The future e-navigation bridge design: Improved, harmonized and user-friendly

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The future e-navigation bridge design: Improved, harmonized and user-friendly

• The purpose with e-Navigation was to enhance both new and already existing equipment onboard and ashore. So that user-friendly and high quality compatibilities could be used and exchanged electronically.

• The main purpose was to relieve the navigator on watch so that he or she could use more time navigating instead of reporting, correcting, communicating and so on.
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• During the e-Navigation process there has been established a platform - a standard called S-100¹. This Standard developed by the IHO will make the equipment used under the e-Navigation “umbrella” compatible with each other.

• This standard will be essential for the further development of e-Navigation components.

¹ S-100 ref. MSC\90\28\10.10.3
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• At NAV 59 earlier this year it was decided upon that five prioritized potential e-navigation solutions¹ identified by the e-navigation correspondence group (CG) should be further assessed

• The first and one of the main solution identified by the CG and recognized by IMO, was;

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¹ ref. NAV\59\WP\8\3.3.s-1
S1 - improved, harmonized and user-friendly bridge design;
ref. NAV 59/WP.8/3.3
S1 - improved, harmonized and user-friendly bridge design;

• How can e-Navigation bridge design improve, harmonize and give us an more user-friendly bridge?

• This is issues I’ve tried to highlight in this presentation

• This presentation is based on an e-Navigation Vision and is not yet regulated.
S1 - improved, harmonized and user-friendly bridge design;

• Improve,
• Harmonize
• user-friendly
Improve

im·prove
v.  im·proved, im·prov·ing, im·proves
v.tr. 1. To raise to a more desirable or more excellent quality or condition; make better.
2. To increase the productivity or value of
3. To put to good use; use profitably
Improve

• How can bridge design improve navigation?

– Already assessed concept in IMO as Integrated Navigation System (INS\(^1\)) and Integrated Bridge System (IBS\(^2\)) must be further developed.
– Furthermore we need to continue to refine on INS and IBS performance standards and guidelines as appropriate.
– There must be established an Human Centered Design (HCD\(^3\)) principles with respect to the equipment and design onboard.
– Guidelines concerning bridge design and navigational equipment will guide us and improve the components used.

\(^1\) INS ref. MSC.252(83) - NAV\(\text{52}\)\(\text{4}\)
\(^2\) IBS ref. MSC.252(83) - NAV\(\text{52}\)\(\text{4}\)
\(^3\) HCD ref. NAV\(\text{59}\)\(\text{WP}\)\(\text{8}\)\(\text{3.29.1}\)
Improve

Guidelines which will be essential for e-navigation bridge design:

1. Guidelines on Human Centered Design (HCD) for navigational equipment and systems;
2. Guidelines on Usability evaluation of navigational equipment;
3. Guidelines for Software Quality Assurance (SQA) in e-navigation

Ref. NAV 59/WP.8/3.29
Improve

• Already exiting equipment onboard ship must be made more efficient and integrated. Equipment which is already arranged onboard and regulated by the convention (SOLAS-74) need to be updated or made available for the S-100 standard.

• Integration of equipment will need to be reviewed and put in to an implementation plan.

• Initially e-navigation components will basically be submitted to new ships, and then submitted to exciting ships accordingly to an implementation plan.
Improve

• The implementation plan must be agreed upon in IMO.
• We are not yet there but an Strategic implementation Plan is to be agreed upon next year in NCSR-1 – the Sub-Committee on Navigation, Communications and Search and Rescue.
• Then hopefully there will be given a mandate to make e-navigation concepts more tangible.
S1 - improved, harmonized and user-friendly bridge design;

- Improve
- Harmonize
- user-friendly
Harmonize

- equipment must be harmonized to the man not the other way.

- We must build around the Human Centered Design (HCD). (ref. NAV 59/6/69)

- The limitation between man and machine must be identified. The human-machine interface must be made aware of and accommodated for. And a Usability evaluation of navigational equipment should be reviewed.
The Human Machine Interface

Decision Support

Situation Awareness
Harmonize

• How can bridge design be harmonized?
  – The S-100 standard will connect all equipment together
  – Equipment can be overlapped other equipment, by means of information.
  – Both required and desired information will be available and could be cross checked regardless of the devices.
  – A Maritime Service Portfolio (MSP) is provided for the ships operation area.
Harmonize

• A big part of the navigators task today, is to send reports, correct charts and other publications etc.
• Most of these tasks are already reviewed and assest by IMO today, and work is in progress.
• However there is still a need of making the information source more available and look for alternatives which can make this possible.
Harmonize

• Static data information will be uploaded to an “Hub” (Single Window), which gives all stakeholders including the ship, relevant administration and other relevant authorities the information they need.
• This “Hub” must be operated and maintained by a shore administration, to decrease the workload onboard.
• Dynamically information will also be included in this “hub”. But information will only be entered when necessary.
• Information from this “hub” will be available on the equipment onboard if required.
Ships reporting to national authorities and local authority will happen mainly automatically through an «Hub» or a «Single Window».
S1 - improved, harmonized and user-friendly bridge design; ref. NAV 59/WP.8/3.3

- Improve
- Harmonize
- user-friendly
User-Friendly

- Human Centered Design (HCD) will be a tool to achieve a user-friendly environment to make the equipment and tasks easy manageable by the navigator.
- A Human-Machine interface assessment must be held on all equipment arranged onboard, before finally regulated. And a usability evaluation of navigational equipment reviewed.
- The goal must be to simplify the navigators everyday task, not make it harder and more complex.
- Therefore it was adopted by the IMO, that innovations must be based on a user need.
User-Friendly

• How can bridge design be made more user-friendly?
  – By standardizing equipment the operator grow more knowledge of the devices he or she is operating.
  – A basis of equipment will be made mandatory. The Navigator will be fully trained in accordance to STCW in this equipment.
  – Due to performance standards and training requirements and general equipment requirements. The navigator is familiar with the equipment before taking over duty onboard.
User-Friendly

- standardized Equipment

Together for improved safety at sea in a clean environment
User-Friendly

• Standardizing of the equipment gives the navigator an advantage, and avoid excessive stress.
• E-navigation simply “make the Navigator Good”!

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User-Friendly

• Examples of user-friendly bridge design could be.
  – Slave Tablets
  – Automatically updated
    • charts (ENC) and ECDIS
    • reporting system
    • Digital publications
  – Voyage planning Database
  – Maritime Service Portfolio (MSP)

  – Bridge Alarm management (BAM)
  – e-Navigation Display onboard
  – INS & IBS
  – Integrated SAR and MSI to relevant equipment onboard.
  – Bridge design based on the operation of the vessel and standardized in compliance with IBS an HCD.
User-Friendly – Vision – Future
Finally

• We need to have in mind, what the purpose of e-Navigation was from the beginning.
• E-Navigation by definition:
  – “E-navigation is the harmonized collection, integration, exchange, presentation and analysis of marine information on board and ashore by electronic means to enhance berth to berth navigation and related services for safety and security at sea and protection of the marine environment.
  
  – [The concept is based on the harmonization of marine navigation systems and supporting shore services necessary to meet identified user needs.]
The end of presentation!

Gracias por su atención!

Thanks.

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