Chasing the end-user perspective in bridge design

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Her trefte supply... ...attforma Statfjord A

218 personar v...

Nordsi...

STØYTTE SAMAN: Eit supplyskip støytte saman med Statfjord A-plattfo...
Biletet syner at skipet trefte ved redningsflåtane, rett under bustadkvart...

FOTO: STRIL HERCULES/SCANPIX

BIG ORANGE XVIII

Background

- 27 collisions on the Norwegian continental shelf between 2001 and 2011

Can it be explained through:

- Misconceptions

- High cognitive load

- Reduced vigilance

- Information overload

- Misplacement of important information and equipment

- Cluttered work spaces

Does clutter really affect us?

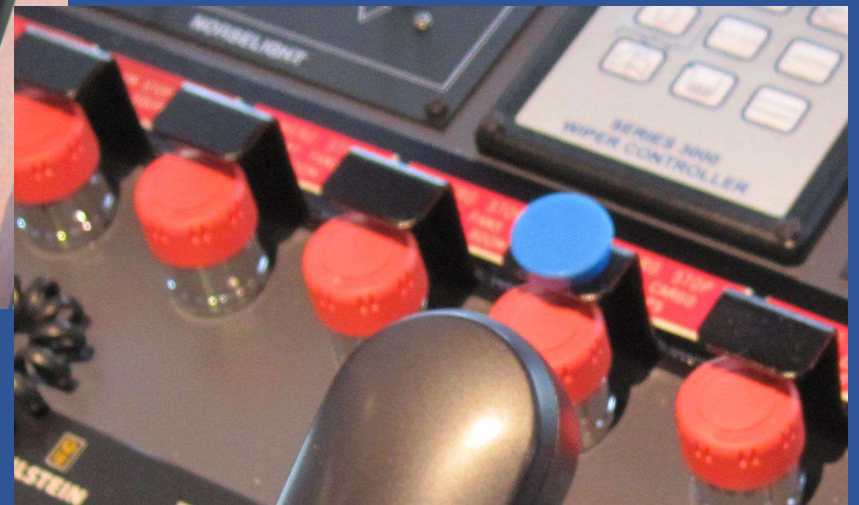- Psychology Today mentioned this a couple of years ago:

5 Reasons to Clear the Clutter out of Your Life

New research shows why it's better to live a cleaner and less cluttered life.

Posted May 13, 2017

1. Low subjective well-being
2. Unhealthier eating
3. Poorer mental health
4. **Less efficient visual processing**
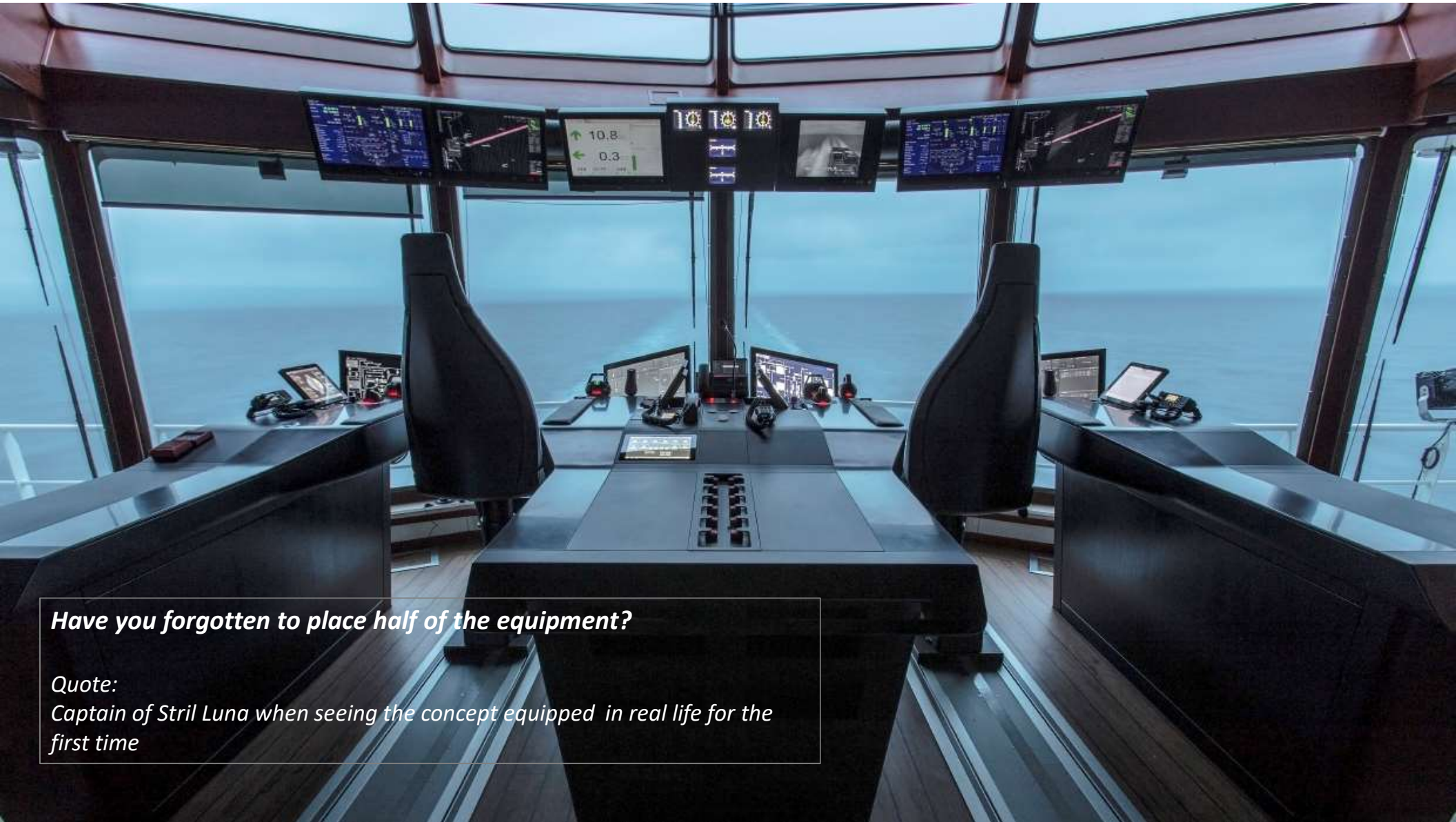5. **Less efficient thinking**

Have you forgotten to place half of the equipment?

Quote:
Captain of Stril Luna when seeing the concept equipped in real life for the first time

Our case study

History

- Firts showed at Nor-shipping 2011

- First vessel sailed in 2014

- This case study presents the feedback and experiences from the crew of these two vessels after **5 years** sailing with the bridge concept.

User centred design process from idea to sailing product

Holistic design thinking

Research based decision making

Design criteria

- Safety
- Simplicity
- Performance
- Proximity

The challenge

- Increasingly more technologically advanced equipment

- Increasing amount of equipment for the operators to relate to with complex user interfaces

- Too much equipment in the consoles causes poor ergonomic placement

- Increased load on the operator's working memory and less capacity to handle critical situations

- Small degree of standardization

The goal

- To increase operational safety in demanding maritime operations through:

- A complete redesign of the ship bridge environment, including consoles, levers and software user interfaces.

- User-centred design process where the human factor, ergonomics and user friendliness is the basis for development

- Introducing a more comfortable and safe working environment for both operators and service personnel

- Unified alert management – silence all alerts from one place

- Common dimming of lights reduces stress and mental load
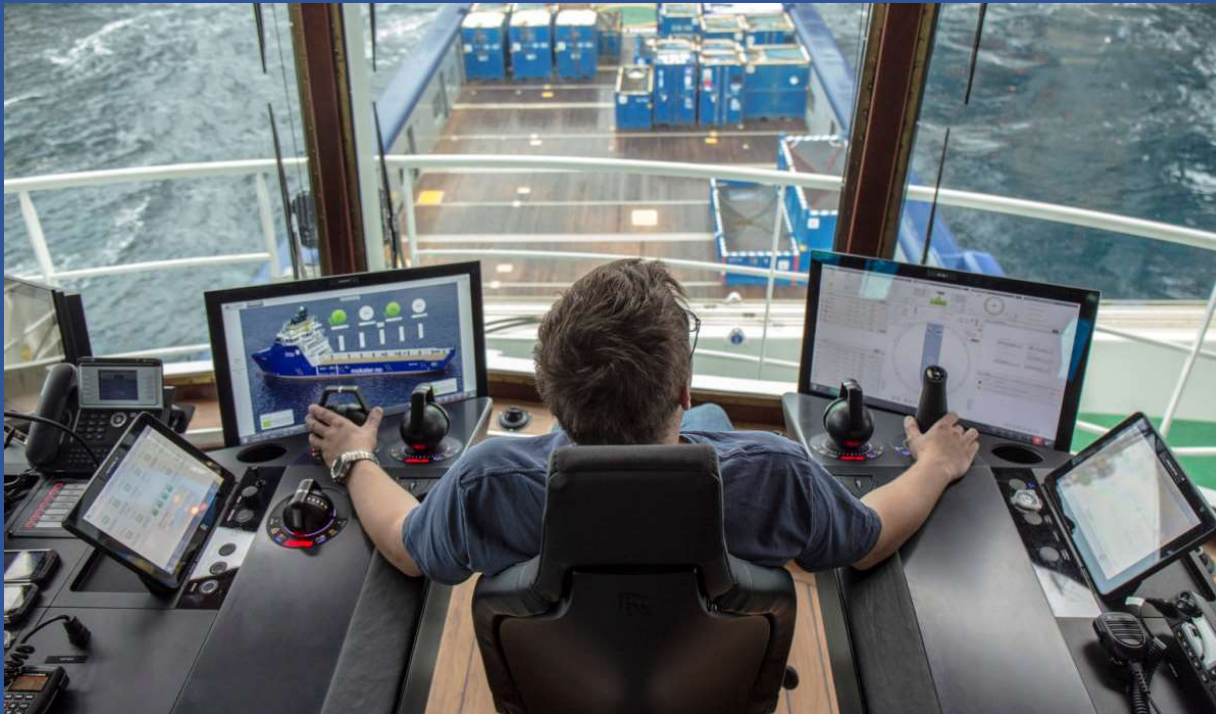
What was new?

- Increased field of vision – minimal occlusion

- Angled console front end to optimise work position reducing strain

- Within arm's reach- Equipment in close proximity to the user

- Operator's chair – adjustable to personal preference supporting seated and standing operations with handpicked breathable materials

- Adjustable displays close to the operator for optimal viewing angle and reflection reduction

- Consistent software interfaces ensure usability and increased operational safety
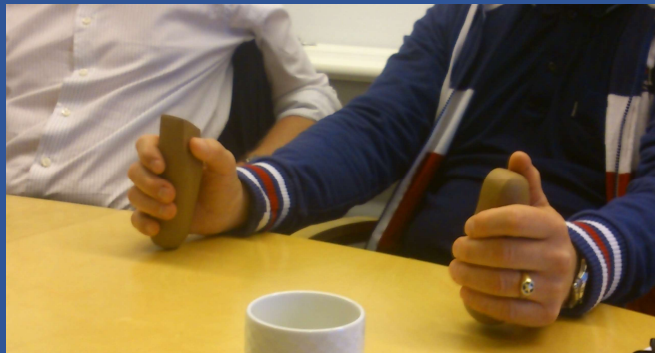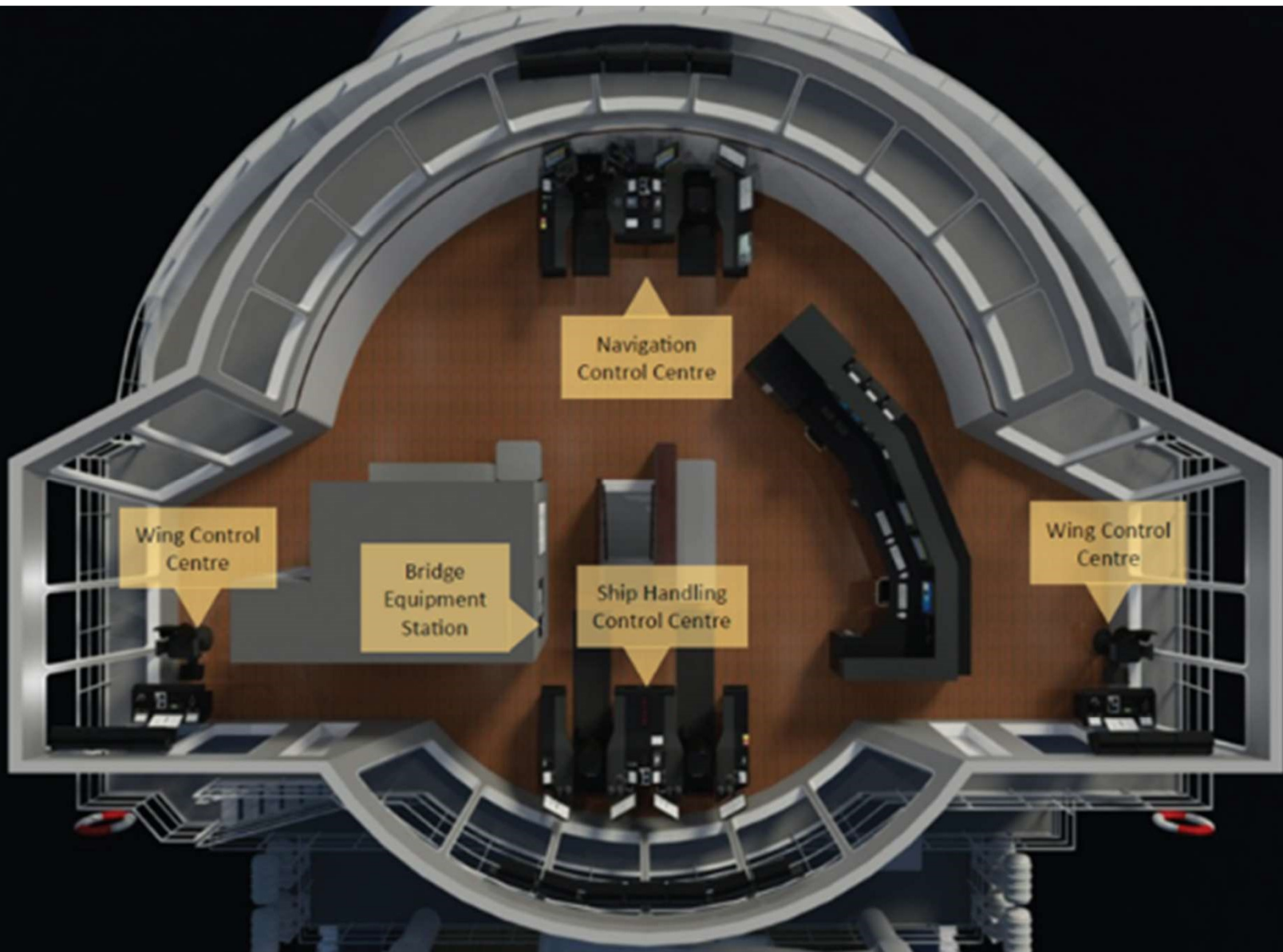
Process
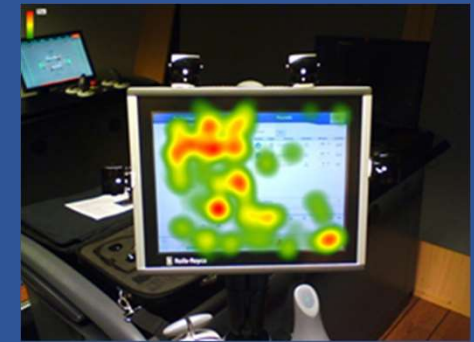
Consistent interfaces with a common way of navigating across systems

Handling and displaying alerts - a **common alert philosophy**

Unified application dimming and palettes

Unified method for standard application settings.

Methods

- Micro ethnographic studies
  - In total approximately 84 hours of observation divided on two vessels
  - Semi-structured interviews with officers and crew

- Challenges
  - Inexperience can lead to misunderstandings an misconceptions of observed situations and conversations
  - Beneficial to collect information about cultural topics from crew
  - Findings may be transferable and of interest to designers and engineers within this field
  - *«Getting used to»*
    - *Adapting to the environment may not reveal problematic issues.*

Findings – design success and issues

Item	Design success	Design issues
Alert philosophy	Satisfied with unified alarm handling for most alarms on one screen.	Not all alarms were integrated and had to be managed from mid console.

Integrated Bridge systems and vessel autonomy

- The crew were concerned about a development towards vendors controlling more from shore.

- E.g. troubleshooting or maintenance that previously was done on board now have to be performed remotely by experts on shore.

- The digitalisation of maritime sector will possibly lead to more tasks and responsibilities being performed by the onshore organizations.

Integrated Bridge systems and vessel autonomy

It might be wise to make an **assessment** in **collaboration** with seafarers of how **future tasks and responsibilities should be shared** between **onshore** organization and the **crew onboard** in order to find an arrangement that can work for both parties.

Conclusion

- Overall very positive feedback after 5 years sailing,
- Describing the bridge system as being "very well arranged" and "a very user-friendly system".
- The human-centred design process behind the development of this bridge system seem to have been able to accommodate many of the end-user needs.
- *The design makes sense to the seafarers when it is in line with their work practices.*
- Some points of improvement
- Some concerns regarding the crew's autonomy as integrated bridges may increase supervision and control from shore.

Future work

- The results from this particular study is important to the product organisation for two reasons.

- First, to provide insight to further improve the concept and address the flaws pointed out.

- Second, to underline the importance of continuing to invest in science-based product development and product improvement, and to confirm that the concept development process incorporating human factors and a user centric process has been a success.

Thank you!

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