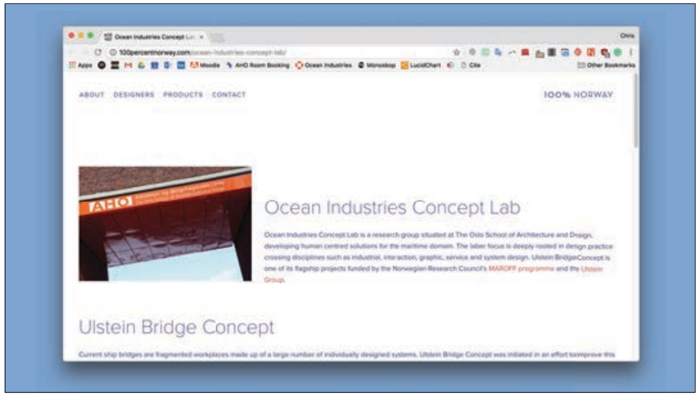
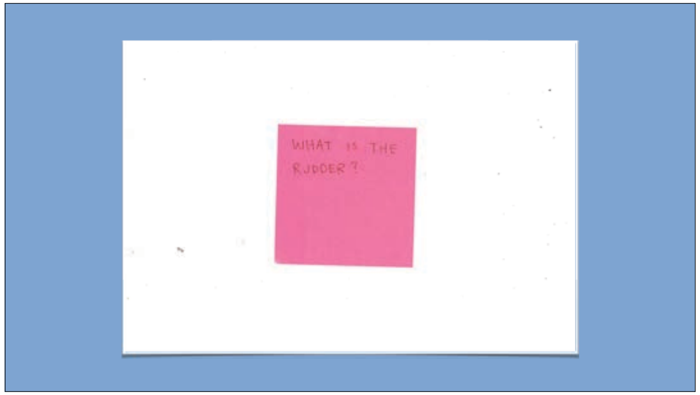
The OICL Pre-Presentation Presentation

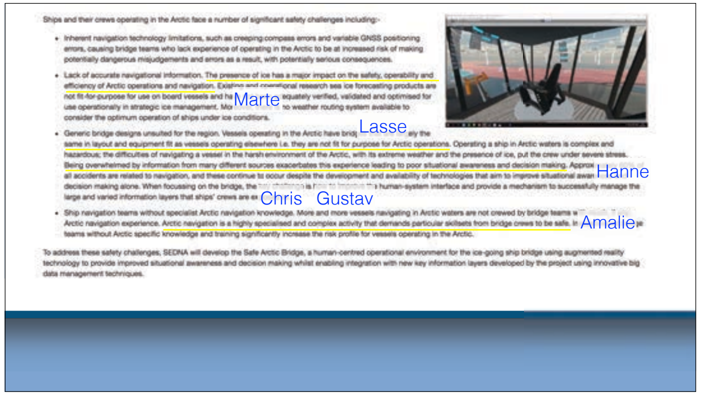
1. Ocean Industries Concept Lab


ABOUT
DESIGNERS
PRODUCTS
CONTACT
100% NORWAY
Ocean Industries Concept Lab
Ocean Industries Concept Lab is a research group situated at The Oslo School of Architecture and Design, developing human centred solutions for the maritime domain. The laber focus is deeply rooted in design practice crossing disciplines such as industrial, interaction, graphic, service and system design. Ulstein BridgeConcept is one of its flagship projects funded by the Norwegian Research Council's MAROFF programme and the Ulstein Group.
Ulstein Bridge Concept
Current ship bridges are fragmented workplaces made up of a large number of individually designed systems. Ulstein Bridge Concept was initiated in an effort toimprove this

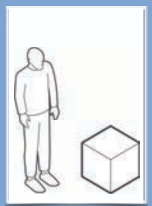

WHAT IS THE
RUDDER?

2. SEDNA - Arctic Context

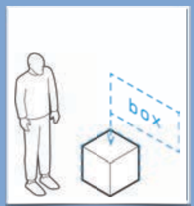
SEDNA ("Safe maritime operations under extreme conditions: the Arctic case") is a research project that is developing an innovative and integrated risk-based approach to safe Arctic navigation, ship design and operation.



2. Augmented Reality

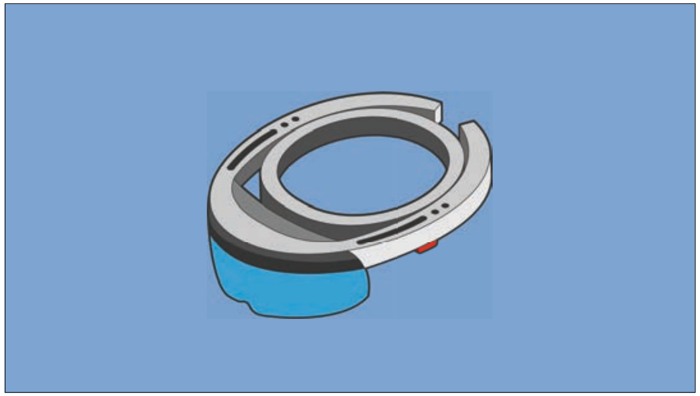


reality

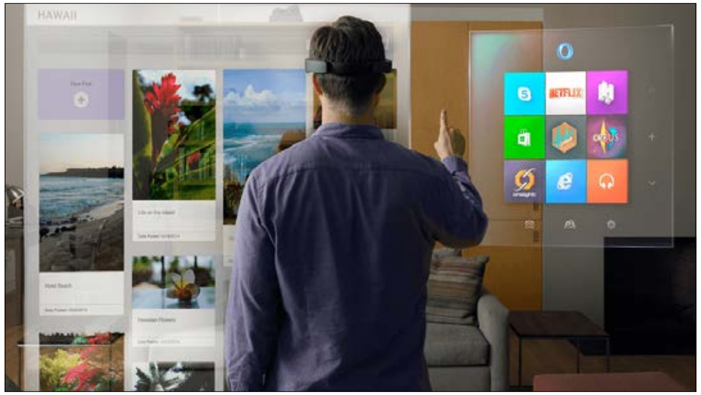


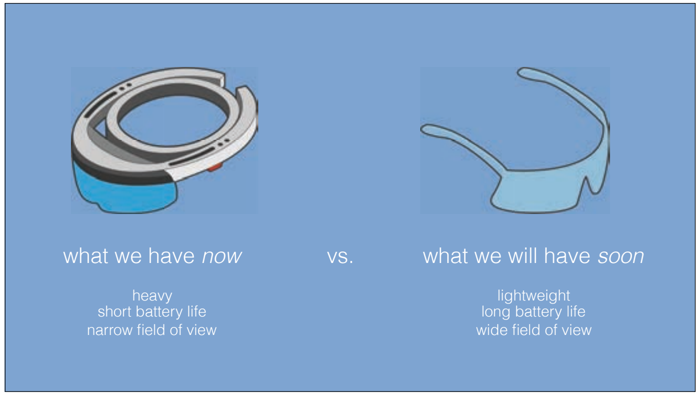
augmented reality

virtual reality



the hololens uses additive project to add layers of information on top of the world we already see. it has on board speakers, and tracks the user’s head and simple gestures.





What we have:

- inside out head tracking
- additive projections
- personal & spatial sound
- on-board processing
- short battery life
- small field of view
- heavy
- poor interactions

What we will have:

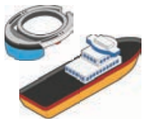
- inside out + outside in head tracking
- eye/gaze tracking
- additive projections
- personal & spatial sound
- distributed processing
- long battery life
- wide field of view
- light weight
- robust interactions

interactiondesign.no

AUGMENTED BRIDGE

EXPLORING USER EXPERIENCE ARCHITECTURE FOR AUGMENTED REALITY ON SHIP BRIDGES

GUSTAV REFSNES & CHRISTOPHER PEARSELL-ROSS



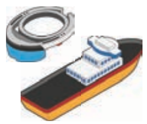
Hello my name is Gustav and this is Chris - and we’ll be sharing with you our project - Augmented Bridge - exploring user experience architecture for augmented reality on ship bridges.

CONTEXT + PROBLEM AREA

USER EXPERIENCE ARCHITECTURE

WORKFLOW + GUIDELINES

REFLECTIONS



We’re going to share with you our project, a UX architecture system, but we actually feel some of our strongest contributions this semester have been to experiment with workflow, and to develop some guidelines for other designers, so we’re going to talk a bit about that as well.

CONTEXT + PROBLEM AREA

First, the context and problem area.

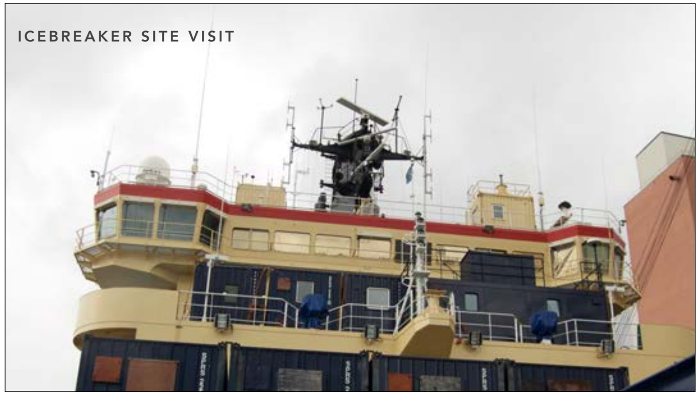
"THE KEY CHALLENGE IS HOW TO IMPROVE THE HUMAN-SYSTEM INTERFACE AND PROVIDE A MECHANISM TO SUCCESSFULLY MANAGE THE LARGE AND VARIED INFORMATION LAYERS"

SEDNA PROJECT

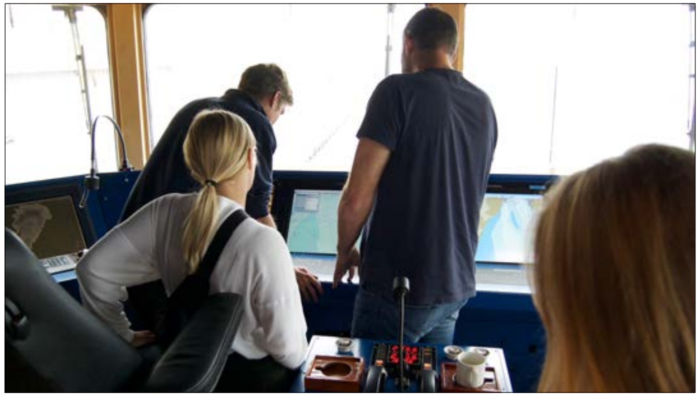
We took as our starting challenge directly from SEDNA:

"the key challenge is how to improve the human-system interface and provide a mechanism to successfully manage the large and varied information layers"

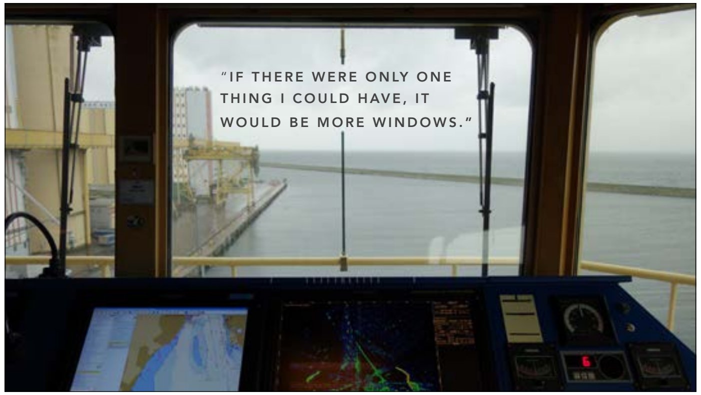
And part of SEDNA's goal is to see how this can be done through the use of Augmented Reality technology.



We tested this assumption while on a site visit to an icebreaker.

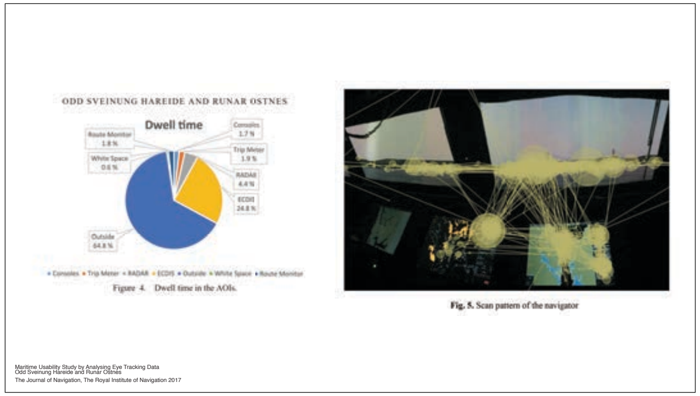


We had the opportunity to tour the ship and spend a long time with the captain and a navigator on the bridge. We learned a lot about life at sea and the realities of navigating in ice.

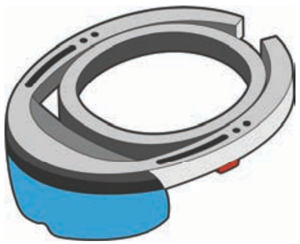


One key take away from this visit was that the crew relies on their eyes and their experience more than any other tool.

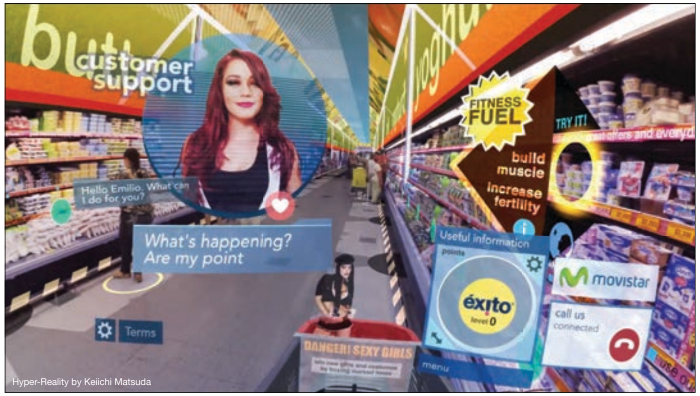
The captain told us "If there were only one thing I could have, it would be more windows."



New research from Odd Hareide and Runar Ostnes supports this statement. Using eye tracking technology, they showed that the information surface navigators rely on most is actually the environment around them.



This presents a huge opportunity, but also major challenges when we understand that this piece of technology has the power to turn everything in the environment into an information surface.



Hyper-Reality by Keiichi Matsuda

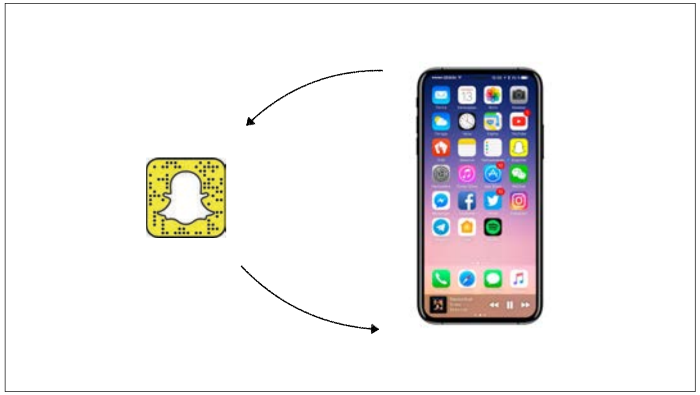
We can live in this reality if we want. Information overload and situational awareness are two sides of the same coin. We can't address one without the other.

Given the importance of clear windows to arctic navigation, and the freedom AR gives us to put information everywhere, we need some kind of structure, some kind of system to design within.

USER EXPERIENCE ARCHITECTURE

This is where we need a User Experience Architecture.

UX Architecture describes the rules and behaviours of the systems that our applications and interactions work within.

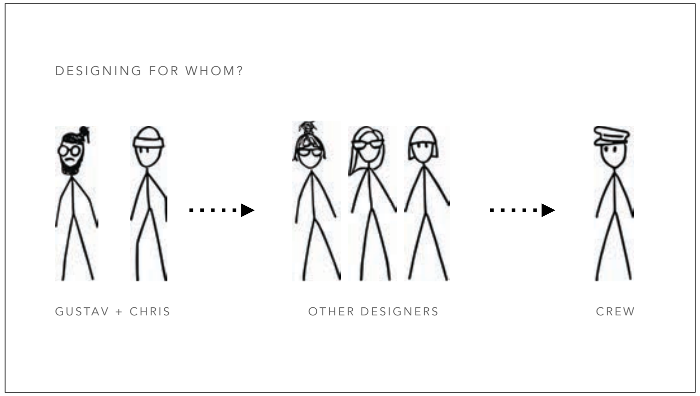


A way of thinking about this is to compare designing only a single application, to designing a system for handling multiple applications, their interactions, and the user experience of the overall system.

Except in our case, that system is not a consumer device, it is a 100 meter long arctic-going ship, and all the critical systems and considerations it brings with it.

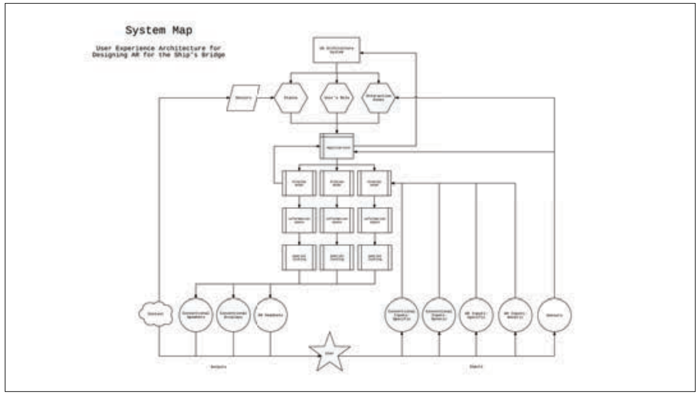
DISCLAIMER: WE ARE NOT DESIGNING SINGLE INTERFACES. WE ARE DESCRIBING A USER EXPERIENCE ARCHITECTURE.

Which brings us to an important disclaimer: we are not designing interfaces. we are describing the system that the interfaces work within.



Which brings the question: who are our primary users?

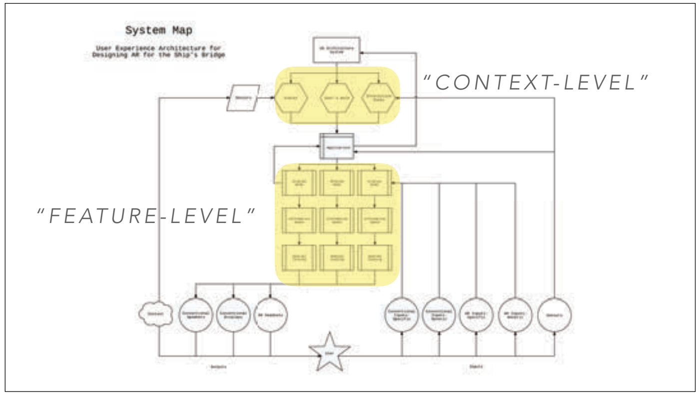
Other designers. The end user is still the crew, and we need to consider their needs at every stage, but for this project we have focused on developing a system and tools for other designers to begin working with augmented reality on the ship bridge.



And the system we have designed looks like this. This is a system map showing what factors influence the overall system behaviour, and what that means for our end users.

Before going into detail about this, we'd like to show you what it could look like.

The captain enters the bridge to start his shift. He can see his checklists and reminders in a space suitable space for reading and interaction. As he looks around a critical reminder follows his view.
Next, he moves to the conning station, and the interface adapts. As he checks the horizon for ice, the system notices his presence, and displays environmental information.
Taking his seat at the controls, he adjusts a setting on the console, seeing the interface when and where he needs it.
We see here a sketch of a distributed, responsive, and user-centric system that runs multiple applications in a consistent user experience.



The two parts of this system we will be focusing on today are what we have tentatively called the context-level and feature-level.

These are the core of the system, and they have a large effect on the user experience.

CONTEXT-LEVEL

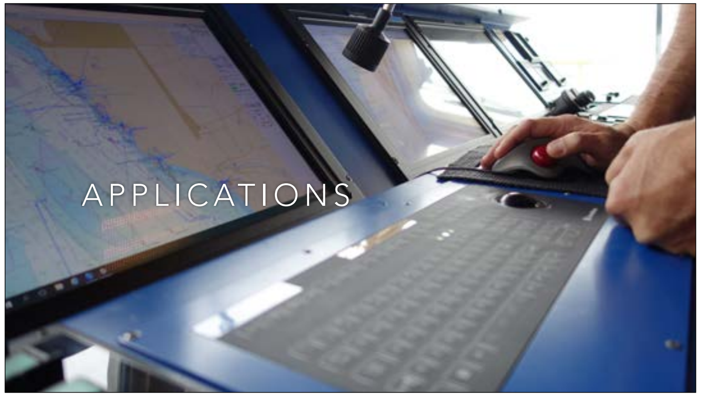
The context level includes external factors, as well as the internal structure of the bridge and the responsibilities of the crew.

It is made up of **roles**, **states**, and situated interaction **zones**.

Roles describe the individual user’s needs, based on their responsibilities on the ship. The system should understand these, and taylor experiences for them. For example, the captain might be responsible for complex manoeuvres, while a junior officer may responsible for scanning the horizon for traffic.

The ship enters different states, or modes, depending on the environmental conditions. For example, as the sun sets, the ship should enter night mode, and if other ships are close by, it should enter a critical navigation mode.

Lastly, the system should understand the functions of different areas of the bridge, and should adjust what a user sees in their display as they move about. When entering the fore-bridge, conning and engine status might be displayed, while as

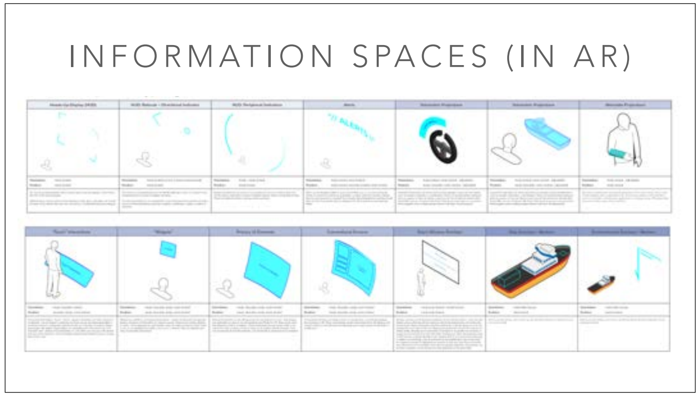


The context-level directly affects the behaviour of the individual applications within the system. The bridge is a complex environment with dozens of individual applications, such as the ECDIS, RADAR, wind sensors, and communications systems.

FEATURE-LEVEL

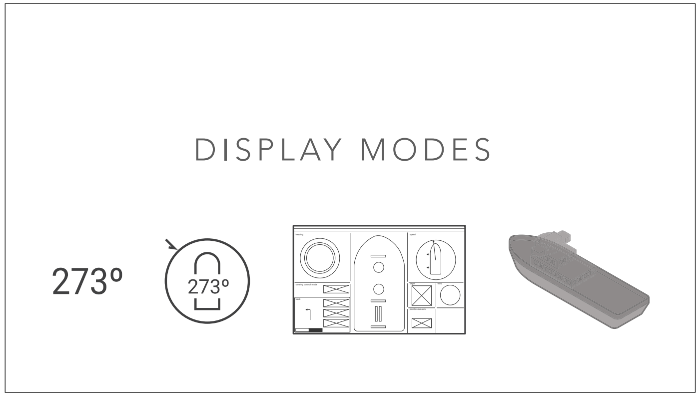
- INFORMATION SPACES
- DISPLAY MODES
- RESPONSIVE BEHAVIOURS
- SPATIAL LOCKING

The feature-level of the system describes how these different applications act and respond to the user. It is made up of these highly interrelated parts: information spaces, display modes, responsive behaviours and spatial locking.

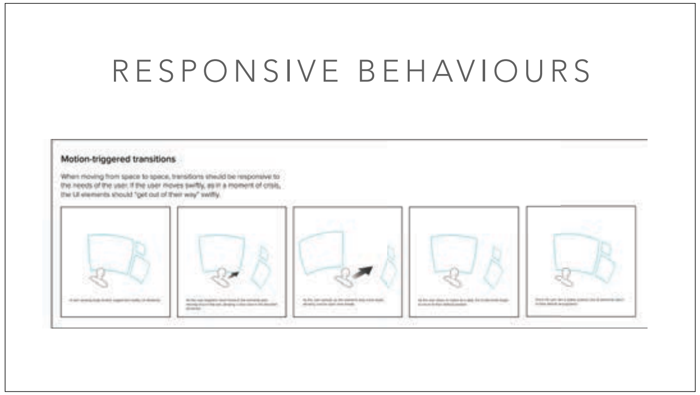


Augmented reality gives us a lot of freedom as to where information can be displayed. 4 broad categories of information spaces on the ship bridge include personal, interior, window and environmental.

We saw these spaces in action in our scenario video. Designers will need to consider where their applications are most relevant and useful to the user.

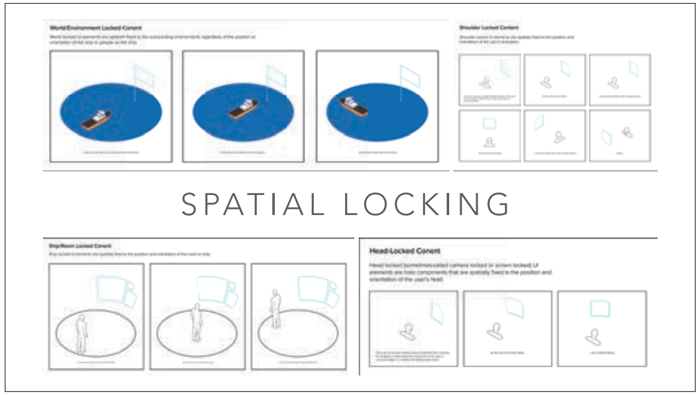


Applications will also require different display modes, depending on where they are shown, and what level of information a user needs. Individual application designs will need to be flexible and make their functions available in different ways.



The system should also exhibit responsive behaviours - reacting to user’s movements and actions. Grounding designs in solid user insights and research will go a long way to make these behaviours helpful, rather than distracting. For instance, if a user needs to move quickly, the interfaces around them should move to give them a clear view.

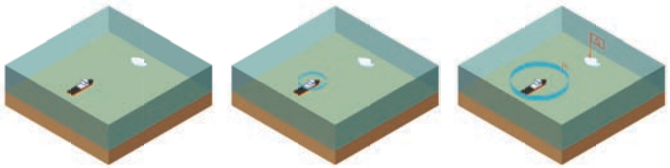
An example of this in the video was this situated interaction - as the user approaches the window, the display changes.



Finally, something unique to augmented reality elements is that they need to be situated in space somehow. Spatial locking describes how the position and orientation of AR elements are related to the people, objects and environment in the real world. Designers will need to think in three dimensions, and situate their designs appropriately.

We saw several examples of this in the video, such as the difference between head-locked and shoulder-locked content.

Putting it all together, we see a complex interaction system with the user at it's core. It responds to the changing environment and changing needs of the users, ensuring the information they need is displayed when, where, and how they need it most. Importantly, the system doesn't overwhelm the user with information, but instead supports their situational awareness.

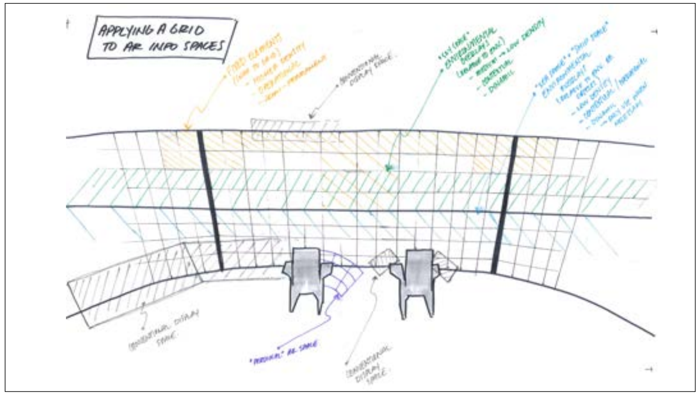


But how did we arrive at this image of the system?

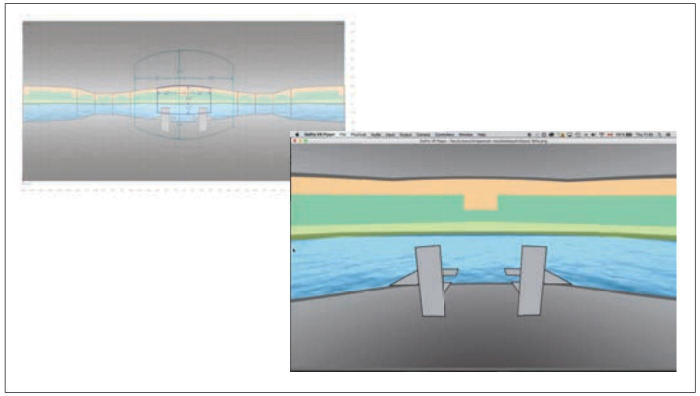
WORKFLOW

We did this by experimenting using designerly methods, to try and define the outline of the user-experience-architecture.

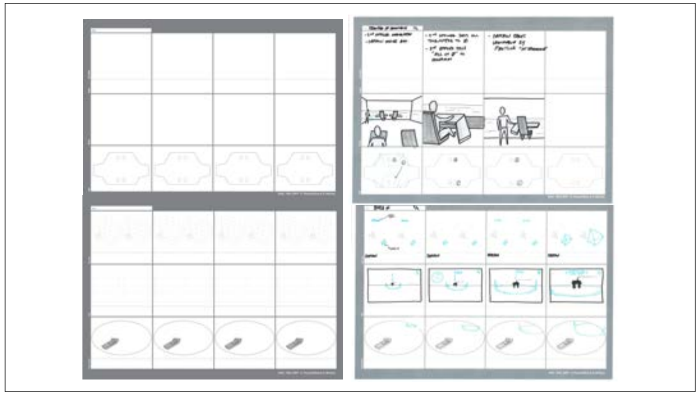
One major challenge, and actually the most fun part of this project, has been trying to adapt our methods and tools to a new context, and a new 3D technology.



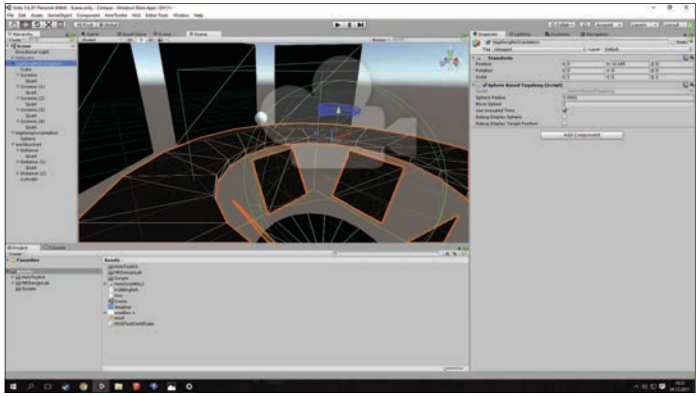
While we are experienced at sketching in 2D, and it is quick, it doesn't fully communicate the spatial aspects of designing for AR.



We have tried to find ways of quickly sketching in 3D. Here, we adapted an existing VR sketching template to our context on the bridge. This allowed us to quickly iterate, sketching in 2D, and experiencing it in 3D.



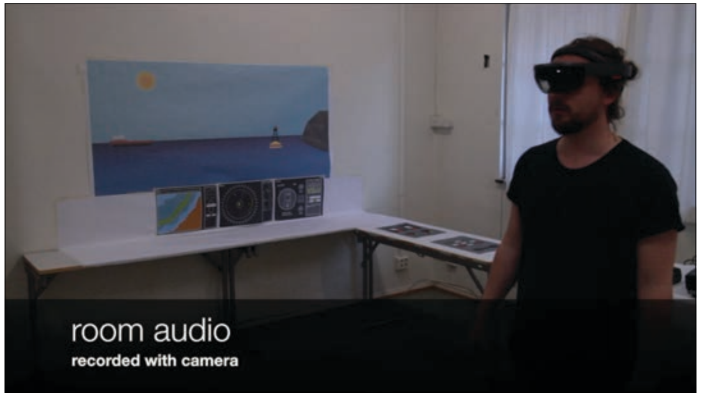
We also needed to find ways of sketching transitions and work flows quickly. To do this we adapted the Layered Scenario Mapping technique and created these Layered Scenario sketching templates, which let us sketch different information spaces as they change over time. This also forced us to think about all the different parts of the system we identified.



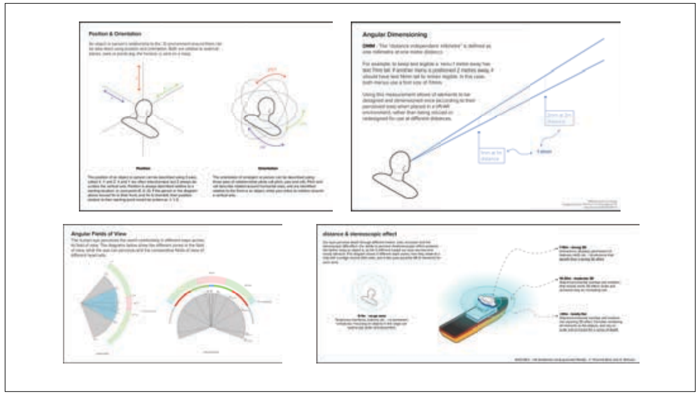
We need to use 3D tools directly. In our case, we used the game engine Unity. We had very little experience using this program, which made it difficult for us to explore interactions. What it did let us do is quickly test how things look in augmented reality, on the HoloLens.

Chris?

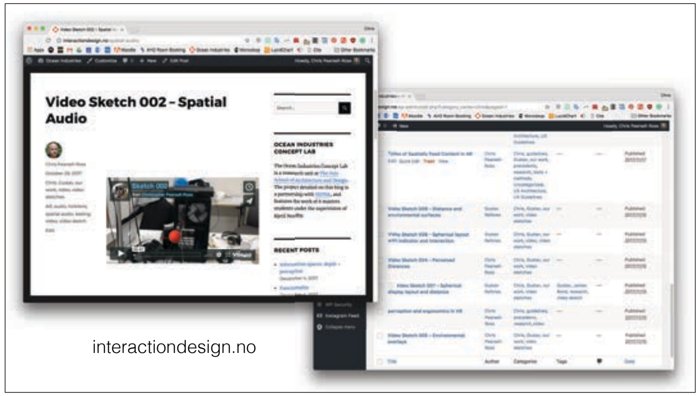
Since AR was such a new experience for us, we were able to focus on testing the fundamental aspects of that experience - perception, distance, scale, colour, and sound.



In this clip, we tested how spatial audio could be used as a personal indicator in alarm systems, highlighting the non-visual opportunities for AR.



All of this experimentation has led to what we think is a deep understanding of what the limitations and opportunities are for designing in AR. We have been trying to make these learnings usable and understandable for others as basic guidelines. But guidelines are not enough - we strongly feel designers need to experience and explore AR for themselves.



This is documented on the blog, interactiondesign.no

REFLECTIONS

All of this has led us to some reflections, probably more will come down the road when we have had a chance to sleep a bit more.

ANSWERS LEAD TO MORE QUESTIONS

SPATIAL TOOLS, SPATIAL THINKING

MULTI-DISCIPLINARY TEAMS

TRY BUILDING YOUR OWN METHODS

BREADTH VS. DEPTH

TESTING WITH EXPERT USERS - DESIGNERS AND CREW

TUSEN TAKK!!!

WE'VE HAD LOT'S OF HELP AND INSPIRATION.
THANK YOU ALL.