Final Master Report

Liquid Living

Identities across Hybrid Place

Designing a platform for oceanic research to explore a future lifestyle

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Abstract

Liquid Living explores a potential future way of living through a combination of design and research. It is looks at a number of trends currently happening in society and technology, and at a future in which we construct our own identities, through mediated connections, in a place loose from location.

In order to address this abstract future way of living, a current day design case 'Ocean Search' is used. It is a large project that creates a kit of sensors that measure different values of water quality that can be installed on regular sailing boats. As sea sailors travel around the oceans they will collect data for oceanic researchers to use.

As part of liquid living, possible ways in which platform for oceanic data collection and communication might be set up are explored. Specific focus in this initial iteration lies with underlying motivations of people to join and with the sailors interface to the platform.

Different design methodologies are applied in each step that works to a more specific idea of what the platform looks like. Through taking these steps for this specific design case, the perception of liquid living will change as well.

It is the relation between the design action and the understanding of abstract futures that is the final reflection of this project.

Contents

Foreword

This being the last project in the context of my education, I want it to showcase myself and the type of designer I am. I want to use my personal strengths and show some of the things I have learned over the years, yet continue to develop myself towards the designer I want to become.

As a designer I want to draw from a personal vision on the world around me. It is my passion to think of ways life could be different, and this is my drive to designing. I am committed to the things I do. I use my imagination and playfulness to explore alternative situations. I think it is my strength to project a playful, fresh and positive perspective on society in order to question assumptions and trigger reflection.

I want to combine theoretical and practical exploration of my personal interests with the conceptual creation of products, systems and/or services. I do not want to focus on making products ready for production today, but am interested in designing for alternative contexts. I want to use design concepts to explore and discuss possible futures so we can reflect upon decisions today.

PROJECT CONTEXT

Over the last six years I have traveled and lived in several countries next to, and combined with my studies at the industrial design department. Although I am constantly drawn to new places, unfamiliar and far away, I can still keep an eye on the place where I was born from my kitchen window. This has triggered my interest in the way daily life can happen across borders and I feel somewhat estranged from the notion of a single 'home'.

The meaning of home is very personal, different for each individual. Some people refer to it as a place where they are with their beloved ones, for others it is simply the place of their bed. However, when we speak about homes, it seems to always be about a place, a location. Is this still a proper definition in an age which wireless technologies and mobile connectivity seem to make us less dependent on fixed locations?

VISION TOWARDS PROJECT

With this graduation project I wanted to work with a subject I was passionate about, through a way of working I look forward to. Starting to identify possible topics for this FMP, I listed interests in future societies, future technologies and ways to design for and with them. In a reflective way I started to explore my personal vision and possible topics to start my project from. Some of the keywords (e.g. global, urban, connected, resilient, growing, platforms) were used to start looking at existing work in design, art and research. Some of the more interesting projects were documented on a project exploration blog.

Next to exploring possible subjects it was also important to look for a way to set up the project in a way I would see myself working. Using my skills as well as developing myself towards the designer I would like to become, the kind of deliverables to work towards will be greatly influenced by the process. Doing an internship at the Interactive Institute I got interested in ways in which theory and practice in design can be combined. Methods described as exemplary design research, critical design as well as platform or system design caught my interest at this stage.

Illustration from the origial edition

Introduction

Ik was voornemens om met de eerste gelegenheid de beste naar Holland over te steken, geconstateerd hebbend dat het spreekwoord waar is en door de ervaring nog eens bevestigd wordt, dat zegt:

iedere vogel is graag daar waar hij uitgebroed is;

want welke prachtige landen, kusten of rijken men ook bezeilt en aanschouwt, welke omstandigheden, voordelen en vermakelijkheden men dan mag genieten, 't zou allemaal maar inspanning op niets zijn, als we ons niet kunnen vastklampen aan de hoop dat we dat alles ééns in ons vaderland zouden kunnen navertellen.

De gedenkwaardige reizen van Willem Ysbrandtsz. Bontekoe (Willem Ysbrandtsz. Bontekoe , 1645)

Final Master Project

With this project a potential future way of living is explored through a combination of design and research. Although design is in essence about the future, since we don't design things that are here already, research is generally based on observations of the current or the past, since it can't see into the future. At the core of this project therefore, lies a search for how these two factors that determine the education that it closes, Design and Research, can be combined to learn something about a possibly different future.

The future context that it aims to explore is defined as 'Liquid Living', hence the project name. It is based on a number of trends currently happening in society and technology, and looks at a future in which we construct our own identities, through mediated connections, in a place loose from location.

In order to address this abstract future way of living, a relevant and current day design case is found in 'Ocean Search'. This is a large project going on in Sweden, involving different partners, running over a long period of time. It creates a platform for oceanic data collection and communication. The project described in this report focuses on the basic setup of such a platform regarding peoples drives to join, and the way that different people connect to each other through it.

Throughout the design process, steps taken in the Ocean Search design will shortly be concluded on two levels: its relevance for the Ocean Search project as such, and the way it changed the perception of the Liquid Living.

In the conclusions part that closes this report, all the loose reflections regarding liquid living will be gathered. In addition, conclusions will be drawn on how the specific design actions for ocean search, actually relate to Liquid living, in short: How can design (and research) actions be used to explore a possible future.

Methodology

Photography: Erich Valo

As an academic design project the relation between research and design is important. Because it is still not obvious to be a scientist in the design community or –the other way around– to be a designer in the scientific world, the design and research methods themselves are clarified in this chapter. The aim is to make clear how the relation between research and design is seen and why it is relevant to be doing this sort of work. In the first part design research methodology in general is discussed, in the second part it is addressed in relation to this project in specific.

"Human-centered design and research is premised on an understanding of peoples perceptions, values and practices in the past or present - but the future is often beyond its scope"

Mazé and Önal, 2010

There are several ways in which research and design come together: as research in design, for design or through design (Frayling, 1993). Research in design is looking at design from the outside and trying to find patterns or trends that can be analyzed scientifically. It is like art history, but focused on design. Research for design is widely applied in industrial design aiming to solve 'design problems', using science as a base for design decisions. Methods include material testing but also more human factors like usability are 'tested'. In its practical role it usually looks for a solution that fits a predefined set of requirements best. Research through design at last, aims to use the design action itself as a source for knowledge building.

This last option seems to be more suitable for investigating unknown opportunities rather than solving problems defined by known parameters. Research through design might be used to find relevant questions rather than appropriate answers, but in formulating those questions it finds out what topics are relevant, how they relate to each other and through what kind of structure we might come to make sense of them.

In 'Lab, Field, Gallery, and Beyond' (2009), Koskinen, Binder and Redström divide currently established methodologies in design research in three types, each with different academic backgrounds. These are 'Lab', stemming from experimental psychology (e.g. user tests), 'Field' from social sciences (e.g. field studies) and 'Gallery' from the arts (e.g. critical design). All three seem to have their limitations in validating design decisions for future contexts. For instance, it is already difficult to generalize findings from within a 'laboratory setting' to a much more complex everyday context, let alone stand a future one.

"Human-centered design and research is premised on an understanding of peoples perceptions, values and practices in the past or present - but the future is often beyond its scope" (Mazé and Önal, 2010). In their 'Hands on the Future' project, Mazé and Önal (a.o.) staged discussions in the present about the future. A set of artifacts and narratives were used to engage expert-participants in a future scenario. "Future scenarios were brought to life and into personal as well as critical discussions among people with diverse interests and decision-making power in the present day" (Mazé and Önal, 2010).

Combining methods from the 'lab', 'field' and 'gallery' we might be able to define a new research program 'beyond' the existing sciences that were initially used to start up design research (Koskinen, Binder, Redström, 2009). Other rules and expectations will apply and thus the validity of approaches to support decisions of future designs will have to be reconsidered. In designing (for) a future society, the proximity to a current context will always be important.

Although these different fields of scientific research have developed their own method and standards on which to base their work, they also share some scientific principles. In essence their scientific experiments have to be:

• clearly situated in relation to previous work,

• transparent in all steps throughout the process to allow for discussion and judgement of relevance by others afterwards,

• clear in its communication of results, so that others in turn can further build upon the work that has been done.

Even though the research communities or the system that governs them might not be perfect, I think these principles are beautiful and I would like to adhere to them as much as possible in the design that I will be doing. Personally I am not yet sure

LIQUID LIVING

This project investigates the relation between identity and place in a context physically loose from location yet highly connected through networked technologies. It is not aimed at ending up with a product per se, but rather at exploring a way of living that might be relevant in the future. The overall strategy in this project might be typified as research through design, based on framing opportunities rather than looking for solutions.

The three principles for the 'scientific experiment' as set out in the previous section will be followed as such:

•The project will be clearly based and positioned in the context of existing theory and practice, this will mainly be described in the 'Navigating new worlds' part of this report.

•A relevant design case is executed in 'Ocean Search'. In the process of structuring the issues at hand, special care is taken to communicate the design decisions in a transparent way.

•The outcomes of the project will be communicated in relevant ways, not only in the written form of this report but also through other media.

OCEAN SEARCH

Within the 'Ocean Search' part however, different methods are used from within the realm of research for design. These will be described and discussed in the according parts. Because the ocean search project functions as a specific context, the boundaries that come with it do create relevance for the more traditional methods used in design and tap into the richness of real experiences in a current day context.

As part of the Ocean Search project –which will continue for years to come– this project is a conceptual exploration. Focused on the mediated communication of sailors with other stakeholders on the platform, its role is to go through the process of designing such a platform in order to find interesting possible directions. The work done within this project will therefore leave many ends open, many questions unanswered and many problems unsolved.

As a designer, one key competence is the ability to understand and frame a bigger picture in complex projects like this. The right balance between depth and overview is crucial and throughout the project it has been key to structure possible steps and directions, frame them in relation to each other and make considerate decisions as to how to continue.

Photography: Sanibel Sea School

Illustration: Albin Brunovsky

Liquid Living

At least in the 'developed' part of the planet, a few seminal and closely interconnected departures have happened, or are happening currently, that create a new and indeed unprecedented setting for individual life pursuits, raising a series of challenges never before encountered.

First of all, the passage from the 'solid' to a 'liquid' phase of modernity: that is, into a condition in which social forms can no longer keep their shape for long, because they decompose and melt faster than the time it takes to cast them, and once they are cast for them to set.

Liquid times, Living in an Age of Uncertainty (Zygmunt Bauman, 2007)

This part is the theoretical framing of the project. It brings together existing theory and practice and by taking different perspectives, it formulates the context of this project. Many of the topics discussed here will be used as relevant vocabulary throughout the Ocean Search design case. Questions around the relation between home and location were at the base of this project. It was from a personal interest that these topics were first explored.

Introduction

HOME AND LOCATION

Most humans seem to live their daily lives in certain patterns. Whether nomads following the same migratory routes every year, or city dwellers on their daily route to work. 'Amsterdam Realtime', a project by Esther Polak and Jeroen Kee followed participants' positions within the city, over time using realtime GPS tracking. It is an interesting example that visualizes these patterns beautifully. Although quite a recognizable map of the city emerges when tracks are combined, individual routes often seem to focus around a few places. This "tendency of people to spend the bulk of their time in only a few places they regularly frequent" is also recognized in research by González, Hidalgo and Barabási on human mobility patterns (2008).

Regular locations to be visited will probably include the home, school, work space, supermarket and possibly the homes of friends or relatives. We visit these places to fulfill certain needs that are currently available through the infrastructure of our built environment. Could we also fulfill some of these needs without such a resource intensive infrastructure?

Mitchell uses the example of how people get their water and how this changed the structure of cities. Early, small communities were usually centered around a well, a system of water pipes allowed for larger cities, and now we have portable water bottles, available anywhere. A similar shift in distribution from single point presence, through extended infrastructure to portability happens with many resources (Mitchell, 2003).

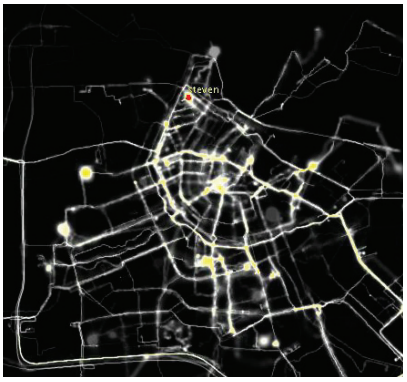
EXPLORATIVE INTERVIEWS

Home is an extremely personal concept. Two explorative interviews were held as a source of inspiration towards needs related to the home. Two people were chosen that recently moved to a new country, both were experiencing a home in a different location than they were used to, in quite different ways.

Both were of the same age (22) and both moved to Stockholm only a few months prior to the interview. However, Gordon planned to stay temporarily for a period of four months to complete an internship as part of his education. He is from the Netherlands, a country and a culture reasonably similar to Sweden in many ways. Parissa on the other hand, immigrated from Afghanistan and moved in with her husband after they had married in Kabul. Cultural differences between her previous home and the current are presumably more apparent.

One interesting contrast between the two interviews was the relation between home and freedom. While one Gordon clearly stated that they were strongly connected ("if I feel free, I can feel at home"), the other strongly emphasized that this individual freedom was useless to her without the ability to share it with other people ("I really need the environment to be like our environment, and all the people to be Afghan"). Although both recognized the relation between loneliness and individual freedom on the one hand, and familiarity and sharing on the other, they valued them in different ways.

Parissa, 22



Amsterdam Realtime, E Polak and J Kee, 2003

Gordon, 22

New Nomads

On the move towards a lifestyle loose from location?

The term 'Digital Nomadism' is often used to describe a modern way of living, less tied to location and supported by mobile technologies permanently connected to 'the cloud'. Joshua Meyrowitz presents one of the most convincing pleas for the term, describing highly abstract parallels between the way that nomads used to connect to place and each other, and the way in which we do so today (Meyrowitz, 2004). His nomadic metaphor refers to a way of life without a fixed home, as experienced by our pre-historic ancestors and a few tribes that remain on the move today. Given their temporary nature, the nomadic home, or shelter, was usually quite simple. Without separate rooms families or small communities lived together in close physical proximity.

When we first settled, places started to be divided for a specific use. A cooking place, an area to grow crops, ritual sites etc. With successive steps in human civilization, the spaces we inhabited got more specialized and further segregated. And not just our settlements as a whole, with dedicated areas and buildings, also within our homes walls erected. Just think of all the typical spaces a modern home has, and how they are literally related to specific activities. Words like 'workplace' or 'living room' would probably just make the moving hunter-gatherer frown (and grunt).

Along with the divisions of space, we also created a structure of time and social roles, or identities. Discriminating between work and leisure time and the roles of male and female, young and old. Today we even sort our children by age and put them in separate classrooms to learn for specific hours each day, while their parents head elsewhere for their individual activities.

However, Meyrowitz argues, with the rise of electronic, mobile communication devices these societal boundaries seem to blur for the first time since we settled. The internet in specific has had a major influence on the weakening of divides in place, time and social roles. We can now work from home while joking on social networks that connect us to our friends, family and colleagues simultaneously and continuously, like a community living within line of sight. Now that many of our activities have become digital, we have identities in this digital place as well, less confined by a structure of divides that has matured over centuries.

It is important to note that the nomad metaphor is directed at the digital sphere. It suggests some similarities in the relations between our ancestors and their physical surroundings on the one hand, and us in our digital landscape on the other. Nomadism is easily misinterpreted here and and even Meyrowitz hints at freedom of physical movement as a result of blurring digital boundaries. However, physical (infra-)structure is still a very determining factor in the way we live our lives, and always will be since it also the very condition for the digital realm to even exist. Besides in reality, nomads were far from free, rather they were forced into movement by cold winters or droughts, their physical surroundings. The nomad might actually be better characterized by the acceptance of his boundaries and the lack of drive or capacity to challenge them.

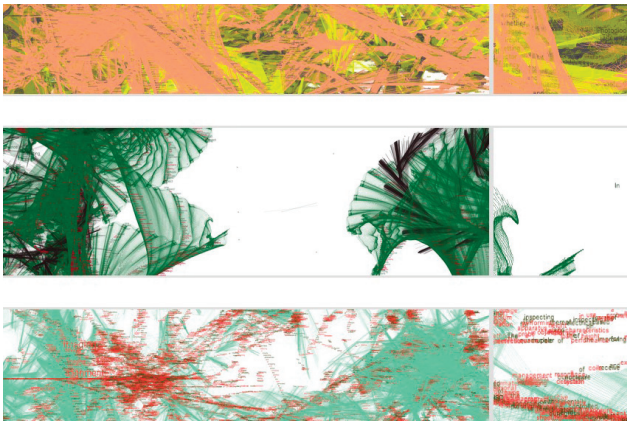
In reality, nomad life seems to be more about uncertainty, which might sound like an exciting and attractive opposite to the boring safety of the structured, specialized society we inhabit today. I believe the further integration of digital layers upon our physical surroundings offer great opportunities to rethink the way we structure our relations with the people and places that surround us. And I do believe that less rigid divides and an overlapping of spheres are important on the way forward.

The question is however, whether the digital, in its very essence a dichotomy of everything into ones and zeros, could ever lead to a less strictly structured world. I wonder whether nomads could ever find their way around, let alone guide us, in what seems to be the ultimate product of sedentary life.

It may be clear that we have to use the metaphor of Nomadism with utmost caution (de Lange, 2009). It is often related to a romanticized way of life, not realistically based on what it is to be an actual nomad (which can be many different things since nomadic tribes greatly differ). However, a few interesting trends in society and technology are actually caught in the narrative. In the following three chapters some of these are put in a new structure, which will form the theoretic frame of this project.

Afghan nomads in the sixties

Networked Technologies



The Emergence Project by Daniel Sauter and Mark Hereld

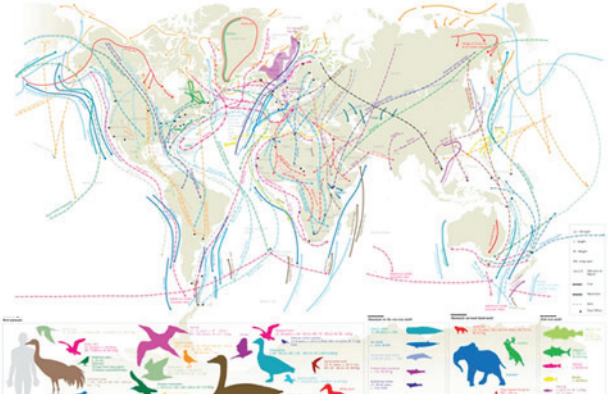
Over the past decades, information technologies have become increasingly important for the way we live our lives. Their shrinking and the parallel rise of wireless technologies have allowed these technologies and the computing power they entail to be increasingly embedded in the world around us. The spread of new functionalities on continuously connected smart phones is one example in which e.g. the news, banking and our friends have become omnipresent, at least in some ways.

These trends are expected to continue and evolve towards a computing paradigms such as Ubiquitous Computing, Ambient Intelligence (e.g. Marzano and Aarts, 2003) and the Internet of Things (e.g. Kranenburg, 2008). In addressing these concepts, the concept of universal access is critical (P. L. Emiliani and C. Stephanidis, 2005). That is, access at anytime, from anywhere and possibly through anything (L. Goulden). We have already seen applications being developed within these paradigms that are currently entering the world around us; at work, at home and in public space. They use technologies such as GPS, RFID and AR and typically combine physical sensors and actuators, computed and networked digitally. Especially with the spread of smart phones equipped with a set of sensors and actuators (e.g. microphone, accelerometer, speakers, screen) and connected through mobile internet, many new functionalities have become omnipresent.

Specifically in the city and often through games they are introduced to a wider audience and a broader range of use. However, these applications seem to focus on the needs that currently belong to those separate activities, not specifically harnessing the opportunities that these technologies bring. Obvious possibilities regarding the freedom of place are somewhat limited by our current infrastructure (buildings, roads, cities) and the way that influences our everyday lives in which we seem to follow quite distinct patterns of location.

Although Ambient Intelligence (AmI) is often related to the everyday situations (e.g. at work or at home), many applications, despite their wirelessness and small, embedded technology, are still designed for specific places and functions. In an email interview with Berry Eggen he shared this observation. “Many applications choose a specific domain. And a specific place within that domain. You have to become specific if you want to build things as part of a design process (it’s an essential part of any user centered design process)”.

Hybrid Place



Extreme Green Guerrillas, by Michiko Nitta (2007)

As the influential sociologist Zygmunt Bauman put it: "Freedom always comes with uncertainty, or a feeling of being lost. [...]The major division in humanity today, is between volatile and fixed. Some people are volatile, they are extraterritorial, others are fixed to a place". Although Baumans notion of extraterritorial might not yet be as loose from location as some of the 'nomadic' future ways of living explored for this project, it is based on the same tendencies in current society. In the modern context it was the friction between being rooted in a familiar, local community and being anchored to be individual and free across the global, that became the focus of this project. The relation between these liquid identities and the concept of place, to put it differently.

Looking at the digital place in which our supposedly nomadic existence could become, it is clear that it's something different than the physical place we are used to. In order to look at a hybrid place, we must first have an understanding of place in general.

Place can be divided in three dimensions that are relevant to the way we construct identities:

"(1) Location: a specific position or area. This is geographical metric place.

(2) Locale: the material setting in which social relations are constituted. This social meaning of place can also be called social situation.

(3) Sense of place: the local 'structure of feeling', the experiential dimension of place" (Agnew, 1987). All three play an important role in defining who we are, our identities.

Meyrowitz argues that modern technologies enable us to access from anywhere (location) and rapidly switch between social settings taking us away from having a sense of place (Meyrowitz, 1985). However, the existence of e.g. online virtual communities do hint at new mediated locales and senses of place. "Media technologies do not substitute but modify place-based identities" (de Lange, 2010).

Liquid Identities

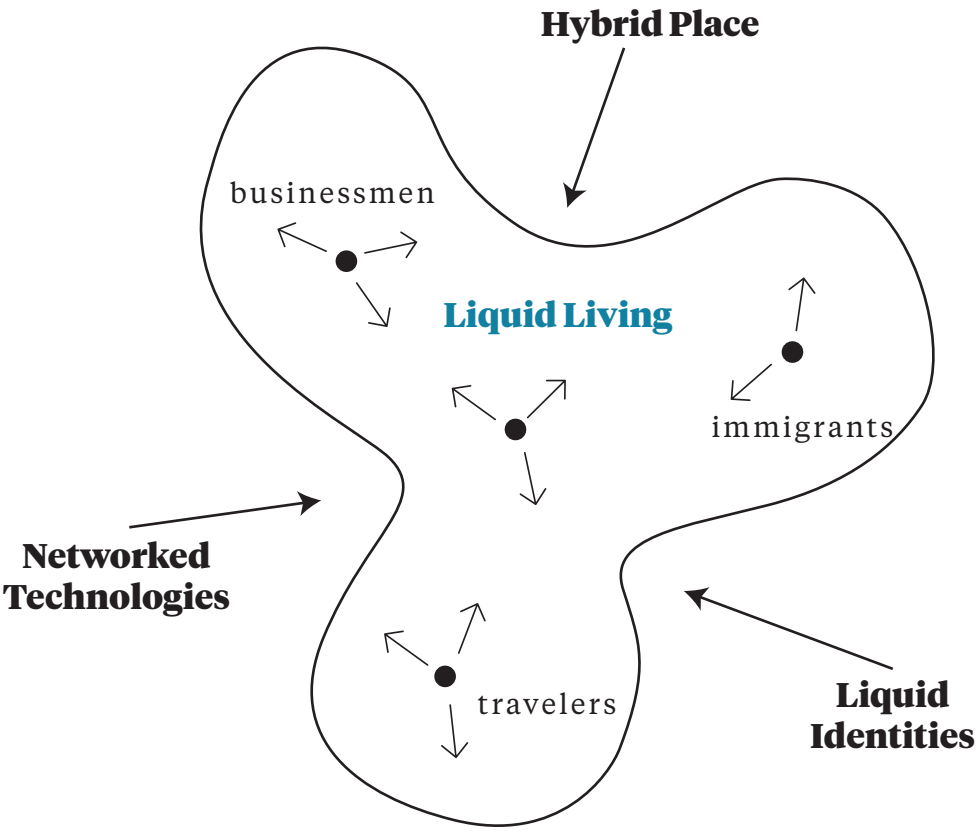
20 Kilo generation, by Sanne Sofia Broks (2010)

Identity is a term often and widely used, in many different contexts. Although ongoing debate questions it's relevance and use, the term is used in this report describing the way we see ourselves and the way others see us. Identity in that sense used to determined by place a great deal. Where you were from marked who you were, to others as well as to yourself.

Sociologist Zygmunt Bauman uses the term 'liquid identity' to describe a constantly changing state of being (Bauman, 2000). Modern identities are created by ourselves, not by the communities we live in. "We no longer unconditionally identify with the people we are with physically, or with the situation we are in" (de Lange, 2010). Having the freedom to make personal decisions regarding life we are thus automatically constructing an identity ourselves.

Another relevant issue explicated in the nomadic narrative is the blurring of boundaries between social roles as they become less based on geographical locations and increasingly through media (like Facebook). Although the focus is increasingly on the construction of our identities, networked technologies not only offer new ways of doing so on a global level, it also takes away some powers. Google for instance, also brings up things you do not want others to know about you.

In what ways do these new, mediated communications modify the way we relate our identities on place in a context physically loose from location?



CONCLUDING REMARKS

'Liquid Living' sums up these three theoretical pillars as described before: Networked technologies, Hybrid Place and Liquid Identities. It can be seen as the overlapping area in between these central themes. Although the three pillars have been described as loose entities here, the way in which they overlap is still rather vague and will be different depending on the perspective taken. This perspective is the design case through which the liquid living concept will be explored. Different contexts will fit in different ways, examples range from businessmen to immigrants to travelers. The Ocean Search project was eventually used as a design case from which to explore Liquid Living.

Pressure Cooker

During a one day pressure cooker project the experience aimed to create with this project was quickly made using tools and materials at hand. Such a short little project proved an interesting way to express current thoughts on the project through a new medium.

The main experience to be conveyed was navigating a hybrid place. Physical constraints were taken away by blindfolding and deafening the participant, letting her imagine being in an unlimited space, free to move around. As only type of 'structure', the heat of a construction light to heat her from a specific side was used.

Based on her decisions of how to respond to this 'structure' the audience was asked to give her different types of feedback. When approaching the light for instance, the audience started to clap their hands (loud enough for her to hear it through the ear protection), when moving away from the light they started to cheer.

It was important not to make a good/bad distinction in the types of feedback. Moving towards the light might be brave or aggressive, moving away might be adventurous or afraid, depending on personal interpretation. The aim was to give the person feedback on the action taken based on a new structure, for a new physical sense. It is up to the participant to use this feedback and interpret it.

Blindfolded, the only structure in the endless space was the heat of a light

The public feedback of cheering as a response to her action

The public clapping hands as feedback on her action

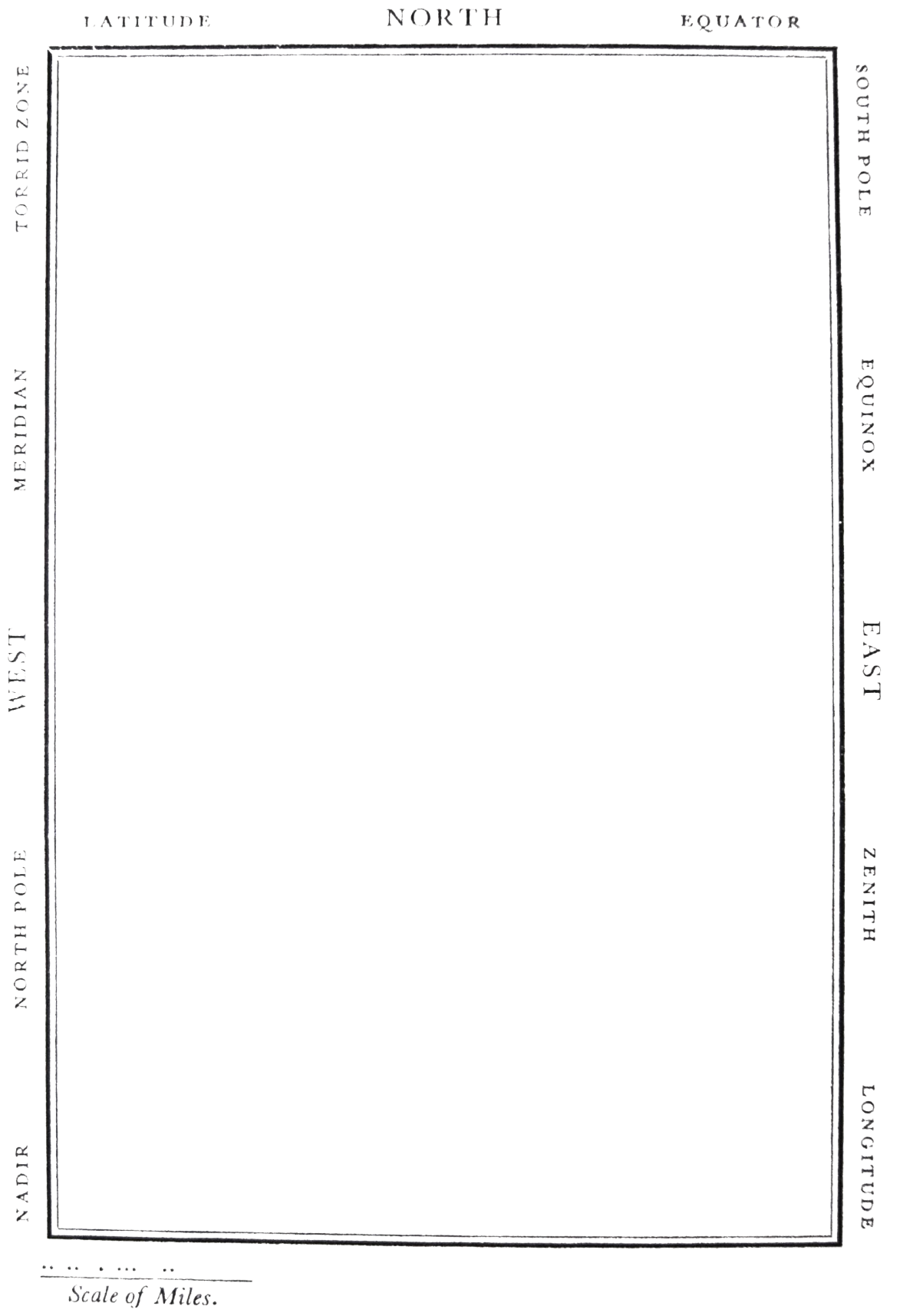


Image: Henry Holiday

Ocean Search

He had bought a large map representing the sea,
Without the least vestige of land:
And the crew were much pleased when they found it to be
A map they could all understand.

"What's the good of Mercator's North Poles and Equators,
Tropics, Zones, and Meridian Lines?"
So the Bellman would cry: and the crew would reply
"They are merely conventional signs!

"Other maps are such shapes, with their islands and capes!
But we've got our brave Captain to thank:
(So the crew would protest) "that he's bought us the best—
A perfect and absolute blank!"

The Hunting of the Snark – An agony in 8 fits (Lewis Carroll, 1874)

In order to use design in a specific and current day context, the Ocean Search project is used as a design case. It provides the Liquid Living thesis with an example that people can relate to. It takes the concept out of the abstract into a world to be experienced. Ocean Search is an ongoing project in which several partners work together. The main contact is through the project manager, Magnus Jonsson from the Interactive Institute.

Introduction

THE PROJECT

Ocean Search aims to visualize the oceans around the world through user- driven data collection and storytelling. The project aims to take the essential data gathering process beyond expensive research vessels and use the enormous fleet of sailors interested in the oceans much like space enthusiasts (proams) helped astrologers to map the universe when telescopes became affordable to a wider public.

The idea is to create a kit of sensors that measure different values of water quality that can be installed on regular sailing boats. As sea sailors travel around the oceans they will collect data for oceanic researchers to use. These researchers are depending on data from specific research vessels, which are very expensive to run. As a result, these vessels can -by no means- gather the amount of data required to research the ecosystem that takes up 75% of our planet, and find out more about the ways in which we affect it.

The second aim is to raise awareness on the state of our oceans with a wider audience through a more accessible and visual public interface to the platform. All oceanic data are currently gathered through specialist tools. Whether through vessels, buoys or satellites, the whole process takes place far from the everyday lives that seem to have a devastating effect on this essential ecosystem. Using the personal story of the sailors that actually connects to the context of these data as they collect them, the platform makes the data more relevant. In that sense it is also a research communication project.

WITHIN LIQUID LIVING

For the duration of my project, the Ocean Search project is in a pilot phase. The first test platform is Journeyman, a sixty foot sailing cruiser. It will set sail in the summer of 2011, with the first set of sensors on board, some of which are specifically designed for this project by a technical partner in Ocean Search.

The work described here, done as part of the Liquid Living graduation project, is focused on the way communications between the different stakeholders could happen through such a platform. The design efforts can be seen as an exploration of interesting directions and an initial iteration of what could become the platform setup. During the development of the pilot this has not yet been a focus, but this will become important in phases of the project to come.

As part of the Liquid Living project, the main focus within these communications is with the sailor and the interface through which he/she connects to the outside world. It is the sailor that lives an extreme example of the future ways of living described in the previous part, yet happening today. Although the physical location of the sailor is literally loose, the communication requires him/her to be actively focused on connecting to the rest of the world, through networked media.

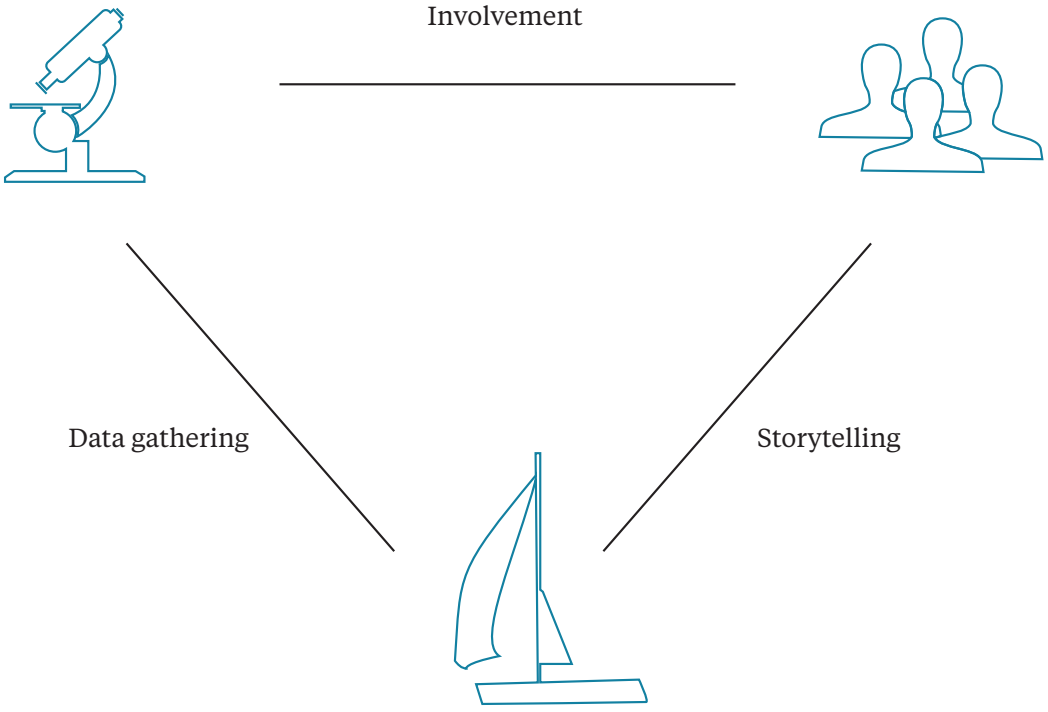
SETUP

Several design methodologies are used in the design process for Ocean Search. In order to frame the project two approaches kicked off simultaneously. On the one hand, the **context** was framed by an exploration of the sailing life and its community. Existing relations between researchers and a public were mapped, also by a study of other projects in this field. On the other hand, possible directions were framed. A **Design Space** was created to explore and discuss where the project might go in the future.

These possibilities are further developed with the involvement of the actual users of the platform. A session was organized in which the main stakeholders of the project (the sailor, researcher and public) came together to come to a reasonable **value exchange**. On the basis of those values, the setup of a **platform** was designed in which specific situations can be placed. Within such a situation, the sailors **interface** was finally conceptualized, prototyped and tried out.

"Ocean Search will explore new ways to observe the oceans, where stories and tools to collect climate data will be made available to sailors and the public, thus creating commitment, participation and awareness."

Ocean Search, 2011



The three main parties and the basic relations that the Ocean Search Project aims to create between them: The sailor that gathers data for oceanic research, and uses storytelling to involve a wider public with the state of the oceans.

Context

As a designer it is an important skill to dive into the context of a project, even if it is completely unknown. It is key to try and quickly develop a birds eye perspective on what is going on in that world. The fundamental challenge is to find a balance between depth and width. In order to be relevant a certain degree of knowledge is required, yet it is the fresh outlook of an outsider that can provide new insights instead of simply following the paths paved by existing structures. This chapter aims to set out some of the relevant issues of the sailing context. There will not be any clear conclusions or results from these steps, but they add a contextual ground layer for stages to come.

By means of introduction to the field of ocean sailing, an explorative interview with Roderick de Boer (27) took place. As a professional sailor he has crossed the pacific, the atlantic twice and he took part in several sailing races including the B.T. Global Challenge and the Blue Water Rally. Roderick is currently part of the nautical crew of the 'Stad Amsterdam', a 256 ft clipper holding 32 sails, but most of his previous trips were on yachts. After the interview the 'HISWA boatshow', a sailing fair, was visited where Roderick further shared his experience and knowledge, around actual boats and equipment.

Sailing Trips

It is usually the boat owner who initiates a trip. A popular trip is crossing the atlantic from the canary islands to the Caribbean. When undertaking such a trip for the first time, it often originates from (life)long dreams of doing so. There is usually a long period of loose preparation through reading, thinking, talking and looking around before actually embarking on the journey itself. In this process magazines, books and peers are important, and at regular events the community comes together to exchange stories and information. Some of the important practicalities to think of when plans become more specific follow here.

ROUTE

Weather is crucial to the sailor, and thus route and local weath er seasons are one of the major concerns when planning a trip. Crossing the atlantic into the Caribbean for instance, the hurricane seasons makes November the perfect time of year to depart from the canary islands. Such 'weather windows' are known for several stages around the world.

Because of the limitations of food and petrol (for generating power) on board, the 'speed over all' (s.o.a.) is monitored on long ocean crossings to keep track of progress.

Except for some of these major rules in sailing, the amount of detail in the routes varies per sailor. Some people have a clear daily schedule where others improvise much more.

MATERIAL

Lots of spare parts need to be taken aboard, "it's amazing how much breaks on a trip". Some knowledge of how the boat works therefore, is of paramount importance.

CREW

Some people need others to make a trip. Roderick has been hired by a couple before because they thought ocean sailing with just the two of them would require too much work. As the size of the boat changes, so does the size of the crew, but when traveling in small numbers (one, two or three), emergencies like storm or illness have to be taken into account differently.

DAILY LIFE

Splitting the day in strict four hour shifts is commonly used in different types of sailing, whether as part of a huge crew and when sailing with just two. Usually, one person is awake at all times. Some captains want their crew to take change blocks in order to spread the less popular time slots, but Roderick prefers the rhythm of regular shifts.

On bigger boats specific roles have to be taken within those shifts. On smaller boats, roles are usually less strict but this also depends on the owner of the boat (leader of the trip). Although most regular procedures can be done alone, some more important procedures are decided on by the captain and/or executed in cooperation.

SPACES

Of course there's a wide range of boats with a variety of facilities, but in general there are separate sleeping cabins, sanitary cabins and living cabins.

TECHNOLOGIES

Technologies on board are mostly used for living, communication and navigation. All power electrical power on board is usually generated through a diesel generator and batteries. Because of limited amount of fuel to be taken on board, electrical power is usually a great constraint and tried to be limited as much as possible. Roderick does bring his laptop for instance, but only uses it regularly when on shore.

An overview of some regular technologies on board can be found on the next page.

CONTACTS

Roderick does not have regular contact with home when on the ocean. Text emails to his girlfriend and the occasional message to his parents are usually the only personal contact he has. Sending such messages is costly, that's why they usually have to be text only. Of course there is an intense relationship with the other people on board, since they are living together in a very small space.

When meeting other boats on the ocean, it is usually good to talk to someone new. through VHF they exchange information about the weather (gripfiles) and have a laugh.

Technologies

COMMUNICATION

SSB radio works with more powerful waves and uses reflection on atmospheric layers and ocean surface and can (depending on conditions) travel up to 1000 miles. Can also be used for free email contact, extremely slow connection.

VHF radio is used for short distance (about the range of sight) communication, with people on shore when approaching, or for human contact on the middle of the ocean when passing an other vessel.

Satellite telephones are generally on board, also used to send small (bare text only) e-mails. Emails to be received are even checked for spam by the main office to prevent over use, not because of technical limitations but costs.

Internet connectivity is available already, but very costly. The Ocean Search kit allows for more connectivity, including video streaming and chat to the data platform and social networks.

NAVIGATION

GPS and Maps, generally the main technology for navigation.

Depth measurements, can be matched with maps.

Radar, Mimics physical surroundings. Displays shorelines, other boats etc. but can also show surface reflection. Intesive training required before being able to operate.

Gripfiles are up to date weathermaps, important for short term navigation.

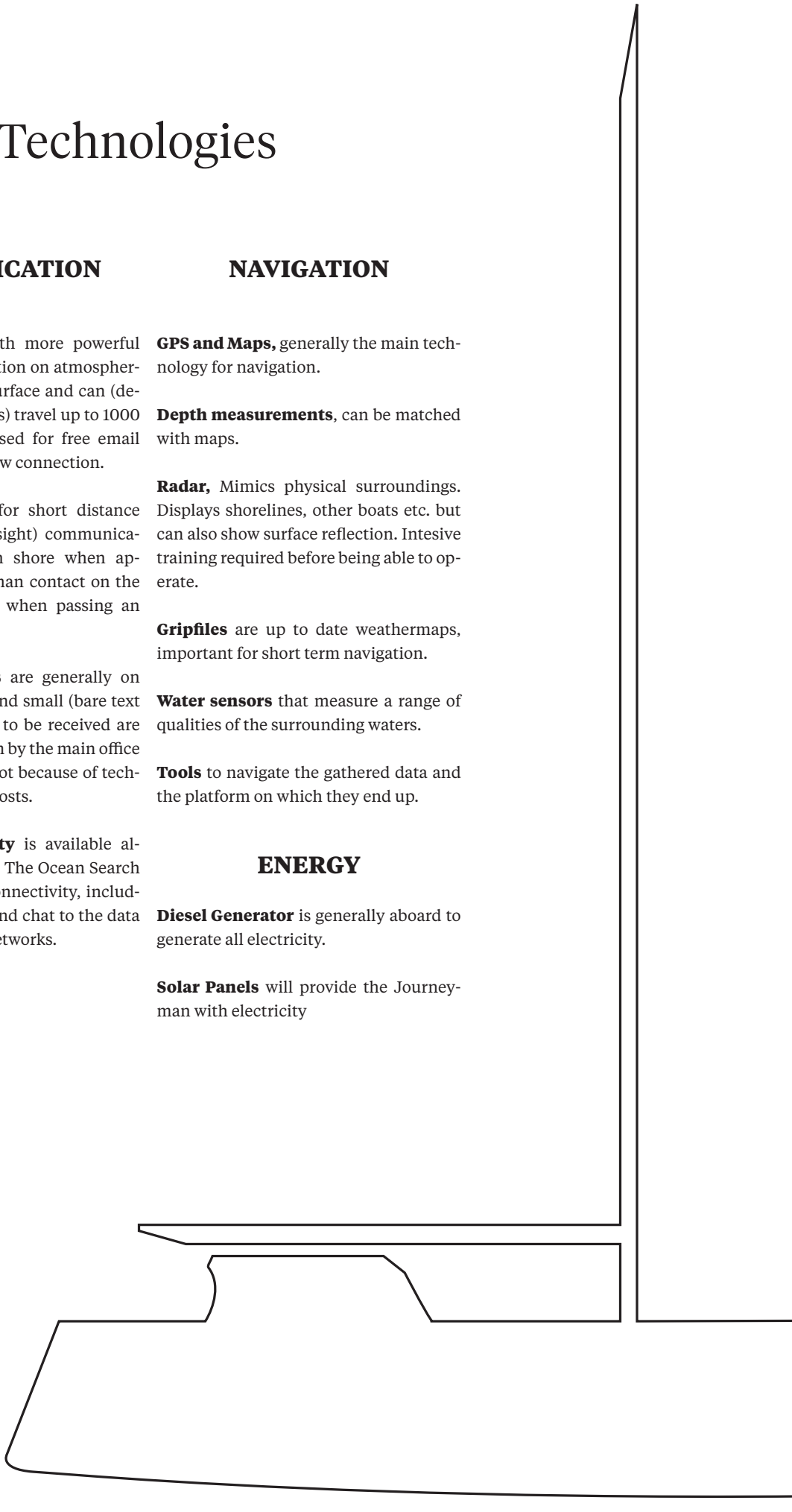
Water sensors that measure a range of qualities of the surrounding waters.

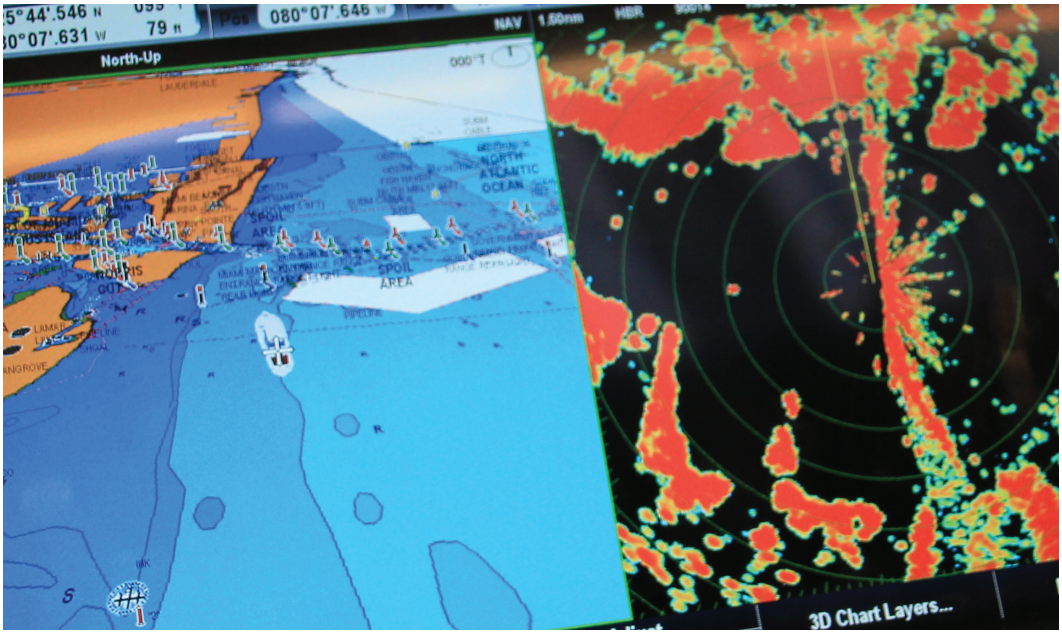
Tools to navigate the gathered data and the platform on which they end up.

ENERGY

Diesel Generator is generally aboard to generate all electricity.

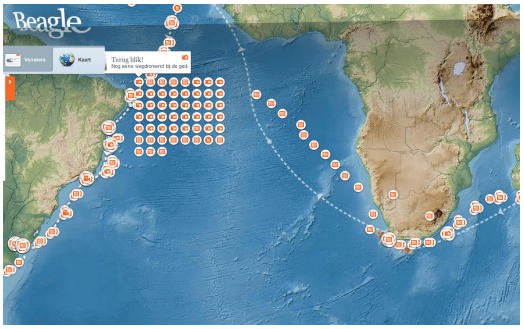
Solar Panels will provide the Journeyman with electricity



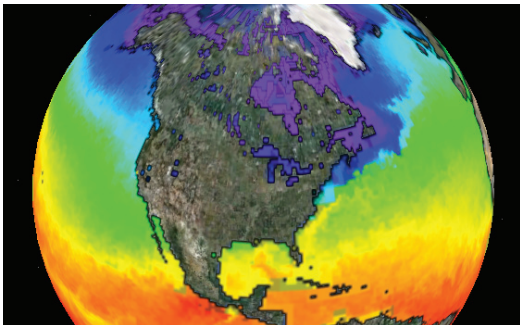


Example of a chart dispay, on show during HISWA 2011

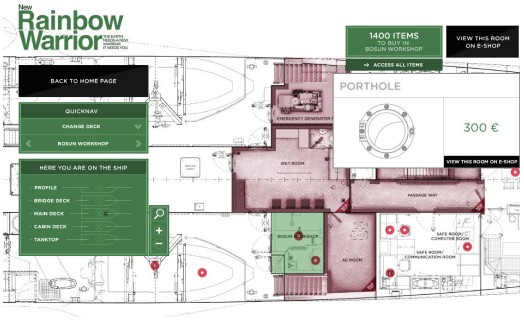
Related Projects



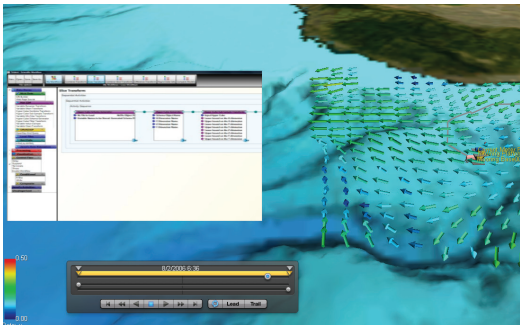
Beagle, VPRO: Through many media

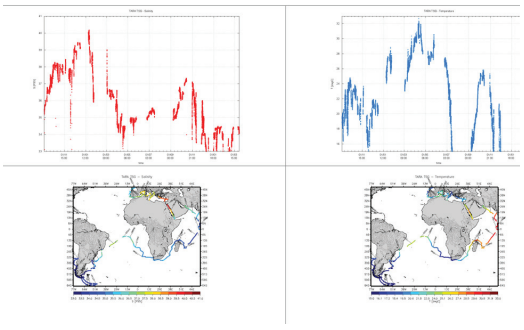


Google Earth; Left: Water temperature, Right: Ship routes



Rainbow Warrior: Crowdfunding the boat





left: The Cove, right: Tara Oceans

To investigate what is currently happening in the context of sailing with respect to oceanic research and communication, several other projects were looked at. The aim of this mapping is to learn from good practices as well as to focus on what sets Ocean Search apart from others.

COMMUNICATING RESEARCH

There are a lot of recent examples that look into the communication of research. Data visualization is a very trendy practice and many fields of research are looking for ways in which to better communicate the knowledge they produce using new media.

In the context of oceanic Research 'the COVE' is an interesting environment in which extensive datasets can be visualized in many different ways. Nice features include the ability to see the data projections change over time and the have video and still images attached to the according data projections. There are endless possibilities for the researcher to define how his/her data should be visualized. It is clearly aimed at the researcher and probably very useful in the communication between them. A wider public will probably not be addressed through this platform.

A popular new approach to involving the public with projects is through marketplaces. Kickstarter has proven to be a successful way to 'crowdfund' creative projects. To be successful on such a platform, communication of the project and its relevance are essential to stand out. These are qualities not strange to the creative community. Although the principle hasn't been applied to academic research on a big scale yet, Akvo applies it to aid and development projects.

SELLING THE SAILING STORY

Bontekoe was the first sailor to write a book and tell the sailing story to a wide public in the Netherlands when his journal was published in 1646, 21 years after he returned from his trips in the east. His adventures were a huge success because of the vivid stories of encounters with shipwrecking storms, strange animals and hostile peoples.

Current technologies allow for a much more direct communication through media such as Twitter, blogs and television. Henk de Velde is one such example from current day Holland. Through these new modes of storytelling he finds enough publicity and funders to sustain his lifestyle at sea. It is because of the fact that this lifestyle is not ordinary, yet interesting to many, that such people can continue sailing.

Another particularly interesting example of involving the public to fund a boat is given by Greenpeace's 'Rainbow Warrior'. It directly addresses the personal sense of responsibility in funding this 'warrior in protecting our planet', by selling each and every part of the boat. The approach gives people a sense of relevance, adding a specific context to their donation.

SAILORS AND RESEARCH

It is common practice to keep logs at sea. Sometimes sailors (and even the crew of cargo ships) are asked to look out for and document specifics about their environment. This could be about the temperatures they measure or encounters with whales. From his experiences, Roderick found that hand logging common values could become quite boring.

THE STORY OF OCEAN SCIENCE

There are also a few interesting examples of projects that approach some of the aims of the Ocean Search project and use the context of sailing to execute and communicate oceanic science.

The Beagle was a television show that ran in the Netherlands in 2009. It reconstructed Darwin's 5-year long voyage on the HMS Beagle in the course of one year, and made an attempt to assess where the world stands today in light of Darwin's evolution theory. Not specifically focused on the ocean, it was a very successful multimedia project telling a scientific story through a sailing adventure.

Tara Oceans is a 3 year marine research expedition. It is basically a floating research platform that offers a place for independent scientists to take and analyze samples on board. Different scientists can board or de-board at planned stops along the route. To preserve and make available the collections, observations and analyses, Tara Oceans has designed a free access data base: the Bio Bank, which will encourage the marine scientific community to refine its knowledge about the continuing evolution of life.

Concluding remarks

The main aspect that will set the Ocean Search project apart from initiatives like these is its networked setup. In stead of having one boat execute and communicate the research, a whole fleet should feed the platform. This should also allow for a more personal reference to the stories, and a more interactive way of involving a public.

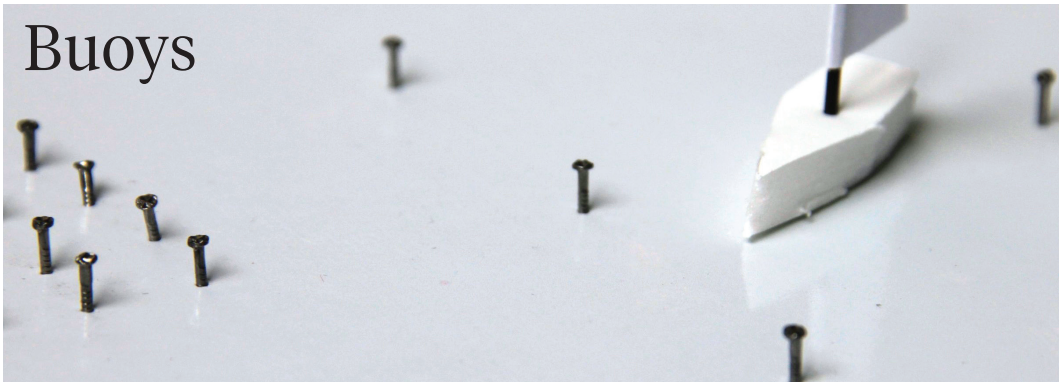
In terms of Liquid Living, the contextualizing of Ocean Search further confirmed the relevant relations between the two. Old sailors like Bontekoe already show signs of navigating a hybrid place when sun standings and compass readings were combined to determine position. Looking at other projects, networked technologies seem to be the key value that set Ocean Search apart.

Design Space

Since this is an early exploration of where the Ocean Search platform might go, a new design space was explored using exemplary design (Binder and Redtröm, 2006) proposals. Twelve concepts, based on interesting opportunities rather then formulated problems, define a point in this space without necessarily being the best option for it.

This approach allows for possibly naive, but less limited ideas of the project to frame its possibilities. These individual ideas are not the main focus here but it is the relation between them that defines the design space. Some concepts might arise that are particularly suitable to communicate the dimensions that define the design space, but in essence it is the comparison with the other ideas either within or outside this space that best describes its existence.

The visuals and their accompanying descriptions therefore communicate the essential implications of the ideas while still leaving topics like their aesthetics, implementation and functionality open for interpretation(Gaver and Martin, (2000). In this form, they were discussed and structured in different ways. Through this discussion and framing the design space takes shape and defines what is within the scope of the project and what not.

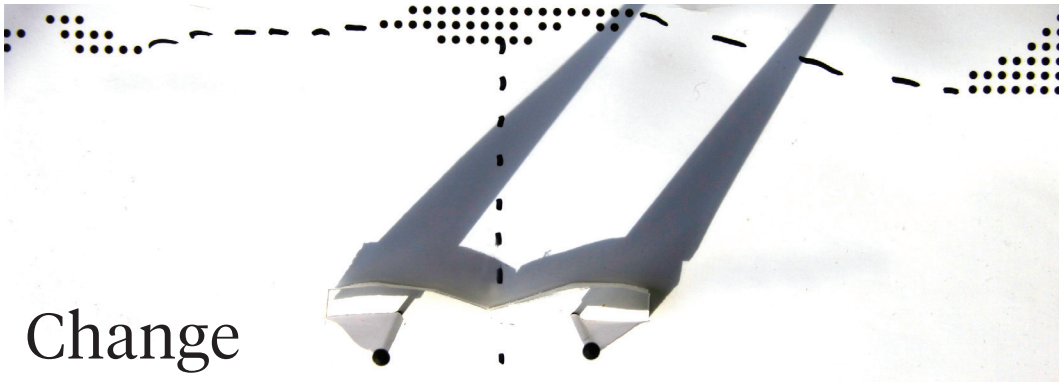


Keywords: Game, Treasure Hunt, Virtual Location

A virtual structure of ‘buoys’, fixed to physical locations is constructed out in the ocean. Physical transactions of data and stories take place here. Messages, requests, challenges or even treasures are left at specific points in the ocean for (other) sailors. Ocean researchers or the public can stimulate the search and follow sailors on their quest.

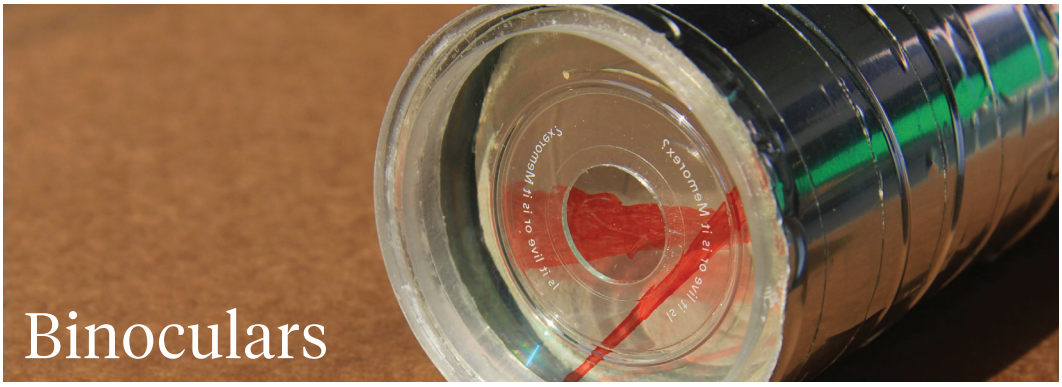
Keywords: Structure, Constraints, Virtual Infrastructure

A new infrastructure constraining ones movement in the open, much like highways do with their exits and viaducts. Creating a new structure in a world without borders. Data gathered along the routes become easier to compare. Would regular peaks occur, toll roads?



Keywords: System Set-up, Invisible Structure, Researchers in Control, Sharing Boats

A scenario in which people borrow boats from the platform to go sailing. Boats will be restricted to follow specific routes or sail in specified areas only. People have to change boats at ports, or even at open sea. Scientist can determine what areas the boats should focus on. Sailors can assemble or pick routes of their interest, they don’t have to own a boat for themselves.



Keywords: Tool, Navigation, Augmented Reality, Virtual Data Projection, Context

A set of Binoculars that use augmented reality to project the data gathered on the ocean surface they belong to. They provide a physical sense of place to an otherwise empty experience of location. How do highways differ from dirttracks out on the oceans, or cities from jungles?

Keywords: Physical Data Visualization, Data Specialization, Tool

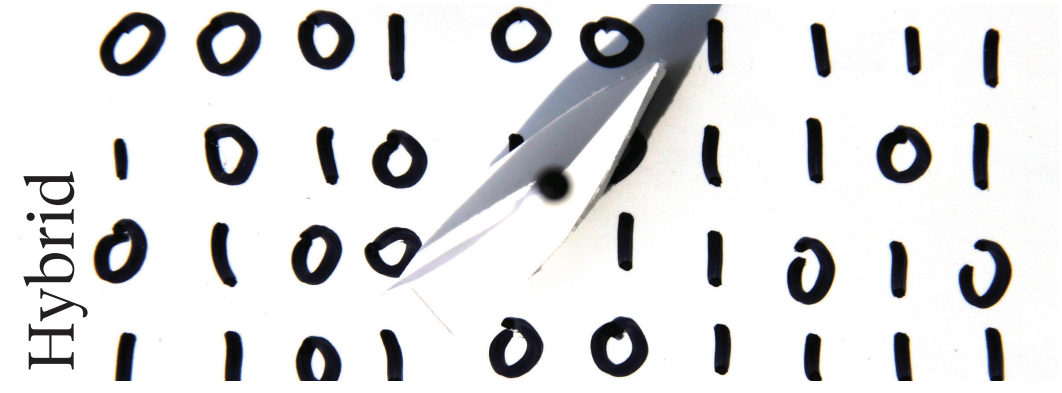
Different types of rope gather different types of data and color according to their measurements. Sailors do not have to actively engage in the gathering process, but do have a physical representation at hand.

Keywords: Tool, Navigation, Decision, Layered Information

A compass with multiple arrows, as a physical guide to the invisible world around. Different arrows point at different layers in that world, for instance the traditional magnetic direction layer and a new layer of approximity to highly acid waters or areas in which scientists would love to have new data. Relations between layers become visual.

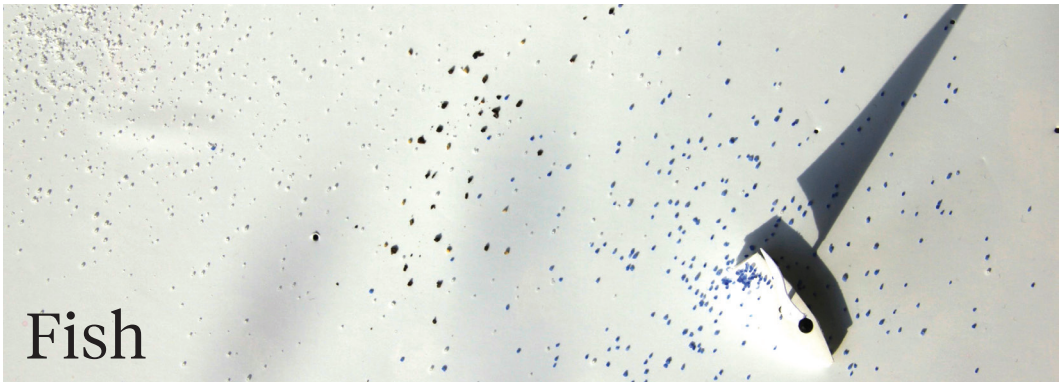
Keywords: Visualization, Narration, Decision, Context, Over- view, Open Data

A map-based visualization of the routes that other sailing boats took. Historical, personal and/or scientific narratives are available to the public. Sailors may choose to follow an ancient expedition, or opt to go where no one has gone before. The decisions they take to determine their trajectory construct their identities. Live updates allow for games to emerge between different boats.



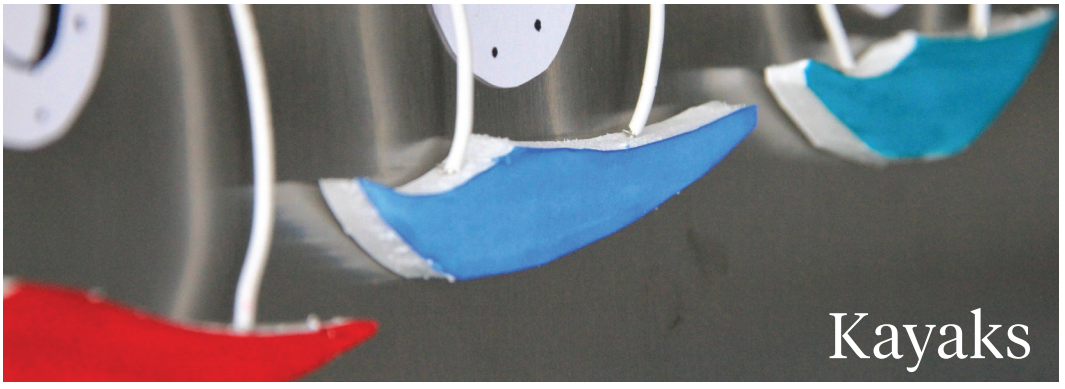
Keywords: Navigation, Hybrid Place, Mixed Realities

Just as the open ocean might not give any signs directly, different media already provide relevant information about the location, direction and situation of the sailor. This navigation system integrates the qualities of the water being researched with the common data important for navigation.



Keywords: Emerging, Initiation, Evolution, Data Specialization

Boats spread out ‘living fish’ that gather specific types of data and feed on them. Each type of fish has two data genes, measuring and feeding on e.g. CO2 and bio-fouling in the water they swim. These fish then start a life of their own, reproducing and spreading over the oceans to create new varieties. With each conception the newly born fish inherits one ‘specialty’ from both its parents. The abundance of a certain species tells about the presence of the data value they gather. For instance, a spree of plastic eating fish means there are a lot of plastic particles in those areas they thrive.



Keywords: Data Specialization, Active Gathering

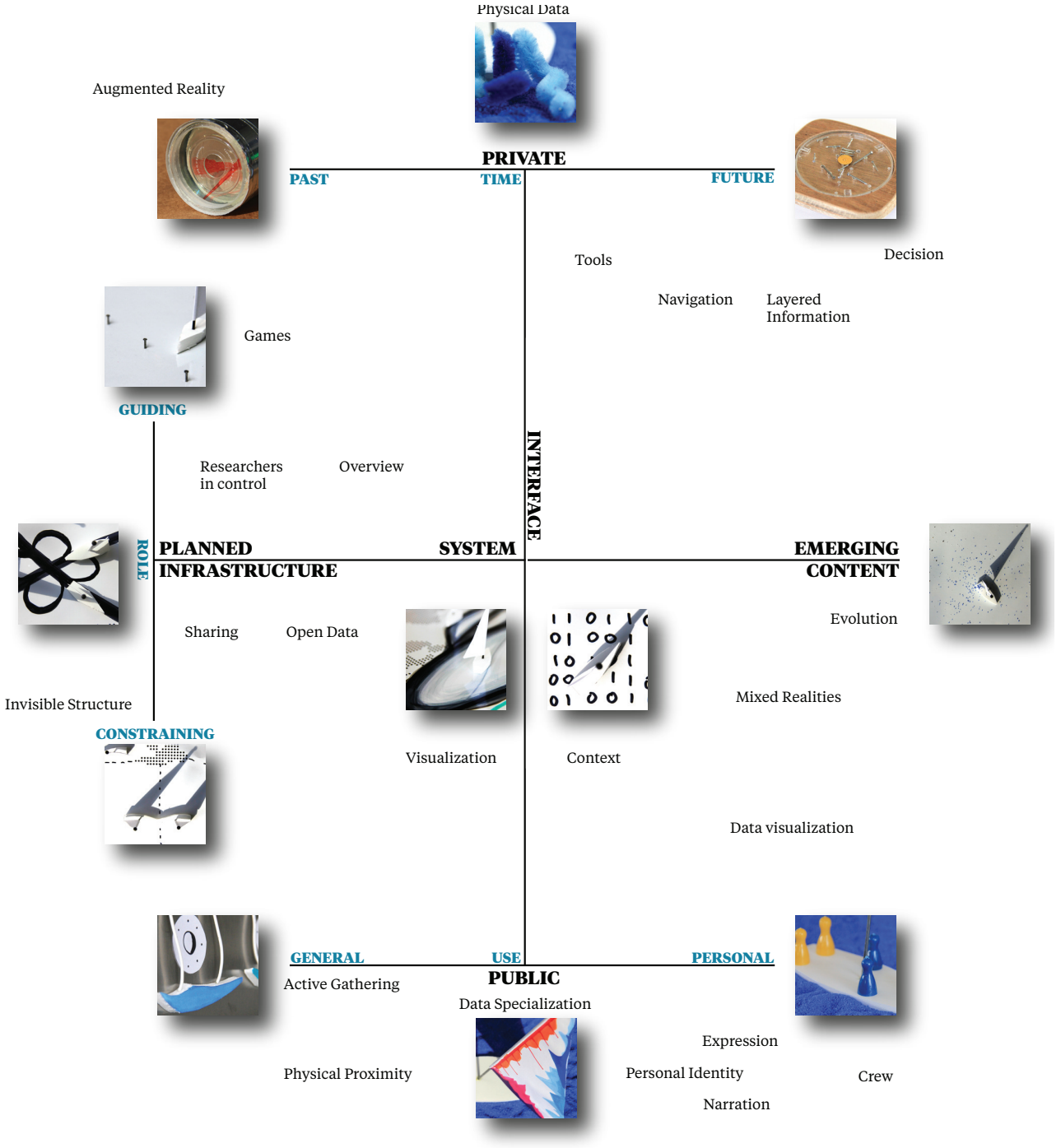
The sailingboats are equiped with kayaks that gather specific types of data. Sailors take them out for specific trips in the open to start gathering data actively. This engagement stimulates attention to the relevance of specific data at specific places.

Keywords: Expression, Physical Proximity, Data Visualisation, Personal Identity

The sails functions as a display of the kind of data that the boat has gathered. This way the boat gets a distinct look over the time it travels. Personal influence on the way the places visited, data gathered time traveled etc. are visualized allows for the sailors to express themselves.

Keywords: Roles, Data Specialization, Crew, Narration

The different members of the crew each represent a certain value their sensors capture and they will develop their own expertise in this specific area. The story they narrate together, as a crew, will develop from their respective perspectives on the journey, like a soap opera. Relations or patterns between different types of data are being experienced by the sailing crew and communicated to the public.



Different ways in which the design space can be divided and structured are set out in this figure. Through reflecting on the proposals, different dimensions emerge that put the ideas and their key principles in perspective. The core differentiation is made between system setup and interface. Ideas describe only one of those, but will need to come together in a next iteration. From the perspective of Liquid Living, examples of the theory can now become concrete.

Value Exchange

From the Design space explorations different ideas about possible interfaces and system set-ups emerged. For further development of either of those, it was key to make sure that each of the three main stakeholders would be motivated to participate in such a platform, through such an interface.

In the process of creating a single and complete platform concept, the three main stakeholders targeted (sailors, oceanic researchers and the general public) were involved. The aim was to make use of their perspectives, based on their experience and expertise on three key aspects the project:

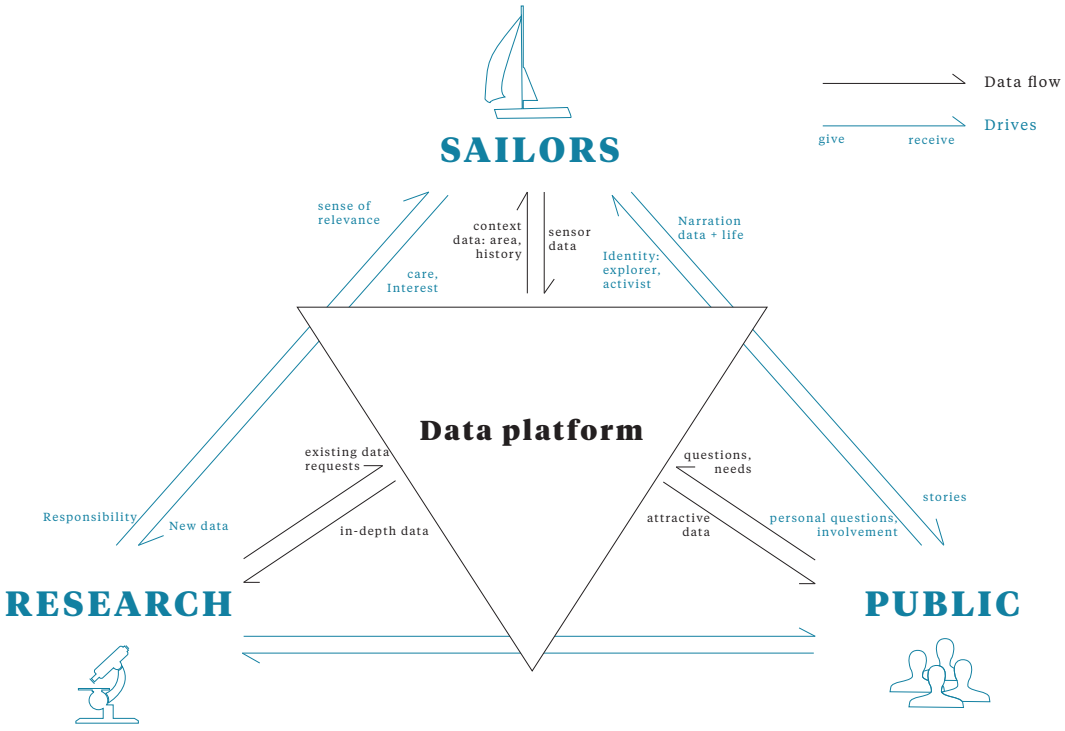
Stakeholder drives:
making sure the interactions between them will take place on the basis of plausible motivations.

Platform set-up:
working towards a realistic scenario in which all parties receive the right benefits for their actions.

Sailor interface:
imagining how the sailor could take the steps required in such a scenario from aboard.

In this chapter the states of all three prior to the session will first be described, still unspecific and rather vague. It is followed by the set up of the session itself, improved after an initial pilot version had been undertaken. The workshop with the actual stakeholders is then described before discussing its outcomes and the ways in which it influenced the three aspects listed above.

Next to using the expertise of the stakeholders through such a session, this confrontation also requires the project to be structured and formulated in such a way that it becomes relevant and clear to the stakeholders. This process itself is important too, and will imply many design decisions.



STAKEHOLDER DRIVES

In the basic Ocean Search concept itself a few basic drives are already described. Through the context mapping and design space described in the previous chapter, and through discussions with the client some of these had evolved but the underlying motivations for the three main stakeholders, as projected in figure hadn't changed much.

Researchers simply want more data for their research. The ocean they research plays a central role in climate change studies yet remains largely unknown. The oceans currently deal with many threats caused by humans. Waste disposal and acidification are but a few examples. To improve the state of the oceans they care about, there has to be an increased awareness and involvement with these issues. First of all people have to know about these issues, secondly they should realize their actions and behaviors can actually make a difference.

The sailor wants the adventure of a trip. He/she becomes someone that is actually relevant to researching the oceans being sailed. Through participation the sailor will be seen as an explorer, an activist or adventurer, living a lifestyle that is special.

For the public interested in the ocean, or in sailors, these stories are told in an exciting and personal manner. Ocean Search makes ocean research specific and puts it in a personally relevant perspective.

PLATFORM SETUP

Initial ideas on the platform setup were based on ideas explored through the design space. These ideas were projected on the different interactions that take place on the platform, see this figure. Three main questions were formulated (one for each of the main stakeholders) around central issues to be resolved through the platform design. The different ideas on how to address these issues, as shown in the figure, happen on different levels of involvement.

SAILOR INTERFACE

Ideas on the sailors interface were based on the current interfaces of the sailor. Existing tools for navigation and communication on board have been important in the starting point. Some of them were adapted and shown in the initial design ideas. This was done not only because these interfaces have a reference of experience for the sailor, they have also developed a strong language of adventure and storytelling over the centuries that these have been used in the maritime world.

How much effort can the sailor put into the process?

ORS

REPLAY/TRY OUT
Simulation for the home, including all the original layers like weather. People can literally act like sailors, taking the decisions themselves.

STRATEGY PARTNER
Providing the context, other boats around, other challenges.

LIVE CONTACT
With the world of the sailor who decides what to share through the use of navigation tools.

Exclusive experience: Sense of adventure

Support and connectedness (exposure)

INFLUENCE
Public can literally influence a layer on which sailors navigate, to support their route.

CREDITS
Public could also get 'credits' for what they contribute.

FIND FUNDING
Through crowdsourcing, social media etc.

ANSWER
Specific questions about the oceans, areas of study, etc.

PUBLIC

knowledge

change of lifestyle

ASK
Specific questions about the oceans, areas of interest, etc.

INTERFACE
How can the public be triggered into anticipation?

PILOT SESSION

To improve the session flow and outcomes, a pilot session was held before the actual stakeholders were involved. Instead three designers/researchers with an interest in setting up such co-reflective multiple stakeholder sessions were taken through the envisioned steps in order to evaluate and improve them. Based on the three aspects to be developed, three main phases for the workshop were defined.

PHASE 1

The first one individual, to introduce the participants in the context of the workshop from their personal perspective, to create an individual understanding of the basic situation and the purpose of the collaboration to be discussed.

For this first stage the main questions to be answered were about the amount of effort participants would be willing to offer and to think of ways in which they can support the platform. Instead of directly asking these kinds of questions, they were translated into examples previously discussed each printed on a small card. Participants were asked to compare and value each of these examples by assigning them a number of pawns, giving most to the way in which they would prefer to join the platform. They were given six pawns to allow for a range of options for distribution.

PHASE 2

In the second stage all participants came together and took those cards to the table to see what would be reasonable exchanges. This was done through some kind of 'trading game', in which the actions are traded for one another. The aim for the participants was to exchange with each of the other stakeholders, ending up with pawns from all three colors.

PHASE 3

The final phase works towards a conceptual direction for the sailors interface to continue with. It used a set of probes, things like maps, markers, screens, radars, compasses etc. which did not actually work but could be imagined to. The role as a facilitator here was to stimulate the process of coming up with concrete ideas for use.

EVALUATION

By executing the pilot session, some practical issues regarding the session itself were encountered:

More space for comments on the example cards was required, this allows for the participants to take all the notes themselves, documenting the workshop while participating.

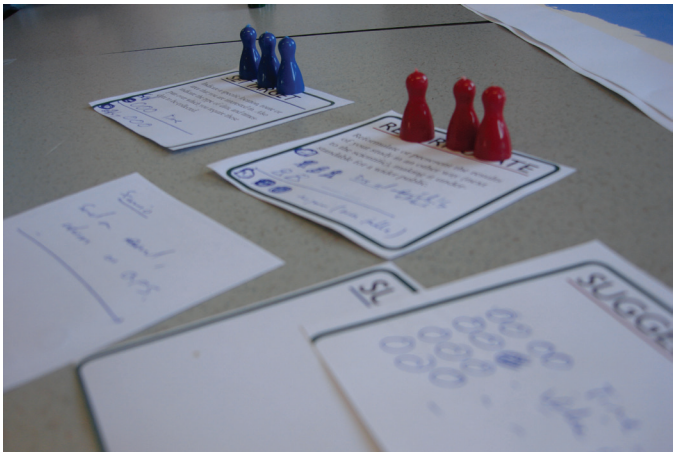
A clear distinction between what a person adds to the platform and what a person would like to get in return for that should be made. This helps to judge the worth of the offers that others make during the exchange in phase 2.

The second stage should be started by addressing the sailor and the researcher in specific and then ask for the public to join the negotiations later on. This prevents a stagnation of 'trade', three people might all wait to initiate the discussion without specific guidance on that part.

To have something specific to work towards, the three participants should be asked to write a scenario together as a wrap up of phase 2.

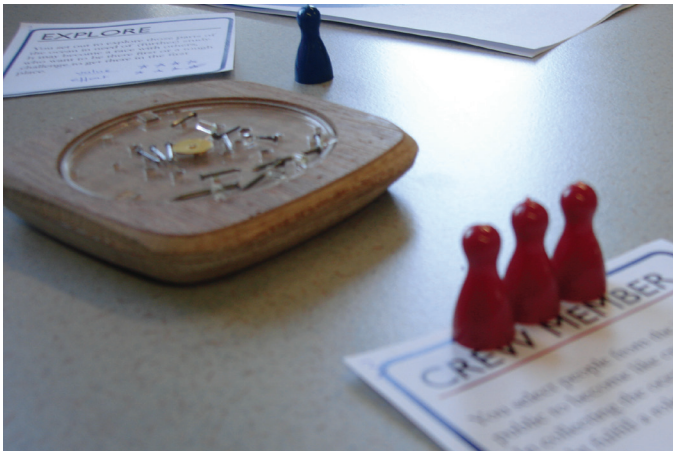
Phase 3 was difficult to execute for a number of reasons. Time should be kept closely, because the group discussion ran long, one of the participants was not able to join.

It was difficult for the two remaining participants to project actions on the probes, because of their lack of actual experience with the context (which would be different in the actual workshop) and because there was not yet a very specific step by step scenario they could 'walk through'.



Phase 1: Value the options, taking notes of offer and demand

Phase 2: Exchange acions



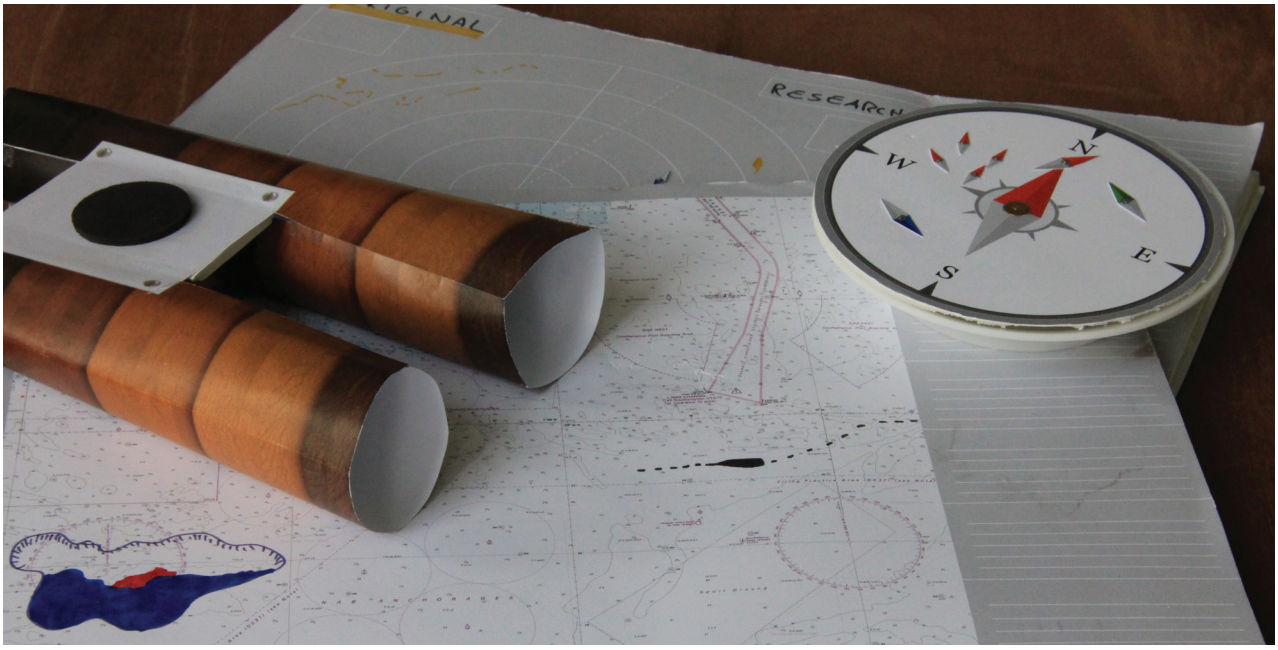
Phase 3: project actions on physical materials

FINAL SETUP

Based on the evaluation of the pilot session, the final workshop was set up. The material that supports the workshop was not just a slight adaptation of the initial material but should rather be seen as a new design iteration to the project, making each of the three central topics more specific.

The materials are designed so they could be used in workshops facilitated by anyone and all steps that participants need to take are described on the materials to be used. Room for notes is purposefully integrated in all materials as well to allow for the participants to document the session as they go.

The workshop set up will be explained using examples from the actual materials, the complete set can be found in the Appendix A.



A set of probes that forms the material for the third phase of the session, going through the scenario and projecting the required actions on these objects. They are made in a sketchy way to make the participants feel comfortable with adjusting them and taking notes.

Title of the option

A short description of what this specific option entails. It is very short and open to alow for the participant to project own thoughts on how it could work.

Rating system to start the individual reflection

Step by step description of action

Notes on what you could offer the other party in such a situation

Notes on what the other party should offer you in return

An introduction, explaining the situation, addressing basic motivation to join and what to do in the workshop

An image based on basic drives to join, to create an atmosphere with the introduction to the sailor.

The Workshop

The session was held on board the Journeyman, the boat that will actually be used for the pilot trip. Even though the boat lay ashore in Stockholm, the context in which the workshop was held, both on deck as in the cabin, was specifically chosen to be close to the sailor.

In this chapter describes the process and the outcomes of the separate phases.

The participants, as depicted on the next page, clockwise from the top left: **Basar Önal**, Experience designer/researcher. As 'public' he grew up in a turkish coastal town. **Martin Hedberg**, meteorologist developing improved weather forecasting system for sailors. **Martin Biuw**, Oceanic researcher connected to the Ocean Search Project. **Jesper Weissglas**, Captain of the Journeyman and experienced sea sailor.

Jesper Weissglas

Basar Önal

Martin Biuw

Martin Hedberg

StakeholderDrives

	Because I like...	I am willing to offer...
Sailor	meeting locals	some insights in my daily life
	to self-interpret data	some time to communicate
	public feedback	additional measurements
	a special price	a maximum of about $200,-
	getting recognition	making a detour of a few days to a week
	being trusted	a look into my long term planning
Researcher	an extra data channel	the appropriate credits/acknowledgements
	to know what is understood	a supporting crewmember
	to suggest and provide tools	an indication of the place and time of interest
	to see the relevance of my study	open up the data that I use
		formulate my questions based on societal needs
		simplified, more attractive results
Public	to do amateur research	a small supportive funding fee
	to express my own issues	personal involvement
	to ask my questions	active change in behavior
	to follow adventures at sea	to participate in a discussion

In this first phase of the workshop, the participants were introduced individually. With the cards as described in the workshop set up (and to be found in appendix A), different options to involvement were presented. Asked to value each, the comparing of these options started the reflection on their own motivations to join such interactions with the other stakeholders.

Documenting their own reflection process by filling in the cards, the public, researcher and sailor sides each differentiated between what they would like to offer the other and what they would demand in return for those actions. The values and comments taken from these individual ponderings are found in appendix B. The most important drives, offers and demands are visualized in figure below.

Exchange

After each of the participants had thought of their own role in relation to the others, a group discussion was to lead to reasonable scenario's for exchange. Initially the sailor and researcher were asked to explore options for cooperation, the public side joined later.

SAILOR RESEARCHER EXCHANGE

Three different plausible scenarios of interactions between the sailor and the researcher were soon distinguished:

1. The sailor installs a kit onboard, data are uploaded to the platform automatically. It will make a very plausible scenario for a large number of sailors, even cargo ships could be interesting gatherers here. The interaction might not be particularly interesting here, the scale at which data could be collected make this a serious option to consider.

2. For specific studies on specific locations, sailors in the area will be asked to join the project and set out to collect data. A short introduction to the research project at stake is provided to involve the sailor. Sometimes the sailor has three weeks to kill, sometimes he has a tight schedule.

3. Sailors set out on their voyage in specific service of a researcher, as a data gatherer. Extensive contact is kept during the trip and its preparations. Because the sailor is really dedicated to the project, more complex tasks could be assigned to the sailor which potentially allows for more valuable data gathering.

The three options seem to balance quality for quantity of the data. The first option probably involving most sailors with the least attention for the data, the third one turning those around. Not an extreme in that respect, it actually seemed the second option that would be the most renewing. The passive option one resembles an automated log, as currently already kept by some sailors and transporters while the most active and third option could have an example sailing around today in the form of TARA expedition.

INVOLVING THE PUBLIC

The public side joined in the further development of scenario 2. What was in this type of platform for him?

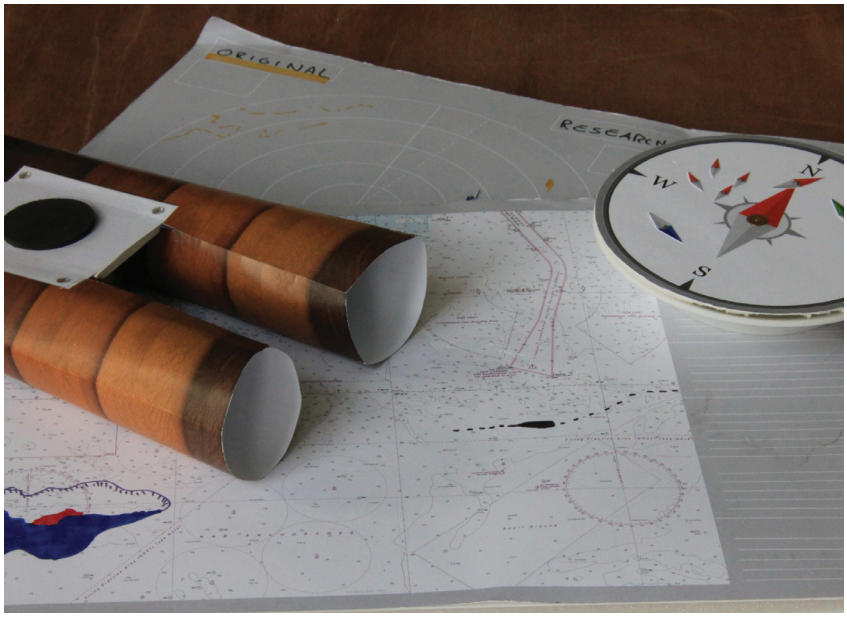
As part of a coastal community, the public would like to be heard about his local concerns and would like to feel that he has the power to start a serious discussions about the topics that are debated locally. As a main drive for the traveling sailor is to meet locals, he is very much interested in contributing to their wishes.

It is also important for researchers to make clear the relevance of the work they are doing. However, in order to have a public debate about the relevance of their studies, this public needs to have some level of knowledge in order to participate in a useful way. It might be good to build up some kind of profile that shows involvement in previous projects.

Media play an important role in current communications between research and the public. Research usually reaches the public only when it is picked up by media and exciting enough for them to broadcast. The way the public influences the research agenda is much more indirect: Local communities might organize protest groups of some sort to get political attention, often through the media. When enough public attention has been spawned, local politics might slowly change and influence other governments or companies to actually change their research funding regulations, which in turn will influence the research agenda.

The platform should actually be a sort of marketplace on which local communities, oceanic researchers and sailors can find each other. On this marketplace specific research projects can be formed where the different parties find themselves involved based on location, person or interest.

Sailor Interface



Due to the fruitful discussions in phase 2, phase 3 was skipped as time had run out. Although the platform setup had become much more specific based on the scenario's, the physical probes had yet been involved to develop towards a specific sailors interface. A Skype meeting with the Jesper was organized to discuss the probes afterwards. The following scenario was sketched beforehand:

You are resting ashore Point Sur, California when a local ocean researcher uses the ocean search platform to indicate hat he is studying the relation between water turbidity and the population of fish in that area. Local fisheries suspect the opening of a sand mine nearby has caused a decrease of fish in their area. The independent researcher has seen that you carry the necessary equipment to do relevant measurements for this study and requests you to collect some data for him. Local fishermen have indicated that they are very interested in your trip and your findings there.

"As a sailor I'm observing the ocean and documenting it as my reality takes place. Whatever I document is available to researchers and public alike, open to anyone."

The way in which the effects of this request could show on the radar, GPS, compass or binoculars was discussed as well as the way the public could come to influence them.

Looking at the different proposed tools, the sailor soon indicate that in reality nearly all navigation happens through GPS software programs. Compasses are actually used on board, but more for checking the course after it was set using such a system. They are good sources of direct feedback on direction. Adding extra functionality would not make sense.

Most interaction with the platform should actually happen through the chart display on board, often operated from a computer on board. Even though such a screen based interface would be the main 'portal' to the platform, some of the other tools could add to it.

"It would be nice if I can get some clue of progress through this interface, a sense of how far from completing the job I actually am."

Concluding Remarks

The value exchange session allowed for initial ideas to be expressed more specifically and for actual experts to confront it with. Because the workshop also brought together several people involved in the project at large, it was good to see them come to common agreements. In the discussion, new topics were introduced as well as additional perspectives to look at the project.

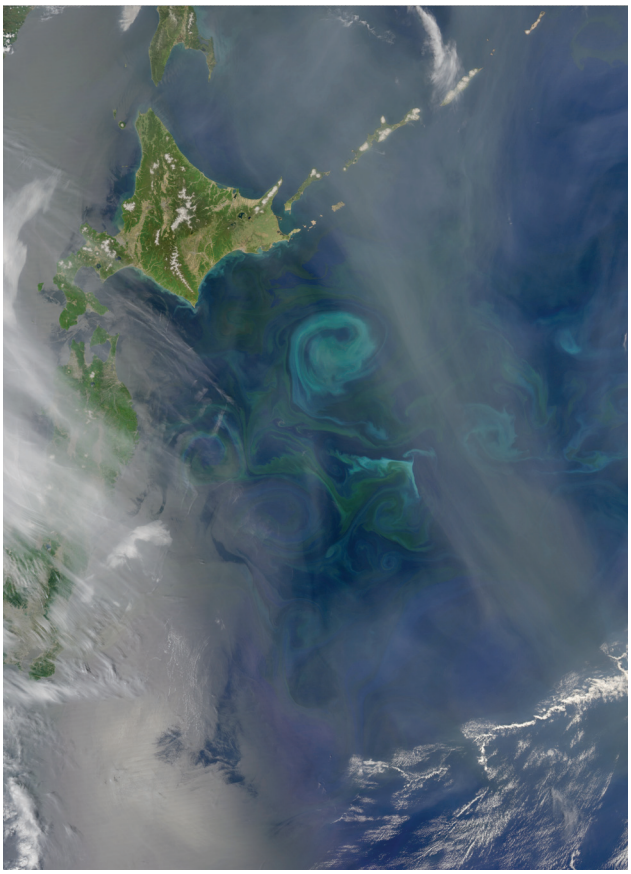
Next to the output regarding motivations, the platform and a sailors interface, it is also interesting to reflect on the workshop itself in order to improve such a session in the future. This might become relevant during the first ocean search trip. Along the route to South africa the journeyman and its crew will stop on several locations. Since the trip is a pilot to the Ocean Search project it could initiate similar workshops to investigate the perspectives of local people, sailors, researchers, and possible other stakeholders.

With respect to Liquid Living, one of the most remarkable interests lay with the sailor. During the workshop his interest for local people and their issues ashore stood out. Whenever there's enough time to lay close to shore Jesper was eager to be involved with them. Even though Jesper is not completely new to the project and might therefore be a biased participant to begin with.

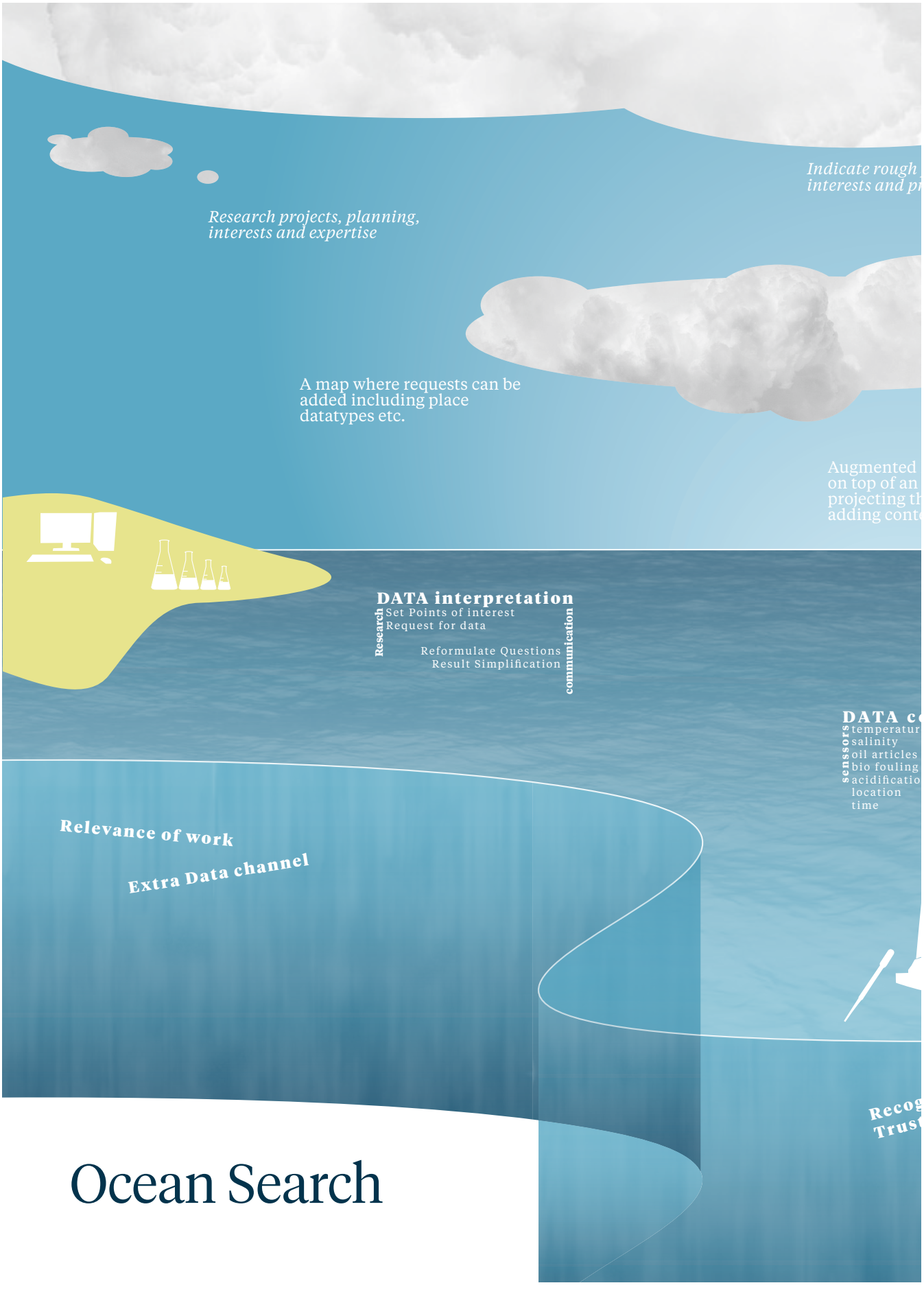
Platform Design

This chapter explains the setup of the final platform design and describes the processes and reasoning behind several parts of the platform. During the second phase of the workshop some clear ideas on how an ocean search platform should work were formulated. These were further developed and brought together in one coherent platform design (see image on the next page).

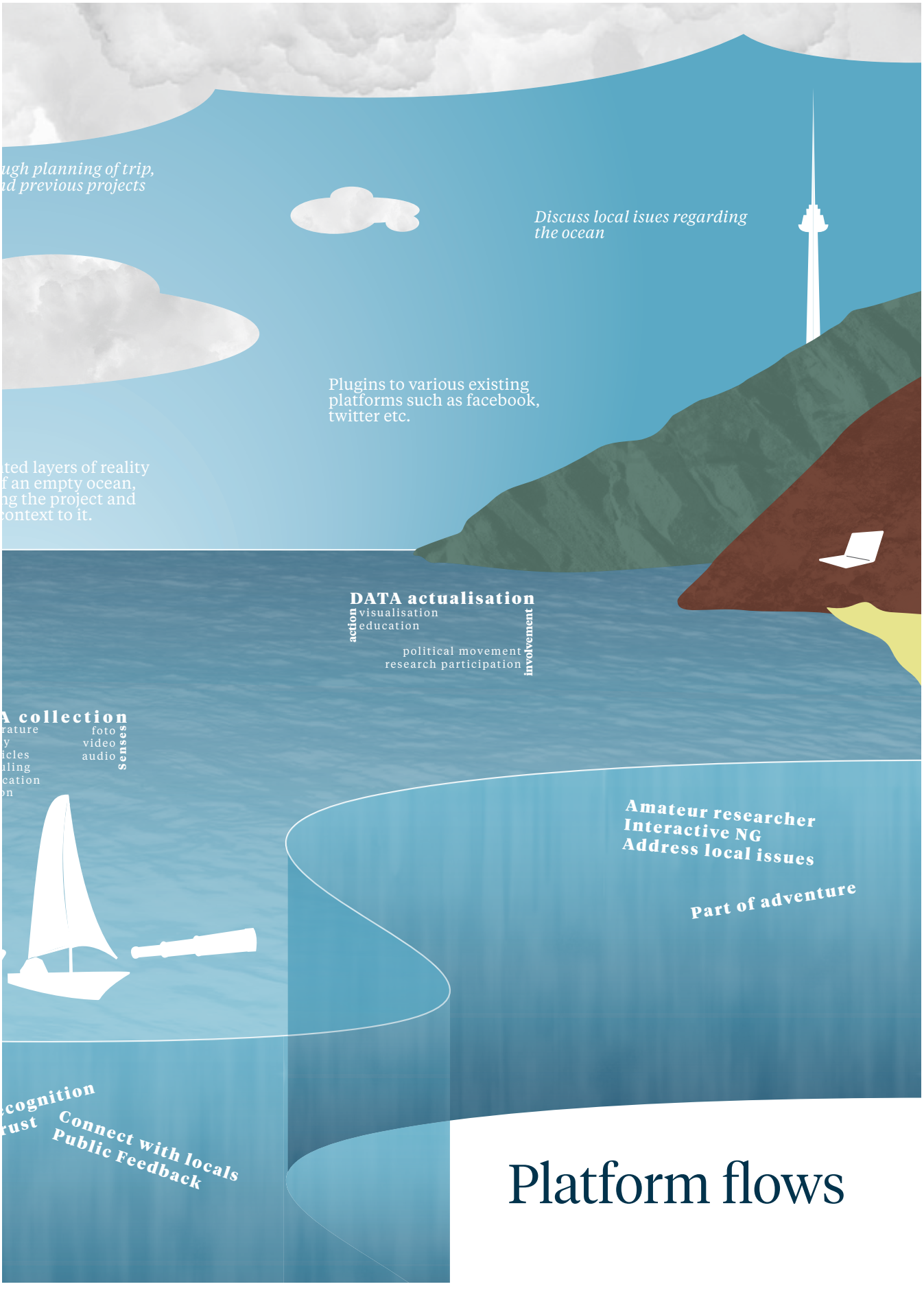
An example scenario was created to have a specific case to relate design decisions to, and to make the communication with the several stakeholders more realistic. To make sure it is a plausible example it was created in collaboration with Martin Biuw, the Oceanic Researcher involved in Ocean Search.



On a satellite image of an offshore area, scientists discover a region of unusually high primary production (algae, also called phytoplankton), which appears to be related to an unusually large oceanic eddy (circular 'whirlpool' like structures that often occur along the fronts between different ocean water masses, in many ways equivalent to atmospheric low pressure systems). The scientists are interested in getting a snapshot of water characteristics (Temperature and Salinity) as well as estimates of nutrients and to actually measure the primary production (to verify the measurements taken from satellite). They also want information about the presence of other organisms such as fish, seabirds and marine mammals, which may use this unusual structure as a feeding 'hotspot'. Also, since these eddies often trap debris, local marine reserve managers are worried that an oil slick from an oil tanker that just cleaned its tanks in the vicinity will get trapped in the eddy and cause disturbance to the animals using this feeding hotspot.



Ocean Search



Platform flows

Based on this scenario, the different flows that happen on this platform are visualized. (figure ...) Underwater some basic drives addressed in this set up are shown, on the surface the actual actions are projected, towards the small and central cloud are the interfaces that connect to the specific project and the top layer is about the connections to the general marketplace. Some essential decisions regarding this set up are described here.

BASIC STRUCTURE

The platform consists of a central marketplace where ideas can cross-pollinate and discussions between locals, researchers, sailors, educational institutes etc. Can take place. It is a marketplace for knowledge sharing and action. Here they can influence each other and bring their agendas closer together. This online platform reaches these people trough different profiles.

On this marketplace specific 'projects' can be formed. This happens when specific parties agree on a collaboration based on matching agendas, interest and trust. In the example scenario, this 'project' concerns this specific oceanic eddy. A group of researchers is involved because they study that part of the ocean, the sailor and reserve manager are involved because of their own location. The project might also catch the attention of another expert that is specialized in this type of eddy.

Different parameters, or tags, are used to match people with each other and with projects. Parameters by which these are matched include time, place, datatypes, oceanic phenomena etc. This structuring helps making the different projects more accessible to potentially relevant.

PUBLIC

Even though the public has been addressed as a single unity throughout the project, in reality it consists of a wide scope of different people, organizations, companies etc. The actions of the public side concerning the data themselves are about 'actualization'. This could include visualization by designers, communication by broadcasters, laws by politicians etc. Action can also be much more passive here, in the way that a random interested person might evolve to change his/her lifestyle as a result from involvement.

In order to allow for all this different action to take place the platform should be open and transparent, yet simple and accessible. One possible way for an educational institute to join for instance, could be creating a visualization of a certain dataset. Such an assignment could teach the students not only about the design side, but in the process, using actual data and personal stories from the researchers and sailors involved, students will pick up on the topics themselves as well. In return, they would provide the project with a better tools and materials to communicate the project findings.

Whether it is through design or through other personal strengths or skills that people have, the key issue is that as long as a 'public side' is interested through the way the data are presented, there are endless ways in which they could contribute to the projects themselves. In designing such a platform for such a wide variety of uses, every attempt to design its use will also become a limitation for other uses.

Naturally, specific set ups including a more specialized profile of the public, could be catered to their needs. This should be seen as a personalized limitation, that allows for a specific use to actually benefit from the increased structure. In other words, to involve a public as wide as possible, the platform should not just simply appear as a place of endless possibilities, even though it might actually be just that.

This means that the core of the platform should be based on open data and transparent connections. To show potential to the necessary public participants however, known interfaces such as social networks should be compatible.

RESEARCHER

The data that come in through platform add another channel to the ones already existing, with specific benefits as well as drawbacks compared to the others. Currently, most data are gathered through:

Satellites for some values (such as temperature). Although these cover wide areas, they also require ground truthing in order to be valuable.

Buoys that drift in many places around the ocean but that are tied to a location. These are useful for comparison of data over time, not specifically useful for exploration of new cases, for which their position or equipment might not be specifically chosen.

Research Vessels, with a research crew on board to make real time decisions and samples. However, these are extremely expensive to operate and as a result only relatively few expeditions, carefully planned and prepared beforehand can actually set sail.

The main benefits of the new data channel that the sailor provides are in the numbers. The potentially huge amount of participating sailors an their sensors could mean a dramatic increase of available ocean data. With a possibly personal connection to the sailor, it also becomes a highly flexible source, distributed over the world.

In the marketplace for knowledge and action, the researcher finds the quantity. Through the ongoing discussions here, he/she finds the relevance of work. In a direct way, by sharing knowledge with people that may use it, but also indirectly, when studies emerge from a public need.

SAILOR

The platform is essentially open to anyone that wants to install the sensors to collect data. Different important and clearly distinguishable groups that might take the role of the sailor include coastal sailors, sea sailors and marine(cargo) traffic. However, in the development of this platform the sea sailor was chosen as the central focus for two important reasons.

For one, this group is likely to be most flexible, and thus willing to spend some time to take part in a project. Secondly, their long trips also promise to be most interesting in terms of storytelling. As part of the storytelling part, contextual data are added on top of the sensor data, turning the sailors senses into system sensors.

CONCLUSIONS

The split of the project into a marketplace on the one hand and specific research projects on the other proved to be crucial on different levels. Although the overall, initial drives as formulated at the start of the project seem to be addressed primarily by the central marketplace, it is the specific projects that focus on some core drives that came out of concluded the workshop. In the development of the platform design, profiles were created for the different stakeholders. Although they might not be very useful as profile setups themselves, the type of thinking that went into developing them proved useful. Especially in formulating the types of information relevant for sharing on such a marketplace.

In determining who is involved in the specific projects from the marketplace, location has a central role. Although the sailor is free from a static location, it is the current location of the boat that determines whether joining a project is relevant.

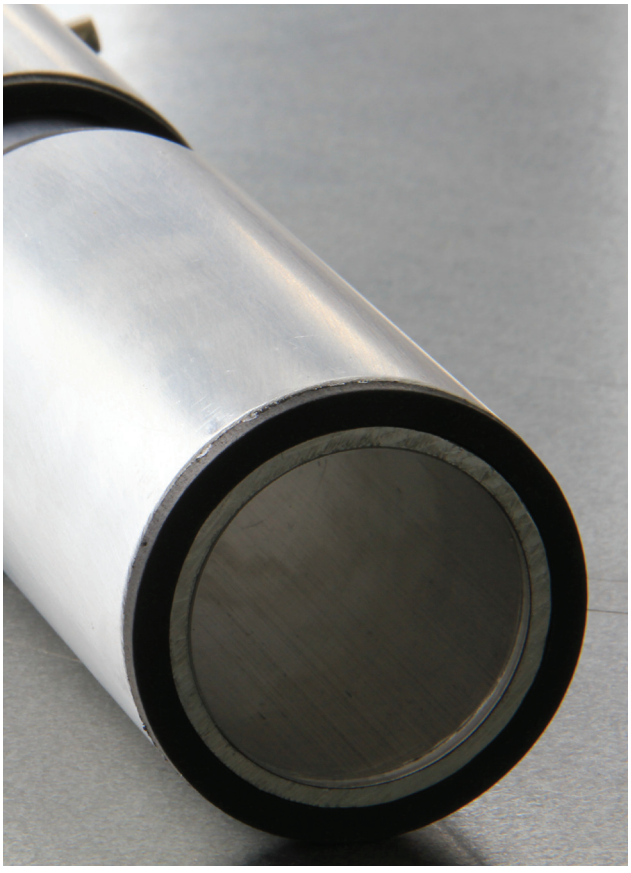
Interface Design

WIthin the platform the focus was on the sailors interface, since this is where the ocean search case becomes relevant to Liquid Living. Next to a more general interface based on a screen, a physical interface specifically aimed at the sailor was developed. The scenario as described in the previous chapter is used as a context in which to place this interface.

Based on the outcomes of the third phase in the stakeholder workshop, and the ideas on the overall platform setup described previously, two core functions for this interface were defined as follows:

1.
Read data points and see what has been collected vs what still needs to be collected.

2.
Record the context and add a layer of ‘experience’, which cannot be captured by sensors, on top of the data that are.



A physical feel for tha binocular idea

A pysical feel for a tagging compass

A physical feel for a 3d compass

Interface Ideas

Taking the sailors interface to the next level of realization, several options based on the ideas confronted with the sailor after the workshop were further developed. The two main functions to be addressed were projected on the objects to see in what ways they could be adhered to.

Three main ideas were explored through physical models that allow for the actions to be taken. Through tinkering with the interactions themselves, extra meaning was sought in the context of the boat.

1. A 3d compass, showing multiple lines that indicate the area of interest through color and position of lines. Although the compass has a strong reference to exploring new worlds (navigating virtual places), it was difficult to apply a meaningful action of gathering context.

2. A compass on a spherical mount. Based on the initial idea, however with more action through rotation of the whole object and pushing the top layer. Still, the action of recording relevant context, through sound, image, movement etc. was not apparent.

3. A monocular with which different layers of information can be browsed by turning one of the tubes in relation to the other. The recording of video and photo could be done by 'pulling' the outer tube inwards. This final option was chosen as an example to continue with.

Monocular

Images exploring different ways in which adding contextual fotographs might be of use.

Images exploring different ways of reading data on the oceans around

The concept interface for the sailor consists of a monocular which can project the data gathered and the data still to be gathered in addition to recording a contextual layer of data through photo and video. These two actions were concretized through visualizations of what they could look like.

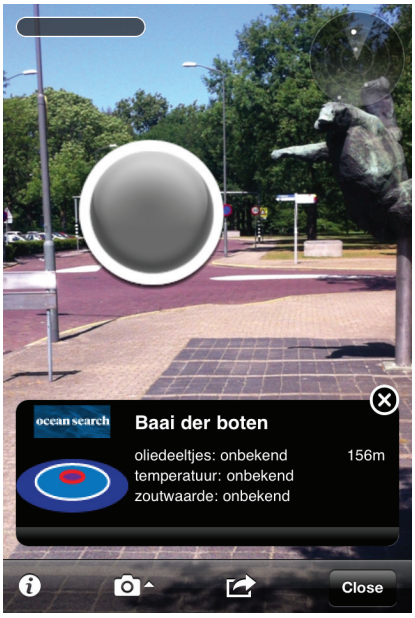
Reading data around:Through augmented reality, different datasets can be viewed on, underneath or on top of the actual water surface.

Recording context: Different example photo's with according notes, as if recorded by the sailor and uploaded to the platform.

The visualizations helped in communicating the idea with client and the other stakeholders in the project and trigger reflection on what would actually be the value of such a tool in the communication of the sailor with the researcher and the public. Whether such images could be interesting for a public yet valuable for research.

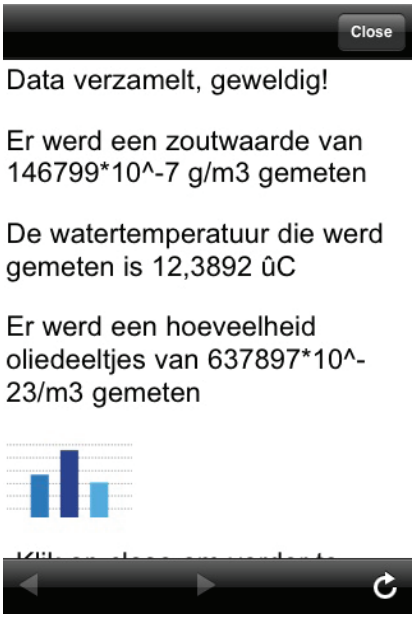
Digital Prototyping

A prototype was built to turn the scenario of using the interface into a step by step experience, into the context of a boat to further develop and define the concept.



1. See the Points of interests and requested data through augmented reality

2. up close



3. a pop-up appears showing the values measured, requesting upload to platform

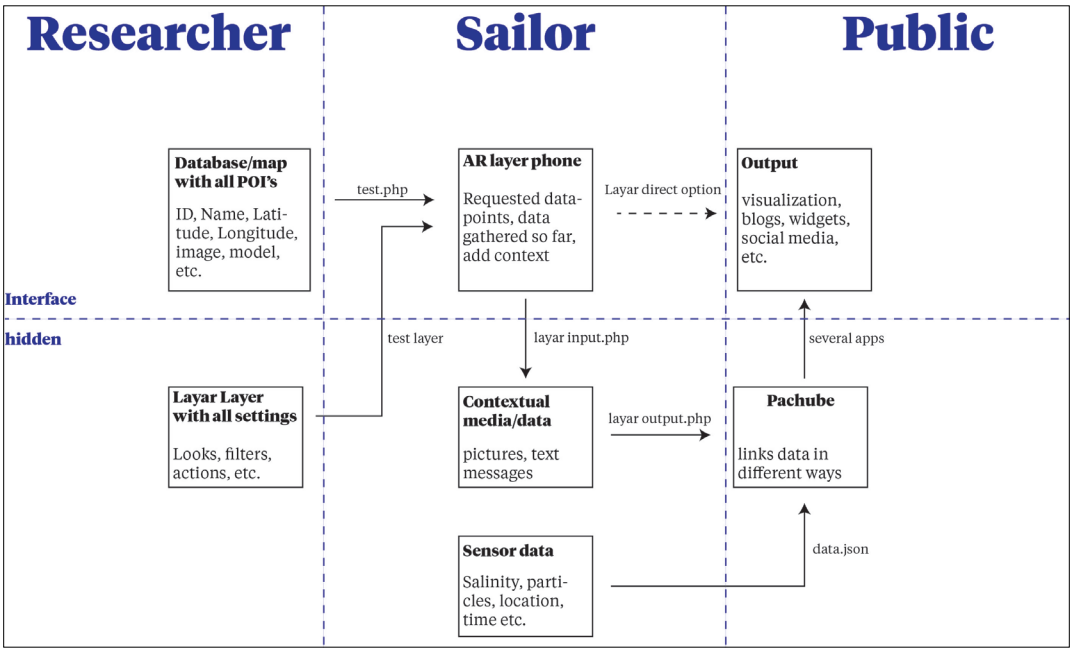
4. Looking back, the PoI now displays the measured datavalues

To allow for the different steps to be taken an augmented reality layer for smart phones was created. It showed points of interest (POI's) on the space around that indicated what values needed to be gathered there. When within a short range of the actual location, data were automatically 'gathered' and the application showed the measured data and request to upload them to the platform.

When looking back at points already visited, the data values attached to the POI's were changed to the 'measured' values.

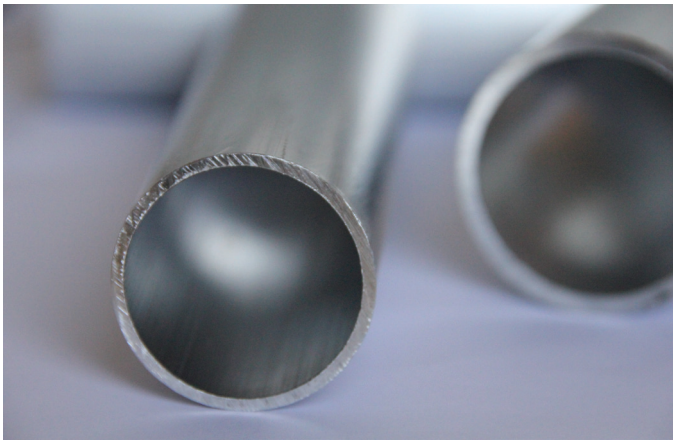
During the entire process, photos and according messages could be saved. These were automatically uploaded to a database to be viewed by others.

In this prototyping process several existing platforms were used, such as Layar, an augmented reality application for the smartphone which allows developers to create their own layers. Being guided by the systems they set up, a conceptual flow of digital transactions was formed. Because the eventual prototype focused on connections through the platform and its interface, by the researcher and the sailor, and did not actively involve a public side, that part of the system setup was not actually prototyped. However, platforms like Pachube were investigated and will be a good starting point for the next iteration, when sensor data are actually online.



A schematic showing existing technologies and platforms in relation to the prototype, not all are used.

Physical Prototyping

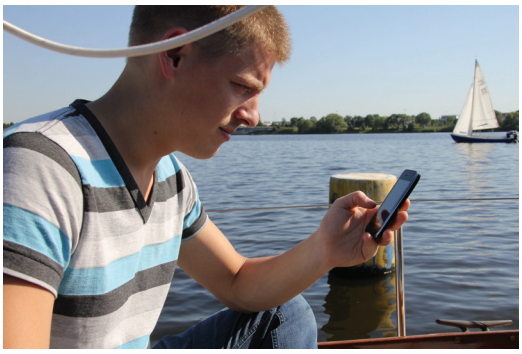


Bare aluminum tubes as he basic material

The final physical prototype

Although all steps could be walked through on the smartphone application, the interaction with such a device is completely different from holding an actual monocular. A physical prototype was made with which the same steps could be taken. This prototype did not actually work, but was used to get a more realistic feel for taking steps as described in the scenario.

User Involvement



Adding contextual photo: oil barrel

Looking over the water surface for POI's

In order to go through all the steps in their context of a boat, a trip was made with a sailor on a small lake. An iPhone running the Layar application was used.

SETUP

Three different target data points were placed on the lake be forehand, each requesting three different types of data. After a small introduction telling the sailor that he was part of this platform, he was requested to sail the lake and gather the necessary data for a researcher. Before setting sail, he was asked to present his findings to the researcher after returning from the trip, using the pictures to be taken during the gathering process.

EVALUATION

Playfully looking around the lake: "Let's see what we have to do, where shall we go", the trip became like a treasure hunt. Tasks were executed in rather relaxed manner, given the somewhat loose and fantasy-like set up, the tryout was clearly not in the real context.

However, a few interesting points for improvement were encountered. For instance, projecting large dots or areas on the water, it was difficult to get a sense of their distance. Also, the use of an iphone is far from ideal, specifically the process of adding context, through taking photos and adding text, required many steps through a menu and a touchscreen keypad. The reading of the data at the POI's did turn out to be a rewarding, and rather easy action, just watching.

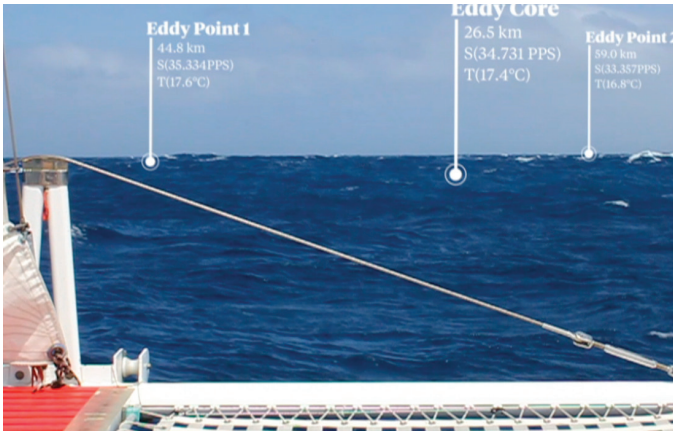
After the evaluating session the sailor was confronted wit the physical prototypes, and we went through the action taken wit the iPhone again, using it. Adding video seemed a lot easier now, although photo's without the ability to add text were valued less. The reading of layers through the monocular made sense.

The route sailed, along POI's

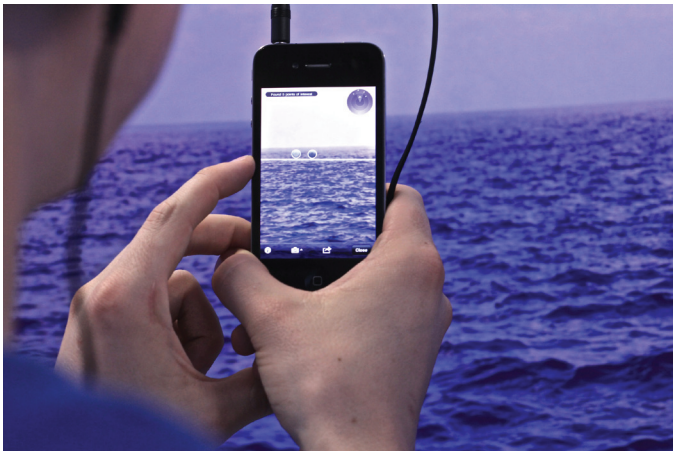
Evaluating the trip, pictures taken during trip uploaded to a website.

Communication

Exhibition setup: example movie, platform and prototype



Screenshot from the movie



A cilindrical exhibition setup creating the impression of being at sea, display POI's through Augmented reality

To communicate the project and try to mimic the context of sea sailing in a different way, not on a boat itself, two final iterations were added to the project. These were not only new design actions for the Ocean Search project, but could potentially end up as media that need less guidance from the designer him/herself, ready to be let loose.

EXHIBITION

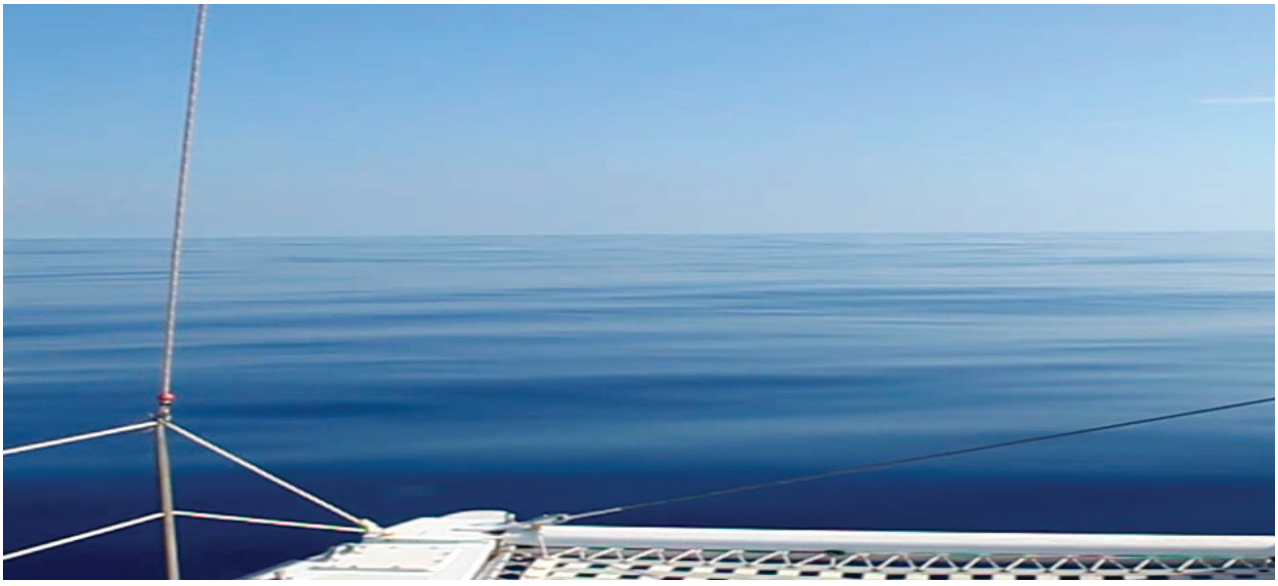
An exhibition set up mimics the experience of being at open sea, having data projected on the waters around. An oceanic horizon is printed on a cylindrical mount with a diameter of 1,5 meters placing the visitor in the centre of an endless ocean with the sound of waves rocking the boat. The same AR Layer is used as developed earlier, now with the points being placed in the ocean around.

Being enclosed in the calm and endless ocean experience, a surprisingly convincing feeling was created. However, in creating such an exhibition stand the actual appeal of the entire stand, including the outside, is important. It is not only about the effect of being inside, but in order for it to work as a stand alone exhibition stand, triggering reflection and discussion requires a lot of work and material.

MOVIE

A short movie was made to play next to the stand. The video is also a medium which can be used to communicate the concept in a realistic way over internet, to reach a wider (sailing) community. It is a medium that people have come quite familiar with, and projecting the augmented layer (which is not real yet) on top of the ocean can be done with a lot of visual freedom yet remaining believable.

It is shot as if it were a video log of the actual trip that followed a request as in in the scenario described in chapter , shot by the sailor and communicated to the public and the researcher through the platform. In presenting the video as such, the relevance of the concept is aimed to become clear to each of the main stakeholders: to the sailor because it is actually made from the sailors perspective, and for oceanic researchers and other parties since such a video would be the outcome they can see, together with the data.



Concluding Remarks

Looking at Ocean Search as a separate design case, its outcomes are described here. Since the project was done as an explorative first iteration on many parts, it is difficult to literally take any conclusions. Instead, a few ways in which the project has developed are set out.

'Context' might not be directly valuable for the Ocean search project in terms of deliverables. However, it is an important part of the project since the basic knowledge and understanding of the context is required in a design project. Knowing comparable work in the area is of similar importance later on, to determine the focus points of this project.

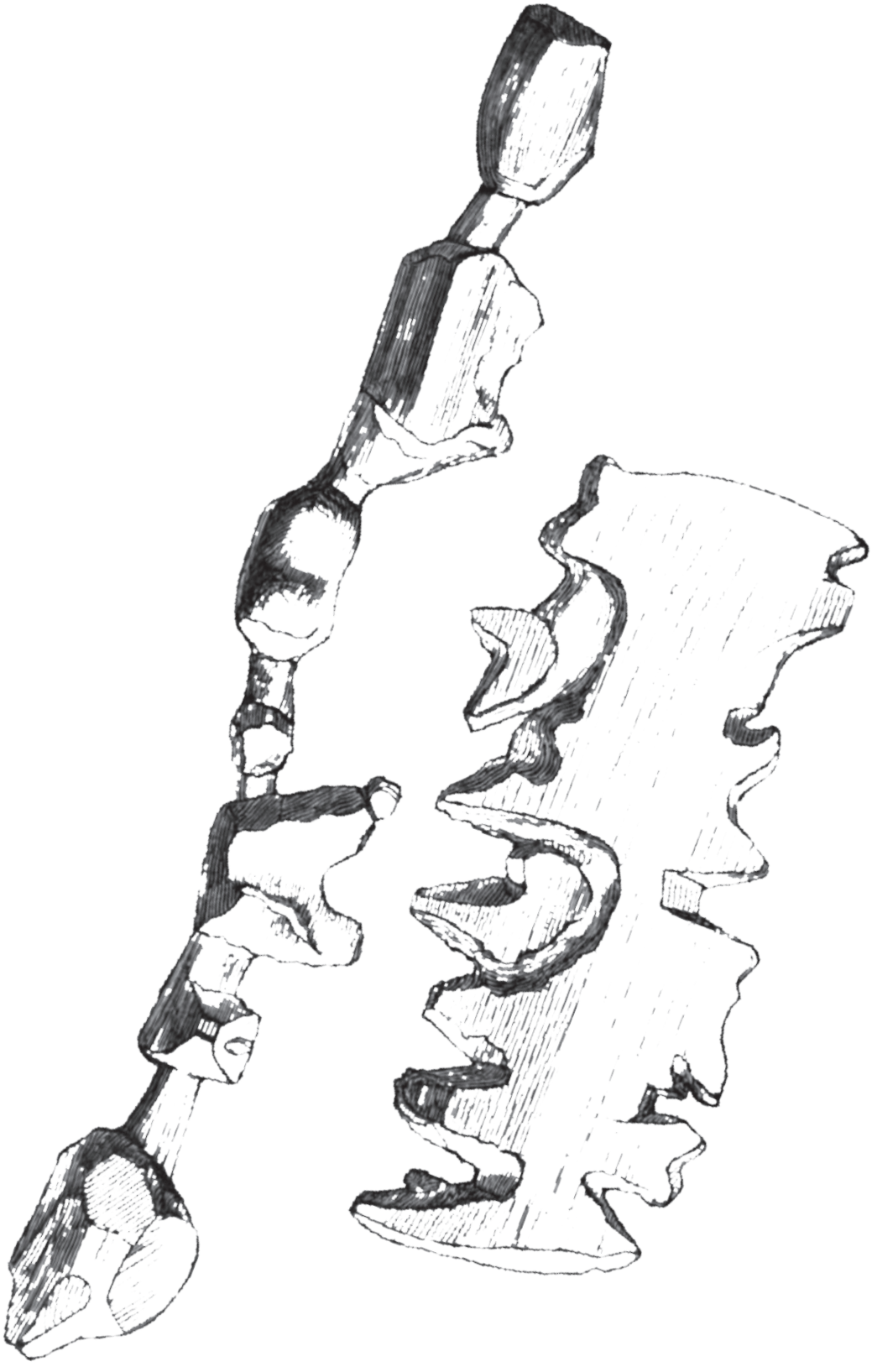
Creating a 'design space' consisting of many exemplary designs proved to work well in communicating the project. Having addressable concepts and a basic structure that relates them to each other, a basic vocabulary of is created.

The 'value exchange' session allowed for initial ideas to be expressed more specifically and for actual experts to confront it with. Because the workshop also brought together several people involved in the project at large, it was good to see them come to common agreements. In the discussion, new topics were introduced as well as additional perspectives to look at the project. Also, an overview of drives and motivations was delivered. The entire set up itself might actually lead to a toolkit for

Creating a concept 'platform' set up, including an exploration of the different stakeholders in relation to the platform, forms a basis for future iterations in which the datasets are actually working and uploading sensor data. For instance, initial tests of tagging pictures with data are currently held.

Although the monocular 'interface' might not be a realistic or useful example to further work with in the Ocean Search project, it does allow for next steps of specification to take place. Through becoming that specific, following steps in the development process are exposed.

In the final 'communication' step, one possible example is worked out. It would mainly be used to trigger response from people that do not necessarily have the experience of sailing oceans, but to have them relate to the situation through these media.



3 Dimensional, woodcarved maps, used by the Inuit to navigate the greenland coastline

Conclusions

The objectification of spatial relationships in the form of a map drawn in snow or carved in wood (Figure) was a traditional mode of the Inuit relationship to place .

The cognized landscape was not less precise or rational for the immense cultural burden it bore. Space and place are merely analytically circumscribed moments of a complex, hybrid human spatiality.

Landscapes, houses, bodies, things: A place and the archaeology of the Inuit imaginary (Peter Whitridge, 2004)

This chapter aims to conclude the project on two levels. First of all, under Liquid Living, the way that the Ocean Search project has influenced the initial understanding of Liquid Living. Secondly the way the design action was used to get to this insight is described in Designing for Future. Conclusions within Ocean Search itself were described in the previous chapter.

"Location is therefore of greater significance then other forms of networked identity. Usernames and avatars construct identity (Turke, 1995; Donath, 1997), but location constructs the framework through which identity can be formed."

Eric Gordon and Adriana de Souza e Silva (2011)

LIQUID LIVING

Through contextualizing Ocean Search, the relevant relations between sea sailors and liquid identity was further cocretized. Old sailors like Bontekoe already navigated a hybrid place when they combine sun standings and compass readings to determine their position. Looking at other projects, networked technologies seem to be the key value that set Ocean Search apart.

In the platform design an important difference between virtual place and physical place was formulated when the platform was meant to be open for different stakeholders to participate in ways yet unknown. Borders in virtual place do not necessarily have to be the same for different users. It is easier to apply filters that cater to the needs of the individual.

In the physical world, the structure of settlement might have paralleled the overall development of human civilization (Bronowski, 1973). This specialization of spheres might have come to a point that its limitations become obvious, resulting (among other things) in a recent increase of appreciation for the overviewing perspectives and disciplines. In the virtual world however, structures can depend on individuals, context and situation much more easily. This allows for personalized structures that do not have to limit others at the same time. In stead of the concrete walls that construct our cities, the virtual structure of specialization might in stead erect as semi-permeable membranes, only apparent when relevant.

The final interface was very much based on Liquid Living. The actual monocular might not be the most realistic option on board the sailing boat, It uses networked technology to link the human sense with sensors and create a hybrid experience of the place around. Plus, in recording video for others to follow, the sailor is actively constructing an identity through media.

The importance of actual location of sailors and communities involved, and to have a specific project that connects specific users from a big marketplace hint at a link to liquid living in general. Although networked technologies provide the option to connect to anyone, the should be applied in such a way that relevant connections are actually made.
Looking at the final platform setting, and ways in which the setup relates to the theories set at the beginning of the projects, a number of links can be found between what happens on the Ocean Search platform and what is seen specifically in urban everyday. "I am unsure that fitting a yacht with a HUD would be realistic", as Jesper Weissglas commented on the video. It makes sense that specifically cities are the places where most of these trends seem to permeate everyday life earliest. It is the cities where technologies that connect humans continuously becomes affordable and widespread the first.

DESIGNING FOR THE FUTURE

The focus that comes with diving into a new and strange world is always defined by the direction in which is sought. As shown in setting the context with the theoretical framing, when looking for metaphorical or real links between stories, one will likely find them.

The use of exemplary design allows the designer to actually steer the focus of the design space. Exemplary design is by definition biased by personal preference, and therefore an interesting way to explore a personal topics of interest.

Although these expanding methods in design do not necessarily lead to scientific truths, in framing links between potential futures and specific cases today, both the design case and the abstract study benefit from coming together. Design focus can be determined by the interesting opportunities as defined by the topics researched, which receive a relevant example case in return.

In the value exchange workshop, the sailor quickly and clearly indicated the relevance for him to relate to locals and their issues. As an extreme user, the sailor can make valuable judgements based on real experiences.

After the latest design stages, where the monocular was developed into something usable, it is very difficult to actually draw solid conclusions after the user involvement. This should not be the aim of this type of work to begin with. It is very difficult to actually mimic the ideal set up. User involvement can be done as an exploration of things, but not really as a test.

Since practical limitations to the reality of the envisioned future way of living, results of are easily focused on these practical limitations as well. Different modes of communication, lie video and exhibitions, might overcome these practical issues but focus on peoples imagination of the experience of the scenario itself. Their reflections might not be from direct experiences (which is impossible to create since it is never he future yet), when executed well, they have the potential to start a discussion. Either way, the amount of detail will determine the amount of useful outcome, both to the further design and the theoretical exploration.

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RELATED PROJECTS

Collaborative Ocean Visualization Environment (The Cove): http://www.prism.washington.edu/story/Collaborative+Ocean+Visualization+Environment+(COVE)

Tara Oceans: http://taramarineexpeditions-us.blogspot.com/

The Beagle: http://beagle.vpro.nl

Akvo: http://www.akvo.org/

Rainbow warrior: http://anewwarrior.greenpeace.org/

OTHERS

STRP Living in the Cloud Conference, presentation by L. Goulden

FMP blog with inspirations and thoughts: http://www.jopjapenga.nl/blog

Initial Interviews, online video: http://www.vimeo.com/user2613285

Amsterdam Realtime', a project by Esther Polak and Jeroen Kee

Appendices

A. Cards used for Workshop Phase 1
B. Notes on workshop phase 2

Appendix B

Notes on The first phase of the Workshop

Individual discussions about motivations and drives were the aim of the initial phase. The options discussed are discussed per interaction.

PUBLIC TO SAILOR

Advice: Feels a little insecure/ thinks that has not enough knowledge to take any role of advisor in connection to the sailor. Would be interested to learn more about daily life on board though.

Influence****: would be interesting to become like an amateur researcher. A bit like watching national Geographic or discovery, but then having an active role myself, as being a member of such a platform. Sailors could be influenced by my actions, behavior, etc.

Fund**: Acknowledgements would be very important (thanks to...), either on the boat or on the website/platform. Open access to the data being gathered is another must. He will only be a funder for the 'good case'. He will therefore have to trust the sailor in being transparent and not biased. If convinced of all this might think about donations of around €5,- a month, which would be different from person to person.

PUBLIC TO RESEARCHER

Ask*: Could ask personal questions that relate to private life, such as: "is the water clean enough for me to swim in". Other topics to ask questions about might include fish, nice and quiet places along the coast, these might be more about the experiences of the researchers than about their explicit knowledge.

Discuss***: Feels like discussion could be more relevant, would have the feeling of contributing something as well. The public in this case would feel more comfortable asking questions of relevance after being introduced in the topic: "First I need to see how these research topics affect my life, then I will be able to ask valuable questions." In such interactions it will be very important for the researcher to be transparent about his/her funds and supporting companies to show valid motivations.

Participate**: Is willing to participate after an invitation by the researcher. Does need guidance or questions to feel confident that he can participate in a relevant matter.

RESEARCHER TO SAILOR

Non-Interactive: Fourth option added by researcher himself. No interactions involved, sensors just uploading data as the sailors go about. This would probably be the case for most sailors, just adding a channel through which researchers can reach data. This would further extend the width of current gathering methods, very useful, but not specifically an interesting way to interact for the researcher (none).

Request**: Would send his request for data gathering after judging if the boat suits his project. Sensor and system specifications regarding accuracy is important. A list of available equipment would help, as would a track record of previously gathered data and where they were used. In return, the researcher would be willing to give all appropriate credits and acknowledgements for the participating sailor. He could also offer a knowledgeable crew member to support the sailor.

Set target**: Could indicate time and area of specific interest. Would need specifications of the boat and its sensors, the availability and autonomy of the sailor to determine whether it would fit his needs. The researcher would want to know the capabilities of the crew on board, whether they can clean sensors, check the dataflow, and report after visual observations. In this setup, where the sailor really joins the study, these types of questions would have to be answered beforehand, to design the study.

Direct Contact**: Not so much to be compared with the other options. The now three options discussed above could be mapped according to time and effort put in, this direct contact would be more of an extra to sending a request or a set target.

RESEARCHER TO PUBLIC

Open data***: This is really important for researchers in general, but also very difficult since it requires the research world as a whole to change. Researchers should then have the ability to credit their references. The datasets themselves should have a value to get an equal status as the research papers that evaluate or interpret them.

Questions*: The researchers must first realize the importance of providing answers. Then he can find the values of public engagement. In such a way research questions can be formulated based on personal and societal needs.

Reformulate**: The researcher should develop methods for data simplification. The researcher, alone or in a team with specifically skilled people could then work on a better visualization of such data. The public could then provide input regarding their understanding of such data. They could suggest or provide tools (think of crowd sourcing).

SAILOR TO PUBLIC

Follow data**: Doesn't require any extra attention, would work well for many.

Crew member***: Unless the boat is in trouble, the sailor has quite some time to communicate. Time to answer questions, make additional measurements and observations if the public would like that. The public could then interpret the data in their own context or present it in a different way.

Recordings*: Depends on the willingness to share these type of data, and their ability to do so. The entire crew must be ok with the sharing of such personal recordings. Journeyman himself is very interested in this type of interactions, but many others might not be. He likes the public feedback and comments a lot, from people he knows, but even more if he finds people that follow him that don't know him.

SAILOR TO RESEARCHER

Buy Kit****: Would buy such a kit without further involvement if it were max $200,-. A sponsored price for such a kit would make it much easier to choose to buy it. It also gives a little bit of recognition or trust. Something like a badge, or online recognition could also make the sailor proud.

Detour**: Would easily make a detour of one or two days, possibly a week.

Explore: Would be heavily dependent on the long term planning and schedule of the sailor and the researcher. Would expect an explicit plan and wish list of the researcher.

Appendix A

Cards for the first phase of the Workshop