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## **Attempting to fly: Deployment of systems oriented design methodology - conducted by the Norwegian Design Council**

*Benedicte Wildhagen & Knut Bang, business advisers Norwegian Design Council, Audun Fossliie Hansen, CEO Celerway, Adrian Paulsen, designer Halogen*

### *A metaphore*

*Albatrosses are amongst the largest of flying birds. They are known to cover thousands of miles in a short space of time, they fly high and low, with such little effort that they can complete a full circle around the Earth in just over a month.*

*An albatross's takeoff on the other hand, is an embarrassingly clumsy affair. On land they have to run, using a 'runway' area of flat open ground, usually placed on the windiest part of the breeding island, and sloping downhill to increase speed. They face downhill, into the wind, and start a headlong run with wings outstretched, this combined with a couple of flaps, usually gets them into the air.*

*When landing on land they use their tails and webbed feet as 'air brakes' and, if they are still too fast when they land, they may topple forward rather comically onto their beaks.*

What does this have to do with systems oriented design (SOD)?

SOD is still maturing as a methodology and is not easy to communicate. To explain how we see SOD we use this metaphore. Our part in the development of SOD so far has been as sensors and bridging partner to the Oslo School of Architecture and Design (AHO) and as an orchestrator of projects. This paper will focus on how the collaboration with AHO has put the Norwegian Design Council in a position to stage the necessary circumstances to get SOD projects in the air, and describe a specific case and its main phases – take off, flying and landing, through the designer and client perspective.

### **An emerging methodology**

The Norwegian Design Council and AHO have been collaborative partners for several years through different research projects. These include the service innovation method AT-ONE, Customer Care 2015 and other projects due to both organizations being part of the Center for Service Innovation. But, not the least, our collaboration within the emerging field of systems oriented design.

This collaboration is important to the Norwegian Design Council because we see the need for new methodology in the design fields - to be able to drive innovation and to tackle and solve complex and pressing problems we are confronted with nationally.

Our contribution to SOD at AHO is mainly to serve as sensors for the master course for the last four years, to recruit business cases to the course and by using SOD in our own work. The master projects we have reviewed during these years have on the whole showed an impressive high quality and great variety; from business cases to

health care and oil spills recovery, really demonstrating the versatility of the methodology. This has given us a deep understanding of the potentials and benefits of this emerging field.

As we see it - SOD has the ability to address the complex problems of our global society - and in this way designers can play an important role in crafting innovative and sustainable solutions.

We see our role as a bridging partner between the academic, research-based development at AHO and the "real world". Our aim is making use of systems oriented design methodology; in our own work, in commercial projects with complex challenges, and if possible, to bring back some new insights to the SOD development at AHO. It is still maturing as a methodology, and our aim is to contribute to its advancement and recognition.

The Norwegian Design Council is the national strategic body for design in Norway. We have a responsibility to collaborate with other governmental organizations, and to find new ways of doing this we have to navigate within very complex structures. As a consequence we have made use of a systems oriented design approach in a joint effort with a national program, Forny2020, within the Norwegian Research Council.

This has resulted in a ground-breaking partnership where the use of professional designers are made available to scientists in the process of commercializing R&D results. The overall goal for the program is to create value and benefits for society from research results.

Our case in this paper, Celerway - was realized through this program. The case demonstrates many of the unique qualities related to a systems oriented design approach.

### **Take off: The challenge**

Celerway Communication has its root in basic research at Simula Research Laboratory, Fornebu, Norway. Simula Research Laboratory was established in 2001 to conduct excellent research in the fields of Communication systems, Software engineering and Scientific computing.

Simula Research Laboratory has since 2008 developed a software platform that enables real mobile broadband in a very flexible and cost efficient way. The software is installed on your mobile device like laptop, smartphone, tablet or mobile broadband router. You can also connect to the real mobile broadband gateway for more and better services. Some of the technology has patent protection.

The key functionalities of the platform are that it can combine multiple networks to increase capacity, switch networks to increase robustness, accelerate throughput and keep applications alive, transparently for the applications. In addition, the platform can offer secure communication and compression in order to further increase speed and save cost.

With funding from the Norwegian Research Council in combination with expert help from the business adviser at the Norwegian Design Council, a SOD-project was proposed to Simula Research Laboratory in the fall of 2012.

To commercialize the new Celerway technology Simula faced a wicked problem. They needed to explore and understand the ecosystem the technology would be a part of, and come to grasp with technology, business and human values aspects in a global context.

The challenge was to bridge the gap - turning a research result into a commercially viable idea. Design competence was needed for several reasons.

- Celerway were not able to communicate the usefulness and commercial potential of the research results. This was crucial to attract investors.
- Since the source of the ideas was basic research, they had a set of algorithms, software, prototypes and patents. They needed help to prioritize how to focus and how to build products out of the ideas.
- Celerway also had several ideas about markets and business models, but little reasoning about prioritization.
- All in all, Celerway had a disarray of ideas, algorithms, software, prototypes and needed help to communicate, prioritize and discover new possibilities.

### **Flying: Stepping out of the technology-silo**

Celerway was developing a technology with obvious potential, but it was hard to grasp how to build a business model around it. To unwrap the potential this technology promised it was clear that the complexity needed to be handled. SOD was recommended for its ability to facilitate rapid learning through delivering an “overview” (GIGAmap) and holistic co-creation in interdisciplinary contexts. Designer Adrian Paulsen, with partner Baard Røsvik, was commissioned to facilitate a systems oriented design process.

The researchers already had a long list of ideas on how to commercialize the technology, but they lacked accessible means of communication and process knowledge to prioritize which direction to develop their “product”. An obvious challenge was also framing the discussion, considering the potentially global marketplace they would enter.

A key to success in projects such as this, is a mutual respect for the strengths and weaknesses in the group. The designers had no background knowledge of the technology; neither did the researchers have the designer’s end user- and process knowledge.

The first step was to establish a shared understanding. Several facilitated meetings were held where the project process was co-constructed and adapted to suit the whole team. To achieve a successful unfolding of complexity, ownership is key.

Therefore a project room was established at Celerways office at Simula Research Lab where most of the work sessions were held, and the GIGAmapping was hung on the wall. Allowing Celerway to have access to it and also invite other colleagues to contribute during its construction.

The second step in the process was to take the technology apart, and at its most basic level create communicative material. Visual sensemaking sessions were needed to ensure that the designers really understood the technology and the ecosystem it operated in. This understanding was then translated into user scenarios and technology scenarios. This material was used to challenge and enrich the potential roads towards commercialization. The unfolding of both user- and technology scenarios also allowed a solid overview of the actors that would be influenced by this technology.

The third step was to establish a shared understanding of the desired outcome from the collaboration and formulating a rich, end-goal description. This process created the backbone of the GIGAmapping. A visual process representation of all of the work that led to Celerway's current state, a rich description of the end goal ambition and the boundaries Celerway would have to overcome to get there. This included accessible technological descriptions, re-establishing a written and visual language, user and market understanding and a set of viable business models. This process map went through several iterations through the project, but the main backbone stayed the same through the exploration, to keep the team focused while unfolding the complexity.

After the initial understanding phase was completed it became clear that a Scandinavian perspective would not allow for the full potential of the technology to be utilized. This also aligned nicely with the researchers own motivation to create a global impact and to achieve a solid return on investments. This led to an extensive look into market research concerning mobile web usage around the world. In order to discuss the alternative markets the team devised an approach named "*Nationas*". (Personas for countries). This gave an understanding of the user needs and how the final business model needed to accommodate this. It also opened the team's eyes on how little most of the project team actually knew about the mobile web usage around the world. It confirmed that there is a global demand for solutions that enable people to access more of the available bandwidth, on the move.

In the final step a roadmap towards commercialization was developed, including three business models. One based on a virally spread application for the global market, together with two product collaboration models. The business model with the most potential, but also in need of external funding was the mobile application approach. It became the main storyline for the communication material designed to assist in the funding process. The material was user tested on relevant test groups consisting of funding experts and consumer experts, sources from the team's shared networks.

The project concluded with handing over the latest iteration of the GIGAmapping and a set of presentation components custom developed to support Celerway's storytelling. The GIGAmapping process resulted in a 4,3 meter long poster that still has a role in the

workflow. It was built not as an end result, but as a process tool. With challenges still needing more research, functional space was left in the map to facilitate further discussions. The map taking the role as a shared visual platform constructed to support Celerway moving forward.

### **Landing: Outcome**

For the Simula researchers, SOD was a very useful way of working. They are used to white board discussions, passionate disagreements and dynamic plans that need to be changed based on results.

Going from discussions and visualizations on a white board to gigamaps on the wall, was very useful to illustrate the technologies in the data chain and the value chain of the telecom industry. Based on this, the team could assess how to focus the product in different markets and how it would affect different actors and competitors. Every week gave new aspects and changes in product packing and business plans. The team also discovered new markets and business plans.

The traditional way of working with business plan templates would not have helped the case, since the ideas were little focused and not ready for a strict template. In that respect, the systems oriented design approach was perfect for the Celerway project.

Celerway are now prepared for communicating the story and business potential. They have concluded a release plan and markets for the product. The only deviation from the plan is that they are about 6 months delayed.

*"- The designers helped us out of our technology-silo and we became part of an efficient process I really enjoyed. As a result we are able to present our case to a broader public in a way that makes sense.*

*Audun Fossellie Hansen, CEO, Celerway AS.*

### **Key observations**

The potential and benefits the Norwegian Design Council see in SOD was in many ways confirmed in the case of Celerway. The process and result is far from a "main stream" design delivery, thus expanding design into new commercial areas. We believe the Celerway case to be a valuable demonstration of what can be achieved in a SOD-driven process, and how this can compliment more traditional methods when it comes to project development and commercializing.

Systems oriented design is an emerging methodology and we believe it promises great opportunities for designers to see the big picture and identify the right problems. We would like to encourage even more research into some areas:

- Pain points: We got Celerway off the ground due to external financing from the

Norwegian Research Council and our orchestration. For SOD to really fly in the future - we believe it would be useful if more academic work could be done to *identify* criteria's in the areas of take off - from a client and business perspective.

- **Framework:** Recruiting of projects to the AHO master-course is done by teachers and collaborative partners today. We believe the dialog going on might be somewhat "below the radar", but it deserves some focus! It would be very useful for the commercializing of SOD to pinpoint some general criteria's on how to identify a potential project challenge - and how to prepare the client for the ride.
- **Complexity:** Designers in general need to acknowledge the existence of counterintuitive, complex systems, which we are surrounded by at all levels of modern society. We see SOD as an effective tool to tackle and share understanding of complexity, thus making it possible for designers to identify - and solve the right problems. With a look to the future, we see huge needs for this kind of design competence – to enable sustainable solutions for businesses, organizations and in policymaking.

*"...as a designer, if you want to get to the big issues of today, the systemic issues, you got to find a way to work with governments"*

*Patrick Frick  
Global Agenda Council on Design & Innovation  
(September, 2013)*

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