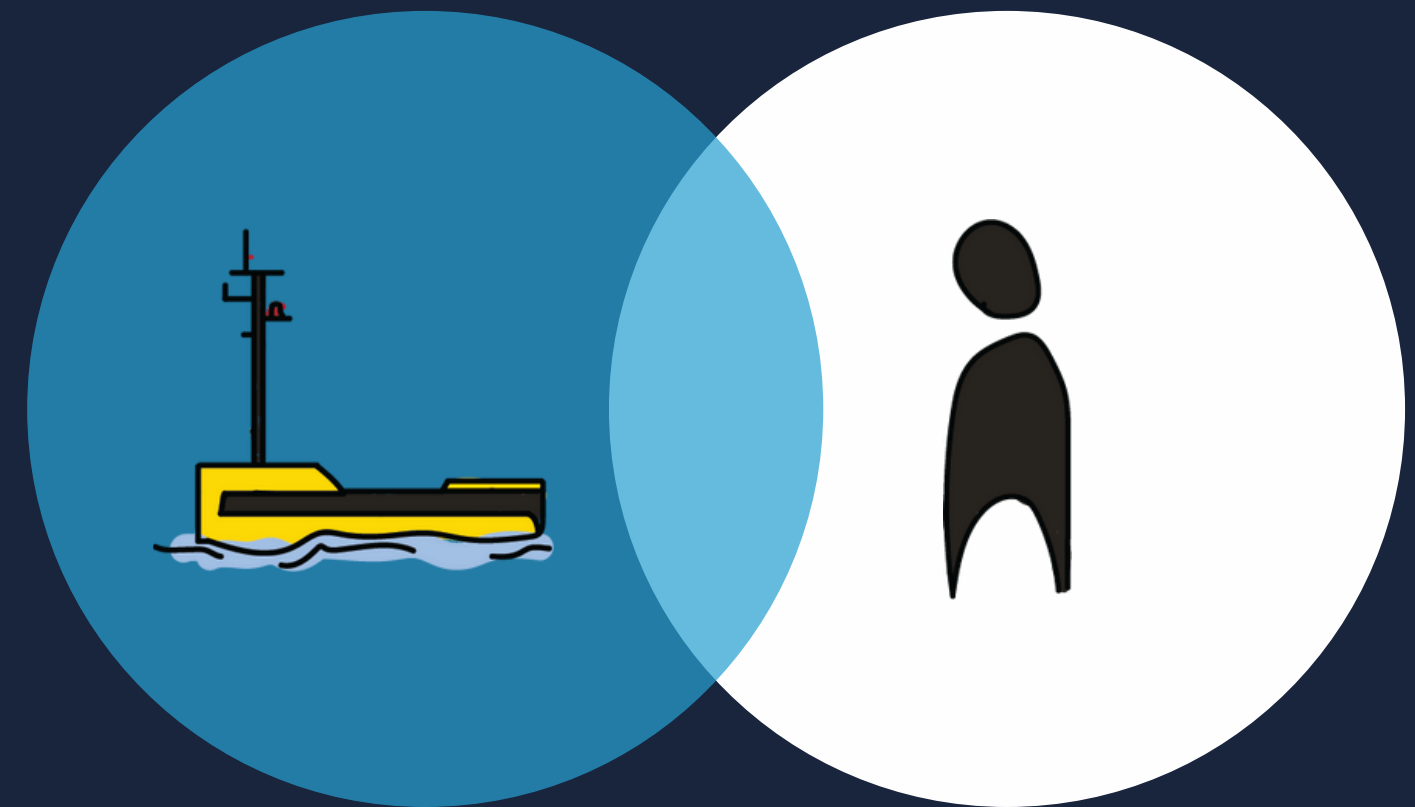


Securing a human-centered transition at the start of automation projects

A guidebook for including context specific requirements and lived experiences of workers in the design of automated workplaces



Introduction

What is meant with "automation" in this guidebook?

Automation is defined here as Robotic, Intelligent, or Autonomous systems (RIA), which are technologies with some degree of self-regulation, taking over tasks previously performed by humans.

When can this guidebook be useful?

This guidebook is intended to be used at the start of an automation project by project managers, designers, or innovators who aim to automate parts of their organization using Robotic, Intelligent, or Autonomous (RIA) systems, but are uncertain about how such implementation might work within complex multi-stakeholder environments.

What is meant by "Human-centered" and why is it important?

In complex multi-stakeholder environments, successful human-robot collaboration is not just beneficial, but essential for effective operation. The use of human-centered design is key to achieving successful human-robot collaboration and maintaining job quality. Human-centered design involves considering the needs of end users during the design process. Involving end users (often workers) improves work quality, builds trust, and prevents design flaws.

Why use these guidelines?

These guidelines will help you to...

Avoid assuming automation simply substitutes human work

Automation is not a simple substitute, but alters a system's overall function. Human work will therefore change and continue to coexist with autonomous systems.

Look beyond just technology

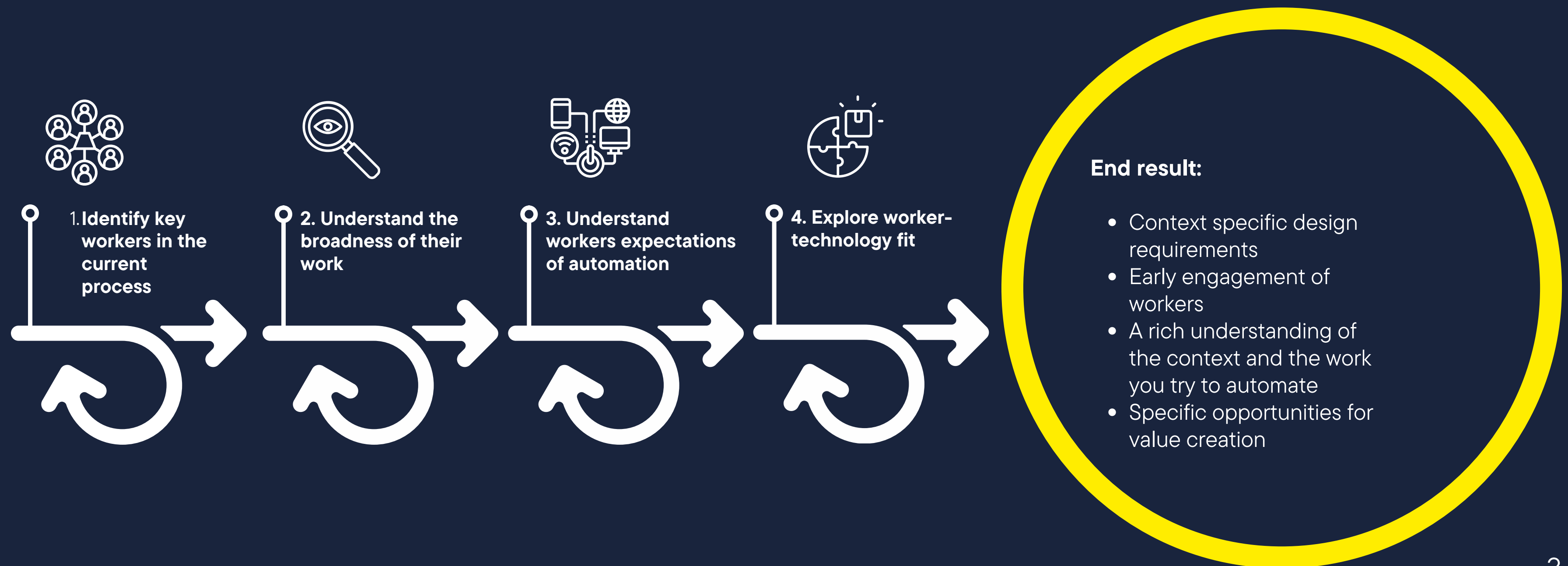
Consider social implications and ripple effects on the broader context. Design for human work rather than focusing only on technical aspects.

Bridge designer-worker gap

Avoid oversimplified views of human work. Create technologies that align with actual user needs through human-centered design.

Process overview

The approach to securing a human-centered transition consists of four steps, shown below. If all steps are followed, you will likely end up with context-specific knowledge and design requirements, early worker engagement, and concrete opportunities for value creation. Each step will be explained in more detail later on.



1.

Identify key actors in the current process

Questions for yourself

- Who might experience indirect consequences?
- Which people are needed to keep this process running?
- In what way is information exchanged in the current process?

Goal

The purpose of this step is to map out the people who play a central role in the process you intend to automate. These individuals will likely experience direct consequences from automation in their daily work and may need to collaborate closely with the new technology. While a primary end-user often comes to mind first, it is crucial to also identify individuals who play a more indirect role in the process but may not be immediately obvious, such as those who support the process indirectly. These individuals will also be affected by the transition and possess valuable, experience based knowledge about the context in which you plan to introduce automation.

How

Create a stakeholder map of the people involved in the current process you are trying to automate. You can then connect these stakeholders by drawing arrows to indicate how information is exchanged between them, forming an information flow map. This will help visualize how your process is embedded within a network and enable early identification of potential side effects of automation. By analyzing information flows, you can determine what actors that play a crucial role in the process.

Who

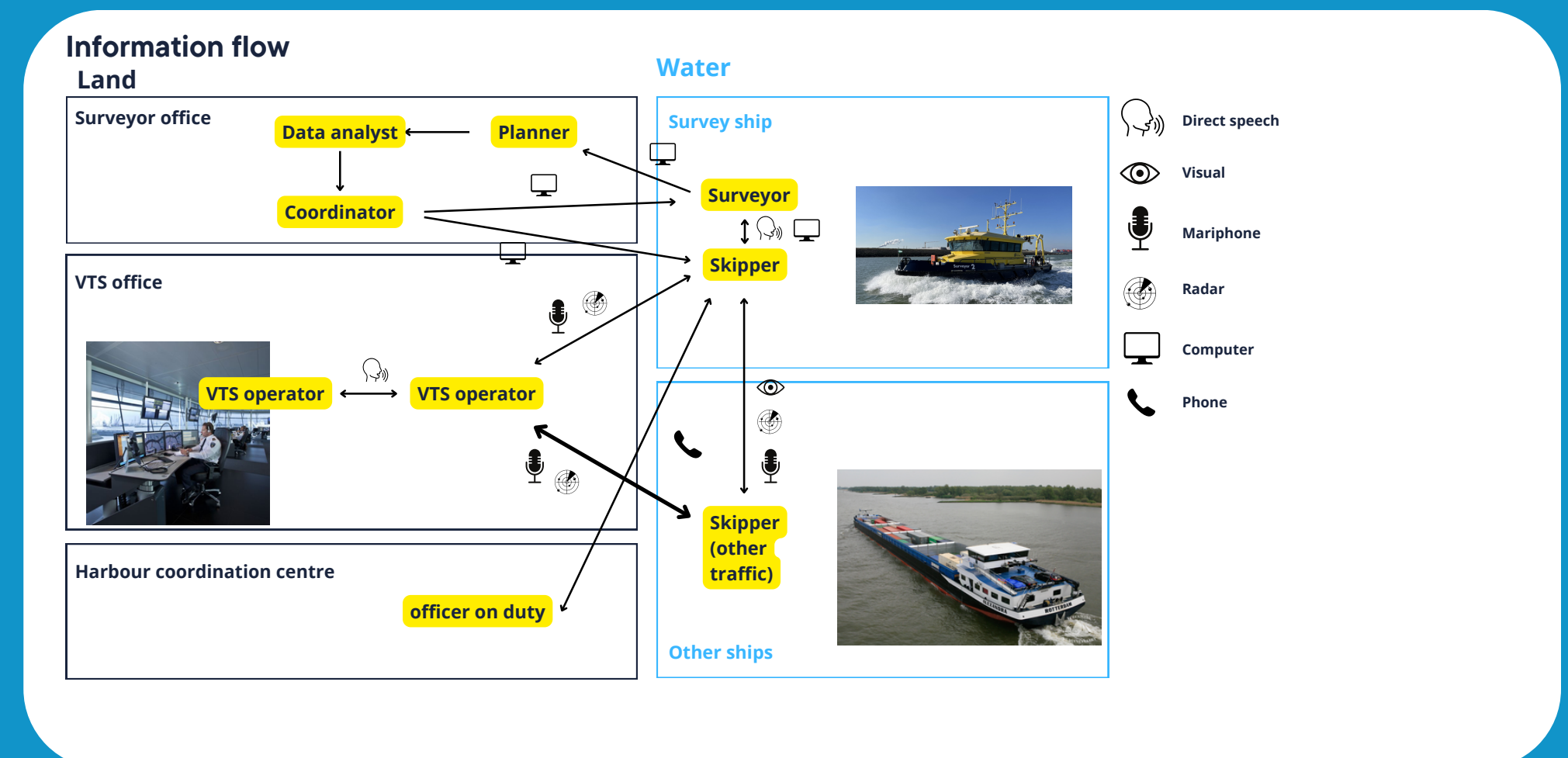
People who will work directly with the new technology or interact with it during their daily tasks.

Tips and Tricks

- Look beyond the direct end-user.
- Recognize that the process you are automating is part of a larger network.
- Discuss the stakeholder map with relevant individuals to ensure it accurately reflects reality.

Example

In the port area, there was a proposal to conduct hydrographic surveying with an autonomous drone. The most apparent end-user who would frequently interact with this new technology was the surveyor. However, the surveyor works alongside a skipper on the boat, who currently operates the vessel. This skipper, in turn, communicates with the vessel traffic service (VTS), which is responsible for safety and coordination with other skippers. Although they are not direct end-users of the autonomous drone, their roles will also be affected by its implementation. Therefore, it is essential to map these individuals and their information flows.



2.

Understand the broadness of their work

Questions for yourself

- Which aspects of the work do I not yet understand?
- What does a full shift or workday look like?
- What pain points are experienced during the work?
- Which aspects of the work are not explicitly mentioned?

Goal

The aim of this step is to develop a comprehensive understanding of the scope of your key actors' work within this context. What tasks do they perform that you didn't initially expect? What challenges do they face in their current work environment, and how do they deal with them? The best way to answer these questions is through direct engagement by visiting and getting to know your target group.

How

Once you have identified your key actors, it is important to immerse yourself in their work and experience the context firsthand. This can be done by spending a day shadowing these individuals and making observations. By doing so, you will witness the obstacles they face in their daily work environment. You can document these observations by creating a journey map of their workday, which can then be used to communicate findings with other team members.

Who

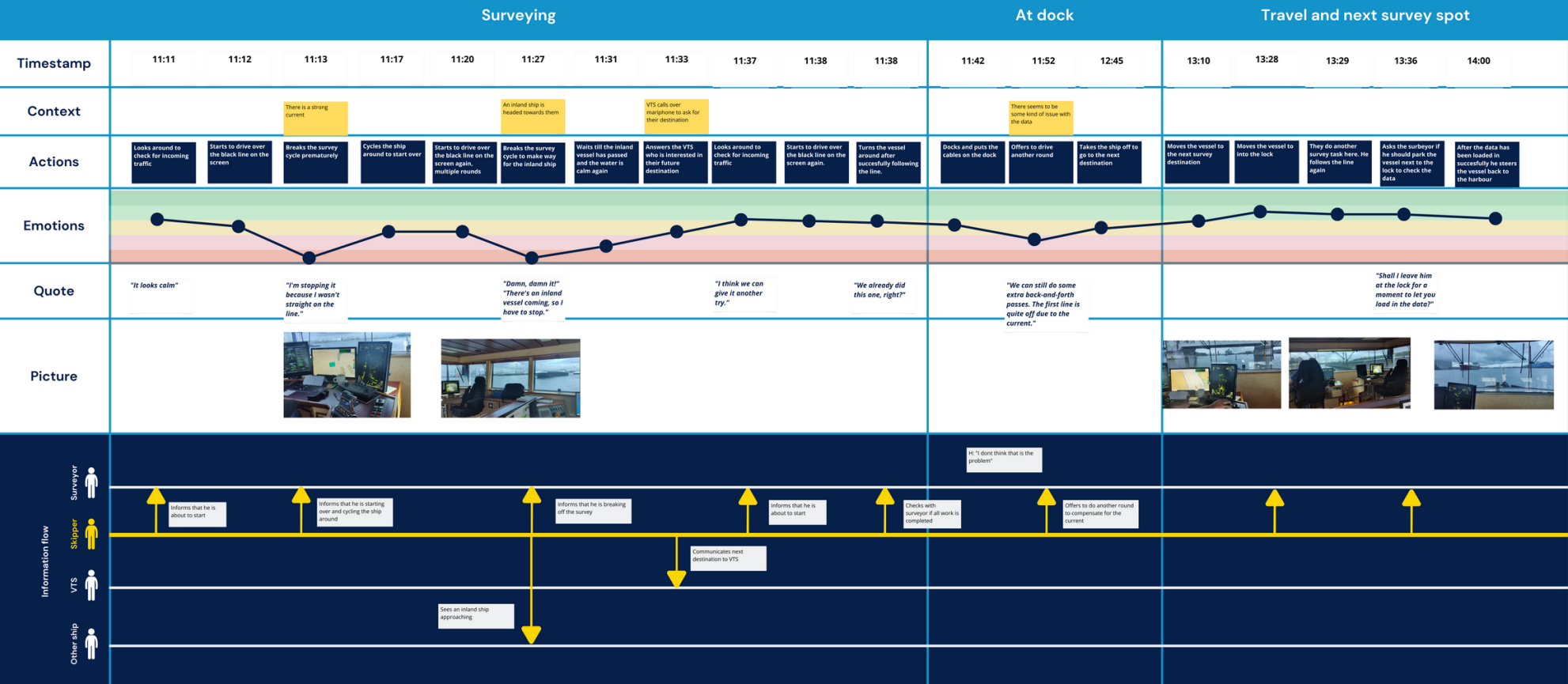
Key actors identified in the first step.

Tips and Tricks

- Make sure to shadow your actors for a full workday or at least a significant portion of it. Avoid general tours or open day visits, as these will not provide real insights into their actual work.
- Recognize that the actors are experts in their own experiences and work environment you are there to learn. Approach them with an open mind and curiosity.
- Clearly explain that your goal is to understand their work and conduct research on automation. Many individuals will readily share their opinions or experiences on the topic. Also, make it clear that no design has been created yet and that their input is valuable.
- Use this step as an opportunity to build relationships with your target group. Ask if they would be interested in contributing to the discussion and exchange contact details.
- Share the journey map you create with participants to verify its accuracy and completeness.

Example

In the context of the port, I spent time on a survey vessel and conducted observations at the vessel traffic service center. This allowed me to see how the work was actually carried out, what frustrations people had, and what they enjoyed about their jobs. Based on these insights, I created a journey map for each key actor.



3.

Understand the expectations of automation

Questions for yourself

- What attitude do workers have toward automation within their field?
- How do employees expect automation to change their work?
- How does automation influence their relationship with other people in the ecosystem?
- What requirements must technology meet to operate successfully within the context?

Goal

The objective here is to establish initial requirements for an autonomous system and gain insight into how key actors anticipate that autonomous technology will change their work.

How

This can be done through individual interviews, but it could also take the form of a co-creation session. Prepare speculative future scenarios in advance to facilitate discussion. These scenarios can also serve as a way to challenge initial automation plans.

Who

Key actors identified in the first step.

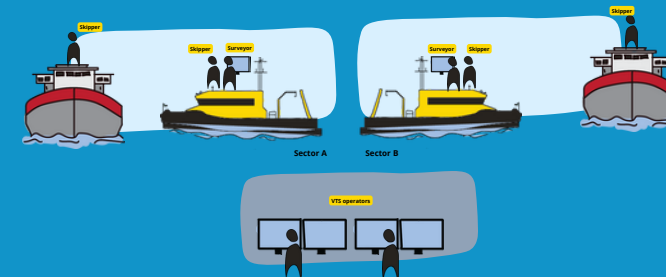
Tips and Tricks

- Involve not only the individuals you visited in Step 2 but also others from this group. Consider using snowball sampling or sending out an informational email to give everyone the opportunity to contribute.
- Ensure that you present concrete future scenarios to keep the discussion grounded. This helps avoid conversations that become too abstract about "fully autonomous" environments.
- If discussing a speculative scenario, emphasize that it is purely for discussion purposes and does not represent actual plans. Sometimes people might withhold their true opinions, because they do not want to insult your ideas.

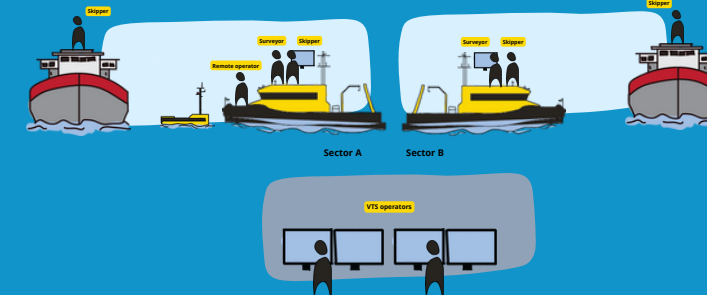
Example

In the port, I developed two speculative scenarios and used them as the basis for interviews with various stakeholders. Through these interviews, I discovered that many participants did not immediately see the value of an autonomous drone under certain circumstances, and that communication speed was a critical factor for vessel traffic service operators. Having two visual scenarios helped to keep the conversation grounded.

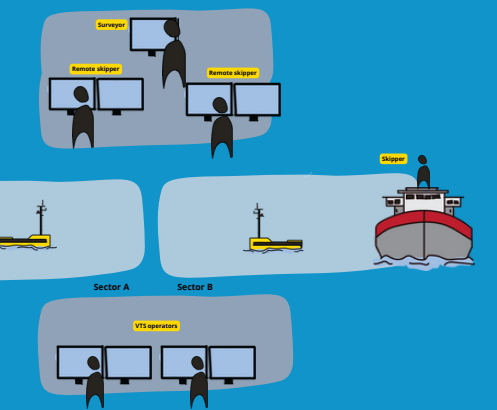
Current scenario



Mothership scenario



Full remote control scenario



Willingness of the port authority to operate beyond visual line of sight

4.

Explore worker- technology fit

Questions for yourself

- In what ways can automation alleviate existing pain points?
- In what ways could automation make the work more difficult?
- How can these risks of increased work difficulty be mitigated?

Goal

The goal of this step is to map out how automation could add value for workers. By making this explicit, you ensure that users recognize both the value and potential benefits of automation.

How

For this step, I recommend filling in the Value Proposition Canvas for each key actor. The Value Proposition Canvas consists of a product side and a user side. On the user side, you document their job to be done, the pain points they experience in their work, and what they aim to achieve. On the product side, you describe your solution, the pain relievers it offers, and the gain creators it contains. The goal is to align these elements as closely as possible with the pains and gains of each key actor. This also provides a clear overview of what each key actor considers important.

Who

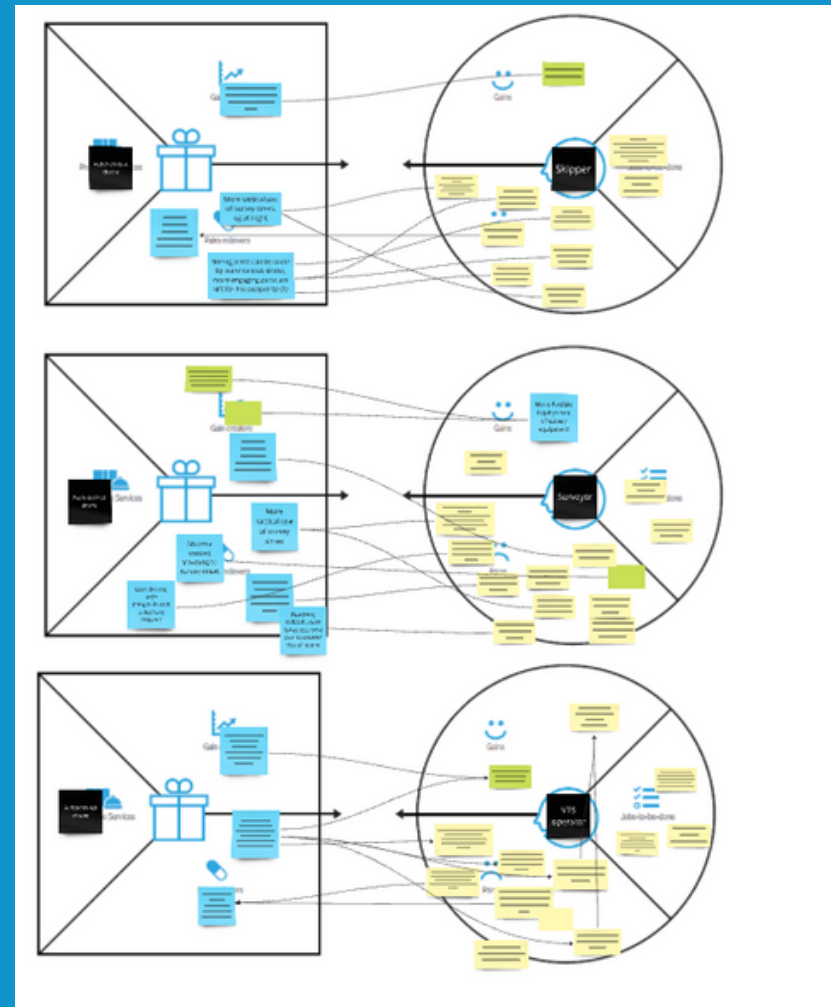
Development team.

Tips and Tricks

- The more you know about your target group, the easier it is to fill this in.
- Update your canvas as you discover new insights.
- Write insights onto insight cards in miro to easily fill in the canvas.

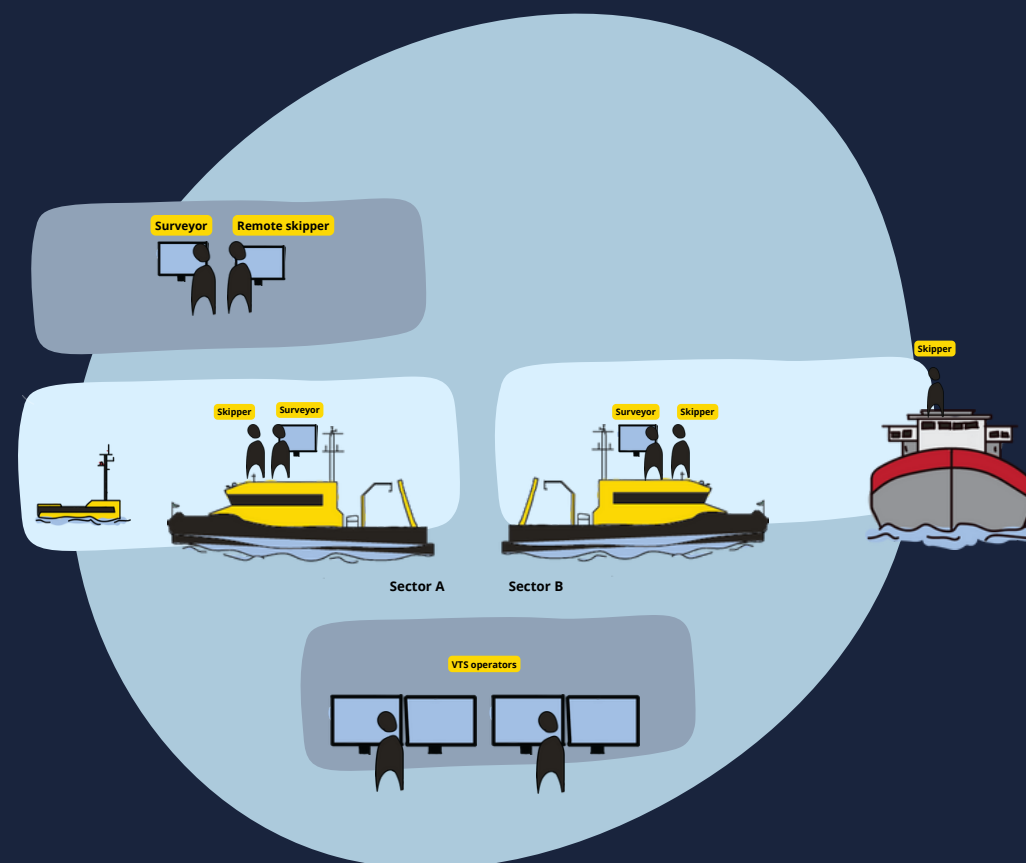
Example

After interviewing key actors and conducting contextual research, I gathered many insights about the target group. I needed to consolidate these insights into the design of a potential future scenario. I wanted to base this scenario on the needs of key actors. By filling in the Value Proposition Canvas, I noticed that many pains experienced by actors were related to heavy vessel traffic. By enabling measurements to be conducted during less busy periods, many of these pains could be alleviated. This ultimately became the focus of my design for a potential scenario.

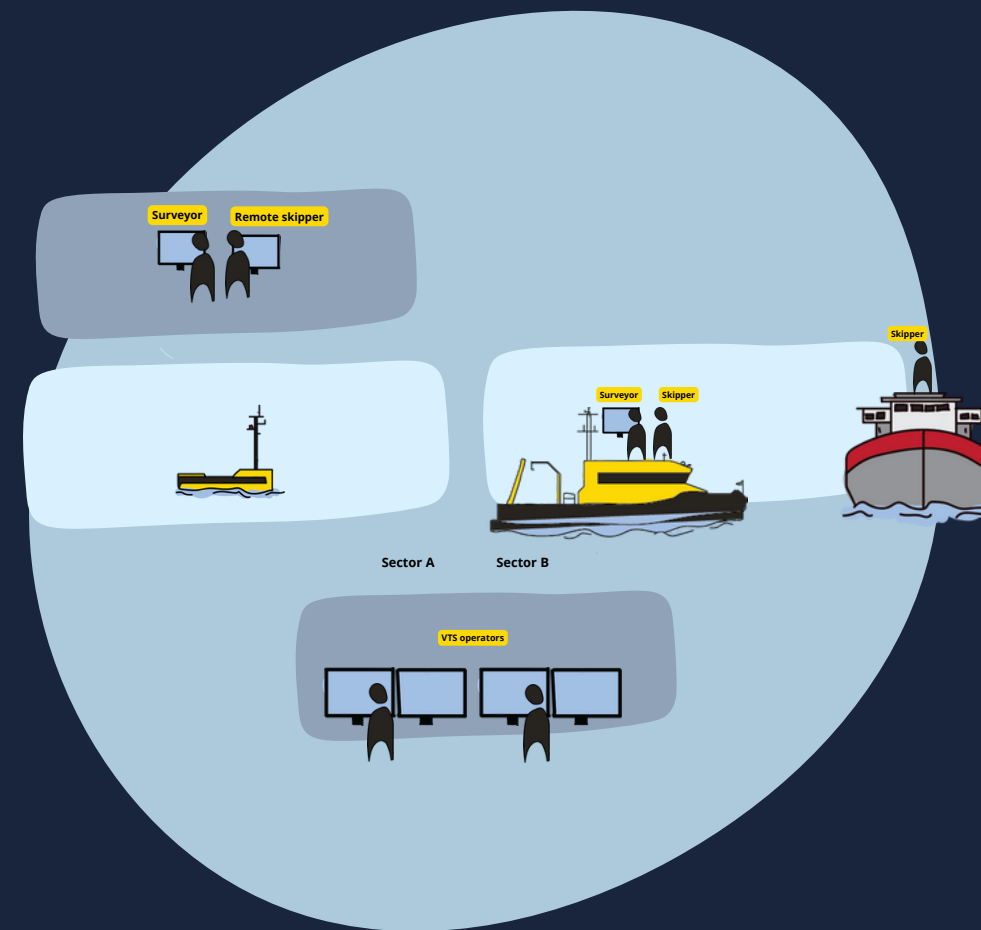


Outcome and possible next steps

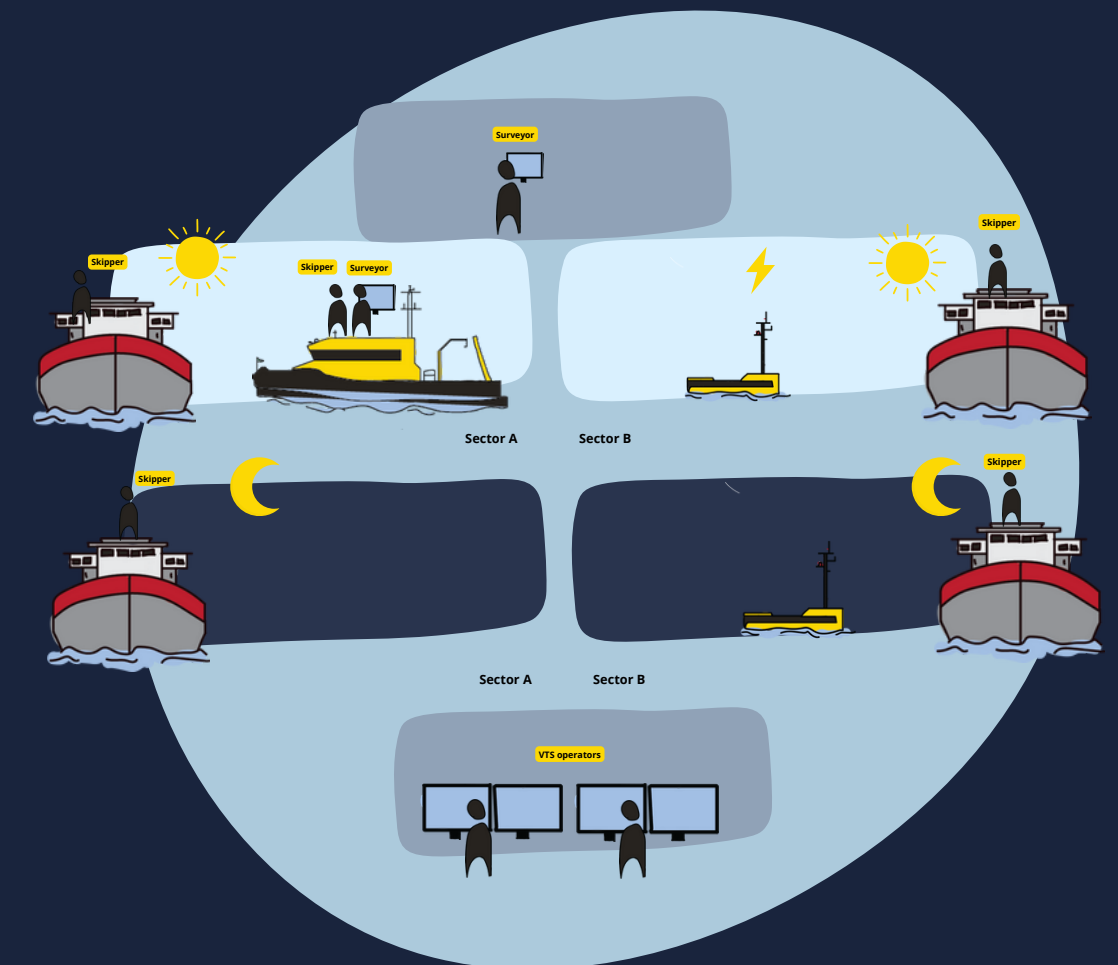
If you've completed all the steps, you'll likely have: A rich understanding of the context and the work you're trying to automate, early engagement of workers, enough information to define context-specific design requirements, and a clear view of opportunities for value creation. This enables you to take informed steps towards a pilot. In the case study at the port, this information was used to plan the transition towards using a USV. These scenarios can then serve as a starting point for running pilots and for conducting further co-creation sessions with workers for validation. It's important to maintain worker engagement throughout the rest of the process.



Ensure physical presence



Ensure (remote) direct human oversight



Test with no real time human oversight