

A Pilot's perspective on remote pilotage – Usability & UX of Remote Pilotage Station

S4V WP 4.3.



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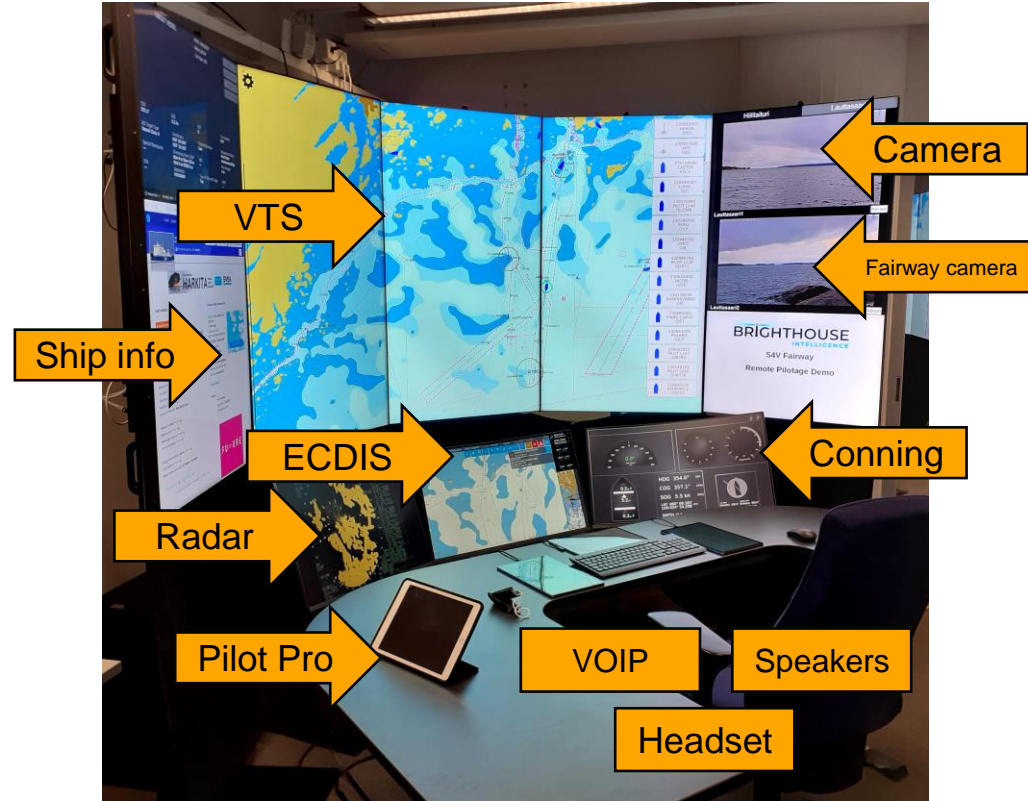
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Remote pilot's demo station

Pilot tools:

- Connection devices
- Information from ship
- Information from fairway
- Context information



Usability

Few issues to
illustrate pilot's
perspective



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Overall screen setup was demo flashy not pilot usable

- Big VTS map in the center did not bring major value to the remote pilots
- Main focus for the pilot is on Radar and Camera from the ship. They were placed in the opposite corners of the demo setup.



Altering transfer delay was a burden

- In the demo it happened that the data transfer had altering delay
- Delay as such was to be expected and it could be adjusted for, bread and butter for pilots
- Altering delay posed a new burden as the validity of the data had to be adjusted
- A new requirement of the setup should be to have as fixed delay as possible and some metric of the delay and the delta of the transmission delay for verification

Voice output device quality

- **Communication in the bridge was hard to follow as the audio output devices in the demo setup were limited to mobile device speakers**
- **Remote pilot could not be certain if something was noticed in the bridge that was important for them too**

Display brightness and contrast settings need adjustments in the dark

- **Dark conditions require preparations**
- **Basic camera settings need to be easily adjustable to dark time**
- **Reflections from the bridge glass need practical solution**
- **Some of the issues can be solved in receiving end by adjusting screen brightness and contrast for maximum information**

Usability for demo expectations was positive

- **Safety of the pilot increases as the risky boarding is avoided**
- **Majority of the functions needed in the remote piloting were already implemented**
- **Camera view from the ship offered a reference for other data sources**
- **Physical ergonomics of the station were good**

User Experience

(UX)



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Biggest expected practical change

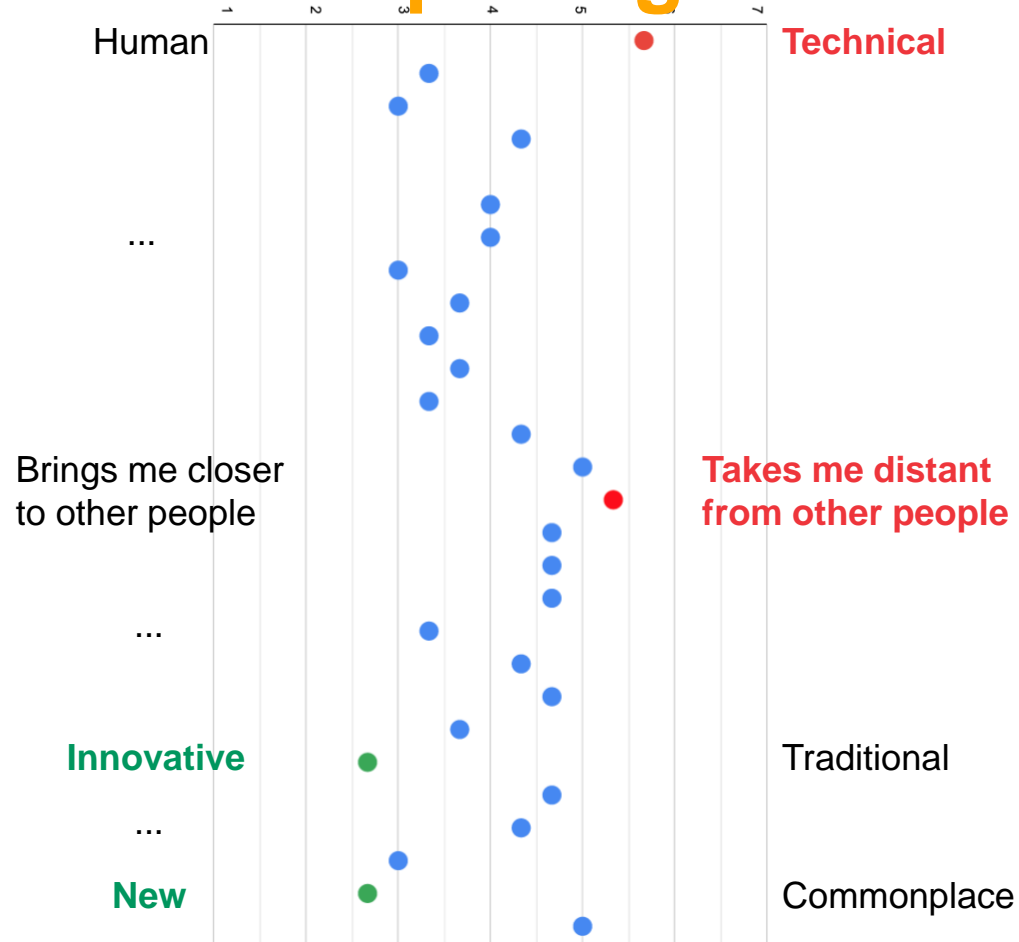
- **Pilot safety increases, physical hazard of embarking and disembarking is removed**
 - "Positive side. Sitting in in the pilot boat is also removed."-Pilot #3
 - "People with less fitness can act as a remote pilot"-Pilot#2
- **Mental load is more demanding**
 - Training was expected to ease this mental load: "When I have practiced the technique the mental load can be lower"-Pilot#1

Indicative feedback of remote pilotage tools

3 pilots agree the tools are:

- Technical (not human)
- Increasing their distance from people
- New and innovative

AttrakDiff2 semantic differentials for user experience measurement



Integration of tools to one remote pilot (ECDIS based?) system

- Different data sources should be integrated in one system
- If the information is in different systems and the secondary information would need extra steps to use, the step won't be taken

Pilots popped ideas of

- More powerful ECDIS (meeting point estimation, deviation from the route)
- Radar overlay to ECDIS
- Awake system information overlay to ECDIS

Ground perspective is alien to pilots

- **Perspective from ship is essential for pilot**
 - **Perception of the vessel motion**
 - **If ground radars would be used the perspective would need to be changed to mimic the ships view**
- **VTS radar could improve in few certain situations**
 - **When there is crossing or islands that block radar from vessel**
- **Camera view to the fairway is nearly impossible to utilize by the pilots as they don't see they ordinary signals from there**
 - **Extra overlays (fairway lines) or just other analysis needed for use**
 - **Assumption (unverified): Other smaller fairway users and their doings could be spotted from the camera view**



Remote pilots will need training in cameras, audio and station setup

- Remote pilots will have a completely new toolset from old: cameras, microphones, displays, VOIP-lines etc.
- This will need training and practice
- Remote pilot cannot be overwhelmed by the tools that are needed when remote piloting starts
- Remote pilots will need to be familiar enough with the tools in the ship, that they can (almost) be the help line about the technical issues

Remote piloting demo showed potential

- **With the right conditions and few fixes the demo setup would be ready for real use according to the pilots**

Demo positive conditions:

- **Familiar ship and crew**
- **Camera forward was an improvement to simulator runs**
- **Radar settings were set on ship by another pilot**

Fixes

- **ECDIS version and setup was not the most familiar and easy to use for pilots**
- **Usability issues**

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Extra slides



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Remote pilotage is cognitively more consuming

- **Micro pauses are harder to include into the work**
- **Remote pilotage requires constant focus on instruments and being on the call, whereas on ship it is easier to predict toilet break possibilities and less demanding minutes**
- **Constantly holding high situational awareness becomes cognitively more consuming**
 - "A lot of data on the screens and the pilot head just keeps spinning",
'I need to focus a lot' (*[Etäluotsina] "skarppaat aika paljon".*) - Pilot #1
- **Feeling from remote pilotage simulations is that the remote pilotage is more burdensome than traditional pilotage**

Biggest expected change

- **Loosing of the control**
 - "After this we cannot control the ships. Captain has it."-Pilot #3
- **Changing into more monitoring role**
 - "Active role is reduced" - Pilot #1
- **Personal meeting with the captain is removed**

- **Remote pilotage requires more from the bridge crew and captain**

Looking back in ship bridge

- **Pilots look back when they are outbound as the marks are on the shore behind the leaving ship**
- **If only forward direction camera is used the remote pilot cannot access this information**