Can a ship at sea be safely controlled from shore?

Cognitive factors for Remote Control of Ships (CogRemote)

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Background and motivation

I have a professional background as navigational officer in merchant shipping with 7 years of seafaring experience onboard product tankers. I have a Bachelor's degree in Nautical Sciences from Indira Gandhi National Open University and a Master's degree in Maritime Management from University of South-Eastern Norway. My PhD degree is in Nautical operations, a joint program of four leading maritime universities in Norway (UiT, USN, NTNU, HVL). My primary motivation to join the SEAS programme was to further deepen my expertise in Maritime Human Factors while also being part of the diverse and inter-disciplinary environment at University of Bergen.

Figure 1: A screenshot of VTS screen from Gothenburg © Anders Johannesson

Project description

The postdoctoral project will advance knowledge in the field of maritime human factors for safety in remote operation of autonomous ships. The project intends to collect empirical data of various actors involved in remote control of ships and understand factors influencing human performance and how it can be better supported through targeted interventions, design, training and performance monitoring.

Main questions

- What are the different cognitive and social factors influencing the performance of VTS operators ?
- What are the information requirements and cognitive demands for remote pilots during navigation of vessels within port limits ?
- How varying levels of automation at ship´s bridge or at shore impacts the performance of operations and process of navigation.

Marine sustainability

By promoting safety at sea through improving understanding of human factors, the project will inform the best practices in the design of workspaces and operational procedures for maritime navigation. Specifically, it can contribute towards the SDG 8 (Decent work and economic growth and SDG 9 (Industry, innovation and infrastructure)

Highlighted activities

Some of they key highlights in the project so far are as below:

- Ongoing 18 months research exchange in Chalmers University of Technology at Gothenburg, Sweden (January 2024 – July 2025)
- Site visits to Gothenburg VTS and Swedish Maritime Authority Simulators
- Participation in Swedish Maritime Authority led project on Navigation Support from Shore with actors from local cluster
- Conducted a systematic literature review of various cognitive and social factors impacting performance of VTS operators
- Performed Applied Cognitive Task Analysis (ACTA) interviews of experienced pilots of Gothenburg Port

Aims

- Conduct a systematic literature review of applied cognitive and social factors for maritime navigation
- Conduct interviews and observations of experienced port pilots
- Design and conduct experiment for evaluating impact of automation on remote operation of ships and maritime navigation
- Use Psychophysiological measures for cognitive state estimation of operators

Supervisory team

Main supervisor – Prof. Bjørn Sætrevik, Department of Psychosocial Sciences, University of Bergen

Co-supervisor – Prof. Morten Fjeld, Department of Information Sciences and Media Studies, University of Bergen

External supervisor – Prof. Scott MacKinnon, Department of Mechanics and Maritime Sciences, Chalmers University of Technology

Industry Mentor – Kristian Gould, PhD, Equinor

Figure 2: A workstation of a VTS operator © Gesa Praetorius

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