Visualizing and controlling simulated processes using the MTP-concept and OpenBridge

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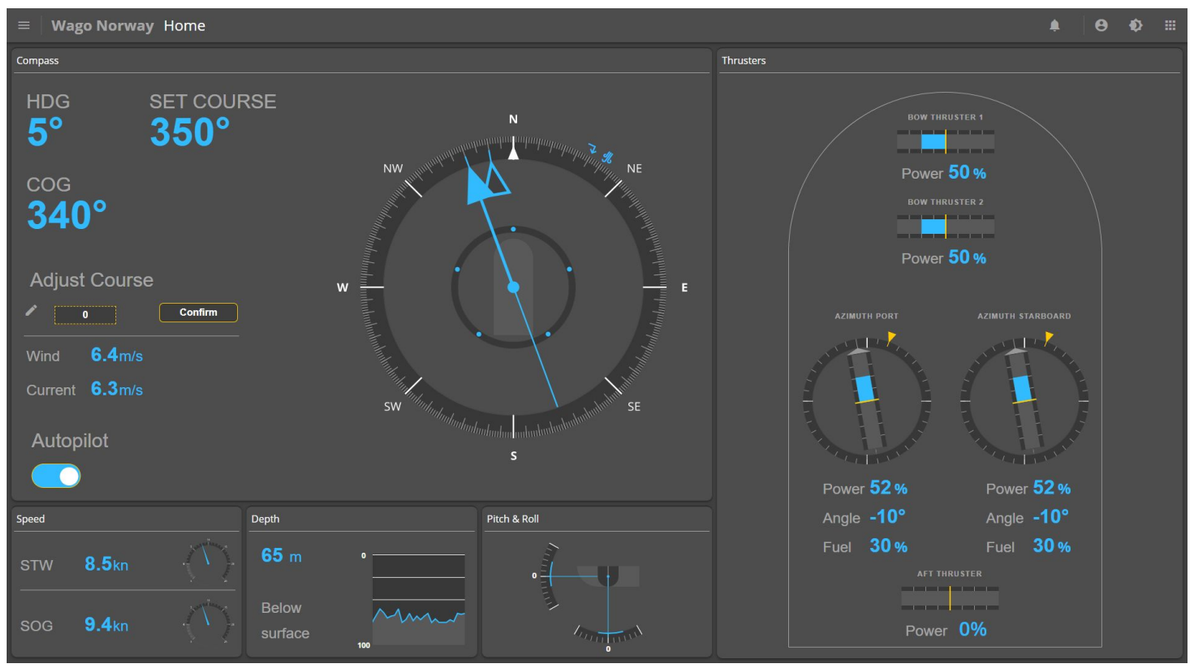
Introduction

Human Machine Interfaces (HMI) of today are often oldschool, out of date interfaces which is locked to a manufacturers own visualization program. For this Bachelor project, our goal was to create a platform independent HMI by using the OpenBridge Design System and the MTP-concept, to aim for a new standard of quality within the automation industry, all running on Wago's Touch Panel 600.



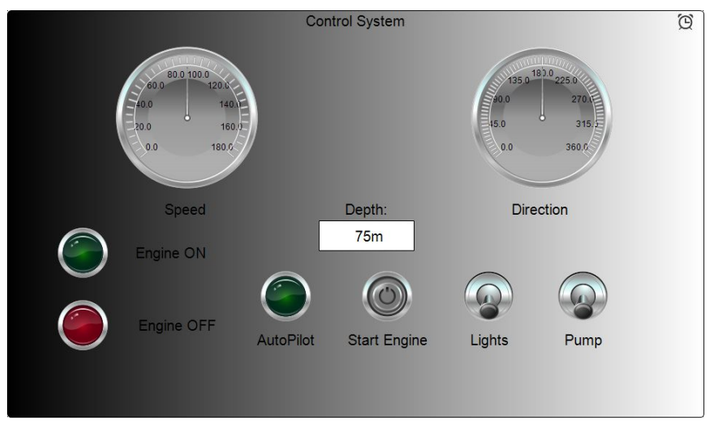
HMI Homepage

Methods

- OpenBridge Design System: *Visualizing the processes*
- e!COCKPIT: *Programming simulated processes using MTP*
- Node-OPCUA: *Establishing a communication channel*

OpenBridge Design System

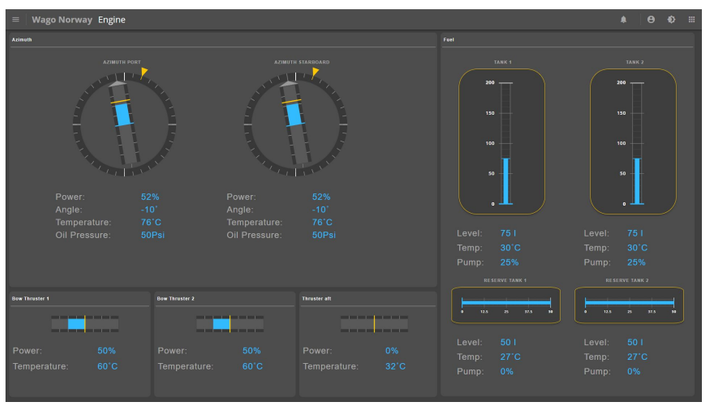
OpenBridge is an open source platform for designing and developing modern visualization for mainly maritime systems. OpenBridge brings design guidelines and components to ensure a new standard for the quality of HMIs.



Common architecture with manufacturer locked HMI

vs

Platform independent HTML based HMI



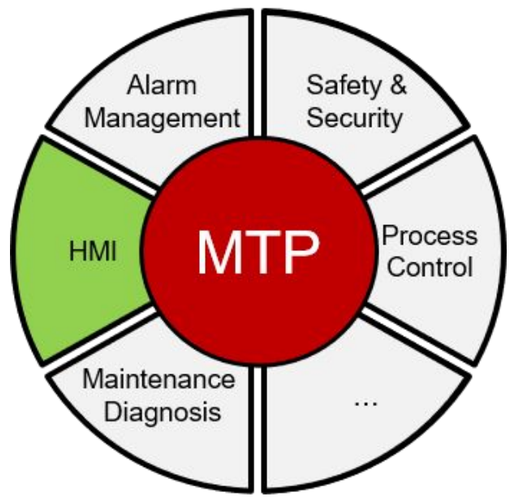
HMI Development

- HTML5 based HMI using external CSS and JavaScript.
- CSS Styling with components from the OpenBridge CSS Library
- Visualizes the processes simulated by the PLC

Communication

The communication channel between the HMI and PLC utilized a custom coded OPC-UA client based on node-opcua, a module for NodeJS, as well as a websocket communication between the HMI and OPC-UA client.

Communication Channel



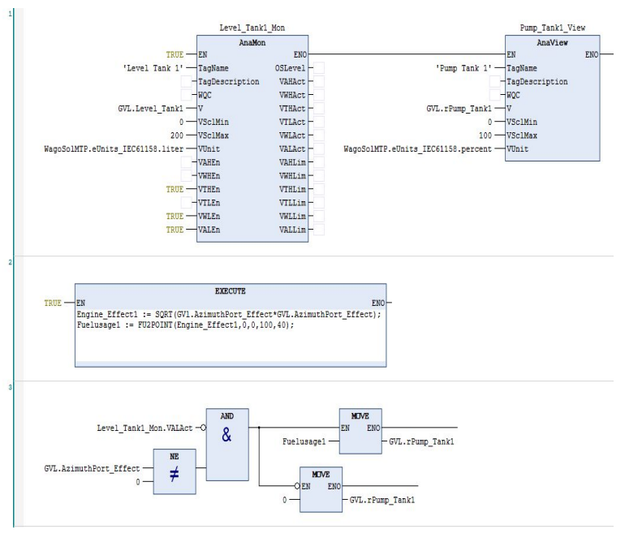
MTP key aspects
Source: www.wago.com

Module Type Package

MTP is an upcoming solution where properties of process modules are described, regardless of manufacturer and technology. This enables simple integration and exchangeability of system modules.

PLC programming in e!COCKPIT

- e!COCKPIT (based CODESYS V3) with pre-built MTP function library
- Simulate maritime processes like Tank Control from test systems
- Integrating traditional PLC programming with MTP functions like AnaMon



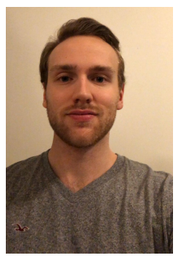
Integrating MTP functions in Function Block Diagram Language

Conclusion

Through a custom coded communication channel between the PLC and HTML it was achievable to design a independent state-of-the-art HMI, utilizing the upcoming framework for MTP to monitor and control simulated processes , all running on Wago's TP 600 and PFC200 hardware.

Pål K. Ofstad

Ørjan Pettersen



Eskil Gaustad

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Want to learn more?

Check out the full project at our GitHub!

https://github.com/Wago-Bachelor/WebVisu