Graduation project summary

This document includes a short description of the graduation project for my double degree at the TU Delft. Combining both my maritime knowledge and computer science knowledge during a project at Damen Shipyards. The project is worth 60 ECTS, of which 30 ECTS is common and 15 ECTS per degree. The responsible supervisors at the TU Delft are:

Dr.ir. Robert Hekkenberg
Ship Design
Maritime Technology - DPO
Faculty of 3mE

Prof.Dr. Mark Neerincx
Interactive Intelligence
Computer Science – DST
Faculty of EEMCS

Ingmar Wever
4161041

Computer science becomes more relevant for the maritime industry, as more data is generated and stored. This involves software architecture, testing and cyber security. But what interests me is how the developments really support the desires and needs of the people using the software and data. Projects relevant in the nearby future are predictive maintenance, autonomous vessels, development of sales strategies, and the generation of ship configurations.

Research will be done on which information should be available in a specific case, how the data will be acquired, stored and retrieved for usage. This is done using a tool and only possible when insight is gained into the data which is available.

To make this project specific, realistic and doable within the time. I will first consider a specific use case. Extending the tool further depending on the availability of time. To guide this process several milestones are defined beforehand. During the project is determined which are realistic to achieve. The initial milestones are:

- Predict safe area in front of a specific ship. Dependent on the manoeuvring properties of the ship, and on the expected manoeuvring properties of the encountered ship.
- General tool to predict ship dependent warning domain
- Warning system for crew to inform them about situation and needed awareness
- Framework based on the tool to support more features, such as:
    - Warning signals for maintenance
    - Enable fleet management to supervise and set targets for captain

Required for the computer science part is the evaluation of human interaction with the developed tool. The tool can only be developed when there is knowledge on the input (data acquisition and database usage) and the output (user interface and visualisation of the data). In an iterative process the tool will be improved, this is among other things based on evaluation tests with users.

The maritime technology part will be more related to the models behind the tool. Currently the warning domain around a ship is loosely related to the type and size of the vessel, research will be conducted on this subject. To determine for each specific vessel the safe area, which depends on length, vessel type, weather, etc. Depending on the progress of the project, it is possible to use the tool for more assignments like predictive maintenance and fleet management. Where the right data should be selected and presented in a clear manner.