Projektförslag för kandidatarbete vid Elektroteknik (E2)

EENX15-21-18 Autonomous WaveRunner – Development of test rig

Background

The Swedish Sea Rescue Society (SSRS) perform thousands of rescue missions along the Swedish coast every year. SSRS has more than 70 rescue station along the Swedish coast in order to guarantee that the time until the rescue teams arrive at the accident site is as short as possible. At the accident site it is very beneficial to use small boats that ease the rescue mission. For this particular purpose a small specifically designed water yet, the Rescue Runner (RR), was developed. It has been shown to be very useful in rescue missions where safety is of the outmost importance. However, a major problem is to get the RR to the accident site. Driving it there is very tiresome, bigger boats are not big enough to bring the RR and trying to toll it would destroy the RR. Therefore, SSRS together with Chalmers students have investigated how it would be possible to get the RR to follow the leader boat out to the accident site in an autonomous way. The projects have previously been called Follow Me and has focused on how the RR can follow the leader boat in open water. Preliminary results show the possibility redesigning the RR and achieving a follow me function installed on the RR (https://vimeo.com/185011755). The department of Electrical Engineering at Chalmers have bought a Yamaha WaveRunner in order to continue this collaboration with SSRS and broaden the scope of the project. The end goal is to be able to autonomously navigate out from the harbor, follow the leader boat and at the accident site safely dock to the leader boat. The rescue staff can then switch to manual control and use the RR for the rescue mission.
A Drive-by-Wire system has been developed on the Waverunner and it is now possible to control it remotely. To further progress towards a fully autonomous system, we will this year have two projects:

1. **Follow the leader:** Autonomously follow the leader boat in a safe way.
2. **Development of test rig:** Create a small test rig for further development at Chalmers.

Problem description

This project (Development of test rig) aims to produce a test rig used for further development of the autonomous Waverunner. This is advantageous since testing in open waters can be hard, while also being time consuming and difficult to plan. By creating a test rig which imitates the Waverunner, it is possible to test different stages of system development without having to bring the Waverunner to a harbor.

The WaveRunner will, during the project, be located in the new CASE-lab at Chalmers where necessary equipment and tools will be available to build and test the physical solution. Testing the solution in water will be made at the Långedrag harbor where SSRS has its headquarters, where also the leader boat is located.

Suitable background: TKAUT, TKELT, TKMAS, TKDAT, TKDES
Group size: 3 to 6 students
Number of groups: 1
Prerequisites: Basics of Automatic Control, Mechatronic Systems, Programming in Matlab and C/C++
Contact person: Petter Falkman, tel. 031-7723723, e-mail: petter.falkman@chalmers.se