

Bachelor Project - CAPTAIN

Appendix

Bachelor - Electronics Engineering
7. Semester project Fall 2017
Group: 17115

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19. December 2017



CAPTAIN

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Abstract

English Abstract

Resumé

Dansk resume

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1 Preface

2 Introduction

3 Requirements

The Requirements for this project has been analyzed with the use of the MoSCoW method. This method is used to prioritize what should be worked on in the project. The method is separated into 4 levels of priority; **Must**, **Should**, **Could**, and **Won't**.

The following priorities have been chosen for this project:

- Must**
 - Navigate waypoints from user input
 - Be compatible with NMEA protocol GPS input
 - Use GPS for localization
 - Implement a PID control loop
- Should**
 - Control thrusters in two-thruster catamaran
 - Use a graphical user interface for user interaction
 - Be able to change the PID parameters
- Could**
 - Control wheel in outboard motor on boat
 - Be generic enough to use with other engine types
- Won't**
 - Use pylogon-coverage for a specified area
 - Avoid obstacles

3.1 Requirements specification

To get a sense of the system, some mock-ups of a ui were created and can be found in the documentation in section 2.1 on page 7.

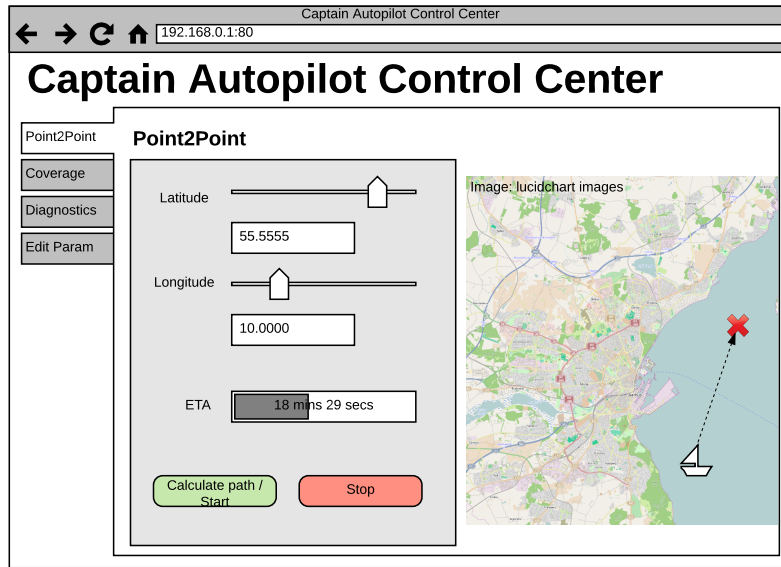


Figure 1: Mockup for the Point to point menu

An example of one of these mock ups is for describing a way point to navigate towards, can be seen in figure 1. It describes how the a user should interact with the system, and how the system should communicate to the user.

To describe the functionallity in further detail, a user case driven approach has been used. First of all the actors of the system has to be identified. In figure 1 is the use case diagram for the system, on the right are the actors that initiate a use case. On the left the other actors are.

Initiating actors or primary actors of the CAPTAIN system, are a technician, and a user. The technician is an actor who setups the system, and has a more in depth knowl- edge of the system then the user. The user could be anyone, since all of the complicated work should be handled by the system or the technician.

The usecase diagram on figure 2 also list 13 different use cases. A use case describe a way to use the system, in this system they mainly describe a button of function that can be started by the user. In this section a few use cases will be looked at, but for all the fully dressed use cases, one can have a look at the documentation section 2.3 on page 12.

3.1.1 Use case 3 - Edit parameter profile

One of the first things that was realized the system needed, was a way to describe pa- rameters of the system. Parameters could be PID-loop terms, or the size of the boat, i fact anything that could be of use to the system. So to be able to save these parameters, the concepts of a parameter profile came to be. A parameters profile is essentially a list of any kind of parameters. Use case 3 - "Edit parameter profile", is the use case used to change the values of the of an already created parameter profile. It's important to note that it is the technician who initiates this use case, since know what exactly the values should be could require some deeper knowledge of the system.

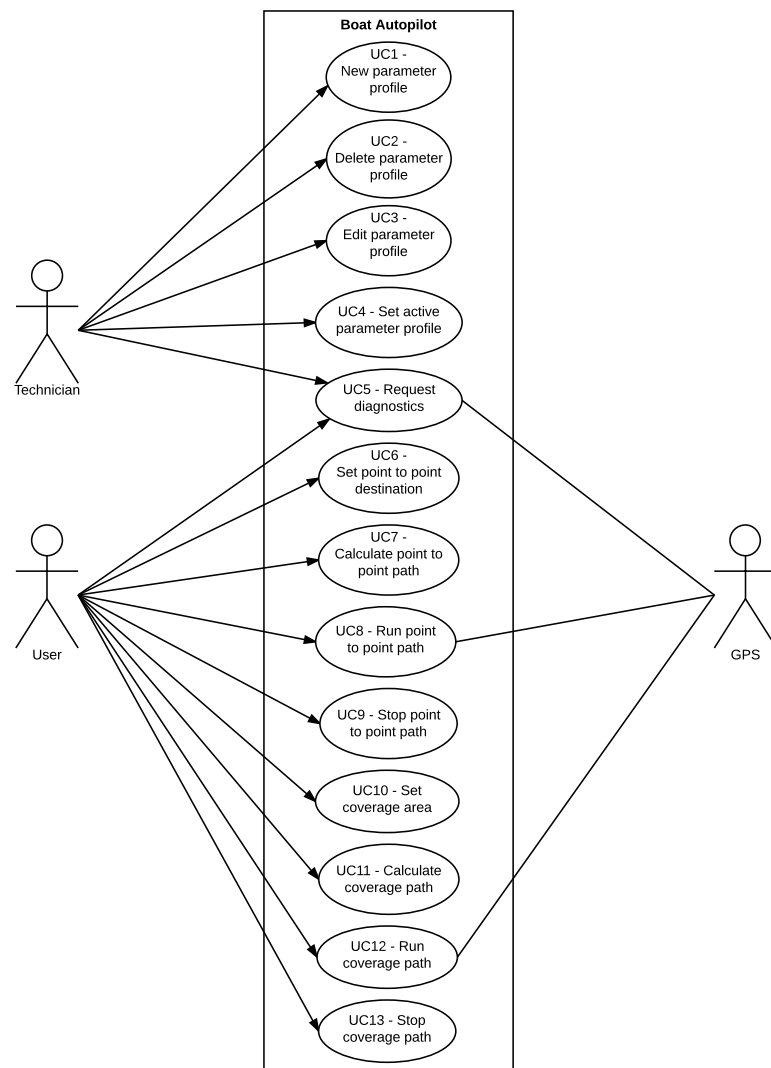


Figure 2: Use case diagram

3.1.2 Use case 11 - Calculate coverage path

There are a tonne of ways to navigate way points, first of one needs to decide on how to describe a way points. So for this system way points can be describe in two ways, either as a single point, or as a rectangle. For the rectangle the system should calculate a path that covers a the rectangle with lines that have a predefined distance between them. This use case should be initialized by the user, as a simple press on the user interface. In return the user interface should display the calculated path, so the user can tell if the path is what they wanted.

3.1.3 Use case 12 - Run coverage path

With a calculated path, ei. list of way points to follow, the boat should be able to follow these points. When the user presses a button label "Run" Use case 12 - "Run coverage path" is initiated, and it should not finish until the boat has reached the last way point of the list of way points. The boat should get though the way points using a control loop.

While the boat is running a the estimated time en-route should be displayed along with the current position of the boat.

3.1.4 Use case 5 - Request diagnostics

At any point in time, it might be convenient for the user or the technician, to know how the boat is doing. In other words, getting the diagnostics data from the boat. diagnostics data might include GPS information, what position the rudder is set to and so forth. This use case can, as mentioned be initiated by either the user or the technician, by the press

of a button in the user interface.

4 Delimitation

5 Method

6 Analysis

7 Architecture

8 Design

9 Implementation

10 Test

11 Results

12 Discussion

13 Conclusion

14 Future work