

# Path planning and autopilot for a ship hull cleaning robot

## Introduction to Fleet Cleaner

Fleet Cleaner develops and deploys robots for ship hull cleanings. We are an innovative technical company based in Delft. With our unique robot we offer the most complete solution for ship hull cleanings on the market, available in all Dutch seaports. The Fleet Cleaner robot removes fouling from a ship's hull, thereby increasing fuel efficiency dramatically and reducing fuel costs. The cleaning is performed during loading and unloading in port; resulting in no down-time for the vessel. The fouling that is removed from the vessel is captured and filtered by our state-of-the-art filtering system aboard our support vessel. This is the reason that Fleet Cleaner is one of only a few companies licensed to perform hull cleanings in Dutch ports.

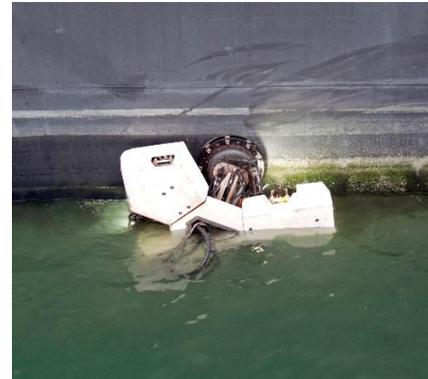


Figure 1 The Fleet Cleaner robot cleaning a ship

## Research objectives

During a cleaning operation the robot is remotely controlled by a human operator. Since a single cleaning operation can take up to 48 hours, the operator would greatly benefit from a semi-autonomous robot. The current robot has an autopilot to assist the operator, which is able to track a target depth on a 2D surface. This allows for a partially automated cleaning of the sides of a ship's hull by cleaning horizontal 'lanes'. However, Fleet Cleaner's goal is to fully automate the cleaning process and the first step is a more autonomous autopilot. Therefore we are looking for interns who are interested in one or more of the following topics:

- Path planning strategies for efficiently dividing the hull into workable areas.
- Investigation into state-of-the-art autopilots for comparable scenarios.
- Extending the current autopilot for use on 3D surfaces.
- Development and deployment of path planning algorithms for covering the ship's hull (a confined, unknown 3D shape).

We are looking for a talented and enthusiastic MSc, BSc or Applied Science (HBO) student, preferably with a background in robotics or related engineering fields. We offer the following:

- 3-12 months thesis assignment or internship at Fleet Cleaner (in Delft)
- Actual implementation and testing of your work in a real-world application
- Working in an innovative company
- Working together in a young, enthusiastic and multidisciplinary team
- An appropriate internship allowance