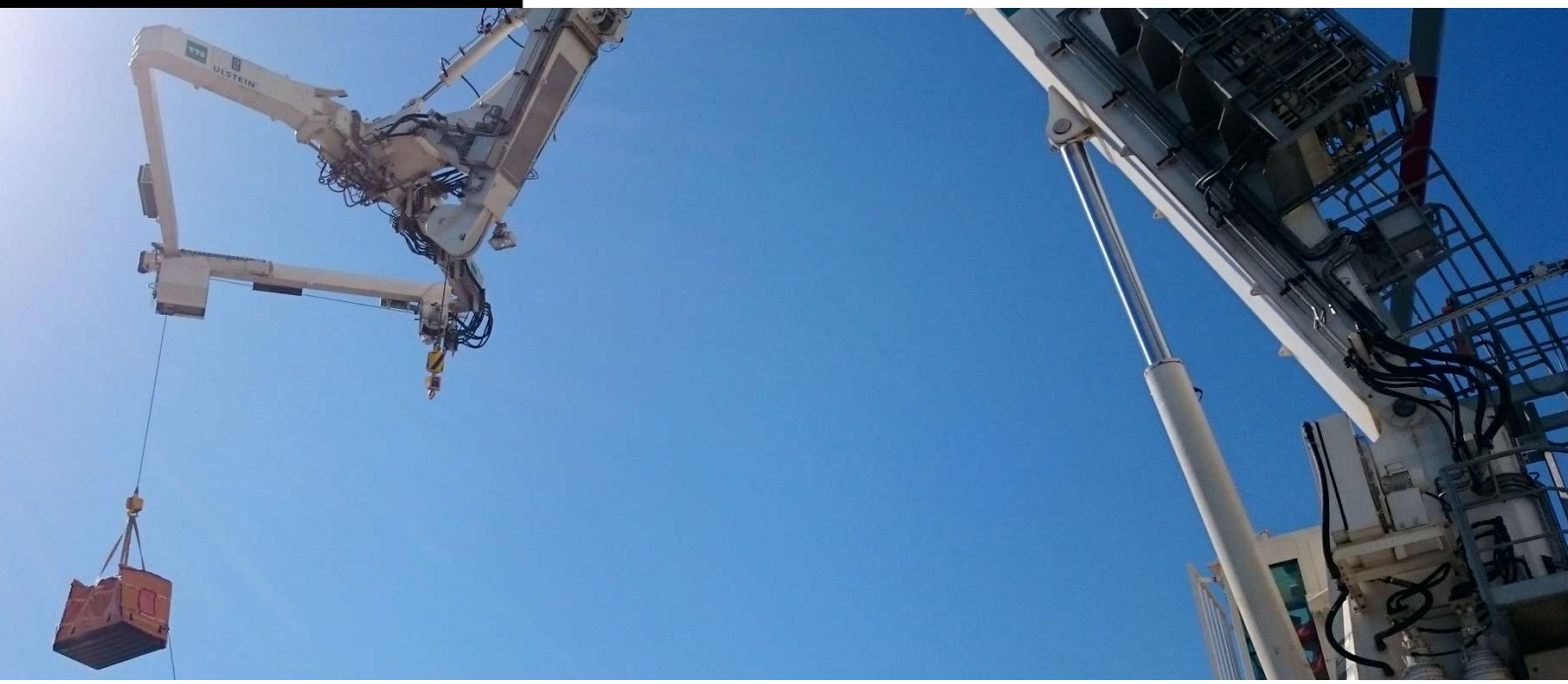
controllab | products

Motion Control



Motion Control

To compensate a crane for the motion of a ship, to steer a robot without collisions, or to make a piston pump transport fluids with ultimate precision, this all requires an accurate control of motions. Controllab has a large expertise in designing control systems for a wide range of applications.

Key for designing a successful motion controller is a good understanding of the dynamics of the machine. Controllab uses model based design. With model based design, every part of a machine that is relevant for the motion is identified and modeled. By coupling the modeled parts, a system simulation model is created. This simulation model is then used to design a control system, that will make the machine move with the desired precision and speed.

The simulation model can also used to test the control system, when it is implemented on a PLC or an embedded system. This is called Hardware-in-the-Loop (HIL) simulation. With HIL-simulation, many scenarios can be tested, before the machine is actually built.

Controllab can speed up the design process, by running simulations automatically and testing the outcomes against preset requirements. This allows us to implement changes to the control systems and test them against hundreds of scenarios.

Wind Tunnel Robot

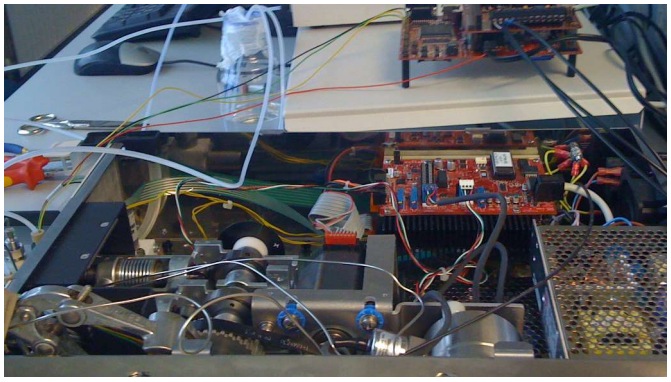
The German-Dutch Wind Tunnels (DNW) operates a high speed wind tunnel. In this tunnel an area of 2.0 m x 1.8 m is available for testing from mach ranges of 0.1 up to 1.35 and pressures ranging from 0.2 bar to 4.0 bar. A robot is used to man oeuvre models into the test area and keep them in the correct postures. For a tunnel redesign a new robot was needed with improved maneuvering capabilities and dynamic posturing. Controllab was commissioned to test the capabilities of the designed robot under dynamic wind loads. Because this project was classified, this fact sheet shows a picture of the previous robot.

photo: courtesy of DNW

With the geometric data and physical parameters of the robot, a 3D model was created. During simulation this model uses the joint torques and wind loads as input and returns the corresponding motion of the robot as outcome.

Ultra high pressure pump

A world-class supplier of components for analytical systems contacted Controllab to work on their ultra high performance liquid chromatography (UHPLC) pump. The UHPLC pump consists of two pairs of serially coupled piston pumps. Each of the four pumps is individually driven and controlled. This generates maximum freedom for the flow control and pulse reduction.



Controllab used the software package 20-sim to model the various components of the pump and develop an advanced control system. One of the challenges of the new pump was its range of operation. This required a dedicated servo motor controller, capable of driving a motor with an extremely constant rotation over a large ranges of speeds. A three phase servo motor model was developed by Controllab. The simulation model helped Controllab to develop an advanced servo motor controller and test it in simulation first, before deploying it on a test bed. An automated work flow was created that allowed Controllab to export the control system as C-code and deploy it for testing on a test bed and prototypes automatically. This allowed the customer to test the prototype and develop a market ready product without any delays. The product lived up to its expectations was quickly seen as best in its market.

Expertise

Controllab is active in the High Tech and Maritime markets for more than 20 years. Our engineers have gained a thorough understanding motion control. Please contact us if you need help.

Contact Us

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