Pieter van Zutven

Competences

Robotics, Advanced Mechatronics, System Architecture
Physics/Mathematical Modelling, Dynamics of (Non) Linear Systems
System Identification (Frequency), Model Parameter Estimation (Time)
Forward and Inverse Kinematics, Path Planning, Trajectory Generation, Optimization
 (Non) Linear Controller Design, Filter Design, Model Based Control, Stability Analysis
CAD, CAE, Mechanical FEM (Structural & Transient & Modal)
Modal Analysis, Frequency Response Analysis, Mode-Shape Analysis
Experimental Implementation/Integration/Validation, Actuator/Sensor Selection
Matlab, Simulink, xPC Target, dSpace, NYCe 4000, Ethercat, Labview, Visual Studio
Linux, ROS, C++, VB.net, Python, C#, Java, Javscript, PHP, HTML, Git, SVN

Project Portfolio

01/2021 - 08/2025

IA01, *STIHL Tirol GmbH*. Development of a new, modern lawn mower platform.
Role: Software Engineer
Team: 10 Software Engineers, 1 Software Architect, 1 Project Leader
Developed software in Matlab, Simulink and Stateflow for a new generation lawn mower platform, including mission logic, HMI, safety, battery management, error handling, navigation and control, integrated sensors, simulated the robot, implemented embedded software on the platform and validated the robot software using unit, integration, simulation and experimental tests.

05/2022 - 10/2024

Titan, *ASMPT*. Development of a new generation of a laser dicing machine.
Role: Software Engineer
Team: 15 Software Engineers, 1 Software Architect
Developed software in Matlab, Simulink and Stateflow for a new generation of a wafer dicing machine, including business logic, safety, HMI, error handling, trajectory generation and control, simulated the machine, implemented embedded software on PiL and HiL targets and validated the robot software using unit, integration, simulation and experimental tests.

10/2022 - 06/2023

Autonomous Navigation, *Andreas Stihl AG & Co. KG*. Integration of a zero turn mower.
Role: Software Engineer
Team: 2 Software Engineers, 1 Electrical Engineer, 1 Project Leader
Integrated autonomous navigation software in C++ and Python using ROS and MQTT including mapping, path planning and trajectory generation algorithms, integrated various localization sensors (gps, imu, odometry and lidar), physically simulated the robot, implemented embedded software on the platform and experimentally validated the robot software.

Pieter van Zutven

11/2021 - 12/2021 11/2023 - 12/2023	**Ear Sensor**, *Fast Focus B.V.* Implementation of unit tests. *Role: Software Engineer* *Team: 2 Software Engineers* Developed unit tests in Python and C for the algorithms and firmware of a wireless, patient physical signs monitoring system including code coverage and integrated tooling for automatic report generation.

12/2019 - 12/2020 **RMI 5**, *STIHL Tirol GmbH*. Development of a smart navigation algorithm.
Role: Software Engineer
Team: 1 Software Engineer, 2 Validation Engineers, 1 Project Leader
Developed software in Matlab, Simulink and Stateflow for smart navigation features of a new lawn mower model, including mapping, path planning and trajectory generation algorithms, integrated various sensors (imu, odometry and magnetic wire), physically simulated the robot, implemented embedded software on the platform and experimentally validated the robot software.

04/2019 - 11/2019 **RMI 4 and RMI 6**, *STIHL Tirol GmbH*. Improvement of legacy robotic lawn mowers.
Role: Software Engineer
Team: 5 Software Engineers
Improved the existing software in C including bug fixing and small enhancements, implemented embedded software on the platform and experimentally validated the robot software.

03/2017 - 03/2019 **Autonomous navigation**, *STIHL Tirol GmbH*. Development of a robotic lawn mower.
Role: Software Engineer
Team: 5 Software Engineers
Developed autonomous navigation software in C++ and Python using ROS including mapping, path planning and trajectory generation algorithms, integrated various localization sensors (gps, uwb, camera, imu and odometry), physically simulated the robot, implemented embedded software on the platform and experimentally validated the robot software.

11/2016 - 02/2017 **Merlin**, *Blue Sparrow*. Development of a consumer drone.
Role: Software Engineer
Team: 3 Software Engineers, 1 System Architect
Developed drone software in Matlab and C++ including mathematical drone models and simulations, digital feedback controllers (filters), model-based nonlinear feedforward controllers and path planning and trajectory generation algorithms, experimentally validated the drone software.

Pieter van Zutven

07/2016 - 10/2016 **Aurora**, *Océ*. Development of a large format roll media printer.
Role: Mechatronic Engineer
Team: 2 Mechatronic Engineers, 1 System Architect, 1 Mechanical Engineer, 1 Technician
Developed linear feedback controllers (filters), designed model-based nonlinear feedforward controllers, performed system identification using frequency response measurements, performed model parameter estimation using regression techniques, implemented controllers in Simulink/xPC Target, experimentally validated mechanics and controller design, documented requirements, design, test plans and test results.

09/2015 – 10/2016 **Exoskeleton**, *Project March*. Development of an exoskeleton for rehabilitation.
Role: Mechatronic Architect
Team: 2 Mechatronic Engineers, 1 Mechatronic Architect, >10 BSc. and MSc. Students
Developed a physical model of an exoskeleton robot in Matlab (Simulink, SimScape and SimMechanics), generated forward and inverse kinematics, generated path planning and trajectory generation algorithms, designed linear feedback controllers and performed time domain parameter estimation and frequency domain system identification, implemented algorithms in Simulink communicating over Ethercat.

05/2016 – 07/2016 **RAAK Aerobics Bin Picking**, *Fontys*. Development of a robotic bin picking application.
Role: Mechatronic Engineer
*Team: 4 Mechatronic Engineers*
Integration of vendor-independent software (ROS) for product detection and recognition, motion planning and flexible robot control. Developed a demonstrator using an UR5 robot and Pick-it 3D vision sensor.
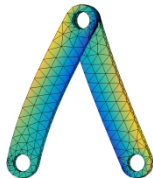
01/2016 – 07/2016 **Flexible Multibody Simulator**, *Segula Technologies*. Development of a simulator.
Role: Mechatronic Engineer
Team: 2 Mechatronic Engineers, 1 Mechatronic Architect
Created software tools to import modal response data of FEM packages (Nastran and Ansys) into Matlab. These data are used for combined simulation of flexible and rigid multibody electro-mechanical systems in SimScape Multibody.
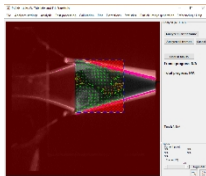
12/2015 – 03/2016 **PIV tool**, *Océ*. Development of software tool for particle image velocimetry.
Role: Software Engineer
Team: 2 Mechanical Engineers, 1 Analyst
Integrated a software tool into Matlab for particle image velocimetry. The tool processes high speed images of particle appended airflows in Océ printers to compute spatial flow velocity vector fields.

Pieter van Zutven

04/2014 - 11/2015

Yukon, *Océ*. Development of the next generation of an enhanced flatbed printer.
Role: Mechatronic Engineer
Team: 4 Mechatronic Engineers, 1 System Architect, 1 Mechanical Engineer, 1 Analyst
Developed multiple mathematical models of the flatbed printer in Matlab (Simulink, SimScape and SimMechanics), designed linear feedback controllers (filters), designed model-based nonlinear feedforward controllers, performed system identification using frequency response measurements, performed model parameter estimation using regression techniques, performed mode shape measurements and modal analysis, implemented controllers in Simulink/xPC Target/dSpace, integrated hardware components (sensors and actuators), experimentally validated mechanics and controller design, documented requirements, design, test plans and test results.

08/2015

Light Installation, *Studio Drift*. Development of a moving light art installation.
Role: Mechatronic Engineer
Team: 1 Mechatronic Engineer, 1 System Architect, 1 Mechanical Engineer
Developed mathematical model in Matlab, documented system architecture.

02/2015 - 03/2015

Freneza, *Smart Equipment Technology*. Development of a die bonding machine.
Role: Mechatronic Engineer
Team: 2 Mechatronic Engineers
Developed finite element model in NX (Advanced Simulation, Motion Simulation) with link to Matlab (Simulink), integrated hardware on test setup, designed linear feedback and feedforward controllers, implemented controllers in Simulink/dSpace, validated model using experimental frequency response and servo measurements.

03/2015

FAST, *Océ*. Development of an image scanner.
Role: Mechatronic Engineer
Team: 1 Mechatronic Engineer, 1 System Architect, 1 Mechanical Engineer
Designed and implemented controllers on Bosch NYCe 4000, performed experimental validation measurements, documented test results.

11/2009 - 04/2014

Humanoid Robot Research, *TU/e*. Research and development of a humanoid robot.
Role: PhD Researcher & Team Leader
Team: 1 PhD. Researcher/Team Leader, 1 Professor, >10 BSc. and MSc. Students
Developed multiply mathematical models of humanoid robots in Matlab, Gazebo and Simulink (SimScape, SimMechanics), designed nonlinear feedback and feedforward controllers, analysed stability of bipedal locomotion, performed system identification using frequency response measurements, performed model parameter estimation using linear regression techniques, developed forward and inverse kinematics algorithms, developed path planning and trajectory generation algorithms, implemented controllers in C++ and ROS, validated models and controllers using experiments, integrated and tested hardware components (sensors, frames, actuators), documented requirements, system architecture, detailed design, test plans and test results.