



Masterarbeit

Mechanical design and construction, Programming, GUI design

Conceptualization and design of 5-DOF sensor motion in 3D observation space

Schlüsselwörter: Automation, Multi-axis motion control

Conditions:

Duration: 6 Months
Requirements: CAD, Circuit design and implementation, GUI design
Language: English or Deutsch
Target group: Masters student (Maschinenbau, Electrical (Automation) oder ISE)

Content:

For two specific measurement environments (APM detection, Greenhouse) a new and flexible test rig allowing different, quick to change, flexible sensor configuration has to be designed, implemented, and partially tested.

The capability of specific sensors to fully capture required parameters from a system in 3-D space is limited by the degrees of freedom available to the sensor based on its mounting. The goal of this project is to integrate a motion platform into existing research equipment (sandbox, new greenhouse), which will allow 5D- controlled motion to a mounted sensor

system for enhanced flexibility in spatial positioning and orientation within the operational space. The project involves design, assembly (including production of printed components) and testing of a 5-D motion control system. The system is required to allow linear and rotational degrees of freedom for arbitrary sensor types including cameras to be used for measurements within the sandbox/greenhouse. A selection of appropriate position/rotation sensors, actuators (motors), as well as other mechanical and electronic components needed to achieve the desired motions is readily available for incorporation into the design. The thesis also integrates on the elementary level the motors motion control as well as the development of different automated measurement strategies (as templates) like point2point, line-wise, etc. measurements.

Due to the interdisciplinary requirements including experimental test the thesis is ideal for mechatronic or automation students.



The steps related to this work can be summarized as:

- Improvement of existing mechanical structure for stability and precision
- Design and implementation of sensing and actuation concept
- Realization (order, manufacturing) of required additional sensors, actuators, components
- Programming of motion control and measurement strategies for 5D-controlled measurements
- User interface design and implementation
- Assembly and integration of the completed system
- System testing
- Complete and detailed documentation and presentation of the completed work

Betreuer: Lina Owino, M.Sc.
Büro: MB 352
Telefon: 0203 / 379 1866
E-Mail: lina.owino@uni-due.de



Lehrstuhl Steuerung, Regelung und Systemdynamik

Betreuer: Lina Owino, M.Sc.
Büro: MB 352
Telefon: 0203 / 379 1866
E-Mail: lina.owino@uni-due.de