CoSES SCADA System Development

The TUM Center for Combined Smart Energy Systems (CoSES) is a laboratory focused on analysis of multi-energy systems. The laboratory has a capability to emulate a small microgrid with Low Voltage Electric Distribution Grid and Three Temperature Level Bidirectional Heat Grid. These energy grids supply 4 Single-family houses and 1 Multi-family house with different distributed energy sources and loads.

The experimental microgrid is controlled through the control system developed using National Instruments technology such as VeriStand software, PXIs and NI Industrial controllers. This control system is monitoring all relevant signals in the microgrid and issues commands necessary for operating the microgrid in desired way.

This project will develop and implement a SCADA (Supervisory Control and Data Acquisition) system to monitor and control different actuators in the CoSES lab. The SCADA system should follow the best practices of automatization of an industrial process. This is an opportunity to learn about state of the art and acquire hand-on experience working on the next monitoring and control systems used in many small, medium and large industrial sites.

The SCADA system will integrate with the existing controllers in the lab that are based on National Instruments technology (NI VeriStand, PXIs and industrial controllers). The developed system should visualize all the relevant signals, issue alarms in case of abnormal operation, and implement manual commands. For the SCADA system an open source Rapid SCADA (https://rapidscada.org/) software.

Project Tasks
1) Classify and group all relevant signals used in the laboratory (measurements and commands).
2) Create an interface between NI VeriStand and SCADA System.
3) Create a suitable User interface in the Rapid SCADA that will show relevant monitored signals.
4) Create and interface for controlling different actuators in the laboratory (valves, switches, heaters etc.)

Requirements
1) Background in Electrical Engineering, Mechanical or Software Engineering.
2) Solid background in software engineering, data management and control systems.
3) Previous experience in with SCADA systems, IoT or LabVIEW is preferable.
4) Affinity to programming and structural thinking.
5) Good team-player and an attitude to learn and explore new approaches.

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