



## Task for the student thesis

# Optimized Human Machine Interface for Service Interaction in Modular Plants

### Context

Modular plants are the promising approach to reduce time-to-market and increase flexibility in process industry. Modularization of process industry is not only limited to modularization of the chemical processes but also introduces a service-based control as part of VDI/VDE/NAMUR 2658-4, in which the basic process functions are encapsulated as process services. The important point in service-based control is the encapsulation approach of process functions. Indeed, for the operator to interact more effectively it is important to represent the process in a meaningful way, creating awareness of the current state, and yet not too complex.

### Scientific research questions

This work examines an optimized Human Machine Interface (HMI) considering the underlying process phenomena (Lutze *et al.*, 2013) affected by the service control.

1. What are the typical operator actions that an HMI must support in modular, service-based systems in relation to VDI/VDE/NAMUR 2658 and VDI 2776? What are the requirements for an HMI that takes process phenomena into account?
2. Which requirement-compliant variants of an HMI result from the knowledge gained? What metric for evaluating these can be derived and how are they evaluated in this respect?
3. Which evaluation experiment can be used to validate the gained knowledge in practice?

### Specifications

1. Literature review and justified selection of the research methodology to address the research questions. The written deliverable of this work package serves as a milestone.
2. Target-oriented answering of the research questions by systematic application of the selected research methodology.
3. Critical final evaluation of the chosen working method and the research results.

The work is to be carried out according to the guidelines of the Institute of Automation. Suitability and quality of the results are to be validated by means of functional prototypes e.g. in AxureRP10.

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