

Dissertation title:

**Automatisierte Inbetriebnahme von rekonfigurierbaren
Bearbeitungsmaschinen mit serviceorientierten Paradigmen**

Michael Abel

Reconfigurable production machines are one option to realize changeable production systems on a technical level. The (re)configuration of such machines is performed by combining mechatronic modules, that provide the functionality of the overall machine. Unfortunately, during a reconfiguration the effort-intensive commissioning phase has to be repeated. The purpose of this thesis is to introduce a concept for the automated commissioning of reconfigurable production machines in order to reduce the cost-intensive downtime during reconfigurations. First of all, an analysis and systematization of necessary tasks during commissioning is performed. On this basis, an information model of the commissioning procedure is derived. In the next step, a concept for the automated commissioning of reconfigurable production machines that is based on a machine-internal service-oriented architecture is created. Afterwards, a system architecture for automated commissioning is deduced. The core of this architecture is formed by a central coordination system for the commissioning process, as well as supporting services, which are located in the machine modules. The latter is designed according to the principles of service-oriented architectures and utilizes an orchestration engine to execute commissioning tasks. Finally, a research platform is introduced, which can be used to evaluate differing commissioning strategies for reconfigurable production machines. On the one hand, this research platform serves as evaluation platform to evaluate the derived commissioning concept. On the other hand, it serves as an evaluation platform for machine design concepts and the resulting commissioning strategies. The developed commissioning concept represents a further step towards the introduction of reconfigurable machines into practice. Therefore, automated commissioning forms an enabler technology for a profitable application of this machine type in production environments.