

**Proposal for a Special Session at the  
IMS 2010  
10<sup>th</sup> IFAC Workshop on Intelligent Manufacturing Systems**

**Title of the Special Session:**

„Applying advanced software design concepts to industrial automation systems“

**Rationale of the need and objective of the session:**

Today's production processes will be performed more and more by automated machines as the level of automation increases steadily. The main trend in industrial automation is the increasing need for customized and individualized plants. The production lines have to be constructed and adapted to new production processes quickly. Such highly automated systems are mainly controlled by embedded hard- and software which are heterogeneous in nature. Heterogeneous specification and heterogeneous architectures lead to a tremendous increase in the design complexity. The software engineering costs will increase up to 80% of the overall systems costs in the next 15 years (currently this ratio is about 50%). In addition, the automation and control engineering of a production plant takes a huge amount of time. Especially in the industrial sector, each plant or system can be seen as a prototype. Thus, the need is now to transform automation solutions to adapt to rapidly changing demands due to new production processes and to transform hard- and software components into more and more complex systems. The design methods and approaches used depend strongly on the application field. This means that different automation and control systems have to work together to perform automation and control tasks.

**Session outline:**

Design and engineering of heterogeneous automation and control systems is tricky and needs the knowledge from different domains during all phases of development. During the design phase, the system complexity, the domain/platform dependence and the design time are the critical factors.

One of the main current design trends in automation and control systems is to put automation components, blocks made of hardware, software and intellectual property (like algorithms and data structures), together. This in turn calls for common, language independent models for representing, saving and reusing such components.

**Specific topics of interest:**

The following topics should be presented within this special session:

- Advanced software design methods for automation and control systems
- Model-driven design of automation and control systems
- Component-based design of automation and control systems
- Automatic code generation
- Automation objects/components
- Simulation – executable models
- Formal verification
- Automation objects and components
- Collaborative objects
- Product line engineering
- Test-driven software quality assurance of automation and control systems
- Unit-tests in automation

## **Contact information for the Special Session chairs:**

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