Workshop objectives and topics

The design of embedded and cyber-physical systems with real-time and other critical constraints raises distinctive problems throughout the design process, from high-level system engineering down to low-level design. On the high-level engineering side, the complexity of such systems has greatly increased during the past few years, and increasingly they are part of large systems-of-systems having to take into account complex collaboration patterns and integrity constraints. On the low-level design side, there are specific architectural choices that have to be made as early as possible in the process to streamline production, and key non-functional constraints related to, for example, real-time deadlines and to platform parameters like energy consumption or memory footprint, have to be handled.

Models and model-based tools are nowadays instrumental in supporting these engineering processes. On the level of system engineering, after many actors in the industry, working on complex, distributed, embedded systems, identified the software crisis to be often rooted in a system crisis, model-based system engineering (MBSE) is becoming the norm in the industry. The formalization of system engineering models and approaches is considered to be one of the major factors for further gains in productivity, quality and time-to-market for such complex systems. Although an ancient discipline, system engineering is currently renewing at high speed, driven forward by the maturation of model-driven approaches and by standards such as SysML or Modelica.

In lower-level design, the last few years have seen an increased interest in using model-based engineering techniques to capture dedicated architectural and non-functional information in precise domain-specific models. Model-driven engineering techniques are interesting for two main reasons: (1) they allow for capturing dedicated architectural and non-functional information in precise (and often formal) domain-specific models, and (2) they support a layered construction of systems, in which the (platform independent) functional aspects are kept separate from architectural and non-functional (platform specific) aspects, whereas these aspects are combined later or more or less automatically via model transformations to obtain the final system.

The objective of this workshop is to bring together researchers and practitioners interested in model-based engineering to explore the frontiers of architecting and construction of embedded and cyber-physical systems. We are seeking contributions relating to this subject at different levels, from modeling languages and semantics to concrete application experiments, from model analysis techniques to model-based engineering and deployment. Given the criticality of the application domain, we particularly focus on model-based approaches yielding efficient and provably correct designs. Authors are therefore invited to submit papers on topics related to System Design Languages including the following non-exclusive list of topics:

- **Model based system engineering**: semantics of system models, refinement of system designs into hardware/software implementations, integration of system and software design models, validation of system models.
- **Architecture description**: position of ADLs in an MBSE approach, techniques for deriving architecture models from requirements, deriving high-level design models from architecture models; verification and validation using architecture models.
- **Capturing and exploitation of non-functional aspects**: Managing feature interactions among functional and non-functional aspects of the design including but not limited to performance, quality of service, real-time constraints, power and resource management, security, etc.
- **Domain specific design and implementation languages**: Computation and composition models, component languages. Synchronous languages and paradigms (Lustre/SCADE, Signal/Polychrony, TTA, Giotto, etc.), scheduling-oriented models (HRT-uml, Ada Ravenscar), component languages (BIP, FRACIAL, Ptolemy, etc.).
- **Model-based analysis, verification and validation** techniques related to the above-mentioned models.

Workshop Format

This full-day workshop will consist of an introduction by the organizers, an invited talk, presentations of accepted papers, an in-depth discussion of a set of topics that are identified by the attendees, and a concluding session presenting the results of the discussion groups.

Submissions

Attendees are invited to submit a short position paper (3 to 6 pages) or a full technical contribution (max. 10 pages) in PDF format in the Springer LNCS format (http://www.springer.com/computer/lncs?SGWID=0-164-6-793341-0). Papers must be submitted online via EasyChair (http://www.easychair.org/conferences/?conf=acesmb13). The authors will be notified about acceptance before the MoDELS 2013 early registration deadline. All accepted papers will be published in 2 versions: the Workshop Pre-proceedings will be published via the ACES-MB workshop pages, and the Workshop Post-proceedings will be published electronically in CEUR (http://ceur-ws.org), which is indexed by DBLP.