Preface

The design of embedded systems with real-time and critical constraints raises distinctive problems throughout the development process, from high-level system engineering to low-level system designs. On the high-level engineering side, the complexity of critical systems has greatly increased during the past few years, while they are becoming regularly exploited in industrial practice as parts of large systems-of-systems. Then the architecting of an embedded system has to take into account complex collaboration patterns and integration constraints of computational elements and physical parts.

From the system engineering perspective, many actors in the industry working on complex distributed embedded systems identified the software crisis to be often rooted in a system crisis. In consequence, model-based system engineering has been adopted as the norm to use in industry. The formalization of system engineering models and approaches is considered to be the one of the major factors for further gains in productivity, quality and time-to-market such complex systems. Although a mature discipline, system engineering is currently renewing at high speed, driven forward by the progress of model-driven approaches and by standards such as SysML or MODELICA.

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. Key non-functional constraints related to, for instance, real-time deadlines and platforming parameters like energy consumption or memory footprint, have to be handled. The last few years have seen an increased usage of model-based engineering techniques also in low-level designs, mainly due to the following reasons: (1) they provide means to capture architectural and non-functional information using precise (and often formal) domain-specific models and (2) they separate functional aspects (platform independent) from architectural and non-functional aspects (platform specific). These aspects are combined later (more or less automatically) via model transformation to obtain the final system.

The workshop series on *Model-based Architecting and Construction of Embedded Systems (ACES-MB)* are a key meeting point between researchers and practitioners interested in model-based engineering in order to explore innovative ideas and experiences that contribute to better architecting and construction of embedded and cyber-physical systems for several years now. The intent is to bridge the gap between the embedded/cyber-physical system engineering and software engineering community by proposing a rich discussion forum. This year's edition, co-located with ACM/IEEE 17th International Conference on Model Driven Engineering Languages and Systems (MoDELS), has received 11 contributions from which 4 regular papers and 1 short paper were selected, focusing on: (1) the unified and formal construction of embedded systems and (2) the model-based verification and validation of such critical systems with respect to their non-functional requirements. The invited talk aims to enhance the dis-

cussions by highlighting the current and oncoming problems the two mature, yet complex, identified topics face.

The ACES-MB workshop has now reached its seventh edition. We would like to thank the program committee for their hard work and the workshop's authors and participants for making it successful.

September 2014 Florian Noyrit, Susanne Graf and Iulia Dragomir

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