Invited talk 2

Model-driven and component based engineering in the era of smart software-intensive systems

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In 2004, I studied and compared component-based development (CBD) vs. model-based development (MBD) in the context of embedded systems together with DeJiu Chen and Ivica Crnkovic. In this talk I will review the origins, similarities, differences and complementarity of CBD and MBD. I will further review how these approaches are prepared to deal with the technical and subjective complexity of the software-intensive cyber-physical systems of systems (CPSoS) of tomorrow. I believe that model and component based engineering will play a key role in the engineering methodologies of tomorrow and will discuss how to deal with existing (known) challenges (such as legacy integration, variability, and composability) where the increasing complexity provides hurdles, as well newer challenges including ensuring predictability for evolvable smart systems. Architecture, architecting and means for dealing with the multiplicity of dependencies across components and models here play important roles. Bridging the gap between the model driven and component based communities is thus essential; I will conclude with ideas and suggestions for how to achieve this.

Martin Törngren *has been a Professor in Embedded Control Systems at the Mechatronics division of the KTH Department of Machine Design since 2002. He has particular interest in cyber-physical systems, model based engineering, architectural design, systems integration, system and functional safety, and co-design of control applications and embedded systems. He has authored/co-authored more than 100 peer reviewed publications, and also been in charge of developing and leading graduate and continued education courses. He spent time as a post-doc at the EU-JRC, as a visiting scholar at 2011/12 at UC Berkeley and at Stevens Institute of Technology, Hoboken/New Jersey. In 1996 he co-founded the company Fengco Real-time Control AB, specializing in advanced tools for developers of embedded control systems and related consultancy. In 1994 he received the SAAB-Scania award for qualified contributions in distributed control systems, and in 2004 the ITEA achievement award 2004 for contributions in the EAST-EEA project. He served as the technical coordinator of the international iFEST ARTEMIS project with 21 partners (2010-2013). Networking and multidisciplinary research have been characteristic throughout his career. From 1999-2004 he served as the Chairman of the Swedish real-time systems association, and he has represented KTH as a core partner in the EU networks of excellence in Embedded systems design, Artist2 and ArtistDesign, and in the Artemis industrial association. He is moreover the principal initiator and Director of the Innovative Centre for Embedded Systems (www.ices.kth.se), launched in 2008.*