Open Archive Toulouse Archive Ouverte (OATAO)

OATAO is an open access repository that collects the work of Toulouse researchers and makes it freely available over the web where possible.

This is an author-deposited version published in: http://oatao.univ-toulouse.fr/
Eprints ID: 5317


Any correspondence concerning this service should be sent to the repository administrator: staff-oatao@inp-toulouse.fr
Abstract

Today, a new category of engineering systems is emerging that combines the physical with the computational in a holistic way: Cyber-physical systems (CPS). The key property of these systems is that functionality and salient system properties are emerging from an intensive interaction of physical and computational components. Traditional separation along engineering disciplines in the design of such systems leads to various quality, maintainability and evolutionary problems, and integrated theories and engineering techniques are urgently needed. The purpose of the seminar is to bring together researchers from the field, from both academia and industry to discuss the new scientific foundations and engineering principles for the vastly emerging field of CPS.


1998 ACM Subject Classification C.0 [Computer Systems Organization] General

Keywords and phrases Embedded systems, real-time systems, control, composition, system integration, design automation, model-driven development, validation & verification

Digital Object Identifier 10.4230/DagRep.1.11.1
3.9 Analytic Virtual Integration of Cyber-Physical Systems & AADL: Challenges, Threats and Opportunities

Jerôme Hugues (ISAE – Toulouse, FR)

License Creative Commons BY-NC-ND 3.0 Unported license
© Jerôme Hugues

The design and implementation of cyber-physical systems gather multiple domains, from low-level physics up to complex control of systems to implement a full function. Such complexity requires particular strategy to characterize each level of abstractions, and then integration to ensure the system under consideration is correctly built. The advent of Model-Based Engineering is often perceived as a silver bullet to achieve all these complex tasks: the system designer can master its design through proper model artifacts (blocks, connections, properties, ...), virtual integration of system blocks, and analysis.

However, current MBE processes usually cover vertical analysis, and address only a few aspects like scheduling or behavioral analysis, while CPS would require also horizontal analysis of the system, combining analysis results.

In this position paper, we review experiments on the use of AADL to design CPS, and highlight challenges, threats and opportunities to support analytical virtual integration.