Workshop on
Tool Platforms for Embedded Systems
Modeling, Analysis and Validation

An initiative of the platform activities within the
Artist Network of Excellence
Artist Embedded System Design NoE

JPA
Joint Programme of Activities

JPIA
Joint Programme of Integration Activities
a. Sharing research platforms, tools, and facilities
b. Staff mobility and exchanges

JPRA
Joint Programme of Research Activities
NoE Integration
Cluster Integration:
a. Real-Time Components
b. Adaptive Real-Time
c. Compilers, and Timing Analysis
d. Execution Platforms
e. Testing, Verification
f. Control for ES

JPASE
Joint Programme of Activities to Spread Excellence
a. Education & Training
  - Courseware
  - Graduate Studies
  - Summer Schools
b. Dissemination and communication
c. Industrial Liaison
d. International Collaboration

JPMA
Joint Programme of Management Activities
a. Strategic Management
b. Operational Management
Artist platforms

“Sharing Research Platforms, Tools, and Facilities”

State of the art research platforms, composed of competencies, resources, and tools targeting specific technical and scientific objectives around a chosen topic. These are made available to the R&D community for experimentation, demonstration, evaluation, and teaching.

The ARTIST2 platforms integrate the results of long-term efforts, and are meant to be durable, evolving with the state of the art. The partners are committed to durability, and have invested significant resources into their development.
Tool support for Embedded Systems Design & Analysis

- Integration of design and validation
  - Hidden verification versus specialists approach
  - Model-transformation, compilation
- Addressing the heterogeneity
  - Heterogeneity of modeling paradigms
  - Heterogeneity of abstraction
- Platform and Architecture design
  - RTOS
- Specific analysis problems
  - Timing analysis, schedulability, performance
  - Design space exploration
  - Analysis of hybrid systems
Hidden verification: an example
Persiform tool integration approach: specialists tools integration

UML

- UML

Designer

- provide (CASE tool)

feedback and discussion

- Hyperformix Workbench

Performance expert

- adapt, simulate, analyze (Perf. simulator)

Functional model

- Enhanced model (time, resources, environment)

Design

- Generated verification model

Functional Verification

- Model transformation
  automatic
  systematic
  semantic preserving

Performance Simulation

- Generated performance model

- Adapted performance model

Performance expert

- adapt, simulate, analyze (Perf. simulator)

Designer

- provide (CASE tool)

feedback and discussion

- Hyperformix Workbench

Performance expert

- adapt, simulate, analyze (Perf. simulator)
Program of Juli 1st

09:15 "MPSoC modeling and simulation techniques“ *Torsten Kempf* (RWTH Aachen)
10:00 **Coffee break**
11:15 "Monitoring your Lego Mindstorms™ with Giotto“ *Noël Plouzeau* (INRIA Rennes)
11:35 “Enhancements of Statechart Modelling - The Kiel Environment” *Steffen Prochnow* (Kiel)
12:00 **LUNCH**
13:30 "Model Driven Engineering: Bringing formal validation into the industrial process“ *Marc Pantel* (IRIT, Toulouse)
14:15 “A model-based Transformation approach for embedded systems development”, *Didier Delanote*
14:55 **Coffee Break**
16:10 “Functional Design and Behavior Simulation of Wireless Sensor Networks Applications”, *Mostafizur R. Mozumdar*
16:30 “OpenComRTOS - Distributed RTOS development using formal modeling methods” *Gjalt de Jong*
16:50 "Contract based modelling with BIP“ *Susanne Graf* (Verimag, Grenoble)
Program of Juli 2nd

Session shared with FMICS
09:00 "The Embedded Systems Design Challenge“ Tom Henzinger (EPFL, Lausanne)
10:00 "Synchronous design and verification of critical embedded systems using SCADE and Esterel" Gerard Berry (Esterel Technologies)

11:00 Coffee break
11:30 “The DECOS Concepts” Balázs Polgár
11:50 “A Coverage-Guided Test Generation Tool for Hybrid Systems”, Thao Dang (Verimag)
12:10 “Coral --- a tool for compositional reliability and availability analysis”, Pepijn Crouzen
12:30 LUNCH
14:00 "Verification of Optimizing Compilers“, Sabine Glesner (TU Berlin)
14:45 "Validation of performance properties with Uppaal and applications“, Kim Larsen (Aalborg U.) and Michael R. Hansen (TU Denmark)
15:30 Coffee break
16:00 “Methodology and tools for performance analysis of embedded multiprocessor industrial applications”, Ismail Assayad (Verimag)
16:20 “Bi-Directional Traceability: The Hi-Five Framework Approach to Reliable Validation of Early System Designs”, Martin Ouimet
16:40 DISCUSSION