

ARTIST2 – Year 1 Review

Grenoble, October 3rd-4th, 2005

Activity

JPIA

Platform: Design tools for Embedded Control

Activity leader : Martin Törngren (KTH)

Industrial needs & practice

Year 1 activities

18 month perspective

Industrial state of practice – a snapshot

Function design

Calibration

- Model based development – fairly mature for embedded control systems
- Highly varying industrial practices
Domain specific tools, languages, processes
- Missing pieces in the tool-chain
In general, lack of model and tool integration
Lack of suitable configuration management

Controller



Platform

Code Generation/
platform integration

Unit testing

Industrial Needs

❖ Example domains:

Automotive, robotics and automation,
consumer electronics, avionics, medical electronics, and new
resource constrained distributed system applications

❖ Needs

Complexity barrier hampers product quality and time to market

Optimization (cost-efficiency, dependability, performance, modularity)

Induces needs for

- Co-design tools,
- Integration of tools and models, and
- Methodology

Year 1 activities

Achievements & Ongoing Work

❖ Work on individual tools

Releases:

- TrueTime v1.2 Oct. 2004, v.1.3 June 2005
- Torsche v1.0 Aug. 2005

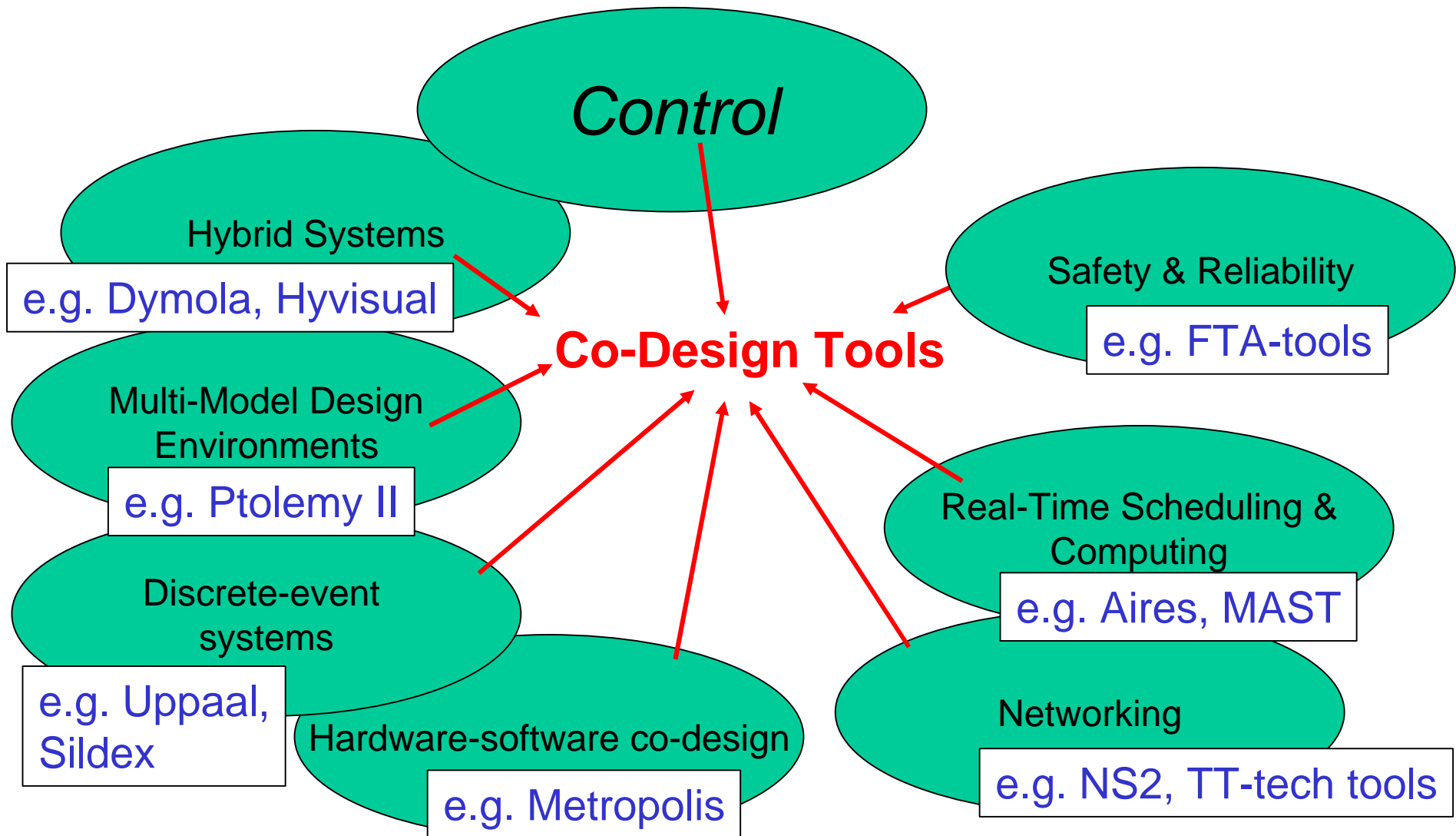
❖ Tool survey –

Co-design of control systems and their real-time implementation

❖ Intra-cluster dissemination through mobility and tool usage

❖ Interactions with other clusters and communities

Context: Tools for control/implementation co-design



Tool survey – Co-design of control systems and their real-time implementation

❖ Industrial model based development – overview and perspective

- Model based design, rapid control prototyping, code generation
- Analytical verification, Testing based verification and validation

❖ Tools from closely related domains

- Tool features; models and design support
- Tool examples: Aires, Metropolis, HIP-Hops, Sildex, TT-Tech tool suite

❖ Detailed overview of selected tools

- Addressing trade-offs and constraints across control and computer design
- AIDA, Jitterbug, ORCCAD, Ptolemy II, RTSIM, Syndex, Torsche, TrueTime
- Different emphasizes; simulation, formal analysis, synthesis, abstractions

❖ Discussion: Trends and challenges

- Complementary tool functionality
- Distributed systems
- Integration and adaptability – meeting the varying end-user needs

Year 1 activities

Interaction & Building Excellence

❖ Tool survey – thanks to ARTIST2

❖ Industrial interactions and take-up

For example Bosch extended TrueTime with support for Flexray and TT-CAN, and dSPACE contributed to tool survey

❖ Interactions with other clusters and communities

HRT cluster and HYCON NoE – Tool survey

Testing and verification cluster: Keynote at FORMATS 2005 (Karl-Erik Å.)

Component and modeling: Invited session at Euromicro (Martin T.)

TrueTime Tutorial at the IFAC world congress

AETHER IP – reconfigurable FGPAs (Zdenek H.)

❖ Challenge

Context & dependencies with other tools, modeling paradigms, analysis

18 Month Perspective

Work Planned for the next 18 months

- ❖ Coordination with other clusters can be improved further
 - Invitation to join the refined tool survey – to create a better cross-cluster map of tools for embedded control systems development
 - Joint workshop on the platform is required within ARTIST2
- ❖ Tool integration
 - Tool integration plan, integration scenarios, state of the art
 - Case studies with initial integration, preparing for integrated tools for control/implementation co-design
- ❖ Further work on the individual tools developed by the partners

Control and computer implementation co-design

Objectives and trade-offs: Cost (dev., production, maint.), Performance, Robustness and reliability, Maintainability

