Year 1 Review
Brussels, January 23rd, 2008

Cluster

Achievements and Perspectives :

Spreading Excellence

leader : Bruno Bouyssounouse

UJF / VERIMAG

Overall Vision and Strategy

Overall objective is the emergence of Embedded Systems Design as a scientific discipline. This objective is pursued within the international scientific and industrial community.

This is implemented in 3 levels:

- **International Collaboration**
  - High-level meetings (NSF/IST),
  - International Schools (eg: European school, China school, SouthAmerican school),
  - support for selected conferences (eg: Embedded Systems Week)
- **European level**
  - Direct organisation of top workshops and schools
  - Support for existing workshops, Artist and other schools (eg: FOSAD) and conferences (eg: DATE)
  - Industrial Liaison (ARTEMIS, triggering projects and promoting standards)
- **Affiliated Partners**
  - Direct involvement in the workprogramme (technical meetings).

Web Portal Newsletter Mailing List

International Collaboration

All of the recurring International Collaboration events from Artist2 continue and will be expanded within ArtistDesign in 2009:

- Summer School in Europe
  A flagship event for Artist.

- Summer School in China
  This will be the fourth edition of the school, now held in Tsinghua – widely regarded as the most prestigious university in China.

- SouthAmerican School for Embedded Systems Design
  This will be the third edition of this popular school.

- Workshop on Embedded Systems Education (WESE)
  This will be the fifth edition of this workshop, now headed by Peter Marwedel of TU Dortmund.

- Foundations of Component-based Design
  One of the top events in this key area – regularly held during Embedded Systems Week. 2009 will be the fourth edition.

Education

All of the recurring International Collaboration events from Artist2 continue and will be expanded within ArtistDesign in 2009:

- 3 Major International Summer Schools
- Workshop on Embedded Systems Education (WESE)
- PhD Schools
- Special Issues / Publications
- Common Technical Baseline

Education: WESE Workshops

ArtistDesign:

- ***WESE'08: WS on Embedded Systems Education*** *October 23rd, 2008 Atlanta, Georgia - USA (in ESWEEK)*
  As embedded system designs grow more complex and the time to market diminishes, quality embedded systems education becomes more and more important. This fourth workshop on the subject aims to bring researchers, educators, and industrial representatives together to assess needs and share design, research, and experiences in embedded systems education.

Artist2:

- ***WESE'07: WS on Embedded Systems Education*** *October 4-5, 2007 Salzburg, Austria (within ES Week)*
  This third workshop on the subject aims to bring researchers, educators, and industrial representatives together to assess needs and share design, research, and experiences in embedded systems education.
- ***WESE'06 - Embedded Systems Education*** *October 26th, 2006 Seoul, Korea*
  This second workshop on the subject aims to bring researchers, educators, and industrial representatives together to assess needs and share design, research, and experiences in embedded systems education.
- ***WESE'05 - WS on Embedded Systems Education*** *September 22nd, 2005 Jersey City – USA*
  This first workshop on Embedded Systems Education aims to bring researchers, educators, and industrial representatives together to assess needs and share design, research, and education experiences in embedded systems.
- **ACM - Special Issue on Education**
  This special issue of the ACM Transactions in Embedded Computing Systems aims to provide the basis for integrated undergraduate and graduate curricula covering the essential areas of knowledge for tomorrow's embedded systems engineers and researchers. Guest Editors Alan Burns Alberto Sangiovanni-Vincentelli - UC Berkeley

and back in Artist FP5:

- ***Artist International Collaboration Days 2003 - Education*** *October 11th 2003 – Philadelphia*
  This was an open meeting to discuss important action lines in the area of Embedded Systems - in which strong synergy between international teams had the greatest benefits. Work over the first year had concentrated on discussion between top researchers in the field, summarized in white papers that were presented and discussed here.
- **Artist FP5 Guidelines for a Graduate Curriculum on Embedded (publication)**
  The design of real-time embedded systems requires skills from three specific disciplines: control theory, computer science, and electronic engineering, and their combination. This often involves experts from differing backgrounds, who do not recognize that they address different issues from complementary angles.

Course Materials

- **ARTIST2 Summer School 2008 in Europe** *September 8-12, 2008 Autrans (near Grenoble), France*
- **ARTIST2 South-American School for Embedded Systems 2008**
  August 25-29, 2008 Universidade Federal de Santa Catarina, Florianopolis, Brazil
- **Artist2 Summer School in China 2008** *July 12-18, 2008 Shanghai, China*
- **Real-Time Kernels for Microcontrollers: Theory and Practice** *June 23-25, 2008 Pisa, Italy*
- **ARTIST2 Graduate Course on Embedded Control Systems** *May 26-30, 2008 Stockholm, Sweden*
- **LASER Summer School on Software Engineering** *September 9-15, 2007 Elba, Italy*
- **FOSAD 2007** *September 9-15, 2007 Bertinoro, Italy*
  First European-SouthAmerican School for Embedded Systems
  August 21-24, 2007 Universidad Argentina de la Empresa (UADE), Buenos Aires – Argentina
- **Artist2 / UNU-IIST School in China - 2007** *August 1-10, 2007 Suzhou (near Shanghai), China*
- **ARTIST2 PhD Course on: Automated Formal Methods for Embedded Systems** *June 4-12, 2007 DTU - Lyngby, Denmark*
- **ARTIST2 Graduate Course on Embedded Control Systems** *May 7-11, 2007 Lund, Sweden*
- **Real-Time Microcontroller Systems: OSEK Standard and experiments on µcontroller devices**
  March 26-28, 2007 RETIS Laboratory, Scuola Superiore Sant'Anna, Pisa, Italy
- **Seminar on Quantitative Aspects of Embedded Systems Schloss Dagstuhl 2007**
  March 4 - 9, 2007 Schloss Dagstuhl, Germany
- **ARTIST2 - MOTIVES** *February 19-23, 2007 Trento, Italy*
- **CASTNESS'07 Workshop and School** *January 15-17, 2007 Rome, Italy*
- **Real-Time and Control for Embedded Systems** *July 10-14, 2006 Pisa, Italy*
- **ADSD 2006: Advanced Digital Systems Design** *September 25-29, 2006 Lausanne, Switzerland*
- **LASER Summer School on Software Engineering 2006** *September 17 - 23, 2006 Elba, Italy*
- **Foundations of Security Analysis and Design** *September 10-16, 2006 Bertinoro, Italy*
- **Model-Driven Design for Distributed Real-time Embedded Systems (MDD4DRES)** *September 4-8, 2006 Brest, France*
- **First European Laboratory on Real-Time and Control for Embedded Systems** *July 10-14, 2006 Pisa, Italy*
- **ARTIST2 Graduate Course on Embedded Control Systems** *April 3-7, 2006 Prague, Czech Republic*
- **ARTIST2 / UNU-IIST Spring School in China 2006** *April 3-15, 2006 Xi'an, China*
- **ARTIST2 Summer School 2005** *September 29 - October 2, 2005 Nässlingen, Sweden*
- **Embedded System Design: A Unified Hardware/Software Introduction**
  Published: 2002 - Authors: Frank Vahid and Tony Givargis

ARTIST Events to be Organised in 2009 (subset)

- ***DySCAS 2009*** *February 18th, 2009 Volvo Office Brussels, Belgium*
  The DySCAS public results dissemination workshop will highlight the advances made during the project. You will learn about a future embedded automotive technology which has sophisticated capabilities to configure itself in context-aware ways to meet the quality-of-service requirements of applications, to automatically optimize resource usage, and to dynamically detect and resolve certain categories of fault.
- ***Mapping Applications to MPSoCs 2009*** *June 29-30, 2009 Schloss Rheinfels, St. Goar, Germany*
  Provide a forum for brainstorming and road-mapping the future of mapping applications to MPSoCs. Knowledge about constraints and directions for future MPSoC architectures should be collected. Existing mapping techniques should be briefly presented and analyzed. Directions for future research should be proposed and evaluated.
- ***WCET Workshop*** *June 30, 2009 Dublin, Ireland*
- ***Workshop on Platform & Tools*** *July 2009 Grenoble, France (Satellite Event with CAV'09)*
  Tools and platforms for modeling and validating embedded systems. Topics include support for component-based development and validation of non-functional properties, e.g. time, energy, hybrid and stochastic behaviours.
- ***PhD School on Quantitative Model Checking*** *November 2009*
  The PhD school will offer a thorough and in-depth presentation of quantitative model checking techniques, including real-time model checking, stochastic and probabilistic model checking as well as model checking of hybrid systems.
- ***Runtime Verification 2009*** *26 27 and 28 June Grenoble, France*
  How to monitor and analyze the execution of programs, for example by checking conformance with a formal specification written in temporal logic or some other form of history tracking logic.
- ***WS on Predictability*** *October 11-16, 2009 (during ESWEEK) Grenoble, France*
- ***Workshop on Verification and Validation of Model-Based Planning and Scheduling Systems (VVPS 2009)***
  September 19-20 2009 Thessaloniki, Greece
  The goal of this workshop is to initiate an ongoing interaction of the Planning and Scheduling (P&S) and verification and validation (V&V) communities to identify specialized and innovative V&V tools and methodologies that can be applied to P&S.
- ***ESTIMedia 2009*** *October 15-16, 2009 Grenoble, France*
  The 7th IEEE Workshop on Embedded Systems for Real-time Multimedia

Conferences Organized with ARTIST Partners

- **ESWEEK 2008** *October 19-24, 2008* *Atlanta, Georgia (USA)*
  Embedded Systems Week brings together three leading conferences in the area - CASES, CODES+ISSS, and EMSOFT. Attendees to benefit from a wide range of topics covered by these conferences and their associated tutorials and workshops.

- **RNTS'08** *October 16-17, 2008* *Rennes, France*
  16th International Conference on Real-Time and Network Systems Rennes, France, October 16-17, 2008

- **ECRTS 2008** *July 2-4, 2008* *Prague, Czech Republic*
  20th anniversary edition of Euromicro conference on real-time systems

- **Ada-Europe'08** *June 16-20, 2008* *Venice, Italy*

- **DCOSS '08** *June 11-14, 2008* *Santorini Island, Greece*
  CiberMouse@DCOSS2008 competition, based on the CiberMouse Simulation Environment.

- **Cyber Physical Systems Week 2008** *April 21-24, 2008* *St Louis, USA*
  Three leading conferences - RTAS, IPSN and HSCC - will take place at the same time and location during the CPS week.

- **DATE'08** *March 10-14, 2008* *Munich, Germany*
  Originally in the area of design automation, the DATE conference and exhibition has developed a very active embedded software track with 13 sessions on software topics and 2 special days on automotive and on dependable systems in 2008.

- **ERTS 2008** *January 29-31, 2008* *Toulouse, France*
  4th European Congress ERTS EMBEDDED REAL TIME SOFTWARE 2008

ARTIST labeled / sponsored Workshops (1/4)

- Embedded Systems: Industrial Applications ’08 *November 12-13, 2008*
- UML&FM’08 *October 27th, 2008*
- WESE’08: WS on Embedded Systems Education *October 23rd, 2008*
- Workshop on Foundations and Applications of Component-based Design (WFCD’2008) October 19th, 2008
- RNTS’08 October 16-17, 2008
- ACESMB 2008 September 29th, 2008
- ARTIST2 Summer School 2008 in Europe September 8-12, 2008
- ARTIST2 South-American School for Embedded Systems 2008 August 25-29, 2008
- Artist2 Summer School in China 2008 July 12-18, 2008
- MoCC 2008 July 3-4, 2008
- WCET’08 July 1st, 2008
- OSPERT 2008 July 1st, 2008
- MPSoc 2008 June 23-27, 2008
- Movep’08 June 23-27, 2008
- Real-Time Kernels for Microcontrollers: Theory and Practice June 23-25, 2008
- COMES 2008 June 17-18, 2008
- Mapping of Applications to MPSoCs June 16-17, 2008
- ARTIST2 Graduate Course on: Automated Formal Methods for Embedded Systems 2008 June 16-24, 2008
- ARTIST2 Graduate Course on Embedded Control Systems May 26-30, 2008
- ArtistDesign Workshop on Design for Adaptivity May 13-14, 2008
- DataFlow Modeling for Embedded Systems 2008 May 5th, 2008

ARTIST labeled / sponsored Workshops (2/4)

- APRES'08 April 21st, 2008
- SLA++P'2008 April 5th, 2008
- UML&AADL'2008 April 2nd, 2008
- Scopes 2008 March 13-14, 2008
- ARTIST2 Timing Analysis activity meeting 2008 March 13th, 2008
- ArtistDesign Automotive Systems Day 2008 March 12th, 2008
- ATESST Open Workshop March 3rd, 2008
- Synchron 2007 November 26-30, 2007
- ARTIST2 meeting on Integrated Modular Avionics November 12-13, 2007
- WESE'07: WS on Embedded Systems Education October 4-5, 2007
- EmSoft'07 October 1-3, 2007
- Embedded Systems Week 2007 September 30th - October 5th 2007
- Foundations of Component-based Design September 30th, 2007
- Between Control and Software (in honor of Paul Caspi) September 28th, 2007
- EPSD 2007 September 10-14, 2007
- FOSAD 2007 September 9-15, 2007
- First European-SouthAmerican School for Embedded Systems August 21-24, 2007
- Artist2 / UNU-IIST School in China - 2007 August 1-10, 2007
- UML&AADL'2007 July 14th, 2007
- FCC 2007 July 4-5, 2007
- CAV 2007 July 3-7, 2007 Berlin, Germany

ARTIST labeled / sponsored Workshops (3/4)

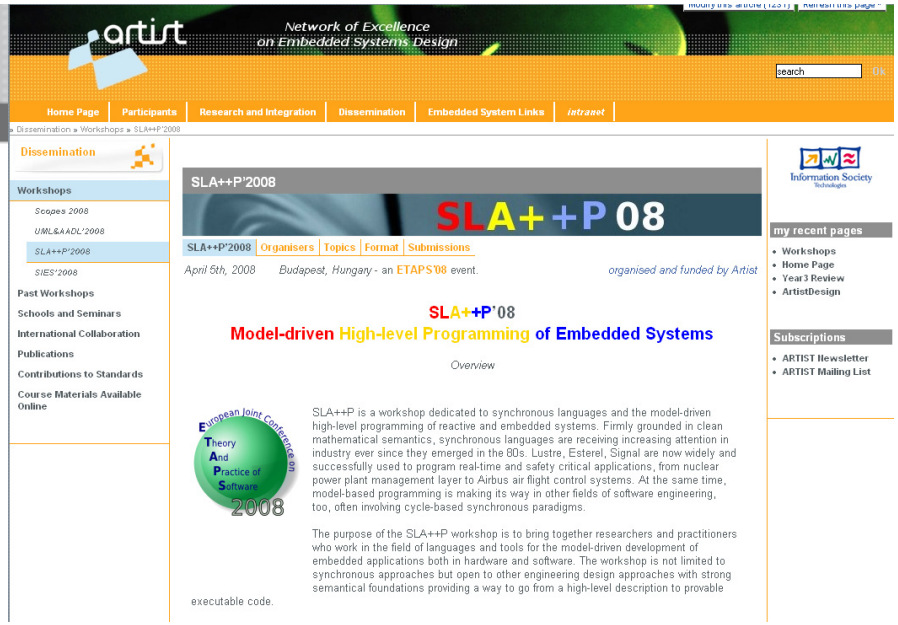
- ARTIST WS: Tool Platforms for ES Modelling, Analysis and Validation July 1-2, 2007
- ARTIST2 PhD Course on: Automated Formal Methods for Embedded Systems June 4-12, 2007
- 2nd Int'l ARTIST Workshop on Control for Embedded Systems May 31st - June 1st 2007
- FMGALS'2007 May 29th, 2007
- ARTIST2 Graduate Course on Embedded Control Systems May 7-11, 2007
- SCOPES 2007 April 20th, 2007
- Towards a Systematic Approach to Embedded System Design April 20th, 2007
- IRTAW-13 April 17-19, 2007
- HSCC'07 April 3-5, 2007
- NeRES 2007 April 2nd, 2007
- SLA++P 2007 March 31st, 2007
- Real-Time Microcontroller Systems: OSEK Standard and experiments on µcontroller devices March 26-28, 2007
- ARCS 2007 March 12-15, 2007
- ARTIST2 - MOTIVES 2007 February 19-23, 2007
- CASTNESS'07 Workshop and School January 15-17, 2007
- CASTNESS'07 Workshop and School January 15-17, 2007
- ARTIST2 Workshop on Basic Concepts in Mobile Embedded Systems December 4-5, 2006
- Synchron 2006 November 27th - December 1st 2006
- ARTIST2 Workshop on Timing Analysis in the Industrial Development Process (ISoLA 2006) November 17th, 2006

ARTIST labeled / sponsored Workshops (4/4)

- MoCC - Models of Computation and Communication November 16-17, 2006
- Artist2 - Foundations and Applications of Component-based Design October 26th, 2006
- WESE'06 - Embedded Systems Education October 26th, 2006
- ATVA China 2006 October 23-26, 2006
- ATVA China 2006 October 23-26, 2006
- JTRES 2006 October 11-13, 2006
- MARTES 2006 October 2nd, 2006
- ADSD 2006: Advanced Digital Systems Design September 25-29, 2006
- FOSAD 2006: 6th International School on Foundations of Security Analysis and Design September 10-16, 2006
- First European Laboratory on Real-Time and Control for Embedded Systems July 10-14, 2006
- CORDIE'06: Concurrency, Real-Time and Distribution in Eiffel–like Languages July 4-5, 2006
- ARTIST2 Workshop on Requirements for Flexible Scheduling in Complex Embedded Systems June 16th, 2006
- ARTIST2 Workshop on Execution Platforms / Cluster Meeting May 22-23, 2006
- ARTIST2 Workshop on Specification and Verification of Secure Embedded Systems May 18th, 2006
- ARTIST2 / UNU-IIST Spring School in China 2006 April 3-15, 2006
- ARTIST2 Graduate Course on Embedded Control Systems April 3-7, 2006
- ARTIST2 Workshop Beyond AutoSar March 23-24, 2006
- ARTIST Workshop at DATE'06 March 10th, 2006
- Workshop: Distributed Embedded Systems November 21-24, 2005
- ARTIST2 Summer School 2005 September 29th - October 2nd 2005

Artist Web Portal

Web Portal - Features



Objective

The ARTIST Web Portal is a major tool for Spreading Excellence within the Embedded Systems Community.

- The web portal disseminates information about ***contacts*** (core and affiliated partners), and ***web links*** about:
  - the JPA events and activities,
  - a fairly thorough set of links to sites of interest to the embedded systems community
- We regularly receive spontaneous requests for:
  - adding information to the site
  - subscriptions to the Artist Mailing List
- Authorised users (principally, the ArtistDesign partners) can access the back end of the site to modify and update information directly. The changes are immediately visible on the site, which greatly streamlines the updating process.
- Ergonomics are set for the entire site. The “look and feel” of the site is always homogeneous throughout the site. It’s possible to change these ergonomics, and these changes are applied homogeneously throughout the site, via automated mechanisms.

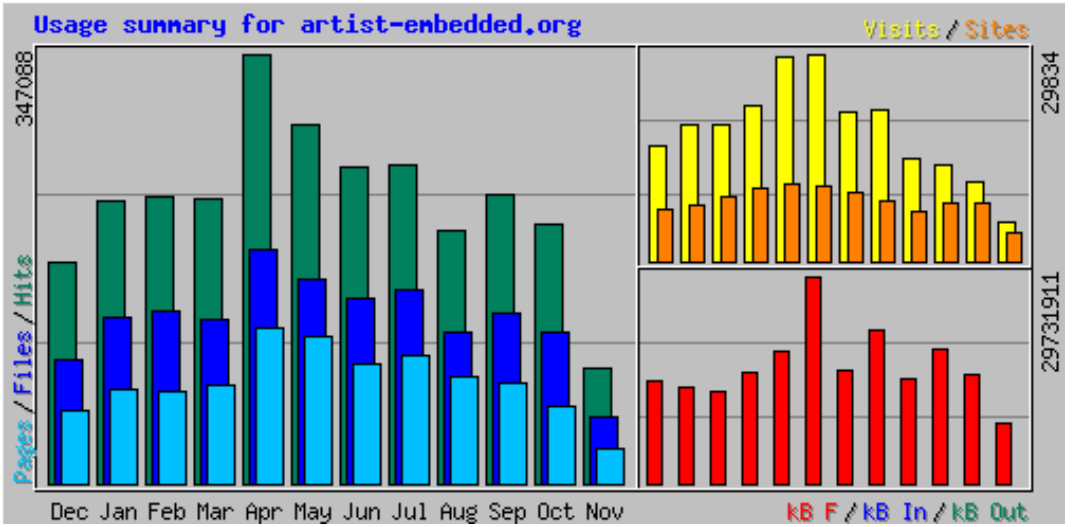
SEVENTH FRAMEWORK PROGRAMME

Website: Potential New Features

- Streamline the mechanisms for affiliated partners

- Reporting mechanisms for partners
  - Projects
  - Staff Mobility
  - Publications (for EC reporting)

Analysis of Visits to the Web Portal



Over the course of Y1, we see a peak in April, which corresponds to registrations for the Artist Summer School.
Overall, the workshops (and their hits) were more evenly distributed than in previous years (Artist2).

Main conclusions:

- Visits to the site are largely driven by the ARTIST events organised (workshops, conferences, schools),
- This seems to drive visits to the other sections: “Embedded Systems Links”, and “Research and Integration”.

But please note:

- Deep analysis of the pertinence and effectivity of the web portal needs to go beyond the numerical analysis provided here.
- Real impact is in whether or not the members of the community find the information relevant, and how it helps them in their daily tasks.

Web Portal - Statistics

Visits distribution / sections of the web portal :

▶ 15. About the Artist2 NoE	1.5%
▶ 20. Participants	10.8%
▶ 25. Research and Integration	7.4%
▼ 30. Dissemination	54.5%
▶ 20. Workshops	31.7%
▶ 30. Schools and Seminars	19.1%
60. Publications	2.1%
▶ 70. Contributions to Standards	1.6%
▼ 35. Embedded System Links	20.4%
10. Journals	2.5%
▶ 20. Conferences	1.8%
30. Standards	0.7%
▶ 35. Tools and Platforms	3.7%
▶ 40. Main Projects	2.7%
50. Position Papers	1.2%
55. Roadmaps	0.9%
60. Newsletters and Magazines	1%
▶ 70. Announcements	5.6%
▶ 40. intranet	1.1%
▶ 70. Artist2 Reviews	3%
71. ArtistDesign Reviews	0.6%
76. Reporting on Mobility	0.7%

- 54.5% of the visits are to the “Dissemination” section, which provides information and pointers about Artist2 events and results. This is up from 40.9% last year. Of these, a full 31.7% (30.3% last year) of the total visits to the portal are to the Workshops section, where the home pages of many Artist2 workshops are located.

- The “Schools and Seminars” section has registered a very large upswing, from 6% last year, to 19.1% this year.

Google searches to access the Web Portal

The Web Portal shows how visitors reach the site via google (over a few hours this week):

- « castness »
- « paul caspi retirement »
- « "semantic level" component »
- « cluster testing »
- « FPVI project »
- « spreading excellence in research »
- « presentation material »
- « Multi-Clock Latency-Insensitive Architecture »
- « Real Time Components »
- « Systems integration activities »
- « Integrated Modular Avionics »
- « ahmed bouajjani »
- « rtcsa 2009 »
- « FORMAL ANALYSIS ART TUTORIAL »
- « NOE structure »
- « RTSS 2009 »
- « artistdesign »
- « Embedded Computing Architecture »
- « embedded DSP workshop 2009 »
- « dsp embedded seminar participants list, india »
- « lilius johan abo.fi »
- « "Model-based development: From UML to Simulink" »
- « project conclusion application design presentation »
- « ERTS EMBEDDED REAL TIME SOFTWARE 2009 »
- « Towards a traceability model in a MARTE-based methodology for real-time embedded systems »
- « Integrated modular avionics for first time »
- « Dr. Christian Salzmann BMW »
- « parallel optimization demo platform compiler options »
- « first to use Integrated Modular Avionics (IMA) »
- « Sirena "Real time Embedded Networked Applications" »
- « integrated modular avionic »
- « Embedded Systems Week 2009 »
- « combest passerone »
- « "roberto zafalon" »
- « artist samos »
- « uml profile for qos and fault tolerance »
- « johan lilius abo.fi »
- « ISO/IEC TR 18037:2004 »
- « RTSS 2009 »
- « OSPERT 2009 »
- « embedded systems europe »
- « what is cluster testing » (2)
- « modular avionics design »
- « timing analysis embedded »
- « integrated modular avionics »
- « established trust level EAL7 »
- « 2009 embedded system »
- « universities in america offering embedded systems course »
- « artemis fp7 »
- « WCPS2008 »
- « summer Engineering courses in Switzerland »« Languages and Tools for Hybrid Systems Design »
- « verification assembler code »
- « basics of model checking paul gastin »
- « sies - switzerland »
- « embedded major project »
- « artist mailing list »
- « julian proenza home page »
- « ethernet powerlink »

Videos from the School in Autrans

http://artist.imavox.ch/mardi/giovanni_de_micheli/

Objective
Improve collaboration between sectors

« Mobility between sectors is slowed by the lack of transversal technologies / standards. »

Embedded Software: Markets, Trends, Skills – PAC 2008

	Current Needs…	**… Addressed by the Common Technical Baseline**

"L'homme de l'art" **(OEMs, SMEs, Integrators, …)**	• Improve interaction along the value chain and with experts from different sectors
	• Standardize HR Management / Improve employability across sectors
	• Simplify access to public funding
	• Position of activities / products
		• ***First step towards*** a Common Reference used e.g. for
		  ◦ Technical documentation
		  ◦ Contracts
		  ◦ Job descriptions
		  ◦ Calls for tender
		  ◦ Collaborative R&D information exchanges
		• Reference for information
		  ◦ Training
		  ◦ General Information

Institutions **(Clusters, Ministries, European Commission, …)**	• Increase efficiency of public funding processes via a better targeting of actions • Gain a high-level technical perspective and insight in the sector	
Wider Public **(Students, Journalists, …)**	• Access didactic resource, generic for the whole sector of Embedded Systems	

Commented and validated by an Expert Committee of ~20 people

Aerospace & Security	Gérard LADIER (Airbus, Senior Manager, Software Engineering) Emmanuel LEDINOT (Dassault Aviation, Responsable des Etudes Scientifiques) Jean-Claude DERRIEN (Safran, Technical Director Sagem Avionics Division)
Automotive	Louis-Claude VRIGNAUD (Continental Corporation, In charge of External Relations) Olivier GUETTA (Renault, Embedded Software Competency Group Manager) Gilles LE CALVEZ (Valeo, EDGE Project Director) Magnus GRANSTRÖM (Volvo Trucks, Group Manager)
Rail	Didier VAN DEN ABEELE (Alstom Transport, EU/Government Projects Manager) Saïd EL FASSI (Siemens Rail, Responsable du Département des Etudes Avancées) Pascal DUCH (Siemens Rail, Directeur Technique - Product Development & Safety)
Manufacturing	Jean-Louis BERGERAND (Schneider Electric, Responsible for Software Architectures)
Health	Ger VAN DEN BROEK (Philips, Senior Scientist, Research Healthcare) Frank VAN DER LINDEN (Philips, Partnership Projects, CTO Office, Philips Healthcare)
Consumer Electronics	Remi HOUDAILLE (Thomson, Software Architect Expert) Pierre CAUCHOIS (Microsoft, Technical Relations for Mobile and Embedded Developers)
HW / IP provider	Eric FLAMAND (ST Microelectronics, Director of Advanced Computing, ST)
Technology Providers	Eric BANTEGNIE (Esterel Technologies, CEO) Eliane FOURGEAU (Geensys, VP Sales & Marketing) Knut DEGEN (Sysgo, CEO)
Science	Robert DE SIMONE (INRIA, Senior Researcher, scientific leader of project-team Aoste)

Further experts have been contacted in order to enlarge the generality of the Common Technical Baseline

A Multi-level, Concept-oriented Set of Definitions

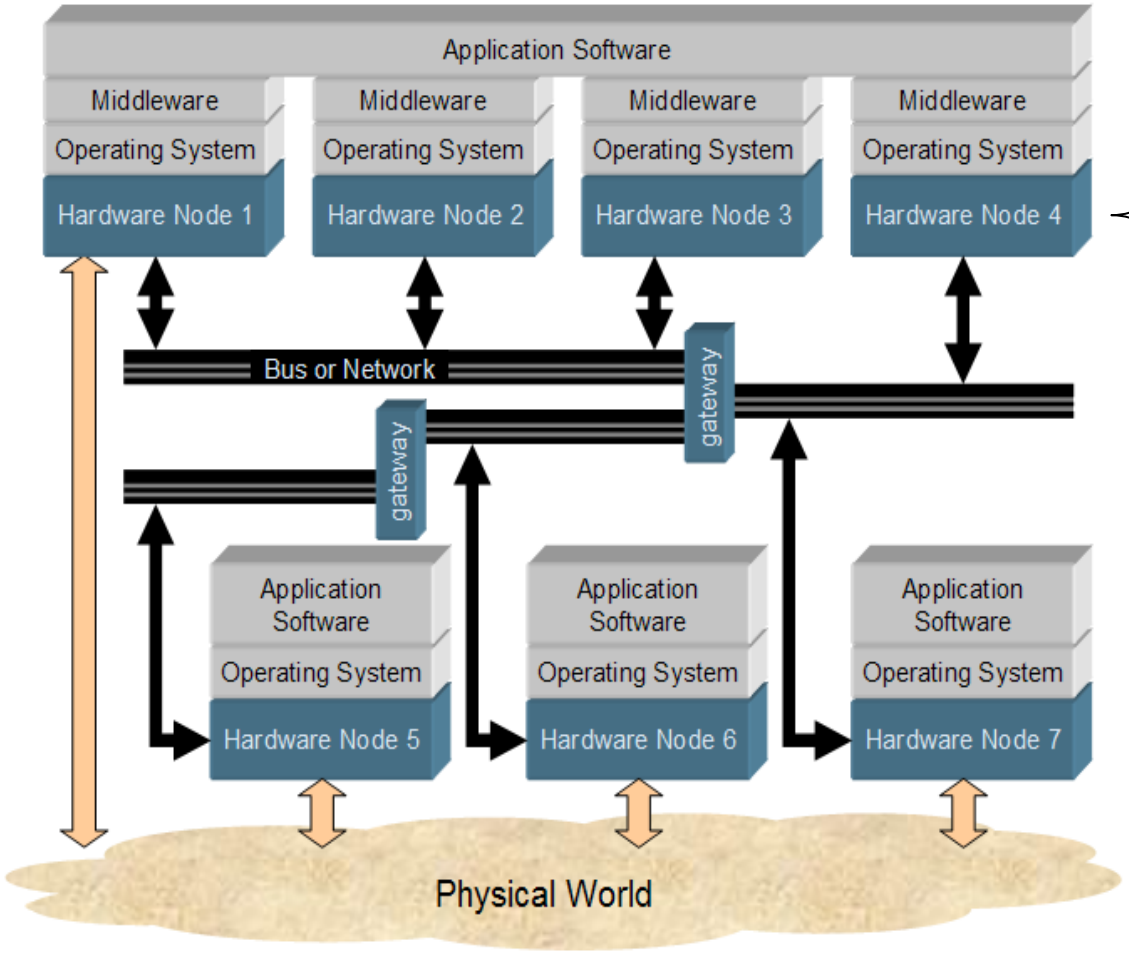
Level 1	Level 2	Level 3
System View	Buses and Networks for Embedded Systems Certification Change Management Code Generation Configuration Management Control Flow Analysis Controller Area Network (CAN) DSP Data Flow Analysis Deployment Development Assurance Level Device Drivers Direct Memory Access (DMA) Electronic Control Unit (ECU) Embedded Operating System Environmental Modeling Executable image(s) Fault Correction Feature Design FlexRay Floating Point Unit Formal Methods Frame Programmable Gate Array	A DSP (Digital Signal Processor) is capable of providing: - very high performance - low production costs - low energy consumption - real time operation - high interrupt rates - intensive numeric computations for specific types of repetitive tasks such as Fast Fourier transforms, digital filters, pattern recognition, image processing and speech recognition. They are key components for many types of applications, such as audio, video and multimedia peripherals, disk drives and image processing systems for medical and scientific applications.
Product Lifecycle View		
Design Tools View		
Design Methods View		
Diagram	***Diagram***	***Text***

Level 1 “System View”

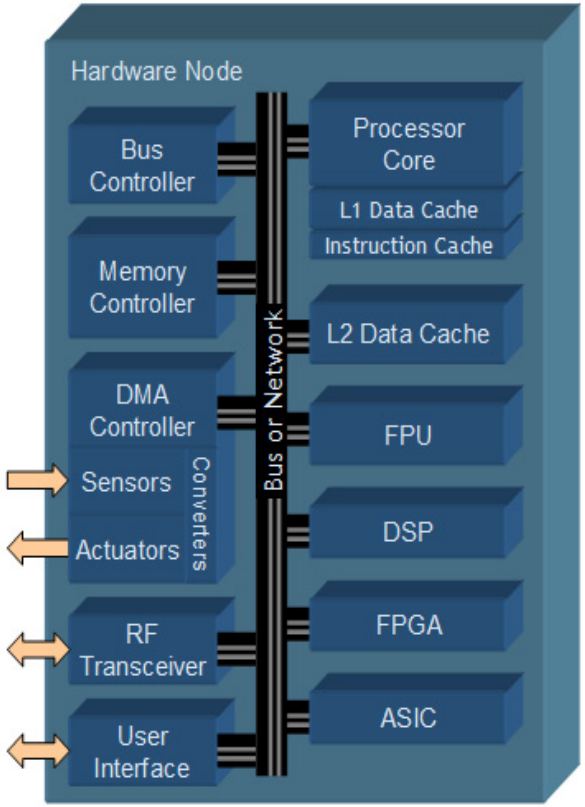
ES by Components

A Distributed Embedded System

Each Hardware Node can be considered as a separate Embedded System



A Hardware node may be composed of different combinations of components



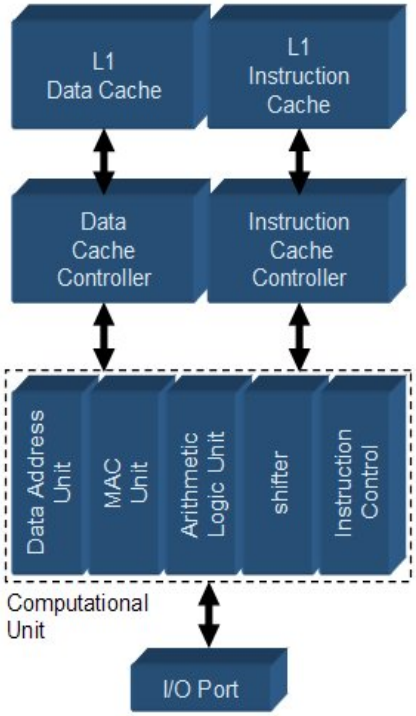
Level 2: *Diagrams*
Level 3: *Texts*

Level 2: Diagram

Level 3: Text

» System View » DSP » Overview

DSP



click on the boxes in the diagram, to see the detailed text

Overview

A DSP (Digital Signal Processor) is capable of providing:

- very high performance
- low production costs
- low energy consumption
- real time operation
- high interrupt rates
- intensive numeric computations

for specific types of repetitive tasks such as Fast Fourier transforms, digital filters, pattern recognition, image processing and speech recognition.

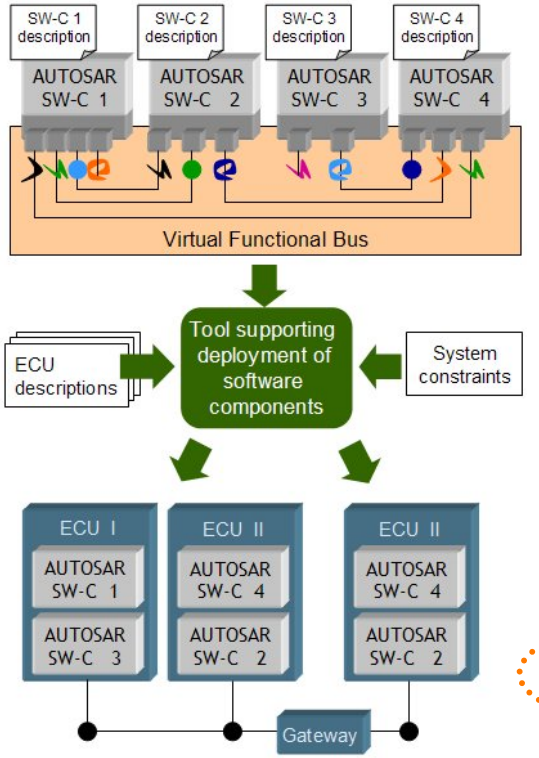
They are key components for many types of applications, such as audio, video and multimedia peripherals, disk drives and image processing systems for medical and scientific applications.

-- External links --

- Courseware: **DSP Architecture**- *Politecnico di Milano*
- Article: **Understanding the reuse of a DSP architecture for different designs (Ceva)**
- Dictionary: **BDTI's DSP Dictionary**
- **Electronics Information Online**

“Architecture Examples”:
Links to existing industry reference architectures

Autosar: Mapping Software Components to ECUs



Overview

AUTOSAR defines Software Compon
hosts the application software. A soft
reduces the component’s dependenc
AUTOSAR, provided the application e

-- External links --

- **AUTOSAR Home Page**
- **AUTOSAR Technical Overview**
  V2.2.1
- **AUTOSAR: AUTomotive Open System ARchit**
  Seminar: Software Engineering for Automotive S
- **Creating AUTOSAR Systems Models Using th**
  Article, Automotive Industries magazine
- **Why does the automotive industry need AUT**
  NEC Electronics Europe

-- See also (internal links) --

- **System View: ECU**
  A more generic view of the ECU.

Electronic Control Unit (ECU)

In automotive electronics, a
electrical subsystems in a v

Some modern cars have
Convenience control, Doo
Machine Interface, Powertr
Seat Control, speed control

The increasing complexity
challenge for OEMs.

Links between generic Baseline and IMA- (Aerospace), LIMO- (Consumer Electronics) and ERTMS-architecture (Rail) are also established

Common Technical Baseline: Goals

- The Common Technical Baseline offers
  - A common reference of terms and concepts, across industrial sectors
  - A didactic tool to facilitate exchanges between different actors
- The Common Technical Baseline is intended for
  - All types of industrial actors, experienced or not
  - Public funding agencies
  - Teachers and students
  - Wider public
- The Common Technical Baseline has already sparked interest in the press
  - L'Expansion – See article of June 23th
  - 01 Informatique – See article of June 20th
- The Common Technical Baseline
  - Will continue to evolve and to be extended
  - Is open to further contributors in order to further increase its quality