Artist2 Final Review
Brussels, December 12th, 2008

Achievements and Perspectives :

Spreading Excellence

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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

The Artist2 Network of Excellence has always pursued an extremely active policy for organizing and funding International Collaboration events:

In *Year 4 alone*, we have had a very large number of International Collaboration events that we plan to pursue into the ArtistDesign NoE:

ARTIST2 South-American School for Embedded Systems 2008
August 25-29, 2008 *Universidade Federal de Santa Catarina, Florianopolis, Brazil*
Second edition of the ARTIST South American School.

ARTIST2 Summer School 2008 in Europe *September 8-12, 2008* *Autrans (near Grenoble), France*
The Summer School offers a number of foundational tutorials, accompanied by a selection of lectures on exciting emerging technologies and industrial applications - given by leading scientific and/or industrial experts.

Artist2 Summer School in China 2008 *July 12-18, 2008* *Shanghai, China*
ARTIST2 has organized the 3rd edition of a school on Embedded Systems Design in Shanghai. This year, the school was organized in collaboration with the SEI/ECNU and the LIAMA.

ARTIST2 meeting on Integrated Modular Avionics *November 12-13, 2007* *Roma, Italy*
Integrated Modular Avionics (IMA) has set the principles of standardized components and interfaces of hardware and software in aircraft, applied for the first time in the development of the Airbus A380.

Workshop on Embedded Systems Education (WESE 2007) *October 4-5, 2007* *Salzburg*
This third edition aims to bring researchers, educators, and industrial representatives together to assess needs and share design, research, and experiences in embedded systems education.

Foundations of Component-based Design
September 30th, 2007 *Salzburg, Austria - within EmSoft / ES Week*
Artist2 organised and funded this event, within Embedded Systems Week.

Information Society Technologies

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.

Artist2 PhD Schools in Y4

Real-Time Kernels for Microcontrollers: Theory and Practice *June 23-25, 2008 Pisa*
The course on Real-Time Kernels for Microcontrollers aims to introduce the basic concepts of Real-time Systems targeted to Embedded Systems, which are often implemented using microcontrollers. The course will briefly illustrate the theoretical background of real-time scheduling, resource-aware techniques, and wireless communication based upon the IEEE 802.15.4 protocol.

ARTIST2 Graduate Course on: Automated Formal Methods for Embedded Systems 2008
June 16-24, 2008 DTU - Lyngby, Denmark
In the lectures, we will introduce a comprehensive set of state-based models as well as automatic procedures for their analysis. The exercise classes will complement this by providing hands-on experience with appropriate verification tools.

ARTIST2 Graduate Course on Embedded Control Systems *May 26-30, 2008 Stockholm*
The course provides an account of state of the art theory and techniques that address the connection and integration of the areas of Control systems and Embedded systems.

Other Schools Partially Funded

or organized with Artist2 partners

CASTNESS 2008
organised with Artist partners
January 15-18, 2008 Roma, Italy

EPSD 2007
sponsored by Artist
September 10-14, 2007 EPFL, Lausanne, Switzerland
Advanced engineering courses will be offered by the Swiss Federal Institute of Technology, Lausanne, Switzerland, during summer period 2007.

FOSAD 2007
sponsored by Artist
September 9-15, 2007 Bertinoro, Italy
The International School on Foundations of Security Analysis and Design (FOSAD) has been one of the foremost events established with the goal of disseminating knowledge in this critical area. The main aim of the FOSAD school is to offer a good spectrum of current research in foundations of security - ranging from programming languages to analysis of protocols, from cryptographic algorithms to access control policies and trust management - that can be of help for graduate students and young researchers from academia or industry that intend to approach the field.

LASER Summer School on Software Engineering
September 9-15, 2007 Elba, Italy
the LASER summer school (Laboratory for Applied Software Engineering Research), organized by ETH Zurich, brings together the concepts and practice of software engineering.

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

Conferences Organized with Artist2 Partners

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

Ada-Europe'08 *organised with Artist partners June 16-20, 2008 Venice, Italy*

Cyber Physical Systems Week 2008 *April 2008 St Louis, organised w/ Artist partners*
Three leading conferences - RTAS, IPSN and HSCC - will take place at the same time and location during the CPS week.

RTSS 2007 *organised with Artist partners December 3-6, 2007 Tucson, Arizona, USA*
RTSS remains the premier conference in the area of real-time computing, presenting innovations in the field with respect to theory and practice.

FORMATS'07 *organised with Artist partners October 3-5, 2007 Salzburg, Austria*
The aim of FORMATS is to promote the study of fundamental and practical aspects of timed systems, and to bring together researchers from different disciplines that share interests in modelling and analysis of timed systems.

EmSoft'07 *sponsored by Artist organised w/Artist partners*
October 1-3, 2007 Salzburg, Austria
EMSOFT aims at covering all aspects of embedded software with focus on principles of embedded software development.

Sponsoring for selected conferences

DATE'08 *sponsored by Artist*
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.

EmSoft'07 *sponsored by Artist organised w/Artist partners*
October 1-3, 2007 Salzburg, Austria
EMSOFT aims at covering all aspects of embedded software with focus on principles of embedded software development.

Embedded Systems Week 2007 *sponsored by Artist*
Sept 30th - Oct 5th 2007 Salzburg, Austria
Embedded Systems Week brings together conferences, tutorials and workshops centered on various aspects of embedded systems research and development.

Artist2 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

Artist2 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

Artist2 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

Artist2 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

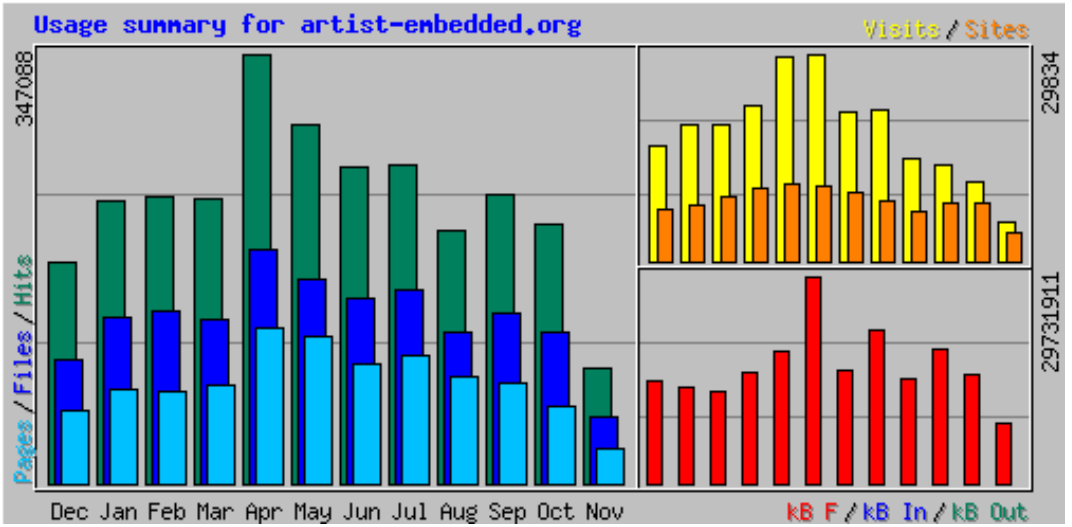
Web Portal - Features

Objective

The Artist2 Web Portal is a major tool for Spreading Excellence within the Embedded Systems Community.

- The web portal disseminates information about ***contacts*** (Artist2 core and affiliated partners), and ***web links*** about:
  - the Artist2 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 Newsletter and Mailing List
- Authorised users (principally, the Artist2 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.
- Ergnomics 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.

Analysis of Visits to the Web Portal



Over the course of Y4, 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 Y3.

Main conclusions:

- Visits to the site are largely driven by the Artist2 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 »
- « hipeac »
- « paul caspi retirement »
- « "semantic level" component »
- « artist2 »
- « cluster testing »
- « FPVI project » (2)
- « EMBEDDED C »
- « spreading excellence in research »
- « presentation material »
- « cédric di tofano »
- « ARTIST2 Design »
- « 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 Systems Week 2009 »
- « ERTS 2009 embedded »
- « 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 »
- « Edward A Lee artist »
- « erts »
- « ROBERT BOSCH AG »
- « 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 »
- /custom?hl=en&client=pub-899...
- « hardware course material online »
- « what is cluster testing » (2)
- « main projects » (2)
- « as level art brief example »
- « neeraj suri »
- « modular avionics design »
- « timing analysis embedded »
- « integrated modular avionics »
- « established trust level EAL7 »
- « Industrial Phd Aalborg »
- « ARTIST DESIGN embedded »
- « 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 »
- « combest passerone »
- « "roberto zafalon" »

Google searches to access the Web Portal

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

- « UML QoS profile »
- « Suitability of dynamic load balancing in resource constrained embedded systems: An overview of challenges and limitations »
- « esweek 2009 »
- « embedded software automotive memory slides »
- « integrated modular avionics »
- « t »
- « survey of programming languages »
- « survey of programming language »
- « EMSOFT 2009 »
- « cluster testing »
- « On the Scalability of Real-Time Scheduling Algorithms on Multicore Platforms: A Case Study »
- « artist design artist2 »
- « artist »
- « "abhijit datar" »
- « artist embedded »
- « artist2 »
- « integrated modular avionics »
- « Automation System

- « nanjing university yue zhang »
- « processor-memory co-exploration driven by memory-aware architecture »
- « mpsoc 2009 »
- « "PARADES" Roma company »
- « real-time embedded system »
- « university of uppsala embedded systems »
- « telecommunication workshops seminars in 2009 »
- « organizational chart of distributed embedded system »
- « Real Time Application Support (AEP), IEEE Std 1003.13-1998 »
- « bound-t »
- « Ptolemy Project »
- « open PhD Positions in Denmark »
- « artistdesign »
- « phan thi xuan linh »
- « artist »
- « artist embedded »
- « artist of this time »
- « artist noe »
- « AADL VTS »

- « security protocol term rewriting »
- « ISO/IEC TR 18037:2004 »
- « Device Power Scheduling via Systems Management »
- « Ndukwu northeastern »
- « artist2 fpga »
- « verification testing tools »
- « CODES-ISSS 2009 »
- « adaptive real-time »
- « truetime lecture »
- « truetime matlab »
- « school in europe »
- « osek oil »
- « what is clusters in strategic management »
- « powerlink matlab toolbox »
- « "eric lenormand" -vin -vins -théatre -pièce -costumes -décors »
- « hardware VLSI research professor .edu home page »
- « international collaboration »
- « uml real time »
- « computing design »
- « Prof. Francky Catthoor »
- « Features of Real-Time Embedded Systems »

Videos from the School in Autrans

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

THANK YOU