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(ICT)
PROGRAMME



REVIEW REPORT

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Embedded Systems Design

Review Y3

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1 Executive Summary

1.1 Project summary:

The ARTISTDESIGN NoE is the visible result of the ongoing integration of a community, that emerged through the Artist FP5 Accompanying Measure and that was organised through the Artist2 FP6 NoE. The central objective for ARTISTDESIGN is to build on existing structures and links forged in Artist2, to become a virtual Centre of Excellence in Embedded Systems Design. This will be mainly achieved through tight integration between the central players of the European research community. Also, the consortium is smaller, and integrates several new partners. These teams have already established a long-term vision for embedded systems in Europe, which advances the emergence of Embedded Systems as a mature discipline.

According to the accepted aims, ARTISTDESIGN will become the main focal point for dissemination in Embedded Systems Design, leveraging on well-established infrastructure and links, such as a web portal and newsletter. It will extend its dissemination activities, including Education and Training, Industrial Applications, as well as International Collaboration. ARTISTDESIGN will establish durable relationships with industry and SMEs in the area, especially through ARTEMISIA/ARTEMIS. ARTISTDESIGN will build on existing international visibility and recognition, to play a leading role in structuring the area.

The research effort aims to integrate topics, teams, and competencies, grouped into 4 Thematic Clusters: "Modelling and Validation", "Software Synthesis, Code Generation, and Timing Analysis", "Operating Systems and Networks", "Platforms and MPSoC". "Transversal Integration" covering both industrial applications and design issues aims for integration between clusters.

ARTISTDESIGN has defined a four-year work programme, with a strong commitment to integration and sustainability. To achieve the aims, the estimated support from the EC is approximately 4.5 MEU. This support is a very small proportion of the overall investment by the core partners.

Project Cost: 5.86 million euro

Project Funding: 4.5 million euro

1.2 Period under review and main review objective

The third 12 months are under review (months 25-36). The review objectives are to verify contribution to the main objectives during this period:

- Strengthening Scientific and Technological Excellence for Embedded Systems Design
- Spreading Excellence in Embedded Systems Design
- Structuring European R&D in Embedded Systems Design

The review was planned and executed in accordance with the contract. The consortium has consumed the expected resources and is in the progress of incurring the expected costs for this phase of the project.

1.3 Overall reviewers' conclusion

The rich web of industrial connections, the attention industry pays to ArtistDesign activities is a testimony that ArtistDesign is an excellent investment: it is an engine of innovation in a strategic field.

The “superstructure” ArtistDesign creates over a number of EU research projects is valuable: the coordination is working, the clusters are active, communities interact and a shared vision is formulated. ArtistDesign has a major promise that new insights will emerge from the vertical, cross-cutting activities that could not have emerged otherwise.

ArtistDesign gives a unique identity to research in EU in embedded systems. The scope of activities, the level of involvement of the researchers, the volume of produced results is impressive. The ArtistDesign portal is a shared intellectual asset used now worldwide.

This all is shown by the research output, the website, the summer schools, the joint publications as well as by the generated projects both at European level (FP7, Artemis) and at national level.

At the review meeting, presentations were at the right level of detail, well presented and the timing was good.

The main points are summarised below:

Strengths:

- The NoE has matured and provides the required conceptual integration for large and diverse technology area.
- There is evidence of significant interaction across researchers, research groups and even research areas. This interaction has started creating a strong convergence on the field and improves effectiveness in addressing rapidly emerging new challenges
- The produced research output of the teams participating in the NoE is extremely impressive.
- There is ample evidence that impact on industry is strong. Connection to industry is demonstrated, with significant variance among the various industrial domains.
- Outreach activities are remarkably strong and well represent EU research excellence in the area of embedded systems world-wide.
- ArtistDesign may be considered as a crown jewel of the EU ICT, well worth the investment.
- The NoE has extended its internal connections and especially in the integration domain, where new fields have been initiated. New fields of application which were mentioned as targets during last review were actually addressed (bio-medical).
- The permeability among the collaborating partners is demonstrated and is based on actual sound research objectives, where joint competences are used to try and bridge gaps, to deliver solutions to identified lacks in embedded systems development areas.

Improvements:

- Prepare in a more timely fashion the financial management documents. This seems to be a constant issue as this was also the case last year.
- Although the produced research output of the teams participating in the NoE is extremely impressive, the path for continuation is not quite clear. The activities that are demonstrated in terms of joint works would benefit from having a joint future research agenda. The strategic research vision could be provided based on roadmapping activities with explanation not only on the rationale for starting these joint activities, but also on objectives that are targeted and expected timeframe for such activities, then connecting to a status on the goals at some milestones. This would also benefit for understanding and demonstrating if / when the collaboration comes to an end (research objectives met, or “dead end”) as well as allowing to determine required extension of the collaboration or decision to stop it.
- Although the need to come to an integrated development environment seems understood by the community, some more progress with respect to this needs to be performed.

This report is a combined effort of all the reviewers and there are no points of disagreement between them on its content.

2 Organisation and logistics

This review was held in Brussels, Beaulieu 33 0/54 Thursday February 24 2011.

Each cluster was represented throughout the review. See list of participants, list of reports and deliverables & agenda (appended to this report). The deliverables were available in electronic version previous to the meeting on the website. An electronic copy of each presentation was available at the review meeting.

The available room was too small for the amount of people present during the meeting.

3 Project Management

The Management deliverables adequately cover the management aspects of the project. During the review meeting no changes within the Consortium were reported.

4 Dealing with previous review recommendations

4.1 Recommendation 1:

The Common Technical Baseline (CTB) initiative is extremely promising. In fact, it would be useful considering extending its goal and scope and creating an international activity patterned after the UMLS (Unified Medical Language System) in the medical field.

(<http://www.nlm.nih.gov/research/umls/>). It could be an interesting topic for the EU-US collaborative activities, and very beneficial for the educational organizations.

Answer from the consortium:

- The Common Technical Baseline is not part of the ArtistDesign DoW
- It has been financed by other means
- To ensure its viability a distinct business model is needed

4.2 Recommendation 2:

Concerning technical deliverables for Year 2 reporting period onwards and in order to avoid redundancy, we would like to propose the possibility of having just incremental documents containing only what is new for that reporting period and referring to previous year's documents for the unchanged sections.

Taken into consideration mentioning the evolution or not of the content of paragraphs with respect to Y1 deliverables. Would benefit to have a standard presentation (sometimes at the beginning of the paragraph, sometimes at the end of the paragraph)

Answer from the consortium:

- An incremental presentation of the results would be an incomplete picture and would be impossible to evaluate - Changes are indicated at the end of each section.
- The deliverables are all done along templates, according to the type of deliverable:
i) Cluster deliverables, ii) activity deliverables, iii) transversal activity deliverables

4.3 Recommendation 3:

Put emphasis on links and levers towards Industry standardization organizations, as this is a key lever to spread and get visibility and feedback on the works and achievements.

Preparing the future is a key task for Y3, so the good work and network will not fade away.

Answer from the consortium: Partners are heavily engaged in standardization bodies:

- Programming Languages (ADA, Java RT, MARTE, SysML, META metalanguage)
 - York and ISEP participate to the Ada standardization process, and in the forthcoming ISO report on Vulnerabilities in Programming Languages
 - DTU and York are involved in the Real-Time Java standardization
 - University of Cantabria is involved in the POSIX real-time system services working group, in the SysML 1.3 Revision Task force and is responsible for two chapters in MARTE 2.1.
 - Trento is participating to the META II program for semantics metalanguage to support system design
 - Catania is actively participating to IEC Technical Committee SC65C, WG17 - Coexistence in Wireless Industrial communication networks
- OFFIS is development Partner of AUTOSAR subgroups of the Methodology Working Group Timing and Safety responsible to bring results from CESAR. TUB is an Attendee.
- KTH is part of the ARTEMIS-IA Tool Platforms Working Group which has as goal to harmonize long term efforts and standards on tool platforms across Artemis research

4.4 Recommendation 4:

The indication on what has changed between Y1 deliverable and Y2 deliverable would benefit to be always either at the beginning of the chapter (3.1.2) or at the end (3.2.1), as this eases clearly the analysis of the document.

Answer from the consortium:

Suggestion: 10 minutes for discussion after each presentation, instead of 5 last year.

4.5 Recommendation 5

About modelling and validation:

- *Tool integration should go beyond individual projects; the team should at least formulate conditions for integrability*
- *One should think about solution for “saving the tools” produced by the community as outcome of research*

Answer from the consortium:

- Prerequisites
Individual tools need well-defined API's (syntax & semantics)
- Three approaches
Common Formats (standardization)
Gateways between tools
Derive global results from partial results produced by different tools
- Challenges for tools to survive
Industrial take-up
Lack of technical support for maturing/sustaining academic tools
Open source?
- Survival of the fittest

4.6 Recommendation 6:

About Synthesis Code Generation and Timing Analysis:

- o There is a need for a vision for new generation of software synthesis and code generation tools,*
- o There should be a deeper integration of results inside the cluster,*
- o A better structured interface with other clusters (operating systems, hardware platforms, etc.) is welcome.*

Answer from the consortium: There has been increased emphasis on software synthesis:

- In addition to the 2nd workshop on software synthesis, partners worked on a special issue of the IEEE Journal on Industrial Informatics on software synthesis. Alberto Sangiovanni-Vincentelli, Peter Marwedel and Affiliate Soonhoi Ha temporarily became Associate Editors of this journal.
- A tighter integration of tools, for example from Dortmund, IMEC, Saarbrücken and Passau is available.
- In cooperation with the cluster on operating systems, timing analysis and worst case execution time aware compilation have been extended to include the analysis of multi-tasking.

4.7 Recommendation 7:

In the framework of Operating Systems and Networks:

- *It seems that increased interaction with the Modelling cluster would be beneficial. OS and network properties are essential for composition and verification, so the opportunity for interaction is there.*

Answer from the consortium: Some activity on modelling Operating Systems has already started in the cluster:

- Pisa and TUKL started collaborating (within the ACTORS project) to model the behaviour of a resource manager that performs resource adaptation in multicore platforms.
- A model has been proposed by Pisa to abstract resource reservation for single and multicore platforms, which has been used by Ericsson to develop resource management for next generation cell phones.
- A workshop on Compositional Theory and Technology for Real-Time Embedded Systems has been organized by Pisa at RTSS 2010, with a Keynote Talk by Edward A. Lee,

Professor at University of California, Berkeley, on "Compositional Timing in Concurrent, Parallel, and Distributed Real-Time Systems":

- CRTS 2010 - 3rd Workshop on Compositional Theory and Technology for Real-Time Embedded Systems
November 30, 2010, San Diego, CA, USA (co-located with RTSS 2010)
<http://retis.sssup.it/crts2010/>
- Research activity on modelling real-time systems will continue in the OSN cluster trying to establish a stronger connection with the Cluster on Modelling.

4.8 Recommendation 8:

In the framework of hardware platforms and MPSoC design:

- o *Increased interaction with software synthesis and code generation*
- o *Approaches for platform modelling: how to do it to help software synthesis?*

Answer from the consortium:

- The MPSoC cluster has increased its interaction with
 - o the Software Synthesis and Code Generation cluster leading to joint work on parallelizing compilers (IMEC/Dortmund) and energy aware compilers (ETHZ/Dortmund),
 - o the RTOS cluster, leading to energy aware mapping based on multi-objective optimization (ETHZ/SSSA) and new scheduling techniques (UNIBO/SSSA).
- The MPSoC cluster has increased its focus on software synthesis support through runtime layers (CEA/UNIBO), execution/simulation environments (ETHZ/KTH/DTU) and MPSoC programming models (DTU).

4.9 Recommendation 9:

Progress of the clusters design for adaptivity and predictability would be stimulated by writing an annual position paper about the new/emerging insights. This is a very complex issue and taking stock periodically of the status of current thinking would be very helpful not only for the cluster but also for the research community.

Answer from the consortium:

- Design for Adaptivity
 - o Annual position paper is too ambitious. Instead, a White Paper / Survey will be written at the end of Y4 summarizing the work done within ArtistDesign and the experience gained
 - o Authors have been decided and an outline is available
 - o Main common activity for Y4
- Design for Predictability
 - o A technical paper will be written on timing predictability for single- and multiprocessor platforms. In connection with the PPES workshop at DATE. An outline is available.

4.10 Recommendation 10:

ARTEMIS link is somewhat fuzzy. This should be improved or clarified.

Answer from the consortium: ArtistDesign has strong links to ARTEMIS, through:

- Representation on the ARTEMIS Industry Association Steering Board:
 - Joseph Sifakis is the CNRS/CEA representative
 - Luca Benini is the University of Bologna representative
- Partner membership in ARTEMIS “B” (Research Organisations & Universities)
 - Representatives from ArtistDesign partners: Aalborg, CEA, CNRS-Verimag, ESI, IMEC, INRIA, Porto, KTH, OFFIS, TU Denmark, Cantabria, UJF.
- Alberto Sangiovanni was one of the evaluators for ARTEMIS and ENIAC
- Strong informal links.

For example, the ArtistDesign Strategic Management Board was asked to review and comment on the latest edition of the Strategic Research Agenda, published in 2011.
- Strong representation by ArtistDesign partners in ARTEMIS projects: CESAR, SMECY, MBAT, RECOMP, iFEST, Encourage, ASAM, IoE, SysModel, Smart, Emmon, iLand, Symbeose, Scalopes, Indexys, Chiron

5 Deliverables

5.1 General comments on presentations

The presentations by each cluster were homogeneous, following a template. The quality of the presentations was overall very high: at the right level of detail and in general respecting the timing. The planned order of the presentations was changed during the meeting as some persons needed to leave early or arrived late.

5.2 General comments on deliverables

The Project Periodic Report became available only a couple of days before the meeting. All Y3 deliverables have been **accepted**.

The Y3 deliverables were, as for the Y2 deliverables, of a uniform excellent quality, written very professionally. Y3 deliverables include a specific indication stating which highlights the newly integrated content for Y3.

5.3 WP0: Joint Program of Management Activities (JPMA)

5.3.1 D1-0.1-Y3 Project Management Report

The document, called project periodic report, was available as a draft version dated Feb 21st 2011. The document is accepted on the condition that a full release is made available soon.

5.3.2 D2-0.2-Y3 Project Activity Reports

The consortium used the name “project management report” is used in this context. There seems to be some confusion on the wording of deliverables

D2-0-2a-Y3_ExecSummary+Overview.pdf

D2-0-2b-Y3_Modelling_and_Validation.pdf

D2-0-2c-Y3_SW_Synthesis_Code_Generation_and_Timing_Analysis.pdf

D2-0-2d-Y3_Operating_Systems_and_Networks.pdf

D2-0-2e-Y3-Hardware_Platforms_and_MPSoC_Design.pdf

ALL D2 reports are ACCEPTED

5.4 WP1: Joint Program of Integration Activities (JPIA)

5.4.1 Integration Activities Report

D3-1-0-Y3_JPIA_Integration_Activities_Report.pdf

The report is ACCEPTED.

5.5 WP2: Joint Program of Activities for Spreading Excellence (JPASE)

In many ways, this is the culmination of scientific impact. The vast range of activities done by the NoE is quite surprising.

ARTIST Summer schools are becoming the flagship events of the NoE. Their impact via training the future generation Ph.D.-s in the field is very high.

The ARTISTDESIGN web site provides a wealth of information and has become the reference for researchers world-wide.

As usual, the reviewers see that a lot of events and publications are demonstrated in the frame of the NoE, including the Portals (more than one is available).

Some of the recommendations of the former review were integrated, even the need to prepare the future (Portal for instance) though the target for sustainability still needs additional focus during the year to come.

5.5.1 Spreading Excellence Report

D4-2-0-Y3_Spreading_Excellence.pdf

The report is ACCEPTED.

5.6 WP3: Thematic Cluster: Modeling and Validation (JPRA)

The cluster continued to be extremely productive in terms of research output: paper, workshops, and interactions.

Reviewers observe an increased attention to transitioning: tool integration and usable “leave-behind” has enjoyed more attention.

- There are islands of excellence around specific approaches (BIP, SPEEDS, COMBEST), much work remained
- Defining tool interoperability requirements AND using some metrics for expressing compliance would be beneficial
- Illustrative design flow and related tool suite case studies would be highly usable for future transitioning efforts.

The results are impressive, in a continuous manner since the beginning of the NoE. Nevertheless, the works would benefit from a perspective for future integration of the various results (based on definition of interface format for instance, or at least, when required for a reduced ambition due to resource status, on recommendations for the future convergence.

This is “easily” feasible by the NoE partners by leveraging the relationships they have set up with industrial partners, asking them to make “use cases” and “demonstrations” of the way these partners would use the tools in their own development process (illustration by one recent development for instance).

5.6.1 Modeling Report

D5-3-1-Y3_Modelling.pdf

The report is ACCEPTED.

5.6.2 Validation Report

D6-3-2-Y3_Validation.pdf

The report is ACCEPTED.

5.7 WP4: Thematic Cluster: Software Synthesis, Code Generation and Timing Analysis (JPRA)

The cluster continued to be productive in terms of research output: paper, workshops and interactions.

The focus on MC platforms is effective for organizing efforts.

There is some indication of convergence between software synthesis area and the model-based approaches (architecture modeling, architecture optimization, timing analysis). For example, WCET and ACET analysis is essential for timing analysis and verification, so these are nice complementary areas. This convergence could be exploited for building (at least) conceptual interfaces between model-based design flows and code synthesis design flows (and tool chains).

The work targeted on Timing analysis in order to address the challenges from the new multi-X architectures has delivered results and is promising on the way these aspects may be considered from the very beginning of the definition (and modeling) of the architectures.

5.7.1 Software Synthesis, Code Generation

D7-4.1-Y3_Software_Synthesis_Code_Generation.pdf

The report is ACCEPTED.

5.7.2 Timing Analysis

D8-4-2-Y3_Timing_Analysis.pdf

The report is ACCEPTED.

5.8 WP5: Thematic Cluster: Operating Systems and Networks (JPRA)

The cluster has strong inter-cluster activities, and an impressive research output.

The planned work on partitioning algorithms on multi-core platforms is important and complementary to other MC related activities inside the NoE.

Again, the work targeting on partitioning applications on many execution platforms has progressed, with new presented results (that can also be in one single Component at the end) are highly relevant and a must for the deployment of new functions)

5.8.1 Resource-Aware Operating Systems

D9-5-1-Y3_Resource-aware_Operating_Systems.pdf

The report is ACCEPTED.

5.8.2 Scheduling and Resource Management

D10-5-2-Y3_Scheduling_and_Resource_Management.pdf

The report is ACCEPTED.

5.8.3 Embedded Real-Time Networking

D11-5-3-Y3_Embedded_Real_Time_Networking.pdf

The report is ACCEPTED.

5.9 WP6: Thematic Cluster: Hardware Platforms and MPSoC Design

Reviewers observe an impressive inter-cluster coordination, exemplary planning with an excellent research output. The work is very targeted thanks to a good identification of the architectures at stake.

There is a very strong vision and research program on MPSoC. The question is how this activity is coordinated with the previous two clusters that also have strong MC focus?

Illustration of the way this cluster drives some roadmaps for setting working directions of other initiatives and clusters such as HIPEAC (being the host for the outcome of these clusters) would be beneficial to influence future research directions in Europe.

5.9.1 Platform and MPSoC Design

D12-6-1-Y3_Platform_and_MPSoC_Design.pdf

The report is ACCEPTED.

5.9.2 Platform and MPSoC Analysis

D13-6-2-Y3_Platform_and_MPSoC_Analysis.pdf

The report is ACCEPTED.

5.10 WP7: Transversal Integration (JPRA)

5.10.1 Design for Adaptivity

This is an important cross-cutting area; it impacts many efforts across the NoE. It demonstrates that there is a very strong team, with a strong research output.

The motivation for and justification of a position paper in the last year review is still valid: the team is gaining significant insight in adaptive solutions that would be important to publicize. The RTSJ Special Issue is a good step in this direction

All three sub-areas (adaptive resource scheduling, adaptive networking and hardware-based adaptivity) are important and partition the space well.

The TrueTime simulator is a high impact outcome of the efforts and shows the importance of generating high quality tools.

Impressive results were shown, especially illustrated by the demonstration that was performed, with a high level of professionalism (indeed a good brick to build on for a future commercial application).

D14-7-1-Y3_Design_for_Adaptivity.pdf

No further comments: ACCEPTED

5.10.2 Design for Predictability

The cross-cut is directed toward reliability and fault tolerance and addresses a major design concern.

The participating groups are extremely strong and provide a broad coverage in the overall technical area of the NoE.

MC is well represented, therefore the cluster is synergistic with one of the overall focus of the NoE. Overall organization is consistent with the cross-cutting nature of the cluster.

The cross-cut is directed toward reliability and fault tolerance and addresses a major design concern.

The works performed in this area are a key contribution to deployment of future applications, required to fulfil high-level objectives of the European Commission (reliability is a key to ensure safety over time, provided dependability is considered as from the design initial steps).

D15-7-2-Y3_Predictability.pdf

No further comments: ACCEPTED

5.10.3 Industrial Integration

Extremely impressive industrial interaction and impact is demonstrated. The NoE is an engine for industrial innovation in Europe. It clearly shows evidence of the significance of the NoE construct. ARTISTDESIGN is a highly visible, influential group.

There is clear evidence for the Commission that the return of investment is high.

Based on the progress achieved from last year through extension of the scope of the industrial partners, this is a key element to the NoE.

These contacts shall be leveraged to provide the industrial use cases and “requirements” that will contribute to define the working scheme for building “integrated or seamless development environments / toolchains”, required for extensive industrial deployment and acceptance.

D16-7-3-Y3_Integration_Driven_by_Industrial_Applications.pdf

No further comments: ACCEPTED

6 Future work

The consortium continues to be more and more internationally well known. ArtistDesign should take profit of that and continue exploring the international recognition, leveraging the contacts already taken with sectorial industry standards organizations (for instance, Autosar membership to be leveraged for automotive).

It is now important to provide methods and/or a structure in order to keep alive the synergy between the different partners and groups.

Also, more demonstrators (as we have seen during the presentations) should be made available and used for demonstrating the impact and results of the consortium work. In general, the consortium is encouraged to contribute actively to on-going road mapping activities in related domains to facilitate a take-up of its integration effort (see Rec. 8).

7 Assessment of objectives

The project continued to be relevant and the original objectives, as expressed in the DOW, were still valid.

8 Recommendations

8.1 Recommendation 1:

Continue efforts for increasing tool interoperability, to ease deployment towards industry by allowing the building of integrated development environments.

8.2 Recommendation 2:

Develop use cases and scenarios inspired by various industrial sectors.

Focus this use cases and scenarios to target more deeply various, even though limited, industrial sectors for design flows and related tool chains so as to guide future transitioning, which would secure the mutual understanding of the research outcome by the industrials and the requirements to have this outcome successfully deployed (acceptance through integration in a seamless development environment). Objective should be to build a success story that would then be supportive for raising interest of the industrial players.

8.3 Recommendation 3:

Increase inter-cluster coordination by exploiting common focus on MC and MPSoC

8.4 Recommendation 4:

Document the insights gained during the last four years in special issues, and other publication forms – including position papers.

8.5 Recommendation 5:

Continue deployment of actions targeting sustainability of the outcome and initiated actions... In particular, leverage the cooperative activities and sharing events which are the best outcomes such as summer school, workshops, portals and joint publications.

8.6 Recommendation 6:

Provide the “reading grid” for the joint activities that have been performed and will go on being initiated, so as to get a roadmap for these in terms of self-defined objectives and achievements (the fruitful results and the dead-ends that definitely have an interest to be known, why these tracks were not fruitful, in order to enrich the overall research community knowledge)

8.7 Recommendation 7:

There is a significant research impact perceived. However more measurable evidence of this impact should be provided.

There is a need to show how this group influences science and industry. Quantified evidence in that regard would be good for the consortium and the commission.

Ideas about some metrics could be:

- How big is the material produced by the consortium
- How many universities are using the material
- How many students are reached

Also impact of collaborations should be quantified.

8.8 Recommendation 8

There are some steps going into the direction of a “survival” of the effort. However this is still too vague. A roadmap on embedded systems could be one step in that direction including a new vision for the future checking this vision against other activities like ARTEMIS, ITEA2, etc and including a priority list of themes to be dealt with.

9 Review conclusion

The overall assessment is that ARTISDESIGN has matured and represents a major scientific and technology asset in Europe. The community has world-wide visibility, huge impact and overall influence. It complements ARTEMIS and many ways provides foundation for the industry-driven ARTEMIS projects. Preserving and growing this community should be a vital interest for the EU industry and the Commission.

While the exact form of continuation is uncertain one thing is essential: capturing, archiving and maturing the research output of the community beyond papers: tools, models and transitionable methods.

ARTISDESIGN has indeed progressed continuously, leveraging a high visible and active community of researchers in Europe and also outside of Europe. The perception of this NoE in the US for instance is a significant demonstration of the quality of this community.

Evidence of the actual existence of this community as a research instrument and the close relationship with industrial stakeholders is shown in the presentation of the list of projects that involve many partners from the NoE, even though the clear connection (and contribution) from these projects to the objectives defined by the clusters could be illustrated in a clearer way. Some of these projects are indeed the result of a strategic approach to build a project proposal, but some appear to be as a new opportunity, which emerged as a result of having built such a community.

Next Meeting:

Year 4 ARTISTDESIGN review meeting is planned for FRIDAY March 16th in DRESDEN, co-located with DATE 2012.

Deliverables should be available four weeks in advance. The project management report should be made available before 10/03/2012.

Brussels, 16 May 2011

10 Appendix: state of project deliverables by WP

Del. No.	Deliverable name	Comments	Status	File
WP0: Joint Programme of Management Activities (JPMA)				
D-0.1-Y3	Project Report		Accepted	D1 – received by the commission
D-0.1-Y3	Project Activity Report		Accepted	D2-0-2a-Y3_ExecSummary+Overview.pdf D2-0-2b-Y3_Modelling_and_Validation.pdf D2-0-2c-Y3_SW_Synthesis_Code_Generation_and_Timing_Analysis.pdf D2-0-2d-Y3_Operating_Systems_and_Networks.pdf D2-0-2e-Y3-Hardware_Platforms_and_MPSoC_Design.pdf
WP1: Joint Programme of Integration Activities (JPIA)				
D-1.0-Y3	Integration Activities Report		Accepted	D3-1-0-Y3_JPIA_Integration_Activities_Report.pdf
WP2: Joint Programme of Activities for Spreading Excellence (JPASE)				
D-2.0-Y3	Spreading Excellence Report		Accepted	D4-2-0-Y3_Spreading_Excellence.pdf
WP3: Thematic Cluster: Modeling and Validation (JPRA)				
D-3.1-Y3	Modelling Report		Accepted	D5-3-1-Y3_Modelling.pdf
D-3.2-Y3	Validation Report		Accepted	D6-3-2-Y3_Validation.pdf
WP4: Thematic Cluster: Software Synthesis, Code Generation and Timing Analysis (JPRA)				
D-4.1-Y3	Software Synthesis, Code Generation		Accepted	D7-4.1-Y3_Software_Synthesis_Code_Generation.pdf

D-4.2-Y3	Timing Analysis		Accepted	D8-4-2-Y3_Timing_Analysis.pdf
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WP5: Thematic Cluster: Operating Systems and Networks (JPRA)

D-5.1-Y3	Resource-Aware Operating Systems		Accepted	D9-5-1-Y3_Resource-aware_Operating_Systems .pdf
D-5.2-Y3	Scheduling and Resource Management		Accepted	D10-5-2-Y3_Scheduling_and_Resource_Management.pdf
D-5.3-Y3	Embedded Real-Time Networking		Accepted	D11-5-3-Y3_Embedded_Real_Time_Networking.pdf

WP6: Thematic Cluster: Hardware Platforms and MPSoC Design

D-6.1-Y3	Platform and MPSoC Design		Accepted	D12-6-1-Y3_Platform_and_MPSoC_Design.pdf
D-6.2-Y3	Platform and MPSoC Analysis		Accepted	D13-6-2-Y3_Platform_and_MPSoC_Analysis.pdf

WP7: Transversal Integration (JPRA)

D-7.1-Y3	Design for Adaptivity		Accepted	D14-7-1-Y3_Design_for_Adaptivity.pdf
D-7.2-Y3	Design for Predictability		Accepted	D15-7-2-Y3_Predictability.pdf
D-7.3-Y3	Industrial Integration		Accepted	D16-7-3-Y3_Integration_Driven_by_Industrial_Applications.pdf

11 List of PO and reviewers

Name	Organisation	Email
Tom Clausen	EC	tom.clausen@ec.europa.eu
Gilles Le Calvez	Valeo	gilles.le-calvez@valeo.com
Janos Sztipanovits	Vanderbilt	janos.sztipanovits@vanderbilt.edu
Martin Timmerman	Dedicated Systems Experts	m.timmerman@dedicated-systems.info

12 Agenda (as executed)

February 24 2011

Time	Presentation	Speakers
9:30	Introduction by EC	Rolf Riemneschneider
9:35	Overview Scientific Management Long-term Objectives and Status NoE Principles of Construction Integration of the area Building Excellence File: 1_Sifakis_ScientificManagement.pptx	Joseph Sifakis (UJF/VERIMAG) Bruno Bouyssounouse (UJF/VERIMAG)
9:55	Modeling and Validation Cluster Achievements and Perspectives Overall Aims and Achievements (Integration, Building Excellence) Overview of Scientific Highlights in Y3 Work planned for Y4 Discussion File: 2_Larsen_Modeling_Validation.pptx	Kim Larsen (Aalborg) Susanne Graf (UJF/Verimag)
10:25	SW Synthesis, Code Generation and Timing Analysis Cluster Achievements and Perspectives - SW Synthesis, Code Generation Overall Aims and Achievements (Integration, Building Excellence) Overview of Scientific Highlights in Y3 Work planned for Y4 Discussion File: 3_Marwedel_SSCGTA.ppt	Peter Marwedel (Dortmund) Björn Lisper (Mälardalen)
10:55	Break	
11:05	Operating Systems and Networks Cluster Achievements and Perspectives Overall Aims and Achievements (Integration, Building Excellence) Overview of Scientific Highlights in Y3 Work planned for Y4 Discussion File: 4_Buttazzo_OSNW.ppt	Giorgio Buttazzo (Scuola Sant'Anna - Pisa) Alan Burns (York) Luis Almeida (U.Porto)
11:30	Hardware Platforms and MPSoC Design Cluster Achievements and Perspectives Overall Aims and Achievements (Integration, Building Excellence) Overview of Scientific Highlights in Y3 Work planned for Y4 Discussion File: 5_Madsen_MPSoC.ppt	Jan Madsen (DTU) - presenter Luca Benini (Bologna) - standby Lotar Thiele - not present
12:10	Integration Driven by Industrial Applications Achievements and Perspectives	Alberto Sangiovanni

	Overall Aims and Achievements (Integration, Building Excellence) Overview of Scientific Highlights in Y3 Work planned for Y4 Discussion File: 8_Sangiovanni_IndustrialApplications.pptx	(TRENTO)
12:45	Design for Predictability and Performance Achievements and Perspectives Overall Aims and Achievements (Integration, Building Excellence) Overview of Scientific Highlights in Y3 Work planned for Y4 Discussion File: 7_Jonsson_Girault_Predictability.ppt	Alain Girault (INRIA)
13:05	Lunch	
14:10	Design for Adaptivity Achievements and Perspectives Overall Aims and Achievements (Integration, Building Excellence) Overview of Scientific Highlights in Y3 Work planned for Y4 Discussion File: 6_Arzen_Adaptivity.ppt	Karl-Erik Årzen (Lund)
	Some questions & answers	
14:40	Spreading Excellence Achievements and Perspectives Vision: Long-term impact ArtistDesign Web Portal Year 3 Events Events planned for Year 4 Discussion Files: 9_Bouyssounouse_SpreadingExcellence.pptx 9b_Bouyssounouse_CTB.pdf	Bruno Bouyssounouse (UJF/VERIMAG)
15:00	Administration, Budget and Efforts Principles / procedures Main efforts in Y3 File: 10_Bouyssounouse_Administration+Budget_Management.ppt	Bruno Bouyssounouse (UJF/VERIMAG)
15:15	Reviewer's meeting	
16:00	Conclusion and Feedback	
16:30	End	

13 Attendees

13.1 PO & Reviewers

Rolf Riemenschneider (PO) (DG Information Society and Media)

Gilles Le Calvez (Reviewer – Valeo)

Janos Sztipanovits (Reviewer – Vanderbilt)

Martin Timmerman (Reviewer – Dedicated Systems)

13.2 Participants from consortium

Present	Name	Email	Speaker
Y	Bruno Bouyssounouse	Bruno.Bouyssounouse@imag.fr	YES
Y	Joseph Sifakis	Joseph.Sifakis@imag.fr	YES
Y	Alan Burns	burns@cs.york.ac.uk	YES
Y	Dejan Nickovic	dejan.nickovic@ist.ac.at	
Y	Gerhard Fohler	fohler@eit.uni-kl.de	
Y	Michael Gonzalez Harbour	mgh@unican.es	
Y	Peter Marwedel	peter.marwedel@tu-dortmund.de	YES
Y	Alberto Sangiovanni Vincentelli	alberto@eecs.berkeley.edu	YES
Y	Giorgio Buttazzo	giorgio@sssup.it	YES
Y	Petru Eles	petel@ida.liu.se	
Y	Weihua Sheng	sheng@iss.rwth-aachen.de	
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Y	Karl-Erik Arzen	karlerik@control.lth.se	YES
Y	Alain Girault	alain.girault@inria.fr	YES
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Y	Luis Almeida	lda@fe.up.pt	YES
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Y	Kim Larsen	kgl@cs.aau.dk	YES
Y	Rolf Ernst	ernst@ida.ing.tu-bs.de	
Y	Jeron Thierry	jeron@inria.fr	
Y	Arne Hamann	arne.hamann@de.bosch.com	
Y	D'Hondt Maja	Imec	
Y	Röck Harald	Salzburg	
Y	Bacivarov Iuliana	ETHZ	
Y	Luca Benini	BOLOGNA	YES
Y	Peter Pusher	TU VIENNA	
Y	Jozef Hooman	ESI	
Y	Hannes Payer	SALZBURG	
Y	Stefan Petters	PORTO/IPP	
Y	Philippe Ruemmer	UPPSALA	
Y	Tom Henzinger	IST-AUSTRIA	
Y	Axel Jantz	KTH	
Y	Armin Groesslinger	PASSAU	
Y	Mircea Negrean	TU BRAUNSCHWEIG	
Y	Axel Legay	INRIA	
Y	François Terrier	CEA	
Y	Jaurne Joven Murillo	EPFL	
Y	Reinhard Wilhelm	SAARLAND	

Y	Jan Madsen	jan@imm.dtu.dk	YES
Y	Susanne Graf	Susanne.Graf@imag.fr	YES
Y			

14 Partner list for this period

Beneficiary number	Beneficiary name	Beneficiary short name	Country
1 (coordinator)	UJF FILIALE	FLORALIS	France
2	UNIVERSITE JOSEPH FOURIER GRENOBLE 1	UJF/VERIMAG	France
3	RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN	AACHEN	Germany
4	AALBORG UNIVERSITET	AALBORG	Denmark
5	UNIVERSIDADE DE AVEIRO	AVEIRO	Portugal
6	ALMA MATER STUDORIUM - UNIVERSITA DI BOLOGNA	BOLOGNA	Italy
7	TECHNISCHE UNIVERSITAET BRAUNSCHWEIG	TUBS	Germany
8	UNIVERSIDAD DE CANTABRIA	CANTABRIA	Spain
9	COMMISSARIAT À L'ENERGIE ATOMIQUE	CEA	France
10	DANMARKS TEKNISKE UNIVERSITET	DTU	Denmark
11	UNIVERSITAET DORTMUND	DORTMUND	Germany
12	ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE	EPFL	Switzerland
13	EMBEDDED SYSTEMS INSTITUTE	ESI	Netherlands
14	EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH	ETH Zurich	Switzerland
15	INTERUNIVERSITAIR MICRO-ELECTRONICA CENTRUM VZW	IMEC	Belgium
16	INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET AUTOMATIQUE	INRIA	France
17	TECHNISCHE UNIVERSITAET KAISERSLAUTERN	TU KL	Germany
18	KUNGLIGA TEKNISKA HOGSKOLAN	KTH	Sweden
19	LINKÖPINGS UNIVERSITET	LINKÖPING	Sweden
20	LUNDS UNIVERSITET	ULUND	Sweden
21	MAELARDALENS HOEGSKOLA	MDH	Sweden
22	OFFIS E.V.	OFFIS	Germany
23	PROJECT FOR ADVANCED RESEARCH OF ARCHITECTURE AND DESIGN OF ELECTRONIC SYSTEMS	PARADES	Italy
24	UNIVERSITAET PASSAU	PASSAU	Germany
25	SCUOLA SUPERIORE DI STUDI UNIVERSITARI E DI PERFEZIONAMENTO SANT'ANNA	SSSA-PISA	Italy

26	INSTITUTO SUPERIOR DE ENGENHARIA DO PORTO	PORTO	Portugal
27	UNIVERSITAET DES SAARLANDES	SAARLAND	Germany
28	UNIVERSITAET SALZBURG	PLU-SALZBURG	Austria
29	UPPSALA UNIVERSITET	UPPSALA	Sweden
30	TECHNISCHE UNIVERSITAET WIEN	VIENNA	Austria
31	UNIVERSITY OF YORK	YORK	United-Kingdom

15 WP list

WP	WP title	Type of activity	Lead partic no.	Lead partic. short name	Person months	Start month	End month
WP0	Jointly-executed Programme of Management Activities (JPMA)	MGT	1	Floralis	51	1	48
WP1	Jointly-executed Programme of Integration Activities (JPIA)	RTD	1	UJF/ VERIMAG	327	1	48
WP2	Jointly-executed Programme of Activities for Spreading Excellence (JPASE)	OTHER	1	Floralis	106,75	1	48
WP3	Thematic Cluster: Modeling and Validation <ul style="list-style-type: none"> • <i>Activity: Modelling</i> • <i>Activity: Validation</i> 	RTD	4	Aalborg	87,25	1	48
WP4	Thematic Cluster: Software Synthesis, Code Generation and Timing Analysis (JPRA) <ul style="list-style-type: none"> • <i>Activity: Software Synthesis, Code Generation</i> • <i>Activity: Timing Analysis</i> 	RTD	10	Dortmund	79,25	1	48
WP5	Thematic Cluster: Operating Systems and Networks (JPRA) <ul style="list-style-type: none"> • <i>Activity: Resource-Aware OS</i> • <i>Activity: Scheduling & Resource Mgt</i> • <i>Activity: Embedded RT Networking</i> 	RTD	24	SSSA-Pisa	73	1	48
WP6	WP6: Thematic Cluster: Hardware Platforms and MPSoC (JPRA) <ul style="list-style-type: none"> • <i>Activity: Platform and MPSoC Design</i> • <i>Activity: Platform and MPSoC Analysis</i> 	RTD	13	DTU	80,5	1	48
WP7	Transversal Integration (JPRA) <ul style="list-style-type: none"> • <i>Activity: Design for Adaptivity</i> • <i>Activity: Design for Predictability and Performance</i> • <i>Activity: Integration Driven by Industrial Applications</i> 	RTD	22	PARADES	109	1	48
	TOTAL				913,75		

16 Project calendar

This is the third year review starting month 25 up to month 36.
The review was executed in month 38.

Month	2008	2009	2010	2011	2012
Jan	1	13	25	37	
Feb	2	14	26	38	
Mar	3	15	27	39	
Apr	4	16	28	40	
May	5	17	29	41	
Jun	6	18	30	42	
Jul	7	19	31	43	
Aug	8	20	32	44	
Sep	9	21	33	45	
Oct	10	22	34	46	
Nov	11	23	35	47	
Dec	12	24	36	48	