ARTEMIS

August 2011 NO.10 ~ Intelligence on the spot

the differentiator

Eric Schutz
"ARTEMIS JU is more than just another funding programme"

Ken Sakamura talks about priority setting after the tsunami in Japan

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FOREWORD

2011 has been an interesting year so far.

We agreed on the content of our ARTEMIS SRA2011 in March in Nuremberg and issued the printed version in May at the end of the special and well attended SRA launch symposium in Brussels. In the meantime the Commission is moving ahead full steam constructing a proposal for the successor programme of FP7 that is now known as Horizon 2020 (via the provisional name Common Strategic Framework) for the period 2014 to 2020. The Commission has already proposed to reserve 80 billion euros for Horizon 2020, although this is yet to be agreed on by the European Parliament and Council. Many hearings and workshops in Brussels are now being organised by the Commission to get input on technical, societal, financial, legal and organisational topics to arrive at a well-supported detailed proposal for Horizon 2020 by the end of this year. In order to capture the attention of the Commission and Member States, the Steering Board of the ARTEMIS Industry Association has written an open letter stating the need for a continuation of the ARTEMIS JU programme in whatever format under the umbrella of Horizon 2020. This letter has been sent to EC Vice-President Neelie Kroes and to the members of the Governing Board of the ARTEMIS Joint Undertaking.

This Magazine contains that open letter after the picture of the ARTEMIS SRA2011 launch. Next, Eric Schutz explains in what respects the ARTEMIS JU programme is more than just another funding programme, and this is followed by an example of a large ARTEMIS project: CESAR. Ad ten Berg provides an overview of the Summer Camp that took place in June, followed by insight into four ARTEMIS Working Groups. Alun Foster describes which current projects in the ARTEMIS JU are related to the societal challenges that are, as examples, mentioned in the ARTEMIS SRA2011. This is again followed by a description of a project: CHIRON. Professor Ken Sakamura gives a preview of his invited keynote speech at our Co-summit 2011, organised together with ITEA 2, this coming October in Helsinki. Finally, Laila Gide is interviewed in our Baton Blue(s) series. She hands the baton over to Dagfin Brodtkorb.

This year's Co-summit will again be bigger than last year's because we now feature projects from three JU calls. I hope to see you all during the Co-summit on 25 October in Helsinki.

Jan Lohstroh

"The ARTEMIS Strategic Research Agenda 2011 introduces societal challenges as an overarching concept that will drive European competitiveness."

(SRA2011, page 13)

FOREWORD

Dear Friends,

In our previous edition, we showed that all ARTEMIS stakeholders enthusiastically believe in the future: there must be, and there will be, a follow-up programme to the present ARTEMIS Joint Technology Initiative. I was highlighting the fact that the mid-point of the ARTEMIS programme was already behind us! At this stage we can see that ARTEMIS has indeed differentiated itself, building strong, pan-European clusters around topics that are key enablers in important sectors such as high-reliability, energy conservation and the 'things of the Internet'.

But our community has not stopped working: the Project Outlines phase of the Call 2011 is now complete. We have received 41 eligible proposals. To evaluate them, we made extensive use of the 'Maturity Index' (or MI) concept introduced last year, grouping the proposals into four categories, from MI=1 for the best structured and complete proposals down to MI=4 for the ones needing a significant rework. This year, the evaluation panel finally granted

> MI=1 to 3 proposals
> MI=2 to 10 proposals
> MI=3 to 9 proposals
> MI= 4 to 9 proposals

As you know, the Council regulation that created ARTEMIS stipulates, in its article 2 (e), that the Joint Undertaking will "promote the involvement of SMEs in its activities in line with the objectives of the Seventh Framework Programme". In the first three Calls, SMEs were very well represented in the submitted proposals as well as in the proposals retained for funding. For our 2011 Call, special attention was given, in the evaluation of the proposals, to the participation of SMEs (as part of the existing evaluation criteria). The conclusion is that 61% of the proposals included SME participation judged important enough, in quantity and in quality (or criticality), for the project.

I know that many of you are presently working very hard to finalise your Full Project Proposal in order to be ready for the submission deadline of 1 September next so let me wish you the best for your proposal and for your holidays!

Eric Schutz

By Else Embregts

The launch of the ARTEMIS SRA2011

For the official introduction of the printed ARTEMIS Strategic Research Agenda 2011 (SRA2011), a symposium on the future of Embedded Systems was organised in Brussels on 18 May. The ARTEMIS JU Office hosted the event in the White Atrium building, an excellent environment for this unique event.

The event started with a video message of Mrs. Neelie Kroes, Vice-President of the European Commission, in which she expressed the importance of the SRA for the future of research in Embedded Systems in Europe. The video message has been published on the ARTEMIS Industry Association website.

Professor Ernst of the TU Braunschweig, one of the SRA experts, explained how the research challenges are derived from the Societal Challenges cited in the SRA. This was followed by a presentation of the first project successes of the ARTEMIS Joint Undertaking by the Executive Director of the ARTEMIS JU. There was then an opportunity for specific topics to be presented in more detail: the relevance of ARTEMIS for SMEs by Stefan Poledna (CEO of TTTech), the Working Group Standardisation by Joseph Affenzeller (AVL) and ProcessIT.EU, a Centre of Innovation Excellence, by Ad ten Berg.

After a panel session with Thierry van der Pyl of the Commission, Rudolf Haggenmüller of ITEA 2 and Aldo Covello (chair of the ARTEMIS-JU PAB), Klaus Grimm and Laila Gide as co-chair of the WG SRA, a sunny Atrium provided the perfect setting for a spectacular delivery by special 'courier', as Jan Lohstroh, chair of the symposium, announced. The first copies of the SRA were handed over by Klaus Grimm to Tatu Koljonen, Laila Gide, Jose Cotta, Aldo Covello and Eric Schutz. ∎

ARTEMIS: Intelligence on the Spot

Open letter by the Steering Board of ARTEMIS Industry Association

Digital convergence by emancipation of data, building embedded intelligence to everyplace, and the internet revolution, are the opportunities of our time. This will change the way we live as citizens of the new knowledge based society and do business in the new digital economy.

Networked Embedded Systems are **THE NEURAL SYSTEM OF SOCIETY**. Embedded Systems pervade all artefacts of life, from children's toys and mobile phones to space probes and from transportation vehicles to healthcare systems. In fact, Embedded Systems will be part of all future products and services, providing intelligence on the spot and capabilities to clever connect to the abundance of systems in their environment, either physical or at cyber-space level, in real time.

These connections can be direct or via a network, such as the Internet. In this sense, **Embedded Systems form the edges of the 'Internet of Things'** bridging the gap between cyber space and the physical world of real 'things', and are crucial in enabling the 'Internet of Things' to deliver on its promises. In fact, Embedded Systems are the technologies that make the future Internet work, full stop.

By nature, internet communication cannot be expected to provide the same quality as dedicated Embedded Systems networks. Therefore Embedded Systems must be made more autonomous and robust to compensate for the reduced real-time and reliability guarantees, operating dependably even in the presence of network degradation or temporary failure. The safe and secure operation of such increasing complexity will impose huge challenges on design, operation and interoperability of Embedded Systems, be it in software, electronics, sensors, actuators or a combination of those.

Embedded Systems, also referred to as Cyber-Physical Systems, become part of bigger systems in a world of 'systems of systems'. This imposes even larger challenges on the functionally of Embedded Systems.

Internet connected intelligent embedded systems will provide the core of solutions for the big societal challenges like affordable healthcare and wellbeing, green and safe transportation, reduced consumption of power and materials, reduction of food waste, smart buildings and communities of the future, and an imminent lack of natural resources. Such solutions to our pressing societal challenges will spur on European competitiveness.

Europe can address these challenges by using its sophisticated Embedded Systems Research and Development resources in industry and research institutes if coordinated well and if funded adequately. **In a global world EMBEDDED SYSTEMS are a crucial KEY ENABLING TECHNOLOGY for Europe's industrial and societal future, and one that must not be underestimated or overlooked.**

ARTEMIS, through its Industry Association (an active 200+ member community), takes the lead to set the Embedded Systems scene with its pan-European Strategic Research Agenda

2011 and by its Joint Undertaking with R&D projects that are co-funded by private project consortia, the ARTEMIS Member States and the European Commission. The ARTEMIS industrial priorities are basis for new value chains and aim at big-impact and quick-to-market business ecosystems providing efficient, inclusive, and trustworthy solutions for the industrial competitiveness and the societal grand challenges of Europe.

The ARTEMIS SRA2011 points to a series of technical issues that should be resolved within the next decade. First, those issues related to foundational science and technology; second, those related to the application contexts; and third, those encompassing societal challenges (see ARTEMIS SRA2011).

ARTEMIS highlights two parallel sets of industrial driven research objectives to help resolve the above:
> Technical solutions that form the basis of developing the pre-competitive industrial goals, by attacking the complexity of new systems through improved designs and implementation processes and tools
> Research into technology that will offer completely new solutions to the technical barriers that hinder progress towards the application context's goals

ARTEMIS aims to establish a new, holistic approach to Research, Technology Development, Innovation and skill creation in Embedded Systems, by means of innovation ecosystems. This will increase the efficiency of technological development and, at the same

time, enhance the competitiveness of the market in the supply of Embedded Systems technology.

Apart from the funded projects that are carried out under the umbrella of the ARTEMIS Joint Undertaking and that are R&D oriented, the ARTEMIS Industry Association is active in the field of Design Environments, Standardisation, Results Repository and Innovation with a number of very active working groups formed by voluntary members of industry and research institutions. Furthermore, the ARTEMIS Industry Association issues a label for recognised established Centres of Innovation Excellence on Embedded Systems (CoIE) as well as for Tool Platforms to boost the chances of good ideas and sound concepts becoming successful products and services in the market. Also, education and training on Embedded Systems is an integral feature of the ARTEMIS approach because it is people who, at the end of the day, have to take an interest to improve the effectiveness and reliability of the highly complex system of Embedded Systems and their interconnectivity.

Europe, with its world class automotive, aerospace, communication, and medical equipment industries, still has an excellent position in Embedded Systems, which play a key role in enhancing the capabilities, availability and usefulness of these products. Only through adequate coordination and collaboration and with the help of public funding can this position be maintained to help solve the enormous societal challenges and, at the same time, spur European competitiveness in many areas. ARTEMIS is a key player in achieving this essential element

for Europe to maintain its competitiveness in 2020.

A successor programme, following the final call of the current ARTEMIS Joint Undertaking programme in 2013, is essential if Europe is to achieve the level of competitiveness needed to keep it ahead in the global race for ICT based solutions to societal challenges as targeted by the European Digital Agenda.

The vision of ARTEMIS is that indeed mankind will benefit from a major evolution in our society whereby our world is widely supported by intelligent Embedded Systems. Life in our society, along with security and safety, will increasingly depend on Embedded Systems technology as the NEURAL SYSTEM OF SOCIETY. The inherent invisibility of these technologies must not hide the need for the resources that are essential for this technology that is a KEY ENABLER in its own right. ◼

For more information see:
www.artemis.eu
For ARTEMIS general.
www.artemis-ia.eu
For ARTEMIS Industry Association.
www.artemis-ju.eu
For ARTEMIS Joint Undertaking.
www.artemis-ia.eu/publications
For ARTEMIS SRA and other publications.

ARTEMIS Joint Undertaking, more than just another funding programme

By Eric Schutz

The ARTEMIS Joint Undertaking has a specific responsibility to support the "creation of open innovation environments, promoting the participation of SMEs, developing standards transparently and with openness to international co-operation, dissemination and public relations". Innovation is not just invention. It is using technology to address the needs of markets and of society at large. The ARTEMIS JU programme takes a holistic approach towards research, technology development, innovation and skill creation in a distributed industrial context of innovation ecosystems, encouraging both competition and collaboration. The complementarity that this holistic approach implies, however, is far from a simple matter of individual entities complementing each other.

ARTEMIS features

> ARTEMIS is an industry led initiative that aims to sustain the Innovation Environment
> Alignment of research agendas for Embedded Systems in Europe
> Industry-Academia collaboration
> Research infrastructures
> Regulation, safety, security and (digital trust) certification
> Intellectual property management
> Open Innovation and open source policy
> International cooperation

ARTEMIS JU is a tripartite Public Private Partnership that, by nature, implies a contradiction in which an upstream approach vies in a kind of love-hate relationship with a downstream approach. Complementarity is essential for tackling the major societal challenges in Europe in a coordinated way. Moreover, the budgets that countries spend on R&D are still far below the investments being made by competitors like Japan, the US and China. So logically, you want to make the most effective use possible of EC and national research budgets. But let's throw a spanner in the works here, by way of example: Who will determine the standard for the development of the electric vehicle? Europe or Japan?

RULES, RULES, RULES ~ It has been said that money is too tight to mention, but when we speak about ARTEMIS, the funding programme, we also speak about money: tax payers' money. To justify the spending of this money a system of audits and procedures has been drawn up. The EC with its range of rules and regulations has created bureaucratic procedures that lead to bottlenecks. Throw in the transnational level

of 22 member states and the maze is more or less complete. The combination of rules in the current set-up produces an administrative burden that is hardly a boon to R&D projects. ARTEMIS JU was established precisely to disentangle the administrative burden and not to compound it. A differentiator that the ARTEMIS JU has available to it in this respect is the Industry Association, which fosters the interests of its members and has urged simplification of the rules. It is evident that the mission to unburden and simplify bureaucratic rules on a trust-based approach to help shape the right innovation climate for Europe has already started.

The value chain at ARTEMIS is an innovation chain from the first steps of research right through to designing products and services

available to all European players who make use of Embedded Systems. The players in such a value chain - research institutes, high-tech SMEs, large industrial companies - constitute an eco-system, but so many stakeholders each bring with them their own vested interests. The art is to get everyone facing in the same (market) direction without losing sight of excellence. The benefits surface particularly in the sizeable ARTEMIS projects like CESAR (the focus of the article that follows this).

ARTEMIS IS MAKING IT HAPPEN ~ 'Making it happen' is the chapter in the SRA2011 that sets out the main differentiators of the ARTEMIS programme. The Working Groups of the ARTEMIS Industry Association have the important task to implement and shape the innovation role of ARTEMIS and make ARTEMIS JU more than just another funding programme.
> Working Group 'Centres of Innovation Excellence': the scope of a CoIE is that of a coherent subspace of an application domain of the ARTEMIS SRA. It creates an Innovation Eco-system for that subspace,

taking advantage of the critical mass of competences and resources that have already been organised in its supporting regional clusters
> Working Group 'Tool Platforms': identify a common set of interfaces and practices that allow tool vendors to integrate their products into tool chains
> Working Group 'Standards for Embedded Systems': to support innovation and fostering new crossIsectorial standardisation
> Working Group 'ARTEMIS Repository': to boost the dynamics for innovation by 'opening access' and sharing ARTEMIS projects' insights
> Working Group 'Education and Training': to improve matching in this fast evolving technological world
> Working Group 'Metrics and Success Criteria for ARTEMIS': to keep the programme on course
> Working Group 'SME Involvement': to help SMEs to play out their key role in the ARTEMIS eco-system model

ALREADY HAPPENING ~ The constant alertness and the unbridled willingness of stakeholders to improve the ARTEMIS JU programme gives the programme an extra dimension: the drive to create an innovation environment in which the ARTEMIS projects can thrive. Just take the last study by the Working Group Metrics and success criteria for ARTEMIS, which revealed that the industry-driven, cross-domain approach along with the type and size of the partner alliances could be seen as a key differentiator for ARTEMIS compared to other programmes like ITEA 2, FP7 and CATRENE. Also, the Pan-European impact is larger than in these other programmes, with the ARTEMIS averagingdaround seven countries per project. The ARTEMIS umbrella has successfully created brand new partnerships (65%), with the significant involvement of European SMEs (33%). In ARTEMIS, project collaboration in sizeable consortia is already having a significant impact in Europa, a perfect illustration being the ARTEMIS project CESAR. ∎

ARTEMIS SRA2011

by ARTEMIS Industry Association (incorporating ARTEMIS-ETP)
Industry-driven- pan-European vision/mission/strategy

FP7	ARTEMIS Joint Undertaking	EUREKA	National / Regional Programmes
> Upstream	> Up and downstream	> Downstream	
> ICT collab. R&D	> MASP/RA (yearly)	> ITEA 2, MEDA+	
> ERC	> AWP (yearly)	> National contracts	
> Marie Curie	> Call document (yearly)		
> Research infrastructure	> National contracts		
	> EC co-funding		
	Since 2008		

the differentiator

CESAR: veni, vidi, vici

By Chris Horgan

This ARTEMIS flagship project, **involving 55 partners, 10 countries and 4 different domains**, addresses the industrial needs for the development of embedded systems for safety related applications by improving methods, processes and tools, specifically promoting a holistic view on system engineering. All this happens in an extremely competitive global market. Central to any complex system development are the methods and tools used to design, verify and (especially in safety-critical equipment) certify the end product. By substantially boosting the cost efficiency of embedded systems development, CESAR will contribute to Europe to maintain the competitive edge Europe holds in the embedded systems engineering in the transportation and automation markets.

VENI, VIDI, VICI ~ Echoing the words supposedly spoken almost two millennia ago by the project's namesake, Julius Cesar: 'veni, vidi, vici' (I came, I saw, I conquered), the victory may not yet be secure, but given the strong commitment from a wide community of major end-users, tool vendors and technical experts from academia and industry, CESAR is ideally positioned to build the fundaments for next generation system engineering by defining tools interoperability for an eco-system that may as much as halve the costs of integration, configuration, deployment and maintenance of tool chains. The success of the approach will be industrially evaluated by developing a Reference Technology Platform. Ingrid Kundner and Gerhard Griessnig of AVL shed light on what makes CESAR such a 'differentiator'.

In what ways does CESAR relate to the major societal challenges of today, such as mobility and transport? ~ CESAR's specific focus is to improve the development processes in embedded system engineering in terms of new methods, processes and tools to meet new challenges imposed by, for example the many new standards and requirements in the transportation and automation domains, especially in respect to safer and more environmentally-friendly mobility. Solutions to these bring ever increasing complexity that is inherent in working with new technologies and functionalities like car-to-car or car-to-infrastructure communication. We need to ensure that our development processes can handle the requirements imposed by these new requirements in a competitive way and yet can adequately respond to the demands of the future.

In what respects can CESAR be considered a 'Differentiator' in terms of the factors cited in the new ARTEMIS SRA2011? ~ One of the important factors of an ecosystem is standardisation linked to a business model. We are dealing with different domains and many different stakeholders; our first priority is to arrive at a level of interoperability that will enhance all kinds of tool connections.

Gerhard Griessnig

Dr. Gerhard Griessnig is working as Corporate Functional Safety Coordinator and Research Project Coordinator in the System Design Transmission and Hybrid Department at AVL List GmbH. He has in-depth knowledge and experience in safety engineering and project management in different domains. After graduating in Electrical Engineering from the Technical University Graz, he started his career in 2001 at FREQUENTIS in the aviation and rail domain, followed by work as Safety Architect and Functional Safety Manager at SIEMENS in the automation field. Since 2008 he has been working in the automotive domain at AVL where he is coordinating and managing CESAR and the safety activities within the AVL group. He was awarded his PHD degree in June 2011.

Our aim is to reach an industrial level of interoperability specification that in the long run may lead to the creation of a standard. A further factor is SME participation. We consider SMEs to be an important part of the project, and CESAR also gives them the opportunity to lay connections with the bigger industrial and academic partners. The 27 pilot applications, in which the

industrial partners reveal typical development processes, focusing on the gaps where the need is not yet covered, give them a deep understanding of industrial needs. CESAR provides the environment in which SME solutions coming from one domain may transfer to other domains that neither the problem owner nor the solution provider may previously have considered. It broadens the range of possibilities and opportunities. Without CESAR, such cross-fertilisation would not have occurred.

But getting back to standardisation, while CESAR has neither the time nor the goal to create a standard, the consortium is preparing the ground and doing the fieldwork in creating a common industrial understanding, in itself a very complex matter. We are now exploring a new, very promising approach that gives us a very real prospect of consensus by the end of the project. On the tool platform front, we see great potential to integrate tools from different stakeholders. And, of course, we are also open to other tool platform solutions. With the CESAR RTP and especially with the interoperability specification, we are cooperating with other ARTEMIS projects that are going in similar directions, providing the information generated in the CESAR project.

Looking at a further factor of the SRA, CESAR is having a real impact on education and training. The academic partners in the project get immediate feedback from their industrial partner and the research being done in the project is already influencing their academic programmes. Without CESAR, this process would normally take much longer. Also, since the project is multi-domain, we can take on board the knowledge of an academic partner in one domain and use it in another. This creates new connections and real win-win situations.

What is distinctive about the CESAR project in terms of its strategy, targets, approach, achievements to date, projected results, etc.? And would the scope of the project have been

SUMMER
CAMP 2011

By Ad ten Berg

coordinating and merging all these is a significant challenge. The ARTEMIS aim is cooperation towards a common goal. So our set-up had to reflect a structure as it is known in industrial customer projects, with specific deadlines and targets, shared responsibilities and strong management. We learned at the beginning of the whole process that we needed more time than expected to get through the start-up phase and to establish the processes everyone followed. What we have learned is that without strong rules and processes, such a project cannot be managed.

Ingrid Kundner

Ingrid Kundner graduated in "International Management" specialising in marketing and market research at the University of Applied Sciences "FH Joanneum GmbH" in 2006. Always being interested in both international business and marketing, she started to work at an Austrian trading company where she was responsible for importing domestic textiles from China and the related product marketing. Joining AVL List GmbH in 2008, she soon got involved in CESAR. Ingrid is leading the dissemination and exploitation team and as member of the Project Management Team, she is managing the legal, financial and administrative aspects of the project coordination.

feasible if not carried out in the context of ARTEMIS? ~ It would not have been possible to combine the multi-domain approach, or certainly the progress that has been made would have been very unlikely without the ARTEMIS environment and scope. The multi-domain approach is essential as is the involvement of academia and SMEs. The pan-European aspect of such an initiative only enhances the prospects of achieving the aims of the project. ARTEMIS facilitates all of this.

Given the considerable size of the project – 55 or so partners, 10 countries, 4 different domains – what have been the major challenges in coordinating and integrating all the elements of the project? What has been learned from this experience and how has this learning been applied to ensure a sustained focus? ~ In general, it is a fantastic situation to be in, with so many partners, domains, knowledge, engineering requirements, you name it. The scope of input is tremendous. Of course, with so many large stakeholders, each with their own strategy, the job of

If the SRA is the skeleton of the ARTEMIS, and the projects are the flesh on these bones, how has CESAR fleshed out this strategy? ~ Of course, the CESAR project is following the line set out in the ARTEMIS strategy. As referred to above, we have been putting a lot of flesh on the bones of tool platforms, SMEs, education and in future standardisation. We are keen to pass on our knowledge and share many of the results so that the next generation of projects can benefit from it.

In the absence of such a project as CESAR and a programme like ARTEMIS JU, how would the landscape appear and where would Europe be in terms of industrial competitiveness, societal benefits and the like? ~ That's really a tough question. Certainly, we would not have had the close connection to other domains. We would have been working more or less independently. To our knowledge, there is no other framework that connects so many different stakeholders. **This is really the essence of the ARTEMIS environment**

– the cross-domain approach and focus on defragmentation. And this is also the essence of CESAR; a common, industrial, pan-European understanding. So, how would the landscape have appeared without ARTEMIS and CESAR? Probably more fragmented and confusing. ∎

On 14 June, 2011, the Summer Camp of ARTEMIS Industry Association was held in Brussels. This year's Summer Camp was coupled to a Steering Board workshop. A tight agenda focused on the impact of the 'Making it Happen' section of the recently launched SRA2011. The discussions covered three main topics:

a - the innovation activities by the working groups
b - the MASP and RA for 2012
c - the Annual Work Programme (AWP) for 2012.

Secretary General Jan Lohstroh updated the audience on the status of the current thinking of ARTEMIS Industry Association on the future after the final Call in 2013 of the current Joint Undertaking.

The AWP discussion was introduced by Eric Schutz, Executive Director of the ARTEMIS Joint Undertaking. He presented some of the successes achieved in the ARTEMIS-JU programme and explained a detailed matching of the ARTEMIS projects on the application contexts and on the industrial priorities. After this very informative talk, the AWP discussion was moderated by Laila Gide, Steering Board member and co-chair of the Working Group SRA. This resulted in a very lively plenary discussion on the main topics for AWP 2012, which are the options for call differentiation and the selection criteria.

Members of ARTEMIS Industry Association are entitled to define the strategic backbone of the ARTEMIS JU Innovation programme. Each year a Summer Camp is organised to derive the input. The Multi Annual Strategic Plan (MASP) and its associated Research Agenda (RA) are submitted annually to the ARTEMIS Joint Undertaking by the International Research Committee (IRC) to the Governing Board. The Annual Working Plans (AWP) are derived from the RA and form the basis for the ARTEMIS JU calls. The AWP is submitted each year to the ARTEMIS JU for acceptance by the Public Authorities Board. Therefore, input from the Industry Association is essential to ensure that the ARTEMIS Innovation Programme is and remains industry driven.

In the breakout session on innovation, four working groups – WG Standardisation, the WG SME involvement, the WG Education & Training and the newly established WG Repository – addressed and developed their future plans and innovation activities. New insights on how to 'Make it Happen' formulated in the SRA2011 provided the

leading theme for the plans developed in each of the four working groups. Standardisation has a big impact on the competitiveness of the European industry and is therefore one of the key topics addressed by many of the ARTEMIS projects. SME involvement, one of the goals of the JU, is another key element, since SMEs largely determine the condition of the European economy and contribute significantly to the innovative climate in Europe. A pre-condition for a healthy economy is the availability of a modern and flexible education and training system, since that provides the base of the people that are essential to sustaining the high innovation levels for the future. Since ARTEMIS is 'more than just another funding programme', the sustainability of the results of projects is being addressed by the newly established working group WG Repository, which will develop instruments to make project results available after project completion.

The results of this Summer Camp provided direct input for the Steering Board meeting the next day and so quickly transformed into Steering Board decisions and actions. ARTEMIS Magazine invited the four Working Groups to report about their session and their future plans. ∎

By Josef Affenzeller

ARTEMIS Standardisation
Working Group

The Working Groups of the ARTEMIS Industry Association have the very important task of implementing and shaping the innovation role of ARTEMIS and making ARTEMIS 'more than just another funding programme'. The ARTEMIS SRA2011 highlighted the main ARTEMIS differentiators (Chapter 'Make it Happen'). The objective of the working group (WG) on standardisation is to provide a vision of the standardisation policy of ARTEMIS and to promote this vision to multidisciplinary and domain specific standards bodies (like the aviation, automotive, energy, telecom, consumer and medical domains). The WG wants to establish a method to identify and position standards in relation to ARTEMIS objectives and to improve consistency across different standards. Ultimately, the WG intends to deliver an update of the Standardisation Strategic Agenda prepared by ProSE to complement the Artemis Strategic Research Agenda. In this article Josef Affenzeller provides some insight into this WG.

Why is this WG a differentiator for the ARTEMIS strategy? ~ Let me begin by saying that the standardisation issue requires a long-term perspective and it is a high priority for the European Commission, public authorities as well as industry. It stimulates business activities, and so helps to create more jobs in Europe. Back in 2007 ARTEMIS started to draft a document, the first Standardisation SRA, describing the mission and planned activities. At the same time, a project proposal for a

Josef Affenzeller

Josef Affenzeller is Director, Research of AVL in Austria. This is the world's largest privately owned and independent company for the development of power train systems. Josef Affenzeller is together with Laila Gide the co-chair of the WG Standardisation.

supporting action called 'ProSE' was prepared, to promote the activities needed to support ARTEMIS. Under the coordination of Laila Gide, ProSE set about drafting the landscape for embedded systems middleware and application areas as well as identifying those existing and potential (evolving) results that could be a good standardisation candidate.

The ProSE SRA which has been accepted as the ARTEMIS SRA will be on a website soon. But it is quite clear that standardisation can have a huge impact on the ARTEMIS objective of creating an innovation eco-system, especially in view of the multitude of domains, applications and SMEs involved within this eco-system. It is, in fact, an essential building block for the ARTEMIS strategy.

What was the outcome of the recent Summer Camp in June? ~ The Summer Camp provided a good opportunity to get up to date on the current planning of the European Commission and the central messages that it had received from ARTEMIS as well as discuss in breakout sessions the options for plans to realise ARTEMIS innovation targets and so help fill in the ARTEMIS 'flower'. It was agreed the colleagues at the Summer Camp that standardisation can have a significant impact on business in Europe. It was also evident that large software providers are needed to integrate standards in their software products because this will then enhance access for SMEs and smaller tool vendors. If you consider that a project lasts three years, you quickly realise that this is only enough to generate a baseline or springboard for further development so, from this point of view, we certainly need to look further into the possibilities and options created in such a baseline.

What plans have been made for the coming year and is there any kind of roadmap for an
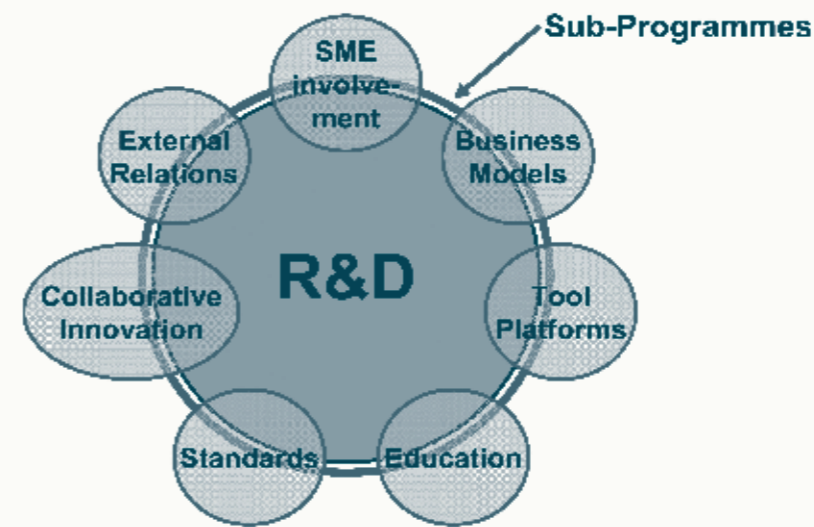
ARTEMIS standardisation label, for instance? ~ Well, what we decided at the Summer Camp was to draw up a questionnaire for all the partners and on the basis of the completed questionnaires, around three projects for standardisation will be selected and proposed at a meeting this coming September. Selection will take place in terms of the criteria that

apply in the ProSE project, so that means that potential candidates include projects like CESAR, ACROSS, GENESYS and maybe INDEXYS. Given the long-term nature of the standardisation question, the more immediate aim is to create motivation and awareness among the project leaders because it is imperative to see the benefits to be gained

from standardisation in terms of the business opportunities it generates. So it is not only a matter of technical integration but also of business model integration. And this keeps the process constantly focused on application. The approach is, then, organic rather than linear. As for a roadmap, we are too early for that. We need consensus. Perhaps the meeting in September will provide more clarity on the when, what and who to be able to come up with an initial roadmap concept.

How would you describe ProSE and the ARTEMIS WG fit? ~ The objectives of ProSE and the standardisation WG are in line with each other, and the members of ProSE and the WG work together closely. The WG is trying to translate the ideas of the ProSE project into practice by a common selection process of three candidates for the standardisation activities of ARTEMIS. The working group members, experts from ProSE and the project leaders will all be involved in this process. ■

By Erwin Schoitsch

ARTEMIS Working Group
Education and Training

Education and Training (E&T) is a crucial factor in maintaining leadership and competitiveness in such a dynamically evolving domain as Embedded Systems. E&T is an issue that goes beyond academia into the world of industry where the training of professionals focused E&T is also required to cope with the emerging and new challenges.

The mission of the WG E&T is to enable long-term sustainability of innovation eco-systems by:
> building an infrastructure for E&T that facilitates the introduction of new content and curricula
> strengthening links between industry and academia

> building on and integrating the results of recent and ongoing European activities, networks and projects
> raising business awareness and facilitating short-term exchange and training in both directions (industry and academia), complementary to long-term basic research.

the differentiator

The importance of the WG E&T to the ARTEMIS strategy is clear in the statement of intent in the SRA2011 to "facilitate the productive engagement of industry and academia to match the pace of evolution of educational systems and curricula to the rapid evolution in technologies." Not only will ARTEMIS break down the present distinctions between system architects, hardware and software engineers, and promote a more holistic approach to system design, covering all levels of industrial groups (OEMs, suppliers, end-users) but it will also use **EIT ICT Labs** of the European Institute of Innovation and Technology (EIT) to get ARTEMIS results quickly to the curricula of students, to the knowledge of SMEs and to the products of European industry.

The ARTEMIS Summer Camp 2011 discussed the primary question: "What can the ARTEMIS E&T Working Group contribute to better match the innovation needs in this fast evolving technological world?". The results of the discussions are summarised below:

Ideas & priorities for future activities of the WG E&T:
> evaluation criteria should include concrete E&T target values
> the whole chain for professionals has to be addressed, also at school level since it is too late in curricula to start at academic level given the shortage in engineering staff on all levels, which has become a problem for industry
> complementary funding to explore innovation is not possible in current ARTEMIS projects: target for 'Next Generation Joint Undertaking'?

Cooperation with other initiatives or programmes:
> mutually beneficial cooperation with EIT
> follow up the concrete request for cooperation with the EIT ICT Lab's Embedded Systems MSc programme
> explore cooperation with KET (high-level group)

Erwin Schoitsch

Erwin Schoitsch has worked at AIT Austrian Institute of Technology for more than 40 years, focusing on software process improvement and on development and validation of safety-related embedded software-intensive systems with high dependability requirements. He has been involved in many industrial and research projects, including the European projects ESPITI, SPIRE, ACRuDA, ISA-EuNet, COOPERS, Watch-Over, MOGENTES, ProSE and the ARTEMIS projects R3-COP, pSafeCer and MBAT. He is active in ARTEMIS and EPoSS, EWICS TC7, ERCIM, (co-) organiser of workshops and conferences, lecturer at a University of Applied Sciences, member of international program committees and of standardisation committees for functional safety (IEC 61508, IEC 61511 and related standards, ISO WD 26262). Within ARTEMIS Industry Association, he is chairperson of the WG Education & Training. He is an active member of the WG Standardisation and contributed to the ARTEMIS SRA.

> contribution to future MASP
> Pupil days (companies, research organisations)
> Short internships for students and schools

"Make it happen" implications of the new SRA2011 for the WG:
> "Sustaining the ARTEMIS innovation environment" – E&T has an important role in this. To invite local students, teachers and local industrial community to ARTEMIS events such as the Co-Summit 2011 exhibition in Helsinki is highly recommended.
> ARTEMIS Centres of Innovation Excellence (CoIE): E&T should be an important criteria

Involvement and commitment from industry is essential. The E&T Working Group is established within ARTEMIS Industry Association and well prepared to meet its objectives within the ARTEMIS context; concrete steps were defined during the discussions. Additionally, in co-operation with COSINE2, work on a 'White Paper' was started and should be finished by the next Summer Camp of ARTEMIS Industry Association. ∎

Link with and tap into projects and their innovation activities:
> E&T activities (development of training material, workshops) planned in R3-COP, pSafeCer and the nSafeCer proposal as well as in MBAT Dissemination

By Pauli Kuosmanen

Working Group
SME participation

Pauli Kuosmanen

Pauli Kuosmanen is CTO of TIVIT Oy, Tieto- ja viestintäteollisuuden tutkimus. TIVIT Oy was founded in 2008 and is a Finnish Strategic Centre for Science, Technology and Innovation (SHOK). TIVIT is committed to ensuring even more rapid development of Finnish ICT know-how. The aim is both to increase the speed with which new innovations reach the market and also to increase the know-how and promote the growth of both companies and research communities.

SMEs are an important link in the value chain for high-tech systems and solutions. In the ARTEMIS eco-system model, high-tech SMEs are expected to play a key role in the capitalisation and dissemination of the technologies. With respect to the large industrial companies participating in ARTEMIS, SMEs have relationships in different phases of the value chain.

The Working Group SME participation was set up by ARTEMIS Industry Association in January 2009. A major and ambitious goal of the group is to see ARTEMIS projects being set up and led by SMEs. Key to this is the roll-out of some activities to get more SMEs to become members of ARTEMIS Industry Association, as this is the best way for them to become visible in the ARTEMIS community of collaborative innovation and reap its benefits. As the newly elected Chair of the Working Group SME participation Pauli Kuosmanen is the person to contact for those wishing to participate in this WG. We put Pauli on the spot with a few questions.

What is the significance of your WG for the ARTEMIS strategy? Specifically: why is it a differentiator? ~ To me ARTEMIS is the programme with the highest ambition in utilising the vast potential of SMEs, aiming to substantially boost their presence both quantitatively and qualitatively in the EU. This is no easy task, and many problems still have to be solved. Currently we are evaluating the most urgent actions we can take as an industry association in order to pave a smooth path for SMEs to participate in and even lead projects.

What did you discuss in Summer Camp, what plans were made how will you realise them? ~ We came up with a number of actions: matchmaking, improve visibility, participating SMEs as messengers, project meetings as information channels, an SME applicant guide, better understanding of the situation and a lobby. Each member of WG is able to influence the priority of these actions and even propose new ones.

Why should one want to participate in this WG? ~ To exercise influence, to find information, to find peer-to-peer support, to have fun.

Why did you want to chair this WG? ~ Before I was appointed as the chair of the Chamber A, the previous chamber chair chaired this WG. So I inherited that task to some extent, but it is a great honour for me. SMEs are so important; they are the incubators of the next leaders of industry. I like to work with them. They have the spirit and willingness to prove their value and do something remarkable.

Can they approach you directly for more information? ~ Anytime, any means, skype/phone/email as well. And come to talk to me at events. I am not as intimidating as I may look.

What is your favourite quote? ~ "There is nothing so practical as a good theory" (Kurt Lewin, 1951). We should always have a solid theoretical foundation for everything. But without the "Word becoming flesh" (another of my favourite quotes, John 1:14 (Holy Bible)), theory is useless. ARTEMIS is about both of them, theory and practical implementation. And the bottom line contains the answer, new business. ∎

the differentiator

By Elena Tsiporkova

WG Repository
– capture and share

Elena Tsiporkova is currently a member of the ICT & Software Engineering Group of Sirris. She holds an MSc in Mathematics/Computer Science (University of Plovdiv, Bulgaria 1985) and a PhD in Mathematics (University of Ghent, Belgium 1995). She has extensive R&D experience, in both an academic and industrial environment in the field of Data Analysis, Decision Making Support Systems, Knowledge Engineering and Multimedia. In January 2009 she joined Sirris, where she is involved in diverse international research projects in which Sirris cooperates with external partners from the academic and industrial world. Elena participated at the ARTEMIS Summer Camp 2011 in the break-out group on 'ARTEMIS Repository'. In this session, the strategy for the newly established WG Repository was on the agenda.

ARTEMIS Magazine put also Elena on the spot with a few questions.

Elena Tsiporkova

Elena, why did you opt for this particular group? ~ I was attracted by the repository group because of my personal interests and affinity with research as well as other challenges related to engaging a research community to actively contribute to knowledge capturing, sharing and tool reuse.

Why is a repository group important for ARTEMIS? ~ The Repository Working Group is very important for defining and implementing a community-enabled repository platform. The existence of such platform will enable a higher degree of leverage between the research performed within the different ARTEMIS projects and will subsequently lead to better visibility and broader impact of the ARTEMIS programme as a whole.

What came out of the Summer Camp discussions, what are the plans and how does the group intend to realise them? ~ Several different topics were touched on during the Summer Camp. Like the type of contribution and degree of openness, coverage (e.g. ARTEMISIA members only, EU players only, worldwide participants), impact on confidentiality and IPR issues, among other things. But what we agreed on was the need to build a platform which is open to everybody, but offers some privileged information and other services to the members of ARTEMIS Industry Association.

There is still no clear consensus on how to approach the request for contributions to the platform: 'top-down' via the project coordinators or 'bottom-up' by inviting

researchers and developers to upload and share their research results and tools. I personally believe in the latter approach since the people involved in actual project research have quite different motivation and dynamics than the project management. The researchers would be more inclined to share results with colleagues or to experiment with existing solutions to help progress in their daily work, while project management are more likely to see a repository platform as PR to communicate research results and to publicise the project and the consortium.

There are still many other topics like scalability, sustainability, maintenance & support, which need careful consideration during our next meetings.

Why should one want to participate in this WG? ~ By participating in and contributing to shaping the concept of the repository, you can have an impact on the final realisation and so determine the potential of the ARTEMIS repository. This is vital since an ill-conceived and inadequate concept not aligned with the culture, spirit and needs of the ARTEMIS (embedded) community will not really succeed in community engagement and will have very short life-span. ∎

ARTEMIS will collect and host the open (or restrictedly available) results of ARTEMIS projects. Such results can be technology components (being HW or SW), complete systems, platforms, tools or methods. The repository acts as source for key enablers for new initiatives inside the programme. The results are especially promoted for wider usage as examples of new openings and or commonly used solutions in the area of Embedded Systems globally. Chair of the ARTEMIS-IA Working Group Repository is Petri Liuha of NOKIA.

Societal Challenges addressed by ARTEMIS

By Alun Foster

Europe faces a number of new societal challenges that have arisen from the major evolutions of the last century: inverted demographic curves and constantly increasing demand for non-renewable natural resources, constant improvement in quality of life, and climate change …

The 'Open letter' published in this magazine on page 7 states that "Europe can address these challenges by using its sophisticated Embedded Systems Research and Development resources in industry and research institutes if coordinated well and if funded adequately. **In a global world EMBEDDED SYSTEMS are a crucial KEY ENABLING TECHNOLOGY for Europe's industrial and societal future, and one that must not be underestimated or overlooked."** ARTEMIS is not striving to address every so-called Grand Challenge but is focusing on *three specific societal challenges* in order to derive the research challenges and prioritise the Embedded Systems research topics addressed in the Strategic Research Agenda

2011. These three societal challenges that take account of established European industrial expertise and infrastructure are:

> Affordable Healthcare and Wellbeing
> Green, Safe and Supportive Transportation
> Smart Buildings and Communities of the Future.

At the Summer Camp 2011 in Brussels, Eric Schutz, the Executive Director of the ARTEMIS Joint Undertaking Office, presented an initial look at the ARTEMIS projects that match the Societal Challenges as described in the SRA2011. The chart below shows these matches.

Match between ARTEMIS projects and Societal Challenges:

The matching process has just begun. If you regard a glass of water as half full, then most (about 2/3) of the 35 projects can be considered a positive match. If your glass is half empty, you might regard with disappointment that not all the 35 projects provide a match with the societal challenges, however, the programme must also deliver more generic solutions to keep fuelling future innovations.

In analysing of the role of Embedded Systems in addressing the societal challenges the ARTEMIS SRA2011 suggests that responses to those challenges require systems that must interoperate across *many* application domains. The original ARTEMIS aim of

achieving multi-domain compatibility, interoperability and even commonality was already moving in this direction. The SRA2011 goes further: the societal challenges will be used to structure the inherent technological issues into a concrete research and innovation strategy spanning multiple application contexts, with results that will benefit both society and the economy. Hence, when we take a closer look at the chart, we see that the Call 2009 project CHIRON covers the broad range of the Affordable Healthcare and Wellbeing societal challenge (see the following article). ■

	Call 2008 – 1st Call	Call 2009	Call 2010
AFFORDABLE HEALTHCARE AND WELLBEING			
Care at home		CHIRON	
Early diagnosis and prevention		CHIRON	HIGH PROFILE
Image Guided Intervention and Therapy		CHIRON	HIGH PROFILE
Clinical Decision Support		CHIRON	HIGH PROFILE
GREEN, SAFE AND SUPPORTIVE TRANSPORTATION			
Green Mobility		POLLUX	IoE
Accident-free Mobility	CESAR CAMMI	ACROSS	D3COS ASTUTE MBAT
Supportive individual transportation (including elderly people)			
Efficient, clean, safe and seamless mobility	CESAR	ACROSS, RECOMP	IoE MBAT pSAFECER
SMART BUILDINGS AND COMMUNITIES OF THE FUTURE			
Mobility for everyone	SOFIA SCALOPES	SMARCOS	
Energy control in the urban and rural environment	eDIANA	ME3GAS	IoE ENCOURAGE
Security	EMMON SMART	pSHIELD	nSHIELD

CHIRON:
fostering a continuum of care

By Silvio Bonfiglio

CHIRON (Cyclic and person-centric health management: Integrated approach for home, mobile and clinical environments) is an ARTEMIS JU project of the 2009 call involving 27 organisations from eight European member states and representing industry (large companies and SMEs), the research and the academic communities and medical institutions. Having started in March 2010, it has a term of 36 months and a budget of 18 million euros.
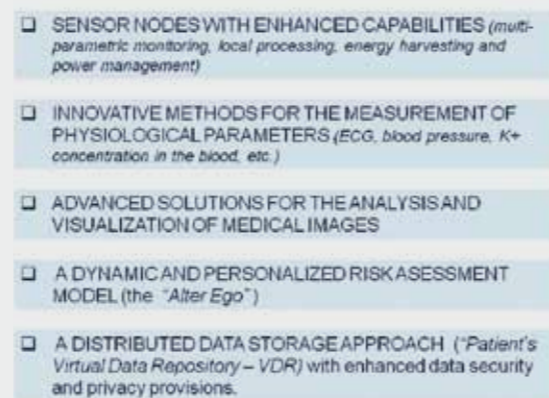
enhanced capabilities, new methods and algorithms for the measurement of physiological parameters, advanced analysis solutions and the visualisation of medical images. The final objective is better quality care at a more affordable cost.

Moreover, CHIRON aims to contribute to the uptake of a market, e-health, identified by the European Commission as a 'lead market' where 'innovative products / services / solutions have high growth potential, where EU industry can develop competitive advantage and where action by the public authorities to deal with regulatory obstacles is needed'.

CHIRON embedded systems for the healthcare of the coming decades … driven by the ARTEMIS JU vision

diseases, new symptoms and new contextual factors relevant to the health of the citizens, such as changed environments, new nutritional habits and lifestyles.

To make a diagnosis and define the most suitable treatment for the patient, the physician needs to make use of a massive quantity of data, aggregated from different large data sets (large volume of different sensor data, medical images, past and current patient information), interpreted and integrated with community related statistical data and past knowledge. Moreover, he needs to take prompt decisions.

All these data represent the outputs of ubiquitously distributed, multiple and heterogeneous devices and sub-systems: physiological signs and activity information are

the computing and memory capabilities to execute a specific task for which the outputs of other sub-systems are needed. The task of each of these 'embedded blocks' could be very simple, such processing the raw data gathered, removing artefacts and extracting features. Tasks may also be complex such as that of a medical image acquisition system or an image-guided surgical system. In this network of embedded systems Internet provides the communication infrastructure for the exchange of information among them.

However, the weaknesses of Internet in terms of quality, reliability and real time interchange of information have to be compensated by a higher autonomy and robustness of each of the modules of the system, especially in such a critical domain as healthcare. Each block needs to be capable
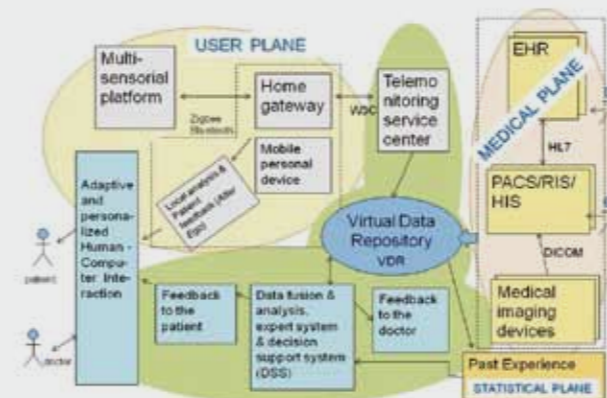

Fig.1 – CHIRON addresses the overall healthcare cycle

Fig.2 – Technological innovation in CHIRON

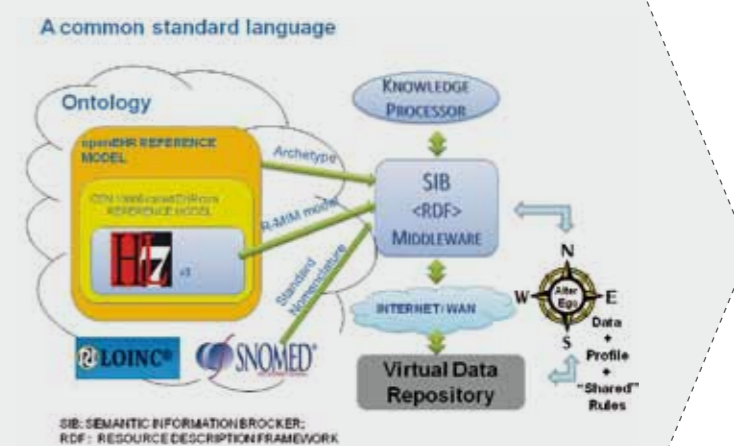Fig.3 – The basic concepts of CHIRON

Fig.4 – Technological innovation in CHIRON

CHIRON AT A GLANCE ~ CHIRON addresses 'Affordable Healthcare and Wellbeing', one of the societal challenges identified by the ARTEMIS SRA2011. The project aims to combine state-of-the art technologies and innovative solutions into an integrated framework of embedded systems for effective and person-centric health management throughout the complete healthcare cycle, from primary prevention (persons still healthy) to secondary prevention (initial symptoms or discomfort) and tertiary prevention (disease diagnosis, treatment and rehabilitation) in various

domains: at home, in nomadic environments and in clinical settings.

CHIRON provides a response to the present-day demographic and socio-economic challenges healthcare is facing: from an ever ageing population suffering from chronic diseases and various handicaps to the need for affordable 'global' healthcare provided by fewer and fewer professionals and medical infrastructures for critical, often mobile, patients. It will help to radicalise the way healthcare is delivered to citizens and will

design an integrated network of embedded systems for:
> an effective and person-centred health management along the complete care cycle;
> a move from treatment of acute episodes to prevention;
> a 'continuum of care' through seamless integration of clinical, home-based and mobile healthcare services.

The project promises to progress beyond state-of-the-art in several disciplines such as healthcare architecture, sensor nodes with

In a complex and global society, primary needs such as the health and the wellbeing of the citizens demands the various actors to contribute in harmonious synergy, so the ARTEMIS JU is ideally positioned to define a joint strategy, coordinate and address common research efforts and bridge the gap between R&D and market readiness.

As a knowledge-based science medicine is confronted by the age of 'globalisation': the movement of people all over the world along with societal and economic developments mean that medical professionals have to deal with new

gathered through unobtrusive on-body sensors and are contextualised with environmental parameters measured by discrete devices; results of lab analyses including image-based examinations are available in the information systems and PACS systems of the clinical centres and hospitals while epidemiological/statistical datasets and past knowledge are dispersed everywhere around the world, sometimes organised and stored in various repositories. All these devices/sub-systems that generate, interpret and store those data are embedded modules of a complex system, each with

of operating dependably even in the presence of network degradation or temporary failure and must be capable of executing a minimal, essential task autonomously (e.g. the prompt patient warning if a vital sign exceeds the allowed threshold or the activation of an emergency call in the case of a critical event). At the same time, these intelligent blocks – integrated – form a networked system with nodes distributed everywhere and all cooperating to realise a complex and important task, in our case the delivery of effective and high quality healthcare services to the citizens.

This is exactly the vision driving ARTEMIS, i.e., a world in which smart 'objects' have 'a presence in cyber space, exploit the digital information and services around them, communicate with each other, with the environment and with people, and manage their resources autonomously'. CHIRON aims to fulfil this vision in the vital and complex domain of healthcare where the citizen and his quality of life lie at the core of the healthcare model proposed by CHIRON. But the CHIRON system, although specifically designed for healthcare, interoperates across many application domains and so touches on other processes involved in people's daily lives. This move towards 'global, open networks of multi-domain embedded systems' will demand cross-company collaboration and so lead to radical changes in business processes.

results" and the cross-sectoral sharing of tools and technologies that are today quite separate.

Another important aspect of the CHIRON architecture is the seamless integration of the personal health platform with the clinical workflow and the integration of the personal and medical data gathered in a "non-clinical setting" into the electronic health record of the patient. Adherence to the standards with regard to the exchange of medical information (HL7 v.3) as well as reliable and secure patient data management are key issues. Semantic interoperability will be realised.

THE CHIRON CONCEPTS ~ As an effective response to the challenges in healthcare and in line with the ARTEMIS research roadmap, the CHIRON research work will foster:

unobtrusiveness and accuracy/'medical validity' of the gathered data. Innovative solutions addressing the challenge of a low-cost, low-power sensorial platform including devices with severe resource constraints will be developed and integrated.

B. EARLY DIAGNOSIS AND PREVENTION ~ CHIRON will foster a shift from 'health care' (how to treat patients) to 'health management' (how to keep people healthy), integrating past and current data of each patient together with statistical data in a large, distributed repository that is secure, easily interpretable and accessible by authorised persons. This Virtual Data Repository (VDR) will provide medical professionals with effective support for early diagnosis and personalised treatment planning.

the new advanced tools developed in the CHIRON project will facilitate real-time processing, computer-aided analysis and accurate visualisation of medical images as well as support doctors in making accurate diagnosis by reducing the risk of a 'false negative' or the need for additional and costly examinations due to a 'false positive'.

C. EFFECTIVE CLINICAL DECISION SUPPORT SYSTEMS ~ Measurements provided by remote monitoring close to the patient will be incorporated into physiological models and fused with anatomical and functional information derived from MRI and 3D ultrasound data, from which organ-level models are built and updated. All these data integrated with those available in the hospital information swill contribute to creating an evolving patient profile

and urine variations and in-house movements.

A critical aspect CHIRON will address is the effectiveness and the intuitiveness of the feedback provided to the medical professionals, avoiding the risk of overloading the doctor with a plethora of data. CHIRON will interpret and translate the data into features; the use of ontologies will allow the requisite information to be retrieved from multiple distributed content repositories and be presented in a structured and aggregated manner and so give the doctor an easy and powerful tool for immediate understanding of the status of the patient.

D. PERSON-CENTRIC HEALTHCARE MANAGEMENT ~ Proactive computing will see self-adapting embedded systems that anticipate the needs of people and thereby enrich the quality of life. Personalisation will also feature in a coaching system to help the patient to reduce immediate risk and improve long-term recovery. Patients will be empowered and encouraged to manage their wellbeing independently. This person-centric approach puts the needs of the citizens, the medical professionals and the whole community at the core of the design.
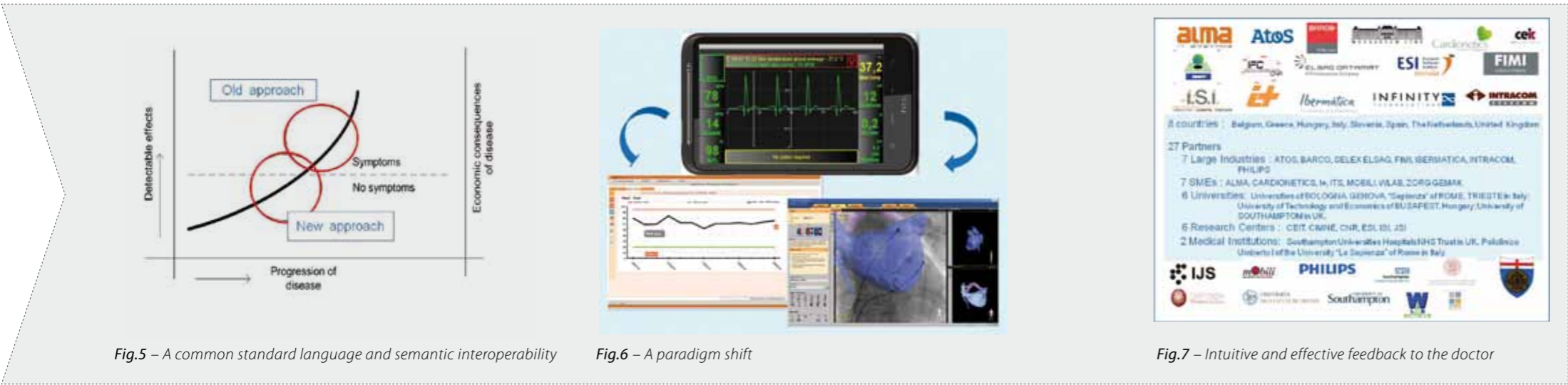
In all these areas CHIRON addresses most of the technological challenges highlighted by the 2011 Artemis Strategic Research Agenda. The outcome of the CHIRON research will be tested in a proof-of-concept clinical trial enrolling 400 congestive heart-failure patients. Furthermore, in line with the industry-led ARTEMIS JU Program objectives, we will execute an assessment of the socio-economic impact of the proposed solutions to find 'economic evidence', i.e., the answer to the essential question of 'who will pay for it'. The healthcare societal challenges will promote the creation of new and innovative services/products and the solutions and the technological advances made in CHIRON will contribute to the take-up of

Silvio Bonfiglio

Silvio Bonfiglio works as New Business Opportunities Manager at FIMI S.r.l, a Barco Company. He has been responsible for the development of new business opportunities in FIMI since 1998. In this role he has been involved in several projects related to large flat displays, interactive solutions, wireless LAN, user interfaces, AAL and Personal Healthcare. He graduated from the University of Palermo in 1971 with a degree in Electronic Engineering. He joined FIMI in 1979 and – after six years spent in the R&D Department – he was involved in sales, marketing and Research Projects Coordination. He was in charge of the Display Competence Centre of Philips Medical Systems. He has participated to several International Projects (multi-divisional Corporate projects and EC funded projects), acting – in some of them – as Coordinator (European Projects OASIS, CHIRON, MICHELANGELO of FP7-ICT and ARTEMIS Programs). He is author of various papers published in international journals and related to display technology, e-health and e-care.

Fig.5 – A common standard language and semantic interoperability

Fig.6 – A paradigm shift

Fig.7 – Intuitive and effective feedback to the doctor

In its reference architecture CHIRON will use a middleware developed by another ARTEMIS JU project, the SMARTS SPACE of the SOFIA project, adapted to the health domain; it will allow interoperability between heterogeneous devices and services (exchange of multisource information throughout the healthcare cycle). This is also an example of the multi-domain compatibility, interoperability and even communality the ARTEMIS strategy is realising by "removing barriers between the application sectors" and fostering "multi-domain reusable

A. CARE AT HOME AND EVERYWHERE ('CONTINUUM OF CARE') ~ The design of an integrated system architecture to produce a patient-centric 'continuum of care' will move care from the hospital to the home, benefit from the availability of informal caregivers and enable more affordable healthcare by reducing the need for hospitalisation. Continuous multi-parametric monitoring of physiological and psycho-emotional state, environmental parameters, patient activity and lifestyle related factors will incorporate the best compromise between

CHIRON will make use of ontologies to retrieve information from multiple distributed content repositories and will implement secure access to patient health information. It wants to effect a paradigm shift from diagnosis and treatment of patients based on symptoms to early diagnosis of patients based on the dynamic and personalised risk assessment of healthy persons. This will translate into early intervention when the economic impact of the disease is still low.

In the current age of image-centred medicine,

with the relevant health aspects of the user including medical history, habits, etc. and to the definition of a personalised and constantly updated risk assessment model (Alter Ego).

A new way of looking at impending risk is being constructed, based on simple measures continuously obtained by the alter ego with time-frame acquisitions, processing and relationships with future events depending on the type of variable considered: heart rate, skin and ambient temperature and humidity, daily weight, water

applications such as medical imaging, personal healthcare (home and mobile monitoring), health management and coaching, wellbeing, clinical decision support systems and healthcare informatics. ∎

Has the Big Earthquake Changed the Japanese Vision of the Future Ubiquitous Computing Applications?

Ken Sakamura will be a keynote speaker at the Co-summit 2011 in Helsinki on 25 & 26 October. ARTEMIS Magazine invited him to give us a fortaste in the context of one of the big natural challenges that Japan unfortunately had to face. On 11 March a series of large earthquakes occurred in just a few minutes off the coast of the Pacific Eastern region of the main Honsyu island of Japan. The tsunami that followed the big tremor caused greater damage than the tremor itself, and devastated the coastal area. In Japan, there have been some research activities, including our own, into using Ubiquitous Computing or the IoT (Internet of Things) in times of disasters for applications such as evacuation route guidance and relief worker support. The sheer size of the damage caused by the earthquake has forced researchers to look into the practicalities of ICT relief support when such a big disaster strikes and for the recovery period afterward. In this article, Ken Sakamura, would like to introduce what they do in Japan, and how the recent earthquake damage has affected people's thinking and research.

By Ken Sakamura
Professor, Graduate School of Interdisciplinary Studies, The University of Tokyo
Director, YRP Ubiquitous Networking Laboratory.
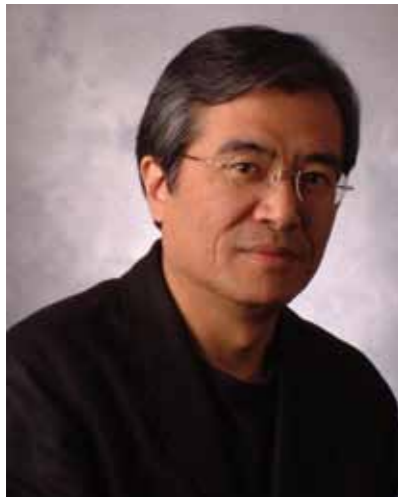
Ken Sakamura

Ken Sakamura will be one of the key note speakers at the Co-summit 2011 in Helsinki. He was born in Tokyo in 1951 and obtained his PhD in Electrical Engineering from Keio University in 1979. In 1984, he organised The Real-time Operating system Nucleus (TRON) project, and has led it ever since. TRON is a total computer architecture for the ubiquitous computer networking society of the future. He has also promoted TRON concepts on his own in diverse ways by undertaking design projects in many fields, such as the design of furniture, industrial products, building architectures and even cities. At present, he is professor of the Interfaculty Initiative in Information Studies at the Graduate School of the University of Tokyo and CEO of the YRP Ubiquitous Networking Laboratory. He has been elected fellow and golden core member of the IEEE Computer Society.
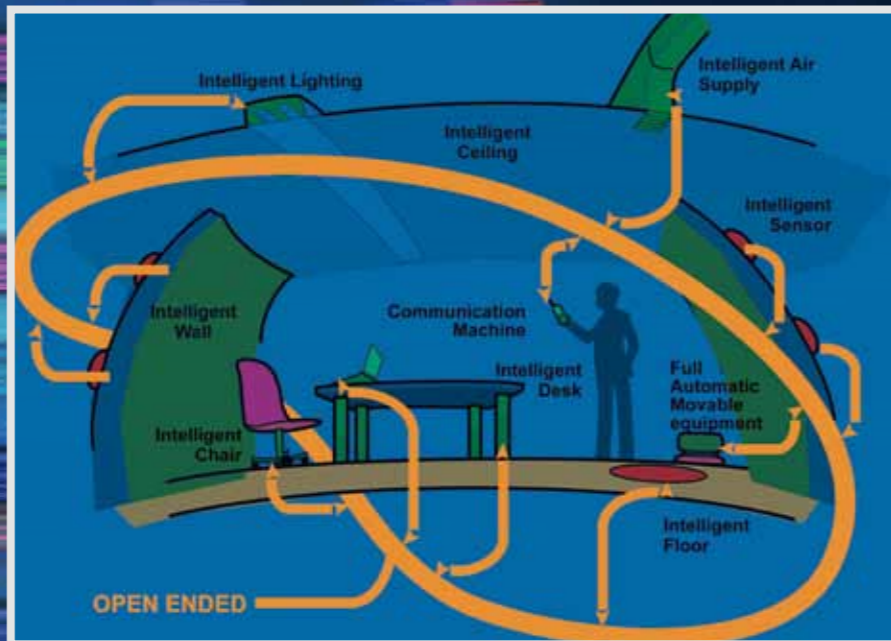
Figure-1 *TRON's Vision of Ubiquitous Computing*

Figure-2 *Windows were opened/closed automatically in the first TRON Smart House.*

Figure-3 *PAPI's exterior consists of aluminium frames and glass panels.*

TRON PROJECT ~ I have been leading a computer architecture project called TRON Project[1] since 1984. TRON stands for 'The Real-time Operating system Nucleus' and it is targeted specifically at embedded systems. TRON Project's ultimate goal is to use embedded system technology for future IoT applications where computing nodes are networked with sensors and actuators, i.e., embedded system nodes, to offer advanced services. This is a vision of TRON Project. (Figure-1)

The TRON Project is basically an industry-academia joint effort to pursue advanced RTOS for embedded systems in an open approach whereby all the specifications were made available for free, for example. Today, a family of real-time OS, called T-Kernel family, is offered in full source code distribution including a version for multi-core processor. Based on the future vision of Ubiquitous Computing (or the IoT), we have set out to develop the necessary components such as small footprint RTOS kernel, T-Kernel, and to prepare the development environment that goes with it. TRON Project is not a Japanese-only project. It has members from all over the world including China, countries in EU, India, Korea, Malaysia, Singapore, USA, Vietnam, etc.

TRON PROJECT FUTURE VISION: STRIKING SIMILARITY WITH ARTEMIS ~ I have been pleasantly surprised by the similarity of the ARTEMIS and TRON Project aims. ARTEMIS is not widely known in Japan, and I suppose TRON Project is not widely known in EU. It is surprising that with so few contacts in between the two projects, we seem to share so much in the identification of today's problems and the possible solutions: the greying of society, energy-crunch, search for clean and safe energy, smart cities to help people live in a comfortable and eco-friendly environment, safe and efficient transportation, etc.

I think it is inevitable that many so-called industrialised nations reach a certain stage where they face similar issues for similar reasons. Naturally we try to solve the issues with a similar technological approach, so it is no wonder we see similarities in R&D activities.

The earthquake prompted an urgency for research to address a number of issues.

An example: Energy Saving
The search for safe clean energy has gained renewed impetus from the recent nuclear power station meltdown accidents in Fukushima. The seriousness of the accidents has been felt all over the world. Of course, embedded computer systems cannot produce energy, but we can help the efficient use of precious energy and cut down waste. Even before the big earthquake of 11 March, the Japanese government was committed to the Kyoto Protocol[2] and to significantly reducing CO_2 emissions by 15%. The industry sector had already done its share of squeezing emissions to a point where private houses and buildings are now the target of CO_2 emission reduction.

Reducing CO_2 emissions per household can be achieved in the form of better utilisation of electricity, approximately 70 % of which is produced by burning coal/gas/oil. This reduction can be achieved by employing a combination of traditional approaches:
> replacing incandescent lamps with LED lamps,
> using sensor networks to monitor usage and human movements to turn off non-essential devices, unused lamps and such

> the use of energy-efficient parts for devices such as CPUs, sensor network nodes, LEDs, TVs, air-conditioners, etc.

It is also very important to visualise energy usage since such visual data motivates people to strive even more to reduce electricity usage.

We have tried to implement these energy-saving features in a whole house. In 1989, the first TRON Intelligent House was built in Tokyo. The second TRON House, called PAPI, was built in 2004 in Aichi, Japan, and was shown to the public during the Aichi Expo of 2005. The third TRON House, called u-home, was built in 2009 in Taipei[3].

These houses contained sensor networks and actuators so that if, for example, someone wanted to cool down the room before the air-conditioner was automatically turned on, windows were opened by actuators to let the outdoor air in the event that the outside air temperature and wind combined would bring in a cool breeze. (Figure-2) But if it started to rain, the windows were closed and the air conditioner was turned on. PAPI

tries to use material that can be recycled as much as possible to be an eco-friendly house. (Figure-3) It was called the house of sustainability for a reason.

The current attention to energy-saving has highlighted some interesting developments. After all, a smart house uses a certain amount of electricity to function, and so we need a backup source; the second TRON House, PAPI, uses the Toyota Prius, the hybrid car, to feed power to the house in the event of a blackout. (Figure-4) Since these hybrid cars also act as efficient rechargeable batteries, our approach to use the hybrid car as a power source was found to be very valuable to run smart houses in the current energy crunch.

FROM HOUSES TO CITIES ~ The prototype services we have carried out are now being used on a daily basis by placing computers and sensors in the urban landscape. The Ginza sub-project of the Tokyo Ubiquitous Technology Project is one such example where the infrastructure containing these computers and sensors can offer guidance services to ordinary people for shopping or to the aged or the visually-challenged for

Figure-4 *Running Prius to feed electricity to PAPI in a blackout*

Figure-5 *i-Box (left), Recording the whereabouts of victims at a shelter (right)*

walking, etc. Such guidance can even be offered underground or indoors where a GPS signal is unavailable.

Where a disaster such as an earthquake or floods caused by typhoons (regular seasonal events) occur, the same infrastructure can be used for evacuation route guidance, etc. We have tested the use of a dedicated information Kiosk called i-Box that has a special satellite communication unit so that it can connect to the global Internet even in the case of a total blackout of nearby land-based communication lines. (Figure-5) This enables the constant dissemination of relief information.

Although we have tried these in Tokyo area, we have not deployed such infrastructure all over Japan, which is a shame.

SOCIETY'S NEURAL BACKBONE ~ I totally agree with the view expressed in the SRA2011 that embedded systems are now the neural backbone of the society. It brings to mind an analogy with the body: is the safety of the whole society (a whole body) related to the safety of an individual house (an organ, so to speak), a building or a neighbourhood?

A case in point: Japan is now trying to cope with the power crunch caused by the shut-down of many power stations after 11 March. The initial measure was drastic: a revolving blackout of areas. Now the country is trying to reduce peak power consumption through the workload rotation of major consumers such as factories. The scheduled revolving blackout was initially very crude, with rather large area divisions and an arbitrary schedule. We heard complaints from the medical profession who literally ran to save patients' lives in stranded hospital rooms and individual homes in the blackout areas. With the advent of smart-grid technology, a more refined way of measuring electricity usage and taking account of the electricity needs of individual homes and buildings, we can possibly control consumption more precisely.

So, as for the question posed in this article, "Has the Big Earthquake Changed the Japanese Vision of the Future Ubiquitous Computing Applications?", the answer is "No, not much." But there has certainly been a shift of priorities. The control of networked embedded computing nodes has become

more urgent and is a research topic for the immediate future.

I hope this brief article sparks interest in the TRON project before my talk at Co-Summit 2011 in Finland this coming October. ∎

[1] *Readers interested in the TRON Project are referred to the following URL: www.t-engine.org*

[2] *The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC). The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions .
See UNFCCC's web page for details: http://unfccc.int/kyoto_protocol/items/2830.php*

[3] *See TRON Smart Houses in Action YouTube Ubiquitous ID Center Channel: TRON Smart House: www.youtube.com/watch?v=7jPKEyM44GU PAPI: www.youtube.com/watch?v=vyhO6y2nUOU u-home: www.youtube.com/watch?v=nfd1ecaVenY*

CO-SUMMIT 2011

CROSS-BORDER COOPERATION FOR CLEAN TECHNOLOGIES

25 & 26 OCTOBER

Scandic Marina Congress Centre

Helsinki, Finland

ITEA 2

ARTEMIS

What's your name and what position do you hold? ~ I'm Laila Gide and I am Director of Advanced Studies for Europe within the Technical Directorate of Thales.

Why are you co-chairing two working groups (Standardisation and the SRA-AWP)? ~ In fact, I am co-chairing the SRA working group, which I have been doing since the beginning when ARTEMIS was ETP – so that is 2005 – and at that time my co-chair was Eric Schutz who, later, became Executive Director of ARTEMIS Joint Undertaking. Now Tatu Koljonen is my co-chair. I am also co-chairing the standardisation working group. When I began I was just a member of the group, responsible for submitting the successful ProSE proposal for Embedded Systems standardisation and as things turned out I became co-chair for this group, too.

Why did you become a Steering Board member? ~ Thales is one of the five founding fathers of ARTEMIS and I was working closely with Dominique Vernay, Technical Director of Thales and member of the ARTEMIS Presidium and Steering Board, so when he retired I was elected and succeeded him in the Steering Board. I was very happy about this because this gives me an opportunity not only to voice my opinion but also be active in the Steering Board.

What drives you to do what you do? ~ I am very motivated and very committed to the ARTEMIS vision for the development of Embedded Systems. I like to see intelligence in objects. This can help us so much not only in our work but also to help us get more out of life. I love to be surrounded by an intelligent environment in which I can really do interesting things, which can free up my time and my mind, to do more fascinating and challenging things than just routine work. It's a creative environment, and that drives me.

C O L U M N

BATON BLUE(S)

This column is the second in a series in which various members of the ARTEMIS community pick up the baton and have a say on developments from a personal perspective and in their own way before passing the baton on. In this edition Laila Gide.

What do you believe is the biggest challenge in the R&D of Embedded Systems? ~ There are many, many challenges. But given the limited scope of the 'baton' let me just refer here to just two. First, an industry challenge: to shorten the product time to market is a really important challenge. So developing engineering techniques, tools and processes, and delivering high-quality, safe, secure products. These are all factors in accelerating time to market. The second great challenge is an ARTEMIS guiding principle: cross-domain collaboration. The challenge here is to bring together people from different domains where many share the same kinds of problems, and to create the openness that encourages them to share their knowledge and insight with each other to stimulate creativity.

To whom do you wish to hand on the ARTEMIS column-baton? Why? Do you have a question for him or her? ~ I would like to hand over to Dagfin Brodtkorb - ABB representative - because he comes from a completely different environment – he's from the north and I'm from the deep south! He has been very supportive from the very beginning so I would like to hear from him. My question to him is: What is it that attracts you to ARTEMIS? And as for the question posed by Irene Lopez de Vallejo to me in the previous baton-blue: What's been my hardest, most embarrassing or funniest moment I have experienced in my ARTEMIS time? My answer would have to be some hard moments to put together all the input from the experts to build an 'elegant' SRA, but frankly quickly forgotten because of the reward of real friendships I gained from this.

What music goes together with reading of your column? ~ This is a really tricky one because I love so many different kinds of music, from classical to pop. But if you push me for one piece, then I guess I would choose the enchantment of Mozart's Magic Flute. ∎

Second ARTEMIS Technology Conference

Date: 12 & 13 September, 2011
Venue: University of Bologna
Faculty of Engineering,
Viale Risorgimento, 2
40136 Bologna, ITALY

After the successful event in Budapest in 2010, the second ARTEMIS Technology Conference will take place in Bologna, Italy on 12 and 13 September, 2011.

This event has been proposed by SOFIA – a project of the ARTEMIS JU 2008 Call – and it will be hosted by the University of Bologna
.
The aim of the event is to provide public visibility over technical aspects raised and solved by ARTEMIS partners in the field of Smart Environments. Exchange of ideas will increase the effectiveness of R&D results', thereby boosting. This implies impact on industry and on society at large. In this sense, four ARTEMIS projects, SOFIA, SMARCOS, CHIRON, iLAND will present their intermediate results
during the conference.

The inspiring principle will be: to compare how each main topic is handled by each project; therefore, for cross-project presentations of individual topics.

Topics of interest include:
> interoperability
> information security
> performance and scalability
> modelling of smart environments and smart applications

> smart space ontologies
> context awareness
> smart interactions
> user activity recognition
> dynamic discovery
> smart space implementations, case studies, field test
> practical experiences of smart space application design and implementation.

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For registration and information:
www.artemis-ia.eu/atc_2011_home

Date: 4, 5, 6 October 2011
Venue: European Parliament building Brussels

Joint JTI event

INNOVATION IN ACTION! ~ The Joint Technology Initiatives ARTEMIS - CLEAN SKY - ENIAC - FUEL CELLS AND HYDROGEN - INNOVATIVE MEDICINES INITIATIVE are organising a joint event on the future of R&D and innovation in Europe. The event will take place from 4 to 6 October, 2011 in the Parliament building – Paul-Henri Spaak building, located in the Quartier Léopold (Leopoldswijk) at 60 rue Wiertz (Wiertzstraat).

The joint JTI event will be hosted by the European Parliament and will include an exhibition along with thematic sessions with presentations, keynote speeches and panel sessions. Participation for the thematic JTI sessions takes place on a first-come, first-served basis as seats are limited. Entrance to the Parliament building is only possible with registration beforehand due to EC security regulations.

The preliminary thematic programme:
4 October: ARTEMIS and ENIAC
5 October: Clean Sky and FCH
6 October: IMI and joint closure event

ARTEMIS and ENIAC will start the joint JTI event together on 4 October, so please note this date in your diary. On the ARTEMIS website we will come back to you with detailed information on the complete programme and registration page. ■

Co-summit 2011
25 & 26 October

Scandic Marina Congress Center in Helsinki. Finland

The Co-summit 2011 event will take place on 25 & 26 October and is hosted by the ARTEMIS Joint Undertaking and ITEA 2. Both programmes are active in helping Europe to achieve and maintain European leadership in the field of Embedded Systems, Software-intensive Systems and Services. Both innovation programmes want to address Europe's big societal challenges like affordable healthcare and wellbeing, green and safe transportation, reduced consumption of power and materials, reduction of food waste, smart buildings and communities of the future, and an imminent lack of natural resources. To underline this ambition the joint theme for the Co-summit 2011 is well chosen: 'Cross-border cooperation for Green Technologies'.

The centre of attention during the Co-summit 2011 will be the exhibition of 35 ARTEMIS projects and 43 ITEA 2 projects. ARTEMIS is very proud to showcase the running projects of the first call in 2008, second call in 2009 and the last call 2010. The deadline for the running

call 2011 will end on 1 September next. A new element of this year's exhibition floor is a joint area around the Co-summit 2011 theme and also the guided tours will be intensified on the ARTEMIS exhibition floor.

The first day of the Co-summit, Tuesday 25 October, high-level keynote speeches and parallel sessions will be held related to the Co-summit theme. For members of ARTEMIS Industry Association it is important to note that the General Assembly will also take place on 25 October followed by the Co-summit 2011 networking buffet.

PARTICIPATION CO-SUMMIT 2011 ~ Members of ARTEMIS Industry Association and Public Authorities are entitled to free admission. Next to public authorities and press, the organisation expects more than 700 participants from all over Europe. For further detailed information and registration visit: **www.artemis-ia.eu/cosummit2011** ∎

Calendar

12 - 13 SEPTEMBER 2011
BOLOGNA, ITALY
2ND ARTEMIS TECHNOLOGY CONFERENCE

On 12 and 13 September, 2011 the 2nd ARTEMIS Technology Conference will take place in Bologna, Italy. This event is being organised by the SOFIA project - an ARTEMIS JU Call 2008 project and will be hosted by the University of Bologna. The aim of the event is to provide public visibility over technical aspects raised and solved by ARTEMIS partners in the field of Smart Environments. In this sense, four ARTEMIS projects, SOFIA, SMARCOS, CHIRON and iLAND will present their intermediate results during the conference.

More information: www.artemis-ia.eu/atc_2011_home

13 - 14 SEPTEMBER 2011
LISBON, PORTUGAL
2ND ANNUAL SMART GRIDS SMART CITIES

Hear from industry leaders how cities around the world are dealing with the increasing demand for power and how they are channelling expertise into solutions that are more energy efficient and sustainable. Explore cutting-edge case studies of buildings and cities that lead the world in sustainable design and energy efficiency.

More information:
http://flemingeurope.com/energy-conferences/europe/the-2nd-annual-smart-grids-smart-cities#brochure

4 - 6 OCTOBER 2011
BRUSSELS, BELGIUM
JOINT TECHOLOGY INITIATIVES EVENT: INNOVATION IN ACTION

ARTEMIS Joint Undertaking is organising, together with IMI, FCH, Clean Sky and ENIAC, a joint event in the building of the European Parliament in Brussels. The active JTI's: ARTEMIS Joint Undertaking, IMI, FCH, Clean Sky and ENIAC will work together to present themselves in Brussels. For more information: Else Embregt, tel: +31 88 0036 188, else.embregts@artemis-ia.eu

25 - 26 OCTOBER 2011
HELSINKI, FINLAND
ARTEMIS & ITEA CO-SUMMIT 2011

The fourth edition of this annual event will take place in Helsinki. The project exhibition, showcasing active projects of ARTEMIS and ITEA, will highlight this event. Interesting key notes, ARTEMIS and ITEA sessions will complete this annual get-together of European embedded systems community.

More information: www.artemis-ia.eu/cosummit2011

17 - 18 JANUARY 2012
PRAGUE, CZECH REPUBLIC
ARTEMIS BROKERAGE EVENT 2012

ARTEMIS Joint Undertaking

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