ITEA 2

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ITEA 2

INFORMATION TECHNOLOGY FOR EUROPEAN ADVANCEMENT

Content

Colophon

ITEA for the economy

Optimists say that we have seen the roughest part of the economic crisis, but pessimists say that real recovery is still far away. Whatever the truth, sustainable growth will have to come from new products and services that bring a real benefit to society. The full potential of ICT in the economy and society has only been realised for a very small part. Therefore, industry-oriented innovation programmes in ICT-related areas such as ITEA 2 are at least as important in this time frame as ever before.

The theme for this year's ITEA Symposium – *Business-oriented innovation that strengthens economy and benefits society* – clearly reflects this. As this fourth issue of the ITEA Magazine is published, we are busy preparing for our major annual event wich will take place on 29 and 30 October in Madrid. Like last year in Rotterdam, the Symposium is co-ordinated with ARTEMISIA in the Co-summit.

The current importance of ITEA for the economy is again demonstrated by the excellent participation in the Project Outlines for the 4th Call: a total of 29 project outlines were submitted with 4,620 person years, by 542 partners of which 226 are small and medium-sized enterprises (SMEs). Spain has further strengthened its leading position in the participation in ITEA, while Turkey continued its strong growth and Egypt made an impressive entry.

I also like another way to interpret 'ITEA for the Economy': as a EUREKA Cluster programme, ITEA runs very efficiently. This appears clearly in all stages of the annual call process. In particular, the two-stage proposal evaluation – Project Outlines and Full Project Proposals – is based on a very mature and efficient process with involvement of industry experts and public authorities. This evaluation process takes several dimensions of the proposals into account, such as business potential, technological innova-tions, consortium balance and project management.

Around this process, the ITEA concept has created a community with innovative ecosystems across various value chains, often with a large number of SMEs around a few big global players. Some 27% of the overall ITEA participation in 2009 in terms of person years is from SMEs. For the Project Outlines in Call 4, the corresponding percentage is 33%. Clear examples of such ecosystems in this issue are in the SODA and OSAmI-Commons project: about 30 partners are, or have been, co-operating in both SODA and OSAmI-Commons; of these about a third are larger industrial partners and another third are SMEs.

A proof point for the efficiency of ITEA is its relatively modest cost of operation: the total operation of the ITEA Cluster is paid from a contribution of only 1.1% of project costs for all non-university partners, plus the in-kind contributions by experts and public authorities, so indeed, ITEA for the economy.

Fopke Klok

Fopke Klok
ITEA 2 Office Director

"The full potential of ICT in the economy and society has only been realised for a very small part. Therefore, industry-oriented innovation programmes in ICT-related areas such as ITEA 2 are at least as important in this time frame as ever before."

ITEA 2 Symposium 2009

Business-oriented innovation
that strengthens
economy and benefits society

This year's ITEA 2 Symposium will take place in Madrid, Spain on Thursday 29 and Friday 30 October in the Auditorium Hotel. Like last year, a Co-summit will be held together with ARTEMISIA Association with a co-organised one-day programme on 30 October. We aim to have around 500 to 600 participants from industry, universities and research institutes, and the Public Authorities from all over Europe. The event will give participants a great opportunity to see, discuss, hear and learn about the ITEA 2 programme and scope, its projects, achievements, progress, projects and ambitions for the future!

The Symposium programme is scheduled around this year's theme *'Business-oriented innovation that strengthens economy and benefits society'*.

As is now traditional, the ITEA Community Day will be held on Thursday 29 October. The ITEA 2 Presidium will give a complete overview of ITEA achievements and successes, current facts and figures, programme progress and the future.

ITEA BUILDING BLOCKS IN THE SPOTLIGHT
During the Community Day, we will also focus especially on ITEA's building blocks: the projects. We are proud to announce that again three outstanding projects will present themselves. The EPAS (interoperability of European e-payment schemes), SMART-TOUCH (mobile NFC services) and SODA (service-oriented device & delivery architecture) projects are all in the running for the prestigious 2009 ITEA Achievement Award. The actual Award ceremony will take place on the afternoon of 30 October.

SPECIAL FOCUS SESSIONS
During the morning of 29 October, the programme includes two special focus sessions for participants to join. Also this year, these sessions will give the participants the opportunity to hear about and discuss particularly current topics within ITEA 2:

Jésus Bermejo from Telvent, ITEA 2 body member and project leader, will moderate a session on 'The digital Economy: OECD Software Innovation Study & OSAmI-

Commons project'. In parallel, ITEA 2 D-MINT project leader Colin Willcock from Nokia Siemens Networks will moderate a session on 'ITEA as a vehicle towards standardisation'.

ARTEMIS & ITEA CO-SUMMIT
On Friday 30 October, for the second time, a Co-summit will be held together with ARTEMISIA Association around the theme: *Ecosystems driving open innovation in Embedded Intelligence and Software-intensive Systems and Services*.

Presentations during this Co-summit will include industrial and political viewpoints on the theme. Furthermore, in the afternoon there will be parallel sessions for participants to join on different topics

linking the themes to concrete ICT-based approaches and examples:

- Multimedia and Communications (organised by ITEA 2)
  by Patrick Schwartz, Thomson — project leader of HD4U, CAM4HOME
- E-payment (organised by ITEA 2)
  by William Vanobberghen, Carte Bancaire — project leader of EPAS
- Ecosystems (organised by ARTEMISIA)
  moderator to be confirmed
- SRA update (organised by ARTEMISIA)
  moderator to be confirmed

EVENT HIGHLIGHT: THE EXHIBITION
Alongside the highly interesting two-day speaker programme, the event will have a large exhibition with over 50 ITEA and ITEA 2 projects showcasing their results and achievements via presentations and fully operational demonstrations on 29 and 30 October. An important section of the exhibition will focus on European competitiveness clusters (PdCs) from several

countries. And, for the first time, around 10 ARTEMIS projects will present themselves in their own project exhibition.

Visitors will be able to vote for the ITEA Exhibition Award. The award will go to the ITEA / ITEA 2 project team that communicates ambition, goals and — if already possible — results of its project in the most understandable and vivid way at the exhibition. The award ceremony will be held during the shared closing session of the Co-summit.

STILL POSSIBLE TO JOIN THIS UNIQUE EVENT
The first day of the Symposium (29 Oct.) is by invitation only, but the Co-summit (30 October) has an open registration — deadline 25 September.

For more information and registration:
http://symposium2009.itea2.org/.

Rudolf Haggenmüller reflects:

This year, ITEA's symposium theme: 'Business-oriented innovation that strengthens economy and benefits society' clearly reflects what ITEA will focus on the coming decade. Key ambitions, which were already introduced in our 3rd Roadmap, include societal computing, massive scalability, competitiveness of jobs and businesses and greater sustainability. In summary, ITEA will focus on grand societal and economic challenges for:

- People: physical and mental well-being
- Planet: sustainability, carbon footprint, management of scarce resources
- Profit: Competitiveness of European jobs and businesses.

Spain committed to increasing IST research funding for SMEs

Spain has been investing heavily in information society technologies (IST) in the past four years and government funding in this area is set to grow. ITEA 2 provides an important opportunity for Spanish SMEs, according to José Ferrer Castro, head of section for International IST R&D Programmes at the Spanish Ministry for Industry, Tourism and Trade (MITYC). Funding for ITEA 2 projects almost doubled in 2008 compared with 2007, reaching €10 million.

"Key benefits of participating in ITEA 2 include increased productivity, competitiveness and wealth; the ability to participate with large European companies and involvement in collaborative R&D with other SMEs, academic institutions and large organisations – something not normally possible for a small Spanish SME."

José Ferrer Castro, MITYC

"The overwhelming majority of Spanish companies – 99.8 % – are small and medium-sized enterprises (SMEs), employing less than 250 people," points out Ferrer Castro. "Key benefits of participating in ITEA 2 include increased productivity, competitiveness and wealth; the ability to participate with large European companies and involvement in collaborative research and development (R&D) with other SMEs, academic institutions and large organisations – something not normally possible for a small Spanish SME."

Turnover in the Spanish IST industry was more than €19 billion in 2008, representing a growth of 4.3% over the previous year. Industry in this sector is also increasing investment in R&D, devoting 3.9% of turnover. This is three times the national industrial average.

FIRST GOVERNMENT PLAN TO PROMOTE IST

EUREKA and EU Framework Programme projects are supported by both MITYC and the Centre for the Development of Industrial Technology (CDTI). MITYC has been promoting IST projects through the Secretariat of State for Telecommunications and Information Society (SETSI) with the 2006 to 2010 Avanza Plan – the first government initiative for developing IST.

Avanza forms part of the broader 'Ingenio 2010' programme, giving new impetus to R&D investment in Spain within the framework of the National Reforms Programme, in compliance with the EU i2010 initiative. Avanza included legislative measures and initiatives for direct action. The budget for 2005 to 2009 exceeded €6.5 billion, five times the amount devoted to Information Society initiatives in the previous four years.

Following the success of Avanza, the 'Avanza2 Plan' will help adapt to new challenges. This second phase from 2009 to 2012 is structured into five areas:

1. Development of the ICT sector (SMEs);
2. Digital public services;
3. Infrastructure;
4. Training for citizens and SMEs; and
5. Confidence, security and accessibility.

For 2009, the government budget allocated for the development of the Information Society will surpass €1.5 billion. Avanza2 should create 45,000 direct and indirect jobs annually from 2009 to 2012 – nearly 200,000 high-skilled jobs in the next four years.

INCREASING SME ADOPTION OF ICT

The 'Avanza SMEs' programme endeavoured to increase SME adoption of information and communications technologies (ICT) through the introduction of sectoral solutions and e-business. MITYC SME-orientated programmes included:

- **Avanza PYME**, for incorporation of ICT in SME business processes to improve productivity and competitiveness using open and standard e-business solutions; and
- **Avanza Formación**, for training of SME workers on ICT, and training of SME workers by means of ICT.

Additional support has come from the Spanish plan for economic stimulus and employment (Plan E), announced in early 2009. "Plan E is an unprecedented effort to support enterprises and especially SMEs through fiscal measures and extending access to credit for businesses," explains Ferrer Castro.

Another important tool for SMEs is the €500 million 2007 to 2013 'InnoEmpresa' innovation programme. This includes prioritisation of aid lines for improving the innovative capacity of enterprises, opening of aid lines at the direct request of the SMEs, an increase in the maximum aid for investments, and a specific focus on co-operative projects.

InnoEmpresa also receives co-funding from the European Regional Development Fund (ERDF) of approximately €105 million, and some financing from the Autonomous Community Governments, within the framework of the SME industry-wide Conference. MITYC projects a budget of around €58 million for 2009.

In addition, the government has simplified corporate assistance for R&D, developed new instruments for SMEs and announced a stable fiscal framework for research, development and innovation beyond 2011.

DEVELOPING A COMPETITIVE AND SUSTAINABLE ECONOMY

"One of Spain's biggest challenges is to update its production model so that our economy is more competitive and sustainable, and based on innovation and knowledge," says Ferrer Castro. "Innovation is essential. The budget for civil R&D and innovation this year totals €8.9 billion, three times higher than in 2004 and 14% higher than 2008."

Ferrer Castro believes more needs to be done at European level: "Despite encouraging progress on increasing the amount of investment in R&D, the overall R&D intensity of the EU-27 has remained unchanged. This highlights the challenges facing the EU – the current global financial crisis, the need to increase research in high-tech sectors and changing the balance of the industrial structure in favour of research-intensive sectors.

"A substantial and sustained increase of business R&D investment is essential to break the current stagnation of the EU's overall R&D intensity at 1.9% of GDP and to progress towards national and EU targets. And knowledge transfer must improve er to accelerate the exploitation of R&D results."

MAKING A REAL IMPACT ON QUALITY ASSURANCE

Participation in ITEA and ITEA 2 projects has made a real difference to the product range and capabilities of software testing company SQS. This Bilbao-headquartered SME is a leading provider of software quality consultancy and testing services, and is part of the Innovalia group. Participation in co-operative projects has enabled SQS to supply test tools that it has fully verified across relevant industrial sectors in Europe.

The Spanish company focuses on quality assurance of customer software products and developments. Its main activities are in the industrial sector, involving validation and verification of safety-critical systems in aeronautics, car production, pharmaceuticals, railways and machine tools, and in business services with customers in banking, insurance and telecommunications. Key activities cover software quality assurance, process development assurance and reducing software development related costs.

SQS is firmly committed to R&D and promoting the 'software quality assurance' concept through involvement in the

"Participation in ITEA projects has enabled us to improve our tool suites using real data from a variety of different of different environments"

Begoña Laibarra, SQS

Spanish quality assurance agency, organising meetings with professionals from the sector and hosting the annual international QA&TEST conference that it launched in 2001. Key R&D fields include development methodologies, system validation and verification in varied environments, and hardware and software co-design.

CO-OPERATIVE RESEARCH CRUCIAL

"R&D lies at the heart of our activities," explains Begoña Laibarra, SQS general manager. "Research is important not only to develop new products but also to reduce test times and to adapt our tools to specific markets." She sees co-operative research as particular important as it provides the opportunity to validate SQS tools in different applications.

Around half the company's research activities include participation in co-operative research projects, particularly EUREKA and EU Framework Programme. SQS has been involved in eleven ITEA projects since participating in the MOOSE project in 2002.

Laibarra sees many advantages in ITEA, not least its down-to-earth approach close to the market. "Participation in ITEA projects has enabled us to improve our tool suites using real data from a variety of different of different environments," she says. "This means that we can be sure of what we are offering our customers."

The SQS AgileREQ tool suite was a direct result of participation in the ITEA AGILE project. Highly adaptive AGILE methodology is particularly useful in an environment where there are continuous changes to the requirements, making it possible to cut development times while keeping customers fully involved. This SQS tool provides management tool support for customer requirements in such an environment.

SIRENA
ITEA 02014

François Jammes
Project leader, Schneider-Electric

Partners
Capgemini
Dortmund University
EADS
ESC
Fraunhofer FIRST
Invera
iXtronics
MATERNA
Paderborn University
Robotiker
Rostock University
Schneider-Electric
Siemens Business
  Services

Traveltainer
ZIV

Countries involved
France
Germany
Spain

Start of the project
January 2003

End of the project
December 2005

SODA
ITEA 05022

Partners
Alcatel Bell
ARC Informatique
B-kin
Borderlight
Capgemini
Consultores de Automatización y
  Robótica
DataPixell
EADS
ESI
Evidian
FlexLink Automation
FluidHouse
Ford

IBBT
Information & Image Management
  Systems
Krause
Kungliga Tekniska Högskolan
Loughborough University
PSA
Rihotec
Semantic Systems
Tampere University of Technology
THALES Communications
TNI-Software
TRIMEK
Universidad Politécnica de Madrid
Universitat Politècnica de Catalunya

Université Joseph Fourier
Volvo

Countries involved
Belgium
Finland
France
Spain
Sweden
United Kingdom

Start of the project
January 2006

End of the project
December 2008

Setting the standard
for the web services world

At the beginning of the ITEA SIRENA project on creating a common service-oriented framework for specifying and developing distributed applications, no one thought it feasible to embed Web Services in a €5 device such as a low cost sensor or actuator. This is now possible, with all the required environment in terms of tools and open-source software. As a result, SIRENA and the succeeding SODA project have become recognised as the world leader in the 'web of objects' domain. And the consortium involved has been the main European contributor to standardisation activities in this field – such as DPWS in OASIS. The resulting standard is now already fully deployed in several major European organisations.

Devices Profile for Web Services (DPWS) was adopted by OASIS in June 2009 and is similar in intent to the universal plug-and-play (UPnP) standard. However, DPWS offers dynamic discovery and is fully aligned with Web Services technology. It allows for seamless integration of device-provided services in enterprise-wide applications, which 'lies at the heart of the 'web of objects' concept.

The 'web of objects' involves devices such as sensors and actuators interconnected between themselves and with the IT world using web protocols such as the Internet protocol (IP) or the XML-based SOAP. Use of standard protocols enables direct communication from a very high level IT application – such as a SAP enterprise application server – to any low-cost component, for example a temperature sensor, with full plug-and-play connectability

and interoperability between sensors/actuators and the IT system. The result is a cheap and fully open solution with no gateway requiring complex configurations.

OVERCOMING MULTIPLE CONVERSIONS
Until now, communications between objects such as a SAP server sending a manufacturing order to a production line in a factory has required multiple operations.

The order would go first to a manufacturing execution system (MES), which would then send the order to a supervisory control and data acquisition (SCADA) system, which in turn would address an intermediate OLE for process control (OPC) server, which would then address a programmable logic controller (PLC) that would finally communicate with the production line device. Each of these intermediaries would involve protocol and data conversions, with many other different operations at each stage – really very complex. So most systems did not use these possibilities to simplify operation as it would be too complex to set up and maintain.

"The basic DPWS technology can be used in nearly any application domain," explains SIRENA and SODA project leader Francois Jammes of Schneider Electric. "We investigated several industrial domains in factories, buildings, homes, communications, the car industry and transportation. It is a basic technology which enables communication between any device, sensor or actuator that we can find. These devices can then communicate with IT systems, personal computers (PCs), phones or even personal digital assistants (PDAs) to provide complete applications over the Internet or intranets."

For example, in a factory you can have communication between a manufacturing line and a SAP system that sends orders for direct processing by the manufacturing line – with reporting, statistics, etc fed back to the SAP system. Or, in a home, it is possible to have air-conditioning or home-automation systems controlling temperatures, lights, etc that can be easily interconnected using this technology and be connected to the operator over the Internet – if there is an intruder, the

person concerned can be alerted directly or the police can be called automatically. It is also possible to control home heating and cooling systems over the Internet.

MAKING IT ALL EASY
While much of this was possible after a fashion before, the new technology now makes it very simple and easy to do. All devices, from the temperature sensor in the home to the PC or IT system will speak exactly the same language – the Web Services language. "With Web Services, you can directly connect your device to the SAP server without any intermediaries or protocol conversions or data manipulation," says Jammes.

"At the beginning of the SIRENA project, we started looking at service-oriented architectures (SOAs) and I had the idea to implement SOA at device level," he explains. "This was something very visionary at the time as everyone was telling me it was too complex and just not possible or feasible. However web services are quite well adapted to IT systems but not then to simple systems."

SIRENA built a proof of concept to demonstrate the feasibility with very low cost, simple device solutions and the very first DPWS component – the communications stack. The SODA project was a continuation of this work to look at all the elements necessary.

"We developed the ecosystem around the components, meaning the tools, methodologies, etc. to manage to complete 'life cycle' of an application," says Jammes. "This started from an initial specification through implementation, deployment and maintenance with different solutions and users at each stage and different tools to these things."

GLOBAL DEPLOYMENT IN PROGRESS
The results of the two projects are already being applied in real applications. For example, Schneider has made a strong move to SOA for interoperability. "We have many businesses coming from different acquisitions over the past ten years," explains Jammes. "And we have many different systems that are difficult to interconnect and to have all working together to achieve a common objective. SOA is now the basis to connect all these systems together. So what was being developed in SODA is now being deployed in our company and our IT systems."

A similar approach has been taken by the other partners involved in the two projects. EADS is using it in its professional mobile radio (PMR) solutions for emergency services communications systems for fire brigades, police, etc. It is deploying the DPWS solution inside its device range between base stations and mobile terminals.

"In addition, our main competitors – such as Siemens and ABB – with whom we are working in the EU Framework Programme IST SOCRADES project on the use of DPWS-enabled devices in the industrial automation domain all have internal projects for the deployment of SOA using our results," he adds.

And the applications are not restricted to Europe as DPWS originally came from Microsoft and a group of companies around Microsoft. "It was very clear during the standardisation process in OASIS that there were two main actors involved: Microsoft and Schneider-Electric, with Schneider representing its European partners," says Jammes. "As a result, Schneider is recognised as a world leader in this important technology."

Building a bridge between
real and virtual worlds

Building the
'web of objects'
through an
open services
ecosystem

ITEA ANSO project leader Tommi Aihkisalo of the VTT Technical Research Centre in Finland sees the 'web of objects' as a bridge between the physical and virtual or internet world. "Real life objects and access to them are represented somehow in the web and we can lay out a layer of services and applications on their functionalities," he explains. This concept is very important in the emerging networked world. It is a step forward from simple web browsing through the introduction of a more tactile world. It is like building a connecting bridge between the 'dream world of limitless possibilities' and the reality.

ANSO
ITEA 04016

Tommi Aihkisalo
Project leader, VTT - Technical Research Centre of Finland

Partners			
CEA-List	Sofia Digital	VTT, Technical Research	**Start of the project**
DS2	SWelcom	Centre of Finland	October 2005
EADS DS	Thales		
France Telecom	Thomson	**Countries involved**	**End of the project**
HITEA	Université Joseph	Finland	September 2007
Icecom	Fourier	France	
Schneider Electric	University of Murcia	Spain	
SESCA Innovations	Vaasa Telephone		
	Company		

"Possibilities are far more beyond than turning on the lights from your web browser or mobile phone," insists Aihkisalo. "Think of building an application on top of the networked devices and other services distributed all around on the globe. Remember as well that the idea of web objects does not indicate any location limitations, so everything can really be on a global scale and maybe even on an intergalactic scale some day.

"This could be in addition to 'standard' home or industrial automation - something that would not only involve more the users, their moods, locations and other context, etc. but also similar information and control from other web objects. Whether they are other users, applications or services does not matter, it is the flow of information between the objects that is important."

ENSURING SEAMLESS INTEGRATION
The success of the ANSO project should make possible the seamless integration of domestic networked multimedia, home control and communications devices, providing universal access to computing and entertainment services. The project promoted open interfaces to replace proprietary and vendor-locked systems. And it developed an applications platform and related software technologies that enable access to a wide range of novel applications combining home automation, communications and multimedia choice.

"We studied and developed some of the required basic infrastructure to introduce those modern everyday things into the web including the technologies for intercommunication and some ground rules and framework for service and applications creation," adds Aihkisalo. "We also enabled intercommunicative home

automation, including a home-care robot, which all were accessible on the web."

A key advance was the development of an all-binding layer that makes it possible to introduce a uniform 'web-of-objects' layer on the top of a heterogeneous pile of things located typically in the home environments – from heating systems and washing machines to sophisticated and less sophisticated home entertainment units. This has provided a competitive edge for European industry and promises citizens at least some coherence in the technological jungle now existing.

ANSO collaborated with several other ITEA projects, especially regarding web services. The ANSO partners are already applying the knowledge acquired to their own products and services. And the development work will be carried on at least to some extent in continuing projects such as CAM4HOME.

The OSAmI-Commons project is developing an open-services ecosystem to enable all types of co-operating devices and software to work together seamlessly in any type of flexible combination. The vision is of a dynamic, service-oriented platform emerging from a community process with all physical entities contributing in the long term, playing service-provider and consumer roles. A combination of service-oriented architectures and broadly-accepted open standards will enable OSAmI to map physical entities to services and build on open-source foundations to construct the 'web of objects'.

Figure Brent Nelson

The world is currently moving to a one-to-many social relationship between humans and computers. These are represented, among many others, by fixed and mobile phones, WiFi routers, gaming consoles, MP3 players, TVs, set-top boxes and infrastructures with impressive computing and storage capabilities. A new concept of a global and cross-domain platform is emerging to exploit the full potential of the network in all business areas. In this convergence process, the software platform should be able to personalise itself dynamically in devices according to the context.

health, education, city services and tools for software development. In parallel, the consortium is contributing to defining the foundations of a cross-platform open-services ecosystem. The sustainability of this platform is an objective beyond the project duration. "Our universe is defined by the interaction between objects rather than by the objects themselves; if an object does not interact with others it does not exist," points out project leader Jesús Bermejo of Spanish company Telvent.

needs to be built among citizens and governments for a common understanding of the new rules powering the 'web of objects'. This is why organisations such as Cenatic – a government foundation for open technologies – is part of the consortium," says Bermejo. "In the technical domain, we need a common technical abstraction for the mapping of the physical objects in the 'web of objects'."

OSAmI is developing open technologies for all types of device – allowing even very small devices to be per-

OSAmI-Commons
ITEA 07019

Jesús Bermejo
Project leader, Telvent

Partners			
Aicia	Prodevelop	University of Vigo	
Bull	Prosyst	Vodafone	
Capricode	RedIRIS	VTT, Technical Research Centre	
Carlos III University of Madrid	Sampas	of Finland	
Cenatic	Schüchtermann-Schiller'sche Kliniken		
CorScience	Siemens AG	**Countries involved**	
EDF	SRDC	Finland	
Espotel	Telefónica	France	
Eteration	Telvent	Germany	
European Software Institute	Thales	Spain	
Fidetia	Treda	Turkey	
INPG	Twinapex		
Materna	UJF	**Start of the project**	
Offis	TU Dortmund	April 2008	
Polytechnic University of Madrid	University of Málaga		
Polytechnic University of Valencia	University of Paderborn	**End of the project**	
	University of Rostock	June 2011	

OSAmI-Commons is therefore developing an open-source common approach to such a dynamic service-based platform that allows any type of device to connect and exchange information and services. It will allow service retrieval from centralised and distributed resources, enable connection between various vertical markets and allow the development of new business solutions.

Services and service delivery are the driving forces in the software industry currently. The approach proposed by OSAmI-Commons will establish an ecosystem built on an European understanding of the relationship between the citizens and the service infrastructures based on open-source and customer- friendly ambient services.

ADDRESSING NEW MARKETS
The project set out to address new markets through the development and application of its technology in vertical domains such as environmental sustainability,

"However, such interactions in the 'web of objects' do not have the same constraints as physical interactions. Past actions can be reproduced easily and accurately, and used to forecast future behaviour. And millions of objects distributed all over the globe can interact, co-ordinating their behaviour as if they were close to each other."

All this is changing how people communicate and how objects interact. Moreover, changes can be made to the 'web of objects' very quickly, simply by changing the rules or environmental conditions, to the benefit of citizens and industry alike. However, such a system needs to be made open and sustainable to avoid lock-in to any specific system or proprietary technology, reduce technological and financial risk, and enable the insertion of new technologies without having to re-engineer the whole system.
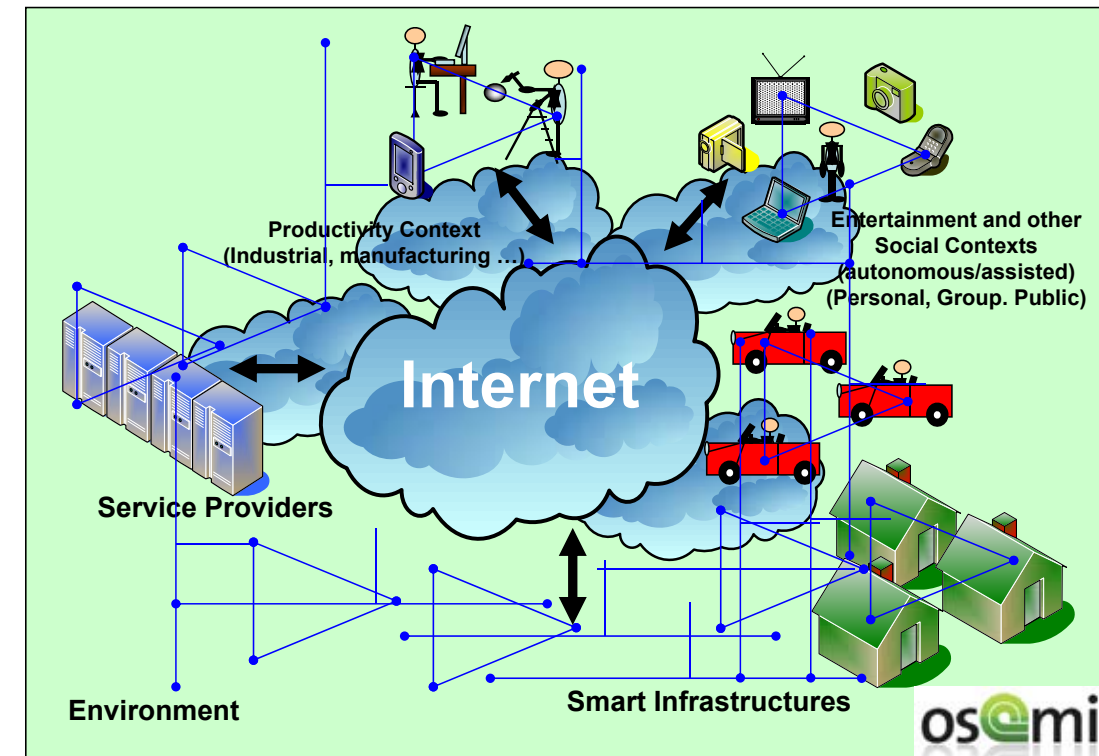
UNDERSTANDING THE NEW RULES
"The concept of an 'open' Internet, managed properly,

ceived as services. It will enable sensor networks to be mapped to aggregated services and dynamic containers to be linked with open repositories of service implementations. Profiling of computing nodes and systems will allow reuse of aggregated service implementations. Finally, digital identity federations and security issues are being addressed for building service systems within the 'web of objects'.

A recent OECD study on software innovation recognises the increasing importance of software for all markets. Major technical trends towards cloud infrastructures and software as a service (SaaS) are identified both in the OECD report and ITEA Roadmap 3. Open source is one of the most relevant innovations from a software-developer perspective. It has allowed the fast emergence of cloud-computing-related technologies. The benefits from an SaaS approach are probably more for the user. Most probably both will converge.

OSAmI proposes a cross-domain approach for build-

ing its ambient intelligence commons – it defines ambient intelligence as 'the system of service systems'. The objective is to increase the level of reuse through open-source service implementations, and extending product line concepts through nodes and system profiles. "Our approach will allow for the same platform to be used in very different domains," explains Bermejo.

BUILDING GLOBAL SERVICE CHAINS
Some OSAmI-related issues are beyond the business of the industrial partners involved. Services interact based on value proposition and the collaboration between services, which may depend on the context, bringing added value. For example, a car rental offering has a higher value once a flight has been booked. The potential of the 'web of objects' to build service chains involving millions of elemental services could result in very high global value.

"We are seeing open-source initiatives with the objective of commoditising parts of the service chain," says Bermejo. "A socially-responsible business approach requires preserving the value where it is, in society rather than in the software platform. Society should be able to drive the web and its ambient intelligence platform according to its needs."

OSAmI is not isolated in ITEA. Bermejo points to OS-MOSE, which started in 2003. "Its major achievements

were both in its enterprise middleware and in the foundations for the dynamic 'web of objects'," he says. Currently, thanks to the open-source implementations, the technology is used in many commercial products and is a key building block for the most relevant open-source communities.

OSIRIS followed in 2005. The concept of the service bus as an architectural pattern was anticipated and relevant achievements in the field of identity federation have been evolving further in the academic networks. COSI, running in parallel with OSIRIS, addressed related software-engineering issues. COSI and OSIRIS together established a collaboration cluster referred as COSIRIS.

"We are now building on these earlier foundations and other projects such as SIRENA," points out Bermejo.

UNDERSTANDING THE PLATFORM
An important element of OSAmI will be a series of 'personality' demonstrators that will show how users perceive the platform.

The five key ambient intelligence demonstrators cover:

1. **Efficient energy.** This will contribute to a better understanding of energy loss in new generation buildings within a broader effort to move from energy-con-

suming to energy-producing buildings. OSAmI can contribute to a sustainable approach by simplifying the sharing and reuse of knowledge;
2. **Assisted living.** This will contribute to rehabilitation for patients recovering from cardiac problems. OSAmI technology has a strong potential for cutting the cost of advanced solutions in healthcare – increasing the quality of life and even saving lives;
3. **Edutainment.** This will help improve education – reinforcing the relationship with academia by recognising its importance in the innovation process when disruptive changes are happening;
4. **City services.** This could be an enabler for such a market to take-off – OSAmI technology is expected to provide higher quality services to citizens; and
5. **Development tools.** This will contribute both to building the platform and to generating new tools for increasing software development productivity.

OSAmI will also contribute to relevant standards and product-oriented solutions. "We expect other market segments to benefit from OSAmI exploiting cross-domain technology synergies. Preliminary work in the mobility and automotive domain seems promising. On the other hand, more horizontal technologies are evolving with a community of users. Digital identity and geographic information systems belong to this category; through them, OSAmI technology can contribute to many other domains."

In the long term, OSAmI partners are working on the foundations for an open-service ecosystem. The project will make possible to define the role that OSAmI technology can play in the context of the global roadmap of the 'web of objects'.

More information: *www.osami-commons.org*

FLEXI spin-offs
realised!

The ongoing FLEXI project has been successful in terms of generating new businesses. Since the beginning of FLEXI in April 2007, two spin-offs have been established and more are in preparation, based on the results of the project.

Spin-offs Yoso and Invicor come from Finland:

- **Yoso** originated from the University of Tampere and has created a new concept and tools to improve innovation capability. "The innovation-capability development programme consists of innovation-capability assessment, a workshop and implementing the results of the workshop in practice," explains Jari Jussila of the University of Tampere. "Assessment can be performed from two points of view: organisational innovation capability and team or individual innovation capability."

- **Invicor** came from the University of Oulu and has developed an InnoCoop method, based on the findings made in the MGroup at the University of Oulu. "InnoCoop is a revolutionary method in terms of harnessing the power of co-operation, group innovation and individual creativeness with a supporting atmosphere and professional guidance," says Mikko Järvilehto, the CEO of Invicor. "Normally, making strategic decisions and creating new innovative ideas in old fashioned workshops or brainstorming sessions can be difficult. We are trying to eliminate these problems by providing a competitive structure in an inspiring environment to motivate the participants to draw on their strengths." Järvilehto claims InnoCoop can produce significantly better results compared with traditional methods. "According to our surveys, commitment level is up to 70% better, improvement in the amount of ideas is 30% and the elaboration level rises to 90%."

*Submitted by Tommi Linna
(special researcher, University of Oulu, Finland.)*

ITEA project EAST-EEA
featured in the 'I am EUREKA' advertising campaign

EUREKA
project
ITEA EAST-EEA
EMBEDDED ELECTRONIC
ARCHITECTURE FOR
AUTOMOTIVES

EUREKA partners have developed an open software architecture that will enable the automotive industry to design safer, innovative cars faster and more cost-effectively.
The result: a blueprint for the next generation of cutting-edge cars.

www.iameureka.eu
The European network for market-oriented industrial R&D and innovation

EUREKA launched a new advertising campaign highlighting the major innovations of EUREKA and its Clusters. The campaign is running in several publications / locations, such as the Brussels Airlines on-board magazine and on poster sites in Brussels.

In the second quarter of 2009, the ITEA EAST-EEA project was featured on a large poster in the Brussels airport (Zaventem, Schengen departures).

For further information: *www.iameureka.eu*

ITEA 2 Call 4
Project Outlines
Growing participation on different levels

By the 9 April deadline for ITEA 2 Call 4 Project Outlines (POs), ITEA 2 had received 29 POs for a total of 4,620 person years. In terms of effort, this was the second largest Call in ITEA 2 after Call 1. The historical two-Call cycle, with a large odd Call and a smaller even Call, has now clearly disappeared. The explanation for the disappearance of this two-year cycle is twofold. Firstly, the number of participants has grown strongly over the years, making Calls less dependent on the research cycles of a few large companies, and, secondly, the maximum project duration has increased from two to three years.

From a country perspective, Spanish participation in terms of effort has become the largest in this Call. The trend of strong growth in Spanish participation has already been visible for several years and also last year Spain had the highest participation. Strong support from the Turkish Public Authorities (PAs) in combination with the successful PO days in Istanbul in February finally led to a fifth position in terms of effort for Turkish participation in this Call. In less than two years, Turkey has managed to come to this position in ITEA 2 starting from nearly nothing.

The biggest surprise however was the strong participation of newcomer Egypt in this Call. The Egyptian Public Authorities have indicated strong support for Egyptian organisations willing to participate in ITEA 2. Egypt is also taking steps towards associated membership of EUREKA. We are also happy to see that organisations from Lithuania and Rumania have definitively found their way to ITEA projects and increased their participation since the last Call.

From an organisational point of view, the trend of strong and growing SME participation in ITEA Calls continues. The growth in effort in this Call compared with last year's Call was mainly as a result of the increase in SME participation. This clearly shows the attractiveness of the ITEA programme and its projects for SMEs. A new trend also visible is a growing participation from public organisations, such as cities, facilitating real life environments for experiments with new emerging technologies. This emphasises the shift of ICT towards the more social- and group-oriented application domains already indicated in the new ITEA Roadmap 3.

Experts of both ITEA and the Public Authorities evaluated the Project Outlines. After sharing the evaluation results, 24 projects were finally invited to prepare Full Project Proposals. The deadline for submission of the Full Project Proposals is 2 October 2009.

Innovation Reports

COSI
(ITEA ~ 04031)

Co-operating with open source requires an open mind

GGCC
(ITEA ~ 05012)

SMEs show the way to quality GCC compilation

GENE-AUTO
(ITEA ~ 05018)

Automatic code generator speeds development of safety-critical real-time embedded systems

COSI
(ITEA ~ 04031)

Frank van der Linden, Philips Medical Systems, The Netherlands

Co-operating with open source
requires an open mind

Drawing on the resources of open-source communities to complement in-house software development is a useful way to cut costs and save time, while also achieving higher quality. The COSI project conducted a series of case studies to show how European companies can benefit by abandoning prejudices and taking up this approach. Successful application of this approach should enable Europe to overcome US dominance in global markets.

For most products, only a small proportion of the embedded software represents a real differentiating element. The remainder is commodity ware, which does not justify heavy investment in proprietary software development. Typical software products begin at the leading edge of technology, but progressively revert to commodity-like status, often performing functions shared by different hardware platforms.

Truly differentiating components remain important, but often account for less than 10% of a total software package. Efficient development focuses in-house effort and resources on these, while acquiring commodity elements through lower cost routes — such as by distributed working or purchasing commercial off-the-shelf (COTS) offerings.

OFFERING NEW OPTIONS
Open-source software (OSS) provides new options to solve the problem. COSI examined the approaches, business models, architectures, processes and priorities appropriate to control and manage ownership in such scenarios. The project studied commoditisation and its implications for competitiveness with both large and small company partners from the European software-intensive sector, complemented by research institutes.

Because much software is no longer product-specific, various trends towards networked collaboration are emerging: through subcontracting and integration; in coalitions — for example, around open platforms; and, to a lesser extent, by direct co-operation with OSS communities.

CASE STUDIES SHOW THE WAY
A series of case studies carried out by the various COSI partners together or individually illustrated lessons learned from entering into open sharing arrangements. For example:

- COSI partners Philips Medical Systems and Agfa Healthcare, as early protagonists of the Digital Imaging and Communications in Medicine (DI-COM) standard for hardware-independent sharing of diagnostic images used in virtually all hospitals worldwide, developed an interoperability validation toolkit known as DVTk. This is used for testing, validating and diagnosing communications protocols and scenarios in medical environments. Launched as freeware, DVTk initially provided its authors with a commercial advantage. But, as more competitors adopted the standard, it became increasingly commoditised. The originators therefore released the source code as OSS, and motivated the participation
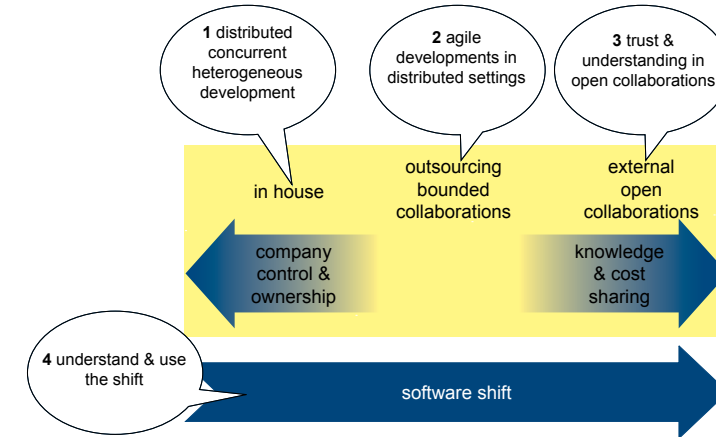

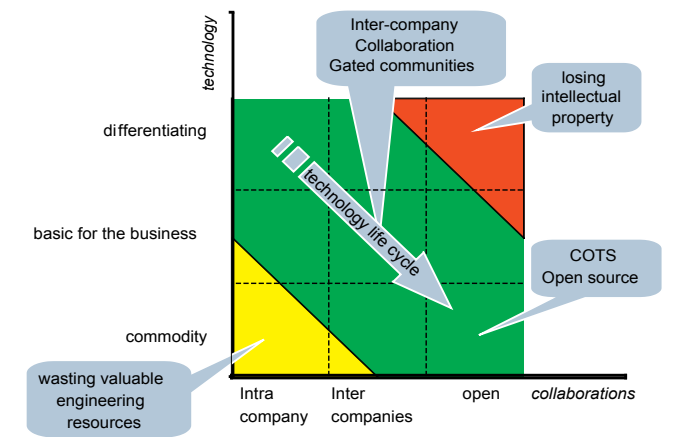Figure 1 — Efficient and effective development

Figure 2 — The four COSI goals in heterogeneous collaborations

of third parties by hosting community events. Development has since continued, sustaining product viability and extending functionality into new areas.

- Nokia Siemens Networks (NSN) uses Linux and open source, both previously considered disruptive technologies by the telecommunications industry, in the development of mobile and fixed networks. In 2002, Nokia joined forces with other major players to define carrier-grade Linux (CGL) as an open-architecture alternative to proprietary platforms in the Internet Protocol (IP) environment. NSN created its performance Network Database Benchmark tool that was first distributed to database vendors under non-disclosure agreements and later made open source. When this proved successful, NSN produced an application-specific OSS macro benchmark — the Control-Plane (C-plane) Benchmark — for monitoring communications to establish connections and ensure correct payload routing and logging.

People in many companies continue to resist the idea of such openness, fearing that it will lead to the loss of proprietary know-how and competitive edge. In reality, the valuable intellectual property does not usually lie in the software itself, but rather in the minds of the people that make it.

Norwegian COSI partner Keymind Computing, for example, produces software for surveillance applications. This is available for others to use, but Keymind itself has invested in acquiring in-depth expertise that makes it the preferred installer. So the company continues to gain benefit in the marketplace.

TOE IN THE WATER
For those not yet ready to take the plunge, 'inner-source' development offers an intermediate step towards full integration of OSS. Further COSI case studies presented different inner-source models, in which internal teams co-operated using open-source processes and tools within a restricted ecosystem.

This approach breaks down traditional barriers whereby people in different departments of a company often had only partial access to the information about a particular development project. With inner source, they can see, and contribute to the whole picture. This implies distributed ownership and control of code, but exploits existing organisational mechanisms for road mapping, prioritisation and conflict resolution. It engenders much greater engagement and trust, which has a positive impact on the quality of the end result.

Mutual trust is certainly vital when sharing with external partners, whether or not competition is involved. Big companies need to determine where to draw the boundaries to open source, and establish the level of investment to be committed.

BROAD VIEW NEEDED
While most potential collaborators focus on technical infrastructure, key social aspects must also be addressed, such as attracting contributors and obtaining the right contributions. Co-operation provides access to a pool of developers with talents that might not otherwise be available. Furthermore, it offers a safeguard against third-party vendor lock-in that can

occur with COTS, and opens the door to use of other related software.

For new or smaller enterprises, involvement enables them to be part of large, complex development projects and helps them build new business opportunities. Academic institutions can contribute more knowledge content and innovation — vital to Europe's global competitiveness.

OPPORTUNITY FOR EUROPE
So far, the take-up of these ideas has been limited, but the trend is likely to accelerate within a few years. It is only a small step from inner source and collaboration with other trusted companies to a full exchange with the open-source communities.

No single business — or even open-source initiative — can effectively develop OSS alone. Both must therefore learn how to manage the emerging forms of collaboration. As new patterns evolve, commercial enterprises must explore the available options and find solutions suited to their own particular business models.

The volume of OSS will certainly grow; it is in industry's economic interest to incorporate its benefits into their products. Europe currently leads the way in this type of collaboration. Maintaining and strengthening our position is one way to help combat the dominance of North American competitors in the global marketplace.

GGCC
(ITEA ~ 05012)

Arnaud Laprévote, Mandriva, France

SMEs show the way to quality
GCC compilation

A consortium with an unusual predominance of SME partners has added a new branch to the widely-used global GNU Compiler Collection (GCC). The tools developed in the GGCC project allow the optimisation of complete programs and libraries – including static analysis for early bug fixes. This could help Europe profit from a range of interesting commercial opportunities.

Explosive growth in the software content of digital systems, coupled with increasing expectations that operation will be trouble-free, creates overwhelming problems for program developers. Integration of components and validation of complete packages now consumes 70 to 90% of total development costs.

Large corporations spend heavily on proprietary systems for the most mission-critical applications in sectors such as aerospace. But even here, the investment required to achieve zero-defect quality can prove ruinous. Most providers of enterprise, consumer and embedded software cannot even afford the same levels of expenditure. Yet, while quality assurance remains a heavy burden, cutting corners may lead to brand-damaging numbers of faults in shipped products.

BUILDING ON INTERNATIONAL STANDARD
Open-source tools are increasingly employed to resolve this dilemma. GCC, for example, has become the standard compiler for most modern Unix-like computer operating systems, including GNU/Linux, the BSD family and Mac OS X. It has been adapted to a wide variety of processor architectures, and is widely deployed as a tool in commercial, proprietary and closed-source software development environments.

GCC is also available for most embedded platforms, including those for top-name gaming consoles. Several companies base their businesses on supply-

ing and supporting GCC ports to such platforms, and today's chip manufacturers consider its availability almost essential to the success of an architecture.

This highly portable compiler suite offers exceptional hardware- and vendor-independence as it is able to generate code for almost every current instruction set architecture. With a massive user base and contributions from hundreds of professional developers, mainly in the USA, its content has grown tenfold over the past decade.

The principal advantages of GCC are code generation quality and compilation speed. However, despite its huge expansion, an aspect that long remained unexplored was global static analysis and coding-rule checking for debugging and project-wide optimisation. Global analysis makes it possible to process complete compilation units such as programs or libraries together, and to manage the relationships between them.

Coding-rule validation ensures programs conform to rules established for a particular industry, company or application. Cumulatively, they further improve coding efficiency, enhance program performance and reduce testing times – cutting costs and time to market.

Earlier work focused on academic prototypes or closed commercial products such as Klocwork and PolySpace. GGCC broke new ground by incorporating coding-rule validation into a popular mainstream platform as a basis for new tools and interfaces applicable across many industries.

REINFORCING COMPETITIVENESS
One of the direct aims of the ITEA project was to reinforce the competitiveness of computer software providers. By improving the quality of the open-source C/C++/Fortran/Java compiler and extending it with static analysis, development time would be shortened and test effort diminished – thus reducing time to market.

Software-hazards detection exposes potential issues in source code, hence lowering costly testing efforts; coding rules conformance makes corporate knowledge on specific software development processes explicit, and its automatic validation helps enhance software quality. Furthermore, GGCC integrates the legacy compilation functionalities but also provides quality assurance and verification & validation (V&V) functionalities in one global package.

And finally, global optimisation opens GGCC to new markets, allowing cutting-edge program optimisation to be integrated into production environments. Target-specific compilers often produce up to 50% faster code than GCC on real applications running on general-purpose processors such as Pentium or PowerPC. The gap can grow to factors of three to five on specific or embedded architectures like Philips Trimedia or Intel Itanium.

Improved performance is important for several reasons, not the least of which is that code that uses machine resources more efficiently can be executed

CODING RULE CHECKING

RULE	EXAMPLE OF VIOLATION	CRISP, A RULE DEFINITION LANGUAGE

MISRA-C
Do not hide a var of an outer scope
	`int i;`
	`{`
	`    int i`
	`    i = 3;`
	`}`
	These are different variables
		rule MISRA-C 5.2
		violated by V,U: *Variable* when
		exist S,T: *Scope*; N: *Name* s.t.
		V *definedIn* S and
		U *definedIn* T and
		S *nestedIn*+ T and
		V *hasName* N and
		U *hasName* N.

User rule (C++) Do not mix overriding and overloading	Superclass `void func(char)` `void func(int)` over-loading Subclass `void func(int)` over-riding	rule MyRule violated by F: *Function* when exists G: *Function* s.t. G *overloads* F and exists H: *Function* s.t. H *overrides* F.

- Declarative
- Unambiguous

Project	Violations	Time (s)
Bacula	3	0.03
CLAM	131	0.84
Ogre	94	1.46
Firebird	191	1.40
Qt	1249	13.06

Get the code: www.ggcc.info

RULE VIOLATIONS REPORT

Some High-Integrity C++ rules implemented and tested with open-source projects:

using slower hardware. Such hardware is typically cheaper and/or less power hungry, both extremely important aspects for embedded systems.

NOTABLE INNOVATIONS
GCC's size, complexity and dynamic nature, plus the strict rules imposed by the GCC community, made the necessary development work daunting. The consortium nevertheless achieved significant progress, developing a common framework to accommodate three main functions: analysis and optimisation, hazard detection and code validation.

It was necessary to integrate a higher level language as GCC is written in C, which – being independent of the system in which it is implemented – is not ideal for abstract interpretation. GGCC opted for Lisp and developed a middle-end Lisp-to-C translator (MELT), which has been adopted as an official branch of the GCC development tree. MELT can be used to detect parallelism in code and has many potential applications in prototyping. Within the project, the first simple static analysers were realised using MELT.

A mature version of the global optimisation framework, bringing greatly enhanced performance and tighter integration with the GCC internal application program interfaces was also developed. Even if still very slow, the global optimisation framework has shown very good performances on par with proprietary compilers on the test codes that were chosen.
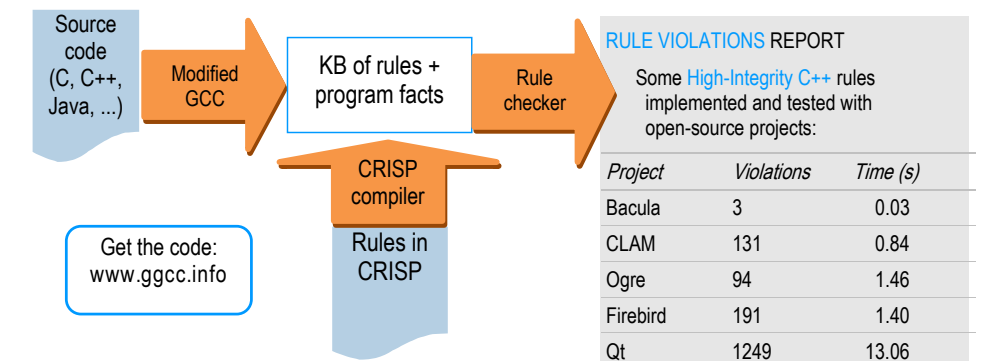
Add-ons include coding rules in sugared Prolog (CRISP), a logic-based domain-specific language making it possible to express coding rules easily even without relevant expertise.

GGCC successfully tested the prototype coding rule checker at full scale on Nokia's C++ Qt cross-platform library. The number of rules remains limited, but the results offer a promising indication of code quality.

TWO-WAY BENEFIT
GGCC was unusual in several respects. Most ITEA consortia are led by large companies, whereas this project was SME-led. For a number of the SME members, it was also a first venture into transnational co-operation. This created some operational difficulties at the start, but the experience has proved valuable – and several partners are already aiming to take part in further collaborations.

Moreover, while SME partners were very interested

in software quality, none was a professional compiler specialist. The initial goal was to produce tools for internal use, taking the view that there is a real need for effective quality-enhancement tools because the cost of bug correction is huge. If the project outcomes allowed automatic solution of even 10% of the problems, the effort could be considered worthwhile.

Although the results at the end of the funded period remained at a relatively early stage of refinement, they were nevertheless sufficiently advanced to be suitable for offer to other projects in the field.

Many of the improvements have already helped GCC to become a leading platform for global optimisation projects that go way beyond the capabilities of competing compilers. By acquiring leading-edge expertise, the partners have created an o pportunity for Europe to establish a strong position in an area with considerable potential.

GENE-AUTO
(ITEA ~ 05018)

Tonu Naks, IB Krates, Estonia,
Xavier Olive, Thales Alenia Space, France and
Olivier Ssi Yan Kai, Continental, France

Automatic code generator speeds development
of safety-critical real-time embedded systems

The ITEA Gene-Auto project has developed an open-source code generator that enables automatic transformation from high-level industry-standard Simulink, Stateflow and Scicos models to executable program code. The system enables automatic code generation for real-time embedded systems in safety critical domains and was evaluated successfully in nine industrial case studies. The Gene Auto toolset conforms to aviation industry standards.

Airplane cockpit picture © Airbus S.A.S.

Embedded critical systems now represent a large part of the final product cost in many European industries. This is particularly so in the safety-critical aeronautic, aerospace and automotive domains – some 25% in automotive and 35% in aeronautics. Moreover, such systems are responsible for much of the innovation in these sectors.

However, development of such complex systems has had to face up to two contradictory challenges: a demand for higher levels of integrations with lower costs, while at the same time the intrinsic complexity of these systems is exploding.

Some industries are compensating for this by outsourcing a large part of their software development to low-cost countries as such activities require a significant workforce to carry out all activities in compliance with current development standards. However, such outsourcing can create extra loops and costs and is critical in terms of know-how and competences.

GROWING USE OF MODEL-DRIVEN SIMULATION
An approach making it possible to reduce the workforce and shorten the development loop, used more and more widely for embedded systems, is model-driven development. Model-driven engineering is widely applied in the development of highly complex and critical systems as application-specific solutions can be more easily described using high-level graphical modelling rather than a computer programming language.

Abstraction of the implementation details makes it possible to verify and validate important system properties very early in the design. Subsequent model refinements add all the necessary details and, finally, the code generator helps to convert the model to working software code.

Increased productivity in the specification and design phases coupled with early verification and validation are already a major step forward when compared with classical development methods. However, there is more to gain! A certified code generator which guarantees lossless conversion from model to software code will allow the suppression of the large amount of verification required normally at code level. This was the goal of the Gene-Auto project – to develop a certifiable automatic code generator (ACG) allowing the conversion of high-level functional models to 'correct-by-construction' software code.

DEVELOPING AN OPEN MARKET-STANDARD APPROACH
Gene-Auto has implemented an open-source solution for automatic code generation based on the *de-facto* industrial standard Simulink/Stateflow modelling suite from The Mathworks and its open-source counterpart Scicos from INRIA. These are both graphical modelling and simulation tools that enable the user to create block diagrams to model and simulate the dynamics of hybrid systems and compile models into executable code.

Several commercial tools exist to convert Simulink/ Stateflow models to embedded code. However, they are all proprietary with narrow freedom for the end users. When compared with the existing solution, Gene-Auto allows more freedom for organising the development process and for toolset customisation; this enables the toolset to be certified and through that suppress code-level verification activities.

The Gene-Auto team gathered the best from existing European knowledge: aeronautics certification experience, aerospace and automotive know-how of efficient embedded code, European-wide software skills and applied research on formal methods from European research institutions.

The result is an open-source toolset that:
- Facilitates long-term support, maintenance and tool qualification;
- Is based on publicly available and well-defined meta-models for system and code modelling to ensure a strong theoretical basis;
- Supports multiple input formalisms and fully automatic transformation from input model to embedded code;
- Provides support for qualification through open architecture and suitable development processes within the scope of the DO178B standard;
- Contains components developed with formal methods; and
- Produces optimised code.

The toolset has been tested and validated by project partners including Airbus, Barco Avionics, EADS-Astrium, Thales Alenia Space and Continental that are the leaders of their specific industries.

IMPACTING COSTS AND PERFORMANCE
The initial impact for users of the Gene-Auto toolset is on the cost of ownership: no purchase is required and maintenance costs will be reduced by 20 to 30%.
A second and even more important effect will be the drastic increase of performance and efficiency of embedded software development. For example, Airbus has carried out a benchmarking exercise comparing two similar software developments – one coded using traditional methods, the other based on automatic code generation for 75% of the software code.

Resulting figures for these Airbus developments show an overall reduction in cost by a factor of three and a reduction in the development cycle by a factor of four. The second point is particularly important as it allows a faster lifecycle for 'on-time in-market' products, especially critical within all domains.

Moreover, the good co-operation between the industrial partners from safety-critical domains, SMEs and academia in the Gene-Auto project ensured that common requirements were worked out from several key European industries. It has also resulted in the creation of an embedded systems community based on aeronautics excellence and maintaining Europe's leading position in these industries.

Furthermore, the open-source strategy deployed by the project has also shown a satisfactory scheme for ensuring the openness of the tools, the end-user influence on the development roadmap and the required durability in line with industry standards – such as the 80-year lifetime demanded in the avionics industry – with the possibility of different uses and contributions.

Last and not directly foreseen from the project set-up, due to the strong theoretical basis of the project in terms of meta-modelling, academic partners have demonstrated the use of Gene-Auto components for bridges between Simulink and its open-source counterpart Scicos.

Following the end of the Gene-Auto project in 2008, a first public release was made under the GPL licence in early 2009. Work is continuing in an open community to extend the tool. The next major development in the tool functionality is adding conversion to the Ada language – currently the only available output language is C. Some project partners have already started this development in co-operation with AdaCore; the results are expected before the end of 2009.

More information
Gene-Auto community: *www.geneauto.org*
Gene-Auto commercial support:
http://geneauto.krates.ee/
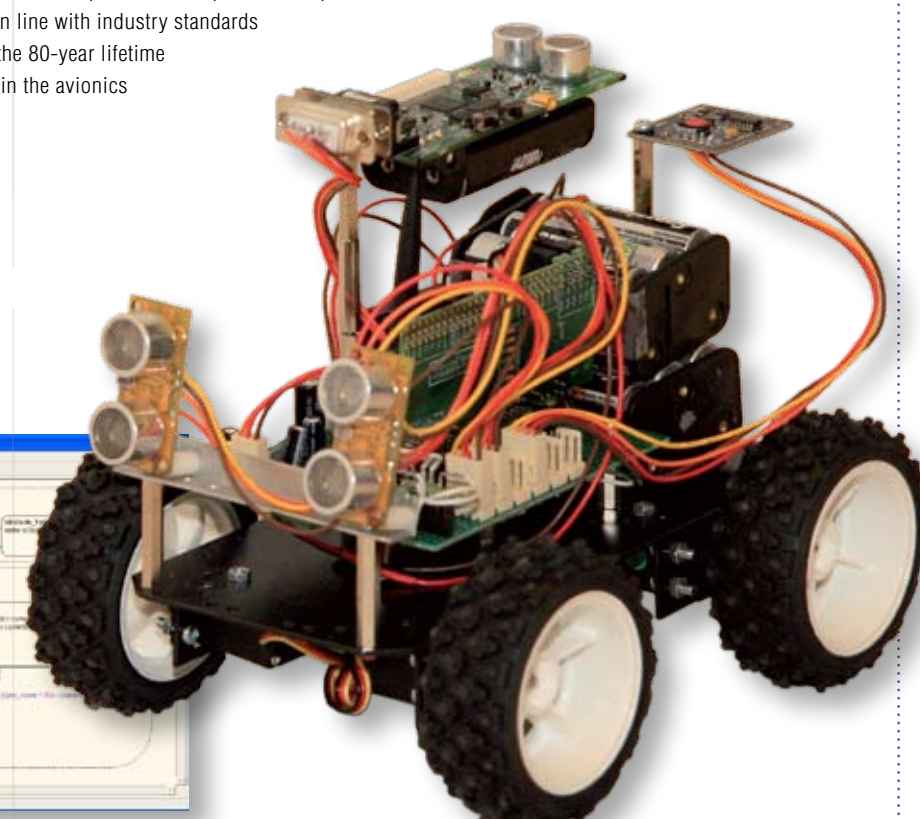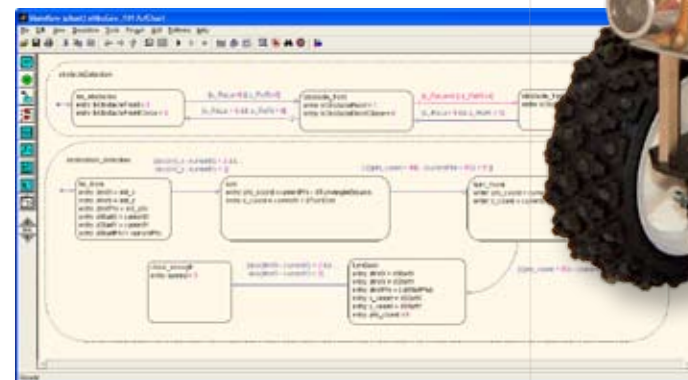
This funny-looking vehicle is the public demonstrator of the GENE-AUTO ITEA project. It is a small robot car with a smart autonomous navigation system and fuzzy-logic motion control. The essential part of the control an positioning algorithms were modelled in Simulink/Stateflow and code generated with GENE-AUTO.

European co-operation combines
competences and speeds market development

From developing technologies through product marketing to managing research projects at national and European level, Patrick Schwartz of Thomson in France has built a sound understanding of communications and embedded software. He sees major benefits for co-operative R&D in terms of combining complementary skills and innovative approaches along the value chain enabling new business models. His particular focus has been on multimedia and digital TV with an important role in the development of high definition TV (HDTV).

Patrick Schwartz
European Cooperative Projects Manager
Thomson (Grass Valley)

Patrick Schwartz graduated from the Institut Universitaire de Technologie before joining Thomson in 1973, working until 1985 in what became Thomson Telecommunications. He obtained his masters' degree from the Conservatoire national des arts et métiers (Cnam) in 1982. "I was involved in R&D on telecommunications systems and then, after advanced studies, on ATM switching systems," he explains.

Patrick Schwartz then moved to Thomson Avionics to work on the engine control unit for the Airbus A320. "For the next three years, I was in charge of developing a computer-based system involving many sensors, gaining experience in managing a software team."

In 1988, Schwartz moved to Thomson research activities to work on multimedia communications, principally digital TV. Here he was involved with a European project on home networks for multimedia communications. Two years later, he joined the Thomson product development team, becoming

a product marketer from 1990 to 1996. The target was to develop a compression product for video communications.

"From 1996 to 2004, I worked for the presales team where I was in charge of worldwide presales support for digital head-end equipment. During these eight years, I learnt about understanding customer needs better alongside the business," says Schwartz.

MANAGING EUROPEAN PROJECTS
In 2004, Schwartz returned to R&D, taking responsibility for European collaborative projects. He manages a team dealing with EUREKA, EU Framework Programme and French national projects.

"Even big companies cannot build a complete system in a short time; if you want to be in time for the market, you need to work with partners," insists Schwartz. "Co-operative projects make it possible to develop complete end-to-end offers thanks to the complementarities of different actors. Working with competitors is more difficult but it can be interesting to see if our solution is a good one.

"Moreover, working on European projects shows competences that are not always available within a company. In ITEA, I learnt from other domains — aeronautics, medical, telecoms, etc. This opened my eyes to different 'cultures'."

Schwartz was responsible for three successive ITEA and ITEA 2 projects, all of which won awards:
1. **Magellan** — 2004 to 2006 — investigated secure end-to-end solutions in heterogeneous local distribution networks such as metropolitan area, hotspots, and enterprise and institutional systems. This won an ITEA silver exhibition award;
2. **HD4U** — 2005 to 2007 — developed a coherent end-to-end system for satellite, terrestrial and broadband Internet distribution of high definition TV (HDTV). This won

bronze awards for both presentation and exhibition; and
3. The continuing **CAM4Home** to enable new multimedia deployment in the digital home by collaborative aggregation of multimedia for improved personalised experiences. This has already won a bronze exhibition award.

In addition, Schwartz is involved with the Images et Réseaux (media and networks) competiveness cluster (PdC) established in the Brittany and Pays-de-la-Loire French regions. This brings together information, telecommunications and audiovisual technologies players at national level to design the key technologies, products and services that best suit new media networks and uses.

SPEEDING COMMERCIALISATION
Schwartz sees advantages in both EUREKA and the Framework Programmes. However, EU projects tend to be long-term. "EUREKA projects are short term, and you can expect results within a year of the end of the project," he points out. "This is important for me as part of a business unit that needs results as soon as possible."

In addition, EUREKA offers easy access to international events and conferences, with a large potential for cross-project exchange. Schwartz points to the large HDTV demonstration during the ITEA symposium in 2007 that involved all the European national HDTV fora.

"Two years later, we already have three HDTV free-to-air channels in France, with more coming after digital switch-off," says Schwartz. "All in all, there are now more than 100 HDTV channels in the USA, with a similar number in Europe taking into account terrestrial, satellite and cable distribution. And Thomson itself has become a major actor, with significant growth expected in Europe in the next two years."

And the next step will be 3D TV. "We are already working on this," he adds.

Upcoming
events

www.itea2.org

ITEA 2
SYMPOSIUM2009

Business-oriented innovation that strengthens economy and benefits society

29 & 30 October 2009
ITEA 2 SYMPOSIUM 2009
MADRID, SPAIN

This year, the ITEA 2 Symposium will take place in the Auditorium Hotel Madrid, Spain on 29 & 30 October. The Symposium programme is scheduled around this year's theme: "Business-oriented innovation that strengthens economy and benefits society".

The symposium includes a co-organised one-day programme together with ARTEMISIA: the ARTEMIS & ITEA Co-summit (30 October) with the Co-summit theme: "Ecosystems driving open innovation in Embedded Intelligence and Software-Intensive Systems and Services".

The registration for Thursday 29 October is on invitation only. The registration for the Co-summit is open.

For more information and online registration: *http://symposium2009.itea2.org*

29 September 2009
TIMMO FINAL OPEN WORKSHOP
ECHING, GERMANY
Participation to the TIMMO Final Open Workshop is free of charge and open to everyone interested.
www.timmo.org/events.htm

21-23 October 2009
QA&TEST 2009
BILBAO, SPAIN
8th International Conference on Software QA and Testing on Embedded Systems organised by SQS (ITEA project partner in e.g. D-MINT).
www.qatest.org/en

22-23 October 2009
EURIPIDES FORUM 2009
BARCELONA – SPAIN
3rd Forum of the EUREKA Cluster EURIPIDES dedicated to the field of Microsystem Technology and Electronic Packaging
www.eureka.be/files/:7060019

12 November 2009
BITS & CHIPS 2009 EMBEDDED SYSTEMS
EINDHOVEN, THE NETHERLANDS
On November 12th, Techwatch organises the 8th Bits & Chips Embedded Systems Conference.. ITEA 2 will be present at the exhibition of this event. (The event will be in Dutch)
www.embedded-systemen.nl

17-18 November 2009
EUROPEAN NANOELECTRONIS FORUM 2009
NOORDWIJK, THE NETHERLANDS
The event is commonly organised and hosted by CATRENE, the EUREKA cluster programme and the ENIAC Joint Undertaking. Both public-private partnerships are working in close synergy for European leadership in nanoelectronics.
www.nanoelectronicsforum2009.org

Expected

February 2010
ITEA 2 PROJECT PROPOSAL PREPARATION DAYS - CALL 5

German EUREKA Chairmanship
World-Class Innovation Through International Co-operation

For the third time in EUREKA's history, Germany took over the network's rotating Chairmanship for 2009/2010 at the Launch Conference held in Dresden, Germany on 6 and 7 July.

The conference was organised by the German Federal Ministry of Education and Research (BMBF) and scheduled around the theme *World-Class Innovation Through International Co-operation*. Annette Schavan, German Minister for Education and Research, opened the conference, which was attended by some 300 representatives of industry, government, academia and trade associations.

"In these times of economic crisis, now is the moment for researchers and innovators in Europe to exploit the international co-operation promoted by EUREKA and strengthen cross-border ties," said Minister Schavan. "Both the stability of the EU Seventh Framework Programme and the flexibility of EUREKA should be better utilised to mobilise Europe's innovative potential."

As she also pointed out in the 85th issue of *Eureka News*: "Germany's Chair Year will continue to build on EUREKA's successes and extend its influence. EUREKA has an important role to play in the on-going development of the European Research Area (ERA), and in maximising the potential of successful instruments such as the Eurostars programme and the EUREKA Clusters."

Further keynote speeches in the morning were from Germany's former Minister for Foreign Affairs Hans-Dietrich Genscher, Che-Min Rim, Vice Minister of the Ministry of Knowledge Economy for the Republic of Korea and Anneli Pauli, Deputy Director-General at the European Commission's Research Directorate-General.

In the afternoon, several workshops were held on different topics. Rudolf Haggenmüller, Chairman of the ITEA 2 Board, gave a keynote speech in the session *Information and Communication Technology: Key for Global Competitiveness*. Enrico Villa, Chairman of CATRENE, chaired this session; other speakers were Jose Jimenez, Chairman of CELTIC, and Jean-Luc Matte, Chairman of EURIPIDES. David Kennedy, Director of Eurescom, acted as rapporteur. A few key questions were used to structure the session, its keynote speech and discussions.

After a short introduction by Enrico Villa, Rudolf Haggenmüller gave ITEA 2's view on the workshop's key questions, stressing how ICT is at the centre of 90% of innovation in Europe. Highlights from his presentation were (taken from David Kennedy's meeting report):

Policy fields and political initiatives:
- Strategic networking of competitiveness clusters (PdCs) at European level – use EUREKA Clusters to make this happen
- More support to deploy research results in the market
- Business-driven expansion of geographic scope

Tools and funding mechanisms:
- Maintain and build upon the strengths of the EUREKA Clusters – *"They are the best places for fresh ideas and focused, concrete, timely business opportunities."*
- EUREKA Clusters and EU Joint Technical Initiatives (JTIs) are complementary on three levels: political, organisational, and scope and content.

Impetus for German Chairmanship:
- The German Chair should push EUREKA to focus on grand societal and economic challenges for planet, people and profit.

Following Haggenmüller's keynote speech, the chairmen of CELTIC, EURIPIDES and CATRENE presented their views on the key topics. The discussion that followed gave ample room to views and opinions about the different presentations and ideas raised.

Enrico Villa summarised the session with the message that if we could identify some common themes across the member countries and then decide on which ones to support with research investments and lead market initiatives, we could really exploit *ICT as the Key for Global Competitiveness of the European Industry*.

For further information: *www.eureka-chair.de* and *www.eureka.be* (Sources)

INFORMATION TECHNOLOGY FOR EUROPEAN ADVANCEMENT