ITEA 2

M Magazine

JUNE 2008 • No. 1

EAST-EEA project
Success story in the automotive industry

Focus on Ireland
Interview: J. Golden & B. Hanly

Showcasing ITEA project results
Brand new innovation reports

Changing the guard
EUREKA ministerial conference

Σ! 3674

ITEA 2

INFORMATION TECHNOLOGY FOR EUROPEAN ADVANCEMENT

European leadership in Software-intensive Systems and Services – the future of embedded and distributed software – www.itea2.org

ITEA 2 is a EUREKA strategic ICT Cluster programme

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Editorial

ITEA FAMILY

Focusing on the ITEA family

Rudolf Haggenmüller
Chairman of the ITEA 2 Board

Recent years have seen the creation of several information and communications technology clusters at a European level with the European Technology Platforms and Joint Technology Initiatives and at a national level with the 'pôles de compétitivité'. These developments have sharpened awareness of our own ITEA 'family'. We first made this visible through the 'family day' at the ITEA 2 Symposium in Berlin in October 2007. And today you hold another embodiment of our family in your hands: the first issue of the M – ITEA 2 Magazine.

In future, there will be three issues a year. Each magazine will provide you with operational news from the programme and its projects – from Project Outline and Full Project Proposal information to Project Innovation Reports. Each issue will also place selected projects, countries or key ITEA 2 people in the spotlight through dedicated project articles, interviews and success stories.

This first issue includes a key interview with Irish EUREKA national project co-ordinator Jackie Golden and Exoftware chief executive officer Brian Hanly on one of ITEA 2's new partner countries: Ireland. From the project perspective, we highlight our legendary success story of EAST-EEA, which paved the way for AUTomotive Open System ARchitecture

"We are a EUREKA Cluster: bottom up, industry driven, market oriented and intergovernmental. It is our EUREKA nature which differentiates ITEA 2 from other European clusters."

(AUTOSAR) – the standardised platform for automotive applications. ITEA 2 continues to play an active role in this key area – for example, our article on the ITEA 2 TIMMO project shows how it is contributing to real time performance modelling and verification. The project results will be integrated in AUTOSAR in a later phase.

In addition, we will enrich programme and project information in the M – ITEA 2 Magazine with more personal background stories on who-is-who in ITEA 2, interesting events and news items in the ITEA 2 field.

Each final article of the M – ITEA 2 Magazine will be dedicated to EUREKA news. In this issue we cover the EUREKA Ministerial Conference in Slovenia in June 2008 and ITEA 2's participation. For our self-understanding, it is always crucial to bear in mind that we are a EUREKA Cluster: bottom up, industry driven, market oriented and intergovernmental. It is our EUREKA nature which differentiates ITEA 2 from other European clusters.

I wish you an enjoyable read.

Colophon

ITEA 2 (Information Technology for European Advancement) is Europe's premier industry-driven co-operative programme for pre-competitive R&D in Software-intensive Systems and Services (SiS). As a EUREKA Cluster programme, ITEA 2 stimulates and supports projects that will give European industry a leading edge in the area of SiS. M – ITEA 2 Magazine is published three times per year by the ITEA 2 Office in English. Its aim is to keep the ITEA 2 community and beyond updated about the ITEA 2 programme status and progress, achievements, projects and events. An online version is available at www.itea2.org

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Submissions: The ITEA 2 Office is interested in receiving news or events linked to the ITEA 2 programme, its projects or in general: R&D in the Software-intensive Systems and Services field. Please submit your information to communications@itea2.org.

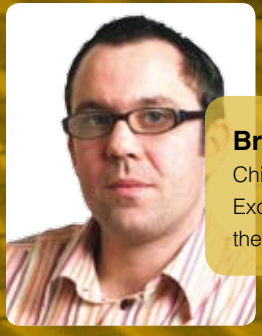
Opinions expressed in the M – ITEA 2 Magazine do not necessarily reflect those of the organisation.

Special thanks to all contributors to this issue of the M – ITEA 2 magazine.

"... We are on a mission to make people aware of ITEA 2 and the potential that exists for collaborations across Europe – and beyond."

Jackie Golden

Jackie Golden
Enterprise Ireland & EUREKA national project coordinator



Brian Hanly
Chief executive officer of Exoftware, participant in the ITEA project AGILE

Project success encourages SMEs to play with the big boys

Ireland is starting to play a constructive role in the ITEA programme as national development plans place ever greater emphasis on information technology (IT) across a wider range of industries. Irish software development specialist SME Exoftware was particularly impressed by the advantages of working with big companies in the ITEA AGILE project. As a result of the success, the company has established good contacts with large organisations across Europe and is already working on a second ITEA 2 project.

Although Ireland was a founder member of EUREKA, its early involvement in European research was mainly through EU Framework Programmes. "We were heavily involved in FP4 as Ireland was busy building up its knowledge economy and we realised we had to work on the same terms as everyone else across Europe," explains Jackie Golden of Enterprise Ireland and the EUREKA national project coordinator (NPC).

"We were less involved in FP5 as our Government put in place a national development plan focused on Irish infrastructure in biotechnology and IT. This led to the interest in the EUREKA Clusters. In common with many other EUREKA member states, we are now finding more Irish companies and researchers are getting involved in Cluster projects than in individual projects. This is inevitable here as Ireland has put so much emphasis on IT."

Ireland now has a new national development plan running to 2013. A huge sum – €6.1 billion – is being invested in a wider range of areas that include enterprise, agri-food, energy, marine, health and environmental technologies.

"Of course – as we already realised with the Framework Programme – IT crops up in virtually every area," points out Golden. "So ITEA 2 is a fundamental and the nature of

ITEA 2 means we have quite a number of companies that should be involved. We are on a mission to make people aware of ITEA 2 and the potential that exists for collaborations across Europe – and beyond."

An important opportunity

ITEA 2 is an important opportunity according to Brian Hanly, chief executive officer of Exoftware. He sees two advantages in getting involved:

1. Participation with large European companies – giving the opportunity for an SME to talk to the big boys; and
2. Involvement in collaborative R&D with other SMEs, academic institutions and large organisations – something not normally possible for a small Irish SME.

Exoftware specialises in Agile software development methods, providing a complete range of such methods and services. These range from mentoring through to near-shore/on-site software development. "The AGILE project set out to see if these development methodologies would be applicable in the embedded software industry as there was a perception that they would not," he explains.

"We are experts in Agile organisation and change, and this gave us the opportunity to work with companies developing large scale embedded systems. We helped on the different pilots, steering people in the right direction. And we bought our experience from large-scale Agile delivery in big organisations such as BT and Standard Life. We helped prove that Agile was appropriate and would work."

Using 64 industrial case studies, the AGILE consortium showed this methodology can lead to massive improvements in software engineering. It results in high quality software developed in a shorter time for a lower cost than possible with traditional techniques. A good example of the project's success is that Nokia is now applying these techniques aggressively across its development organisations.

Freedom to participate

"ITEA labelling is important as it helps with funding, giving you the freedom to participate," says Hanly. "I'm shocked that more companies from Ireland have not been involved in ITEA. I think there is a perception that it is bureaucratic. It is not – although you do need to be tenacious."

"I was particularly thrilled that Exoftware got involved in ITEA and has been such an enthusiastic member of two projects, adds Golden. "If Exoftware can get involved in a major cluster and use the experience to grow, so can other companies. It is very much a trail blazer for us."

SMES are of fundamental importance in Ireland but often very small by European standards. There are fewer R&D players but ones with very high potential. Because of investments already made, Ireland has a fair number of very high quality spin-out companies from its universities and colleges. It also has programmes to help Irish universities and third-level college researchers to work closely with industry.

Moreover, such involvement converts into real products. "That is one of the major attractions of EUREKA – it is very focused on industry outcomes and on the market," adds Golden. "Very few small Irish companies have the luxury of getting involved in something that may not see an outcome for five, six or seven years. As must be true for small companies across Europe, they need to see a result."

In 2007, The AGILE project consortium received the silver ITEA Achievement Award.

News

NEWS

ITEA 2 Office moves
to Eindhoven High Tech Campus

The ITEA 2 Office, which is co-located with the ARTEMISIA Office, moved to the High Tech Campus in Eindhoven, the Netherlands on 29 February 2008.

The High Tech Campus Eindhoven is a technology centre with a worldwide reputation, many thousands of top-level engineers and advanced facilities. The Campus is strategically located between the economic core regions of the Rhine/Ruhr area in Germany, the Amsterdam/Rotterdam area in the Netherlands, Antwerp/Brussels in Belgium and Northern France. Furthermore, the Campus was elected best business area of the Netherlands in 2006. This all makes the High Tech Campus a highly inspiring environment for the ITEA 2 Office.

More information: http://www.hightechcampus.nl

ITEA 2 Symposium 2008
ARTEMIS Annual event

The ITEA 2 Symposium 2008 will be held in the De Doelen Concert Hall and Congress Centre in Rotterdam, the Netherlands from 21 to 22 October 2008. It will be a co-ordinated event with ARTEMISIA, sharing a common one-day programme on 22 October.

The programme for the ITEA 2 symposium will include high-level speakers from industry and public authorities and parallel sessions on practical ICT-based approaches to real challenges in society and economy. The exhibition will demonstrate practical examples and success stories from ITEA / ITEA 2 projects.

More information will be published online shortly at: http://www.itea2.org

Programme status

PROGRAMME STATUS

Call 3 Project Outlines

The ITEA 2 Call 3 opened on 21 February 2008 with the traditional two-day Project Outline (PO) preparation event at the Radisson SAS hotel at Amsterdam Schiphol Airport, the Netherlands. A total of 190 participants from 18 different countries attended this event. As with previous PO preparation meetings this year, there was a particularly strong participation from Finland, France and Spain. Special promotion activities by the ITEA 2 Office in Ireland and Turkey in January and February also led to an increased participation from these two countries, especially Turkey. The audience represented in total 47 different universities/research institutes, 35 SMEs and 30 large industries.

About 50 project proposals were issued beforehand and presented in a poster session and three special parallel sessions on the first day. Following a dynamic grouping of the project ideas in smaller discussion group, this finally resulted in 13 combined initial project ideas being presented at the end of the event. From the evaluation forms, we learned that participants rated this event with a high score of 3.7 on a 5-point scale.

On 11 April, the Call was closed with 28 Project Outlines received. This is not an all-time record, probably due to other similar ongoing initiatives – FP7, national clusters and Joint Technology Initiatives (JTI) – in Europe at the same time. In this Call, Spanish participation exceeded French participation for the first time and Spain became the number one country. The presence of participants from new countries such as Turkey and Ireland at the PO days also led to a strong participation from these countries in the proposals. Evaluation of the POs by ITEA 2 and the Public Authorities is continuing; the choice of Project Proposals invited to prepare a Full Project Proposal will be decided after a joint meeting between the ITEA 2 Board Support Group and the Public Authorities represented in the ITAC group.

Networking during the Project Outline preparation event in Amsterdam, the Netherlands

Who is who in ITEA 2

Meet the ITEA 2 Steering Group
Read about their backgrounds

Marie-Line Valentin
Airbus France – Avionics & simulation software research coordination

Marie-Line Valentin was formerly involved in research and support for the operational introduction of object-oriented techniques and model-based approach. She is now in charge of the co-ordination of engineering research projects for avionics products. She has been an ITEA 2 Steering Group member since 2006.

Jos van Sas
Alcatel-Lucent – Director external affairs Belgium

Jos van Sas is currently responsible for External Affairs for Alcatel-Lucent in Belgium. His responsibilities also include the co-ordination of Alcatel-Lucent Bell's R&D projects towards regional, federal and international funding authorities and the co-operation and partnerships with local universities and research institutes. He has been an ITEA 2 Steering Group member since September 2002.

Dominique Segers
Barco – Project co-ordinator funded R&D projects

Dominique Segers worked as Quality Engineer for Bombardier (Eurotunnel Project) and Documentation Engineer for Barco. Since 2005 he has been working within Barco as co-ordinator for innovative and funded R&D projects on national and European level. He has been an ITEA 2 Steering Group member since March 2007.

Medur Sridharan
Bull SAS - Group R&D public affairs manager

Medur Sridharan currently holds the position of R&D Public Affairs Manager of the Bull Products and Systems division and he coordinates Bull R&D collaborative projects. He has been an ITEA 2 Steering Group and Board Support Group member since June 2003.

Jens Herrmann
Daimler – Project leader

Jens Herrmann works as project leader in Daimler Group Research & Advanced Engineering. He was and is still involved in several ITEA projects as work package leader and holds an ITEA achievement award (TT-MEDAL project). He has been an ITEA 2 Steering Group member and an ITEA 2 Roadmap 3 team member since 2007.

Moreno Sioli
Italtel Spa – System engineer

Moreno Sioli has 36 years experience in research and development in telecommunications systems. He has been an ITEA 2 Steering Group member since May 2005.

Who is who in ITEA 2

Kari Systä
Nokia – Distinguished research leader

Kari Systä has worked for the last 12 years in the area of runtimes and software platforms for applications and services. He has been a member of the ITEA 2 Steering Group since 2007. Furthermore, he is a member of the ITEA 2 Roadmap 3 core team.

Ronald Begeer
Philips Research – ITEA programme manager

Ronald Begeer has been working since 1985 for several businesses at Philips Electronics. Since 2006, he joined Philips Research as Program Manager for Public-Private Partnerships. In this role he represents Philips Electronics in the ITEA 2 Steering Group and is chairman of the R&D steering group of the Dutch innovation program Point-One.

Karlheinz Topp
Robert Bosch – Corporate sector research and advance engineering

Karlheinz Topp has been involved in R&D in electronics, computer hardware and software – all related to software-intensive systems – for various domains, e.g. military, telecommunication and automotive. He has been an ITEA 2 Steering Group member since January 1999.

Rainer Glaschick
Siemens AG – System architect

Rainer Glaschick has been dealing with computer software since 1970; his special areas are software patents and security issues. In the C-LAB, a co-operation with Paderborn University, he was responsible for several funded projects on subjects such as augmented reality, service-oriented architectures, efficient media streaming and mobile services. He has been an ITEA 2 Steering Group member since 2002.

Ramon Gonzalez Carvajal
Telvent – Embedded systems

Ramon Gonzalez has been working in the Embedded Systems field since 2000. He has experience in several national and European projects. He has been a member of the ITEA 2 Steering Group since 2007. He has also participated in some Roadmap 3 meetings.

Vania Conan
Thales – Senior research engineer

Vania Conan has been involved in embedded software innovation in distributed middleware, networking and telecommunications systems in Thales for over 10 years. He has been an ITEA 2 Steering Group member since 2001.

Denis Mischler
Thomson R&D France – Lab manager

Denis Mischler is leading architecture research activities for IPTV in NGN and is representing Thomson in the ETSI TISPAN meetings where he is also acting as rapporteur for some work items. He has been a member of the ITEA 2 Steering Group since November 2006.

Post project results

EAST-EEA
ITEA 00009

Mastering complexity in competitive automotive technology
An industrial success story

Partners
Audi
BMW
CEA-LIST
Centro Richerche Fiat
Daimler
ETAS
IRCCyN
INRIA
Linköping University of Technology
LORIA
Magneti Marelli Sistemi Elettronici
Mälardalen University
Opel Powertrain
Paderborn University – C-Lab
PSA Peugeot Citroen
Renault
Robert Bosch
Royal Institute of Technology
Siemens VDO Automotive
Siemens Automotive
Siemens Business Services – C-Lab
Technical University of Darmstadt
Valeo
VECTOR Informatik
Volvo
ZF Friedrichshafen

Countries involved
France
Germany
Italy
Sweden

Project start
July 2001

Project end
June 2004

The EAST-EAA project has been a major success for ITEA. It developed middleware-based software architecture for networked electronic control units in cars and laid the foundation for the Automotive Open System Architecture (AUTOSAR) consortium. Architectural development is continuing, particularly in the ITEA 2 TIMMO project, while an EU-funded project is taking the high level description language further. Another key achievement has been to establish a truly European community of automotive software specialists sharing the same language.

Electronics and software are being used increasingly to improve safety and comfort in all areas of the car – from engine, steering and braking control to communications, entertainment and man-machine interfaces. One of the main challenges facing automotive manufacturers is integrating the different electronic systems, subsystems, modules and components delivered by various suppliers.

EAST-EEA successfully addressed the need for interoperability by developing an integrated platform based on open-systems architecture to be used in European cars from 2010. Innovative processes and tools were validated in all car domains: body electronics, power train, telematics, human-machine interfaces and chassis.

Key project results included:

- Creation of standard middleware that integrates all the different electronic systems and components from different suppliers into the complete network of a vehicle system;
- Definition of a high-level description language to make all this accessible; and
- Development of the specialist tools necessary, including test tools and demonstrators.

Dr Joachim Irion
Irion Management Consulting, project leader EAST-EEA project

Dr Stefan Voget
Continental, formerly project leader at Bosch for EAST-EEA

Quicker and cheaper

Application of these results is making the next generation of vehicles quicker to design and cheaper to bring to market, while maintaining high quality standards. This is expected to strengthen the automotive sector's competitiveness significantly, securing a lead for European carmakers and suppliers well into the future.

EAST-EEA was a massive undertaking, occupying 250 person-years, a budget of €40 million and partners from four countries – France, Germany, Italy and Sweden. The 23 partners

represented all the major players in the sector, including car manufacturers, their suppliers, SMEs with essential control software expertise, and academic and research institutions.
The outcome of EAST-EEA formed the basis for the European car industry's automotive open system architecture (AUTOSAR) initiative. The AUTOSAR partnership was formed in July 2003 as a spin-off from EAST-EEA and is fully funded by industry. The goals of the partnership include standardising basic system functions and functional interfaces, integrating and transferring functions, as well as substantially improving software updates and upgrades over the vehicle lifetime.

Fast application of results

"It is nearly unheard of for project results to be taken up so quickly – and AUTOSAR is now an important factor in the automotive industry," says consultant Dr Joachim Irion, who managed the EAST-EEA project.
There were two main reasons for this success according to Dr Irion: "Firstly, the project had clear goals but we were flexible enough to adapt our overly ambitious initial ideas to a more down-to-earth objectives that we could really achieve; and, secondly, the team work that built up in a group of people that did not know each other at the beginning."
The European car industry drives technical innovation globally with such advances as driver-assistance and predictive-safety systems. This can only be done with embedded architecture. "Mastering complexity is a major challenge if you have a hundred electronic control units (ECUs) in a car," says Dr Irion. "Moreover, by exploiting such technical innovation, European industry can stay competitive and maintain employment."

"This emphasizes the importance of the EAST-EEA project. Embedded architecture has to be standardised otherwise it is just too complex. It took nearly a year to make up a common glossary of terms and come to a common understanding between the companies involved. This was one of the big successes of the project. But the other was the architecture description language. This is still being worked on. For example the ITEA 2 project TIMMO will enhance the language with a timing component."

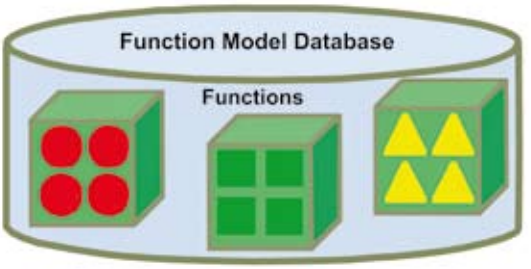
"EAST-EEA was an important community approach that helped to pave the way for AUTOSAR."

Daimler

“ITEA gave us the possibility to find each other and showed our differences”,

Dr Stefan Voget

Various car functions are distributed over several Electronic Control Units (ECUs)



Key role for ITEA

This lack of a common understanding across Europe is also highlighted by Dr Stefan Voget of Continental and previously the EAST-EEA project leader at Bosch. He points out public funding for automotive research had only been provided for collaboration at national level before EAST-EEA, mainly through small-scale research projects in France and Germany.

The ITEA project brought together key players from the different countries across Europe. “ITEA gave us the possibility to find each other and showed our differences,” says Dr Voget. “It took a year to bring everyone together and to get them to understand each other.”

Dr Voget also emphasises the importance of the two main pillars of the EAST-EEA project: the architecture – or rather four architectures, one per domain – that was taken up and refined by AUTOSAR into a single architecture; and the EAST architectural description language (EAST ADL) that was taken forward in an EU-funded project called ATESST, with further work planned in a follow up project (ATESST-2). This second pillar requires more time than for the architecture.

Creating a European community

“EAST-EEA has been a success story for the whole automotive industry,” insists Dr Voget. An even greater achievement is the creation of a community of architects and experts working in the automotive industry across Europe – before they only knew each other at national level. This came through annual meetings and workshops for the company project leaders – the main drivers of the software architecture in the automotive industry.

“Without this networking, AUTOSAR would not have been possible,” he believes. “The founders of AUTOSAR met for the first time in these EAST-EEA workshops. In addition, there are a dozen other projects that now base their glossaries on the glossary we developed in EAST-EEA.

“EAST-EEA set a clear starting point. Today we are more and more able to standardise. AUTOSAR is not a question of being better or worse but rather of understanding. It lets us focus on the additionals where we can compete!”

Ongoing project information

TIMMO
ITEA 2 06005

Partners
Audi Electronics Venture
Chalmers University
CEA-LIST
Continental
Denso Europe
ETAS Entwicklungs- und Applikationswerkzeuge für elektronische Systeme
Mentor Graphics
Paderborn University
Robert Bosch
Siemens IT Solutions and Services
Symtavision
TTTech Computertechnik
Volkswagen
Volvo Technology
ZF Friedrichshafen

Countries involved
Austria
France
The Netherlands
Germany
Sweden

Project start
April 2007

Project end
September 2009

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Project website:
www.timmo.org

Dr Friedhelm Stappert
Continental,
project leader TIMMO project

Early analysis overcomes in-vehicle timing constraints
Automotive systems

The ITEA 2 project TIMMO set out to develop a standardised approach to describing timing information in embedded system design for the automotive industry to predict and master in-vehicle timing constraints. It builds on work carried out by automotive manufacturers, suppliers and tool vendors in the ITEA project EAST-EEA that developed into the AUTOSAR software architecture now finding wide application in the automotive industry in Europe and further afield.

Electronics and software are playing an ever growing role in the automotive industry, driving much if not most innovation in cars. They currently involve more than 20% of vehicle costs – a figure set to double by 2010. Key growth areas include active and passive safety systems, entertainment and infotainment, and power technologies to handle and co-ordinate the rapidly growing electrical requirements of such vehicles.

Key applications include integration of new safety and environmental devices – such as braking and stability control, anti-collision systems, parking aids, clean-burn fuel injection, and exhaust and emission management systems. And Europe is leading the way in much of this innovation.

With so many of the functions in cars now handled by electronics and software, timing synchronisation between electronic control units (ECUs) has become crucial – especially for safety-critical processes. Timing faults are now detected by testing, measuring and simulation. So, currently, such problems are only picked up late in the design cycle when working on the finished units, sometimes meaning the whole design process may have to be restarted.

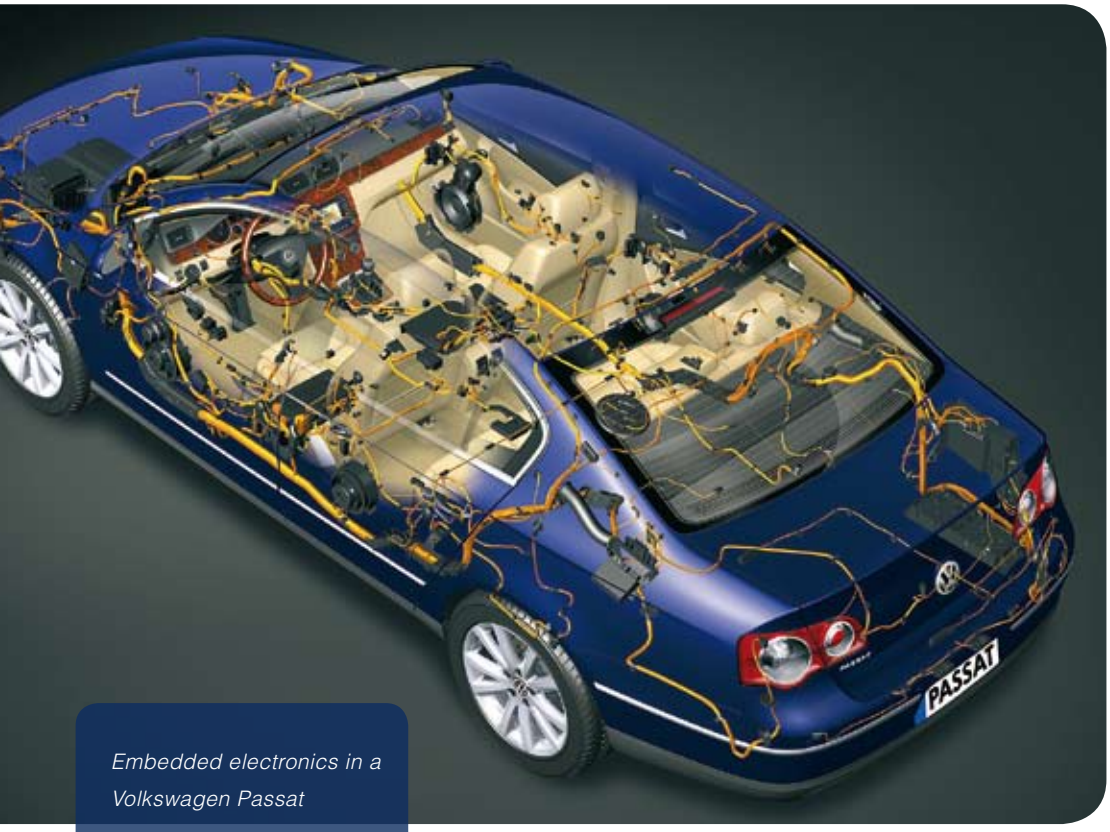
More effective approach required

A more effective approach would be to analyse the timing from the beginning of the design cycle, using a common standardised language as an input for tools. While the Automotive Open System Architecture (AUTOSAR) consortium has developed templates for systems and applications, it was realised that extending this to timing constraints was more difficult because of the complexity – too complex for AUTOSAR alone. So it was decided to set up a research project. The result was TIMMO.

Siemens VDO – now Continental – took the lead with initial contacts made at the ITEA Symposium in Helsinki in 2005. “An ITEA 2 project was thought to be the best fit for the partners from different European countries and the timing was good with an ITEA 2 call for project proposals starting in January 2006,” explains TIMMO project leader Dr Friedhelm Stappert of Continental.

"We were five partners at the beginning and there are now 16, from Germany, Sweden, Austria, The Netherlands and France – although the French partners have had no funding, one of them is still sufficiently keen to continue participation. And the consortium involves car manufacturers, suppliers and tool vendors."

TIMMO started just over a year ago and the first phase of the main technical work packages ends in June 2008 – definition of the language, methodology and validation of the results. "We now have first drafts of the definitions of the language and the methodology," says Dr Stappert. "The next phase will involve synchronisation, ensuring that the results of the three work packages fit together, and then working on the details for the final results due in 2009."



Embedded electronics in a Volkswagen Passat

ITEA 2 provided a lot of help in establishing the project proposal and provided valuable contacts with the public funding authorities. It also proposed some additional Austrian partners.

Common standardised language

Timing is involved in all areas of control, with constraints such as deadlines by which certain functions have to react, and properties of specific units or functions that take a finite time to act – worst case execution times. The goal of TIMMO is to have a common standardised language to describe all these elements that can be used as an input for timing and scheduling analysis tools and to make timing predictable.

The results will be applicable to car manufacturers and component suppliers as well as tool vendors – the companies offering the tools for timing analysis. "A formal and standardised language makes it easier to exchange requirements and specifications between manufacturers and their suppliers," he explains. "And tool vendors will benefit from a common input language for their tools.

"The overall result is an easier development cycle, making the development of complex functions more reliable and faster. Consumers will also benefit from more complex functionalities that lead to greater innovation in ever more reliable and safer cars."

Such an approach should also keep Europe ahead as the US and Asian automotive industries continue with current design methods that involve solving timing problems late in the design cycle. Europe will benefit as European cars are driven by innovation in more and more complex functionalities.

Early application of results

Results of the project should also be quickly applicable. The TIMMO consortium is already co-operating closely with the AUTOSAR consortium, ensuring that its results will be included in the AUTOSAR standard as soon as they are available. New releases of the AUTOSAR standard are planned for mid of 2008 and for the end of 2009. So the TIMMO results should be in an industrial standard very soon – and this should make this new approach applicable worldwide eventually.

Major application areas for the results of TIMMO will be in safety-relevant functions where timing plays a central role, such as enhanced stability control. "At present you have a series of isolated boxes – ABS, steering, braking or the engine," says Dr Stappert. "Much more complex functions can be realised by making these units more interactive but reliable timing plays a crucial role."

The new approach will help cut development costs as the design cycle is less complex and more predictable. "With this language you can consider timing problems quite early and also tackle them quite early, making the design less complex and much cheaper."

Innovation Reports

ENERGy
(ITEA ~ 04024)
Automated network control tools cut information system costs

MARTES
(ITEA ~ 04006)
Boosting productivity in embedded-systems development

SERKET
(ITEA ~ 04005)
Open software platform set to enhance public security

ENERGy

Automated network control tools cut information system costs

ENERGy
(ITEA ~ 04024)

By: Julien Borgel & Maurice Israel, Thales, France

Most businesses today are completely dependent on their information systems. Achieving optimal solutions has resulted in a patchwork of multi-vendor and multi-technology environments, where end-to-end services are provided by distributed subsystems and limited by complicated intersystem exchanges. The ENERGy project set out to develop the tools for autonomous control of such heterogeneous networks to cut management complexity and reduce operational costs. User case studies are in progress to validate its approach in a range of application areas. Commercial products are envisaged within a couple of years, making it possible to slash network operation costs while meeting tough service level agreements.

The explosive growth of intranets in companies and the Internet in general means the number of mobile technologies, fixed-mobile convergence, network infrastructure and related services has become ever more complex. Network administrators need much more sophisticated tools to manage complex heterogeneous environments that provide an ever increasing range of dynamic services.

Moreover, many more computer-system customers are demanding complete network services rather than just equipment alone. Such customers do not want to know how their services are provided but simply that they conform to tough service level agreements (SLAs). System providers now have to take responsibility for managing the networks themselves. If a problem occurs, the costs come back to the provider.

Consequently, there is an urgent need to reduce the cost and the complexity of network management. And, as a result, the market for effective network management tools is continually increasing.

Enormous pressure to cut costs

Network operators have invested billions of euro in infrastructure in recent years – not only in hardware but also in the management tools required to optimise network use. Hence, there is enormous pressure to achieve a return on this investment. In 2002, €32 billion – about 3% of total revenue – was spent on operations support systems and the integration of dissimilar systems.

However, most of the management tools available commercially today only provide solutions to monitor the network layer itself – hubs, routers, switches and so forth. Very few also provide capabilities to measure real business impact in terms of quality of service

(QoS), security threats and downtime. This is a particular challenge for some large companies where annual costs of problems with their information systems can reach millions of euro, depending on the number of users affected and the recovery time.

How to increase service uptime in this ever more complex environment without radically changing the perception of the information system is a real issue in maintaining a good quality of service for end users and saving money for companies. ENERGy therefore set out to develop a unified generic platform for the delivery of global network management services. The key to its success has been a capacity to interpret information – for the first time, software has been developed to analyse the events coming from the system and compute the reaction.

End-to-end management of complex information systems requires the co-ordination of a wide range of heterogeneous network services and resources to ensure reliable services with a high QoS and minimum downtime. With information retrieved from the network, network-management systems (NMS) must implement network policies to ensure the best service for end-users. In addition, the NMS must detect and repair faults and errors while protecting the network from security threats. At the same time, the NMS needs to track and report on network resources and service use to control costs.

All this involves the deployment and configuration of network equipment such as servers, hubs and switches and the operation of diverse applications and services, as well as the control, monitoring, updating and reporting on network status – particularly QoS, fault levels and security threats. There are few systems that can do this automatically.

Meeting high level objectives

The results of ENERGy make it possible to improve this situation through the exploitation of relevant enabling technologies enabling autoconfiguration and self-management of complex systems. Operation is simplified by transcribing network information into a form manageable by humans with improved interpretation of high level objectives such as SLAs and correlation of networks alarms, enhanced and supported by computer-based analysis.

Before ENERGy, system behaviour was tracked by monitoring 'raw' events – such as more and more traffic, a security attack or low system performance; the interpretation had to be done by a human. Now this can be done by semantic interpretation, meaning the system software is able to analyse raw events and compute the reconfiguration to cope with the problem – offering its recommendations to the human operator or enforcing the new configuration directly.

Such automatic interpretation has been achieved by establishing a link between the raw events and knowledge supplied by network experts. The experts define the ontology of the network – effectively a specific systematically ordered model of the data structure that represents the complex relationships between the different elements and provides the rules governing interchanges.

Such a model enhances the exchange of information and supports reasoning by software agents. The definition is established in ENERGy using the OWL web ontology language. This model is then used with semantic annotation to understand and interpret events, compose new configurations and enforce them.

ENERGy provides

- *Network and service management* using a business-oriented services-based approach to assess the quality and efficiency of the end-user experience;
- *Policy–based management* to deal with high level objectives;
- *Automation* (or computer-assisted operations) in service and policy management;
- *Web–based network management* using Web Services, etc.;
- *Security management* with implementation of security safeguards providing reasonable assurance that all components related to security, transaction processing and network availability are well protected, preventing unauthorised access while assisting with verification and recording of the current network configuration;
- *Telemanagement and teledistribution* to provide monitoring information and manage the system – software updating, dispatch of security log, etc. – dynamically; and
- *Quality of experience* improvement by maximising service reusability to facilitate automation of service creation and to energise developments and improve distributed execution and monitoring to perform, manage and feedback applications ubiquitously.

Cutting network management costs

Simplifying network management by automating and distributing the decision-making process helps optimise the use of network resources, improve the reliability of services while decreasing downtime, and thus cut network management costs. With ENERGy, human network operators can focus more on the business logic and less on low level device configuration.

More reliable networks lead to greater customer satisfaction and business efficiency. The major targets for ENERGy were telecommunication companies and services providers.

Information system departments and infrastructure providers are the most interested in such tools.
Moreover, the ubiquitousness of information systems and telecommunications networks means that ENERGy provides answers to a worldwide need. Europe already has large market shares in both telecommunications and industrial network technologies, with around a third of the global automation market, worth about €75 billion. There are considerable financial implications related to network management, and the ENERGy project places Europe in the vanguard to supply the next generation of tools providing self-management and self-healing features.
ENERGy partners are continuing to develop and improve the system. This includes demonstrating the possibilities offered by the new tools in real use cases this year. The first commercial implementations are expected within one or two years.
Thales intends to use these tools to manage SLAs for the growing number of its customers requiring complete network services within contracts with strong incentives. So the need to enhance the efficiency and responsiveness of network management will undoubtedly speed the introduction of ENERGy tools.

MARTES

Boosting productivity in embedded-systems development

MARTES
(ITEA ~ 04006)

By: Klaus Kronlöf, Nokia Research Center, Finland

The embedded systems industry faces major challenges in improving productivity as systems complexity increases. The ITEA MARTES project exploits model-based methodology with a combination of the Unified Modelling Language (UML) and SystemC hardware description languages that makes it possible to verify architecture early in the design cycle, speeding development of real-time embedded systems and markedly reducing time to market. Advantages include improved interoperability of software engineering tools. The validity of the approach has been demonstrated in a series of industrial case studies.

Digital convergence leads to new products created by combining and integrating existing and new technologies in innovative ways. However, such developments often leave embedded systems developers struggling with unprecedented complexity and scalability. Traditional programming craftsmanship cannot deal with all these problems, so a real engineering methodology is needed.
MARTES set out to improve productivity and reduce the complexity of embedded systems development. It defined, constructed, validated and deployed a model-based methodology that separates application development and platform technology, together with an interoperable toolset for real-time embedded systems (RTES) development.
The resulting methodology is applicable in principle to the development of any kind of RTES. It focuses on early phases, such as requirement specification and architecture definition. The methodology was evaluated by industrial partners in the domains of mobile communications, telecommunications, consumer multimedia, avionics command/control and displays, and space. These industrial case studies showed encouraging results.

Driven by systems companies and tool providers

MARTES was driven by the needs of systems companies and tool providers, both well represented in the large project consortium:

- **Systems companies** urgently need the new methodology and supporting tools for efficient development of embedded systems products targeting increasingly diverse markets. The co-modelling approach enables analysis and early verification of design architecture. This capability is crucial to maintaining and advancing the leading position of European companies; and

- **Tool providers** require a consistent, widely accepted methodology and tool interoperability for the creation of a large market for systems-level design tools. UML and model-driven architecture (MDA) have already gained widespread acceptance in the information technology industry, and these concepts can form a basis for an industry-standard, embedded-systems design methodology. This opens up a market for a new category of UML-based tools – and, thanks to tool interoperability, increases the market for many existing tools.

The success of MARTES gives tool vendors the opportunity to enlarge market coverage by supporting embedded-systems development more extensively and by realising dedicated tools for model-based engineering, thanks to a close partnership with the main actors in this domain.

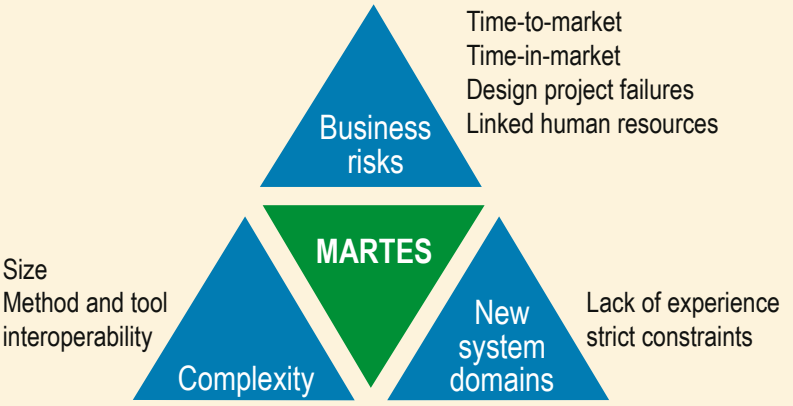


Figure 1: Embedded systems industry product development challenges

Use of UML expanding significantly

UML is a general purpose modelling language already widely used in software engineering, while SystemC is a popular C++-based hardware modelling language for transaction-level simulations. MARTES set out to combine the strengths of both languages to simplify modelling and help increase the abstraction level, especially on the software side, where SystemC alone does not have extensive support.

In recent years, use of UML has expanded significantly in the embedded systems industry. While software designers were the only users in the past, there are now new users in systems-architecture creation and communication-protocol engineering.

The notations of UML 2.0 seem appropriate to represent many of the relevant architectural views for systems architects, but the analytical capabilities of available UML tools are limited. In fact, there are hardly any UML-based architectural/performance analysis tools available – offering a major market opportunity.

SystemC 2.1 was ratified as the IEEE 1666 standard in December 2005 and is being adopted for hardware modelling at higher levels of abstraction – the only real competitor seems to be System-Verilog for existing Verilog users. SystemC will probably be widely used for hardware-oriented architectural models – i.e. for modelling platform resources, such as processors.

This kind of modelling is largely complementary to use of UML for more end-user-oriented architectural modelling. However, there is an obvious need for interoperability. Proper interworking of UML and SystemC increases the attractiveness and market for both UML and SystemC tools as well as commercial off-the-shelf (COTS) SystemC models.

Exploiting a common meta model

A major achievement of MARTES was to bring together the views from the many different industries in the consortium into a common understanding on model-based RTES development. At the core of the methodology is a meta model, which forms the basis of a new way to use UML and SystemC for RTES development and of the MARTES UML profile.

In practice, software applications, their control and scheduling are modelled with UML 2.0, while the hardware architecture model is written with the SystemC. In architectural exploration the application model represents the computational workload while the hardware architecture model represents the execution resources. The combined model can be simulated to monitor the timing of execution and resource use. The interface between the workload and hardware models is also described in UML to enable simulation of the modelled system.

The strength of this approach is that it enables architectural exploration and dealing with non-functional properties, such as real-time performance and power, better than any previous UML approach. In addition, the MARTES meta model enables semantically sound integration of tools for architecture development, analysis and deployment.

Separating application and platform development

A fundamental idea of the MARTES common core meta model is to separate the concerns of application and execution platform development. This brings three benefits:

1. **Complexity management** – the applications and platform aspects of the system can be developed and analysed separately;

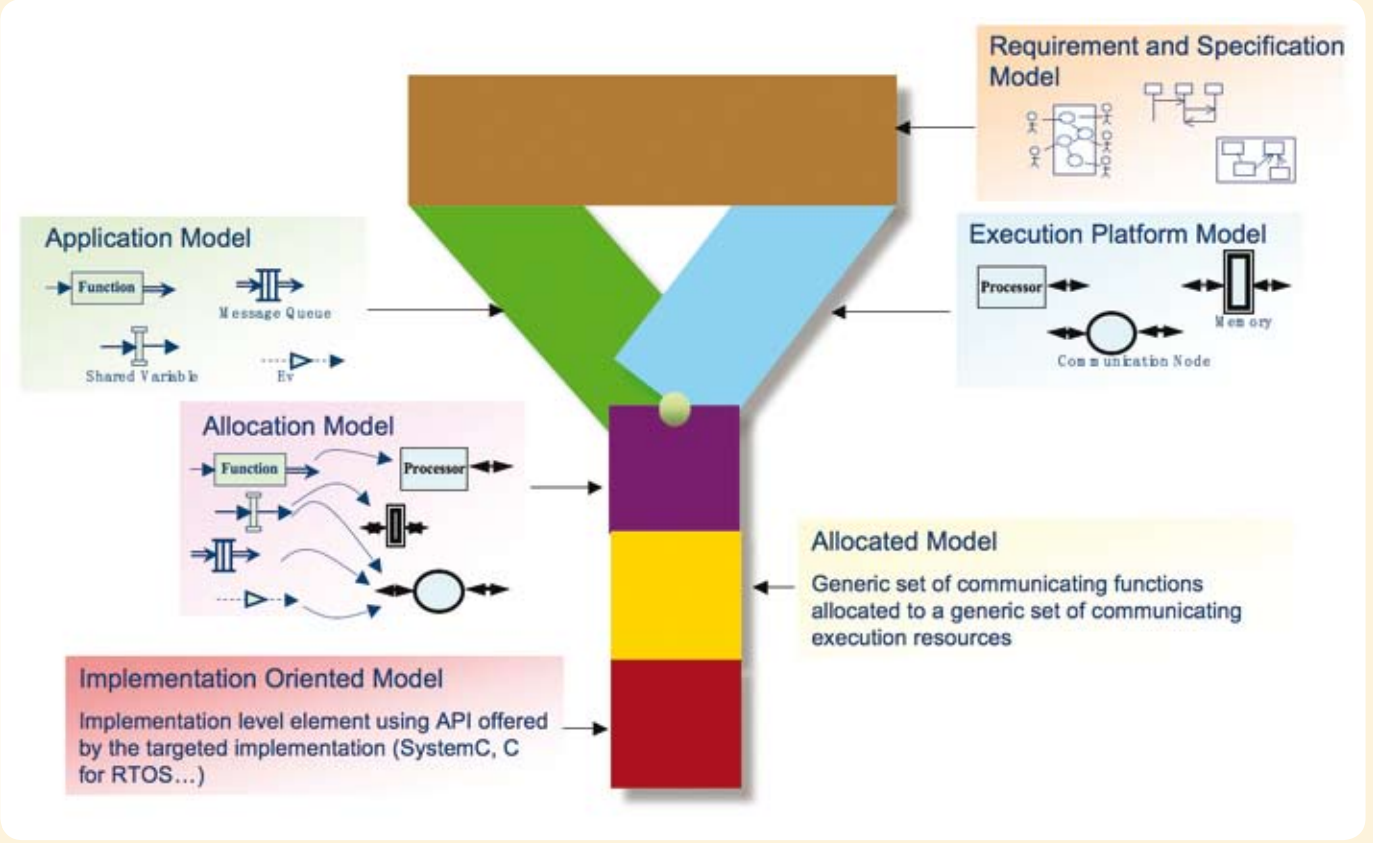


Figure 2: Models of the MARTES methodology

2. **Architectural exploration** – the application model is mapped onto the platform model explicitly, and several alternatives can be tried to find the best solution; and
3. **Re-use** – application and the platform models are both self-contained re-usable design artefacts.

The MARTES UML profile is based on this meta model and is divided in the same way into application, platform and allocation models with associated stereotypes.

A methodology was defined for model transformations, based on the core meta model. MARTES methodology also includes the development process aspect. It defines a tailorable model-driven engineering process framework that supports traceability and conforms to standardisation requirements.

All the tools in the MARTES tool integration strategy share a common technical space, enabling tool interoperability. Each domain-specific tool has its own extended technical space that is partly mapped to this common space, which is defined by the MARTES meta model using EMF Ecore technology[1].

Aiming for consensus on interoperability

The primary motivation for systems companies to join this ITEA project was obviously the improvement in their product development practices. This should lead to more cost-efficient and better quality products. Likewise, tool vendors aimed to improve their product offerings and so attract new customers. A number of commercial and in-house tools have been implemented. UML tools use the MARTES profile, while other tools are integrated using model transformations and the meta model.

However, the impact of the project is expected to be much wider. The ambition is to achieve a consensus in the industry at large on the common meta-model-based interoperability. Several MARTES partners have participated actively in the ProMARTE consortium[2], supplying project results as contributions to the definition of the OMG UML MARTE profile[3].

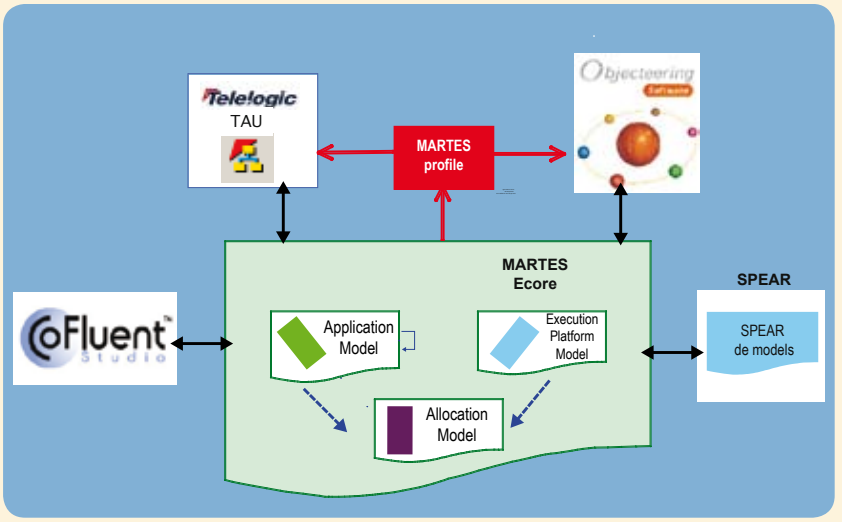


Figure 3: MARTES tool interoperability framework

The benefits of industry-wide meta-model adoption would be significant in terms of solving product development challenges in embedded systems through model-based thinking by:

- Improving efficiency in joint product development;
- Enabling interoperable models and thereby easing use of COTS, intellectual property (IP) components and subsystems; and
- Easing integration of the design environment and so enabling use of best-in-class tools from multiple vendors. This opens up a market for small tool vendors offering highly focused tools.

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2 *http://www.promarte.org*

3 *http://www.omg.org/cgi-bin/doc?ptc/2007-08-04*

SERKET

Open software platform set to enhance public security

SERKET
(ITEA ~ 04005)

By: François-Xavier Josset, Thales, France

The shear mass of information now available from a wide range of sensors – from video-surveillance cameras and microphones to badge readers and intrusion detectors – can quickly overload operators co-ordinating security for public places and large cultural, sporting or other public events. As a result, it is often impossible for such operators to identify risk situations and react to avoid such situations degenerating. The ITEA SERKET project has now developed an innovative open software platform to automate processing, fusion and analysis of such information to provide security operators with timely warnings for effective preventive actions.

Public security operations generally require co-ordination from a centralised command-and-control room, where information of very different types is transmitted for decision making. Such operations are often complex since they depend on several key factors: the presence of crowds or small violent groups, the variety and severity of potential threats, the layout of the site, the control level of surveillance hardware, availability and ease of co-ordination of forces of order, and overlapping demands of simultaneous activities.

The supervision of an event and the surveillance of a public site from a command-and-control room is a hard task. The accumulated experience of operators and good preparation remain the best current guarantees of adaptation to unexpected situations that occur regularly and that require fast decisions with dramatic consequences.

Security devices, particularly video systems, play an ever greater role in fighting terrorism, crime and public disorder. However, while video surveillance can provide important evidence for criminal prosecutions, there is a growing need to prevent risk situations developing in the first place. The problem is that the amount of information now provided to command-and-control rooms is simply overwhelming, making it impossible for security personnel to react in real time.

By analysing automatically the information supplied by different types of sensors – such as video-surveillance cameras, intrusion detectors, access control barriers and microphones – SERKET makes it possible to pinpoint risks. The system alerts operators as soon as any threat is detected and identified, allowing them to focus on their mission rather than trying to analyse all incoming information themselves visually. Their knowledge of the situation is enriched – of prime importance when such a situation is particularly sensitive, complex and liable to concealed threats.

More and more data

Most western countries acknowledge the efficiency of video surveillance in preventing delinquency, and fighting criminality and terrorism – as exemplified initially in the UK. This trend is marked by the accelerating installation of video-protection hardware – though very often providing lots of images rather than good quality ones.

As a consequence, the amount of information potentially available to the forces of order is exploding. Such assets are straightforward for investigative activities – the more recorded images, the higher the chance to find clues – even if numerous questions are still pending, such as solving the trade-off between storage capacity and clarity of recorded images.

On the other hand, new doctrines have to be established for appropriate exploitation of this overload of information in public protection to enable command-and-control rooms to cope efficiently. Security operators in these situations are responsible for assessing all the information related to running missions as well as relaying information and co-ordinating the security forces deployed.

Currently, video is se ldom the source of an alarm, unlike radio reports from police on the ground. Indeed, it is impossible for operators to view in real time all the images related to their operations – it is only possible to focus from time to time on those judged the most informative – so a multiplication of images does not simplify the supervision task.

Preventive security

SERKET set out to develop and prototype technologies focusing on preventive security of public places and for large events. The objective was to provide security operators with more knowledge relevant to their mission to optimise their decisions. The major outcome is the specification and prototyping of a novel open software platform dedicated to the security of public places and large events. The openness of the platform comes as a consequence of the architectural choice of SERKET, and represents the cornerstone of the future SERKET-like security systems that will offer novel capabilities of easy plug (application layer and sensor layer), integration and reconfiguration, unlike the state-of-the-art 'black-box' and non-standard products available on the market today.

Major technical breakthroughs

1. Intelligent signal and data processing:
   - Video: Robustness to challenging conditions, individual tracking, novel crowd motion algorithms;
   - Audio: Security sound detection such as gun shots, shouts and window-pane breaking, and emotion classification in speech, specifically fear; and
   - Combination of both: Uncertainty mitigation – false alarm removal;
2. Information processing and fusion for enhanced situation awareness:
   - Complex Event Processing (CEP): Filters, matching rules, spatio-temporal correlations; and
   - Threat assessment: Alarm triggering when potential threats detected;
3. Architecture – from classical surveillance equipment to a novel generation of integrated security systems:
   - Event-driven architecture by coupling service-oriented architecture (SOA) and CEP service; and
   - Heterogeneous smart sensors: (meta-)data produced in a generalised format.

To build this platform, the SERKET consortium focused first on adapting existing hardware and software as much as possible, including video-surveillance cameras and other sensors, commercial off-the-shelf (COTS) mediation middleware, robust video-analysis algorithms for intrusion detection and standards for dynamic 3D display.

In addition, several innovative functions were designed to meet the SERKET goals, such as a generalised concept of a heterogeneous smart sensor, application of the mediation principle to a security platform, advanced signal-processing algorithms and the fusion of their results for automatic detection of abnormal situations.

All these novel software modules and services have been applied at least once in the final demonstrators of SERKET: one demonstrator of a security system for urban surveillance, two demonstrators on public/private infrastructure protection and one demonstrator on sea- coast surveillance.

The SERKET platform uses the latest technologies and standards – such as SOA, mediation middleware and CEP for information fusion. This enables the innovative software layer to match the needs of both low-level processing algorithms – such as signal and data processing of for example images, sounds and interruptions – and upper-level applications like information filtering, correlation and combination for threat assessment and situation picture display.

Integrated security market

Public security is a highly competitive and growing market. This is one of the first times that several European companies have carried out long-term common R&D work in this area. SERKET resulted in a software platform able to manage a complex security system offering advanced capabilities such as threat assessment and information fusion. This platform is already being marketed to system security providers for incorporation into their systems.

SERKET's industrial partners see the resulting event-oriented architecture as the basis of a new generation for integrated security systems. These would address markets such as: security in ports, airports and railway stations; urban security; traffic surveillance; and organisation of large cultural or sports events. The results have been disseminated widely and relationships established with security stakeholders including the ministry of the interior, national police force and defence equipment agency in France, railway operators in France and Spain, and airport operators in Belgium.

It is hard to evaluate the overall business impact of this novel approach to active security as opposed to current passive security approaches. Nevertheless, while the overall security market is expected to grow at about 10% annually, the SERKET platform is expected to penetrate rapidly and deeply, with an increase far more than 10% a year.

Innovation management

A new methodology was applied to SERKET technologies to quantify their innovation level and to provide advice for improvements. Monnier's Innovation Matrix© methodology represents the market versus technology maturity levels of the technology concerned on a 2D matrix. This matrix provides a standard measure for different products, similar to a diagnostic framework, identifying parameters to be tackled to improve the innovation level.

Innovation applies to new technologies, products and processes, as well as the adoption of best practices in industry. Monnier's Innovation Matrix© and associated methods have proved effective in several cases to measure and define a strategy for increasing innovation. The synthesised results in each of four categories – algorithms, software architecture, hardware architecture, and system and services – helped in identifying current technological shortcomings with respect to the growing market for global security.

Calendar | what is happening, where and when

Upcoming events
ITEA2 and ITEA/ITEA2*

12 September 2008

Open Source and Product Line Workshop at the SPLC Conference 2008

LOCATION
LIMERICK, IRELAND

MORE INFO
COSI project website:
www.itea-cosi.org

SPLC website:
www.lero.ie/splc2008/workshops.html#W7

This workshop is co-organised by the ITEA COSI project.

Embedded industries have invested a lot in the introduction of software product lines in their software development. In addition, use of open-source software appears to be a profitable way to obtain good software. However, at present, there is limited interaction between the open-source and product-line development communities. The aim of the workshop is to explore what the two communities can learn from each other and to develop a better understanding of how the two communities can benefit from each other. •

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21-23 October 2008

ITEA 2 Symposium 2008
ARTEMISIA Annual event

LOCATION
ROTTERDAM, THE NETHERLANDS

MORE INFO
ITEA 2 website:
www.itea2.org

ARTEMISIA Association:
www.artemisia-association.org

The ITEA 2 Symposium & ARTEMISIA Annual Event in 2008 will be a co-ordinated event with ARTEMISIA with a common one-day programme (22 October). •

9-10 October 2008

EURIPIDES FORUM (2ND EDITION)
BERLIN, GERMANY

23 October 2008

1ST AUTOSAR OPEN CONFERENCE & 8TH AUTOSAR PREMIUM MEMBER CONFERENCE
DETROIT, USA
The global AUTOSAR standard, a follow-up of the successful ITEA EAST-EEA project, is organising its first public event with a restricted parallel session for Premium Members only.

25-27 November '08

ICT 2008
LYON, FRANCE
The ICT Event – formerly the 'IST Event' – is being organised by the European Commission Directorate-General for the Information Society and Media

2-3 December '08

EUROPEAN NANOELECTRONICS FORUM 2008
(FORMERLY THE MEDEA+/ ENIAC FORUM)
PARIS, FRANCE

** ITEA 2 and ITEA/ITEA 2 projects and events with participation of ITEA 2 or ITEA/ITEA 2 projects.*

EUREKA: changing the guard

The 2008 EUREKA Ministerial Conference was held in Ljubljana, Slovenia on 6 June, bringing together ministers and representatives of 38 European countries and the European Commission. The conference was opened by Slovenian Prime Minister Janez Jansa, Slovenian Minister of Higher Education, Science and Research Mojca Kucler Dolinar and European Commissioner for Science and Research Janez Potočnik.

As Slovenia prepares to hand over the EUREKA Chairmanship on 1 July 2008 to Portugal, Dr Aleš Mihelič – current EUREKA High Level Group Chairman – looked back on the Slovenian Chair year. Main achievements include the creation of a new proactive strategy re-mobilising the EUREKA network, the reinforcement of co-operation between EUREKA and the EU, notably through actions such as the EUREKA Eurostars programme and the EU Joint Technology Initiatives (JTIs), and greater emphasis on the communication of results of EUREKA projects within the network and externally.

ITEA 2 Chairman Rudolf Haggenmüller was one of the keynote speakers and elaborated on ITEA 2's mission 'Contribute research excellence to Europe's competitive software-intensive systems and services'. "Since its start in 1998, the ITEA community in industry has broadened tremendously. Within the ITEA programme, we see many mature and emerging achievements in successful and promising key areas such as product-line engineering, high definition television, automotive and the Web of Objects."

Furthermore, Professor Haggenmüller highlighted the beneficial conjunction between EUREKA Clusters and JTIs, leading to economic progress in Europe. "EUREKA has been involved in the JTIs since the very beginning," he pointed out. "For instance, the ITEA 2 Board decided to help the creation of the ARTEMIS initiative on embedded systems. There is a commonality in objectives and complementarity in contributions between ARTEMIS and ITEA 2. We foresee a coexistence of the ITEA and ARTEMIS programmes for the coming years."

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At the end of the conference, the EUREKA Chairmanship was formally handed over to Portugal. "The Portuguese Chairmanship wishes to contribute to the success and strengthening of EUREKA as a major tool to promote research and innovation, strengthening the bottom-up, open and flexible nature of the network," said Portuguese Minister of Science, Technology and Higher Education Mariano Gago.

In addition to the plenary programme, EUREKA success stories presented themselves to conference participants in a special showcase exhibition. Exhibitors included ITEA Achievement Award gold winner AMEC, which demonstrated its results and achievements. Moreover, the ITEA NUADU, AGILE and SmartTouch projects were featured on the enormous poster wall full of EUREKA success stories at the exhibition.

ITEA 2
INFORMATION TECHNOLOGY FOR EUROPEAN ADVANCEMENT