ITEA 2

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Σ! EUREKA

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Public security
From intelligent surveillance to in-home safety systems

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INFORMATION TECHNOLOGY FOR EUROPEAN ADVANCEMENT

European leadership in Software-intensive Systems and Services – www.itea2.org

ITEA 2 is a EUREKA strategic ICT Cluster programme

Content

Colophon

Editorial

Uniqueness of ITEA

Nowadays, there is a range of different tools to support innovation in Europe – regional as well as national funding, EUREKA Clusters, Eurostars, EU Joint Undertakings and the EU 7th Framework Programme (FP7). This diversity is good for the industry players but they need to take on board the realities of the different kinds of research projects. It is therefore important that each tool stresses its specificity.

For ITEA, we can say that our uniqueness comes from our industrial community management lead, closely connected to public authorities. Our ITEA Founding companies and countries (IFCCs) are putting effort into organising the ITEA programme – co-design events, project evaluation, project steering and community events. Their great success is on the well balanced repartition of effort that can be seen between IFCs, other large industrial organisations, small and medium-sized enterprises (SMEs), research organisations and academia. In particular, the mobilisation of SMEs in this programme is incredible when you know the difficulties to ensure real SME involvement in such co-operative R&D programmes. We can say that an ITEA community is steady and is growing in strength.

This continuous involvement of IFCC experts in managing the ITEA programme has allowed us to build long term success, pushing a set of coherent projects around some important and successful themes – such as AUTOSAR, high-definition TV and Agile software engineering.

We have defined the ITEA scope with our Roadmap 3, but ITEA is clearly a bottom-up process. Project topics are coming directly from market needs. The administrative burden is kept as low as possible.

The only target of ITEA is to push the birth of top-ranked projects and the three key words are: market impact, innovation and flexibility.

Nothing is more important for ITEA than the research projects and their results. In this issue, we have selected a set of projects dedicated to security at home or in public. I am pleased to welcome in this issue articles on:

- **CANDELA** - detection of objects. The societal impact is to reduce the risk of criminal or terrorist actions;
- **CANTATA** - complex scene analysis. The added value is on the semantics to solve the analysis of multiple objects in a complex scene;
- **ViCoMo** - 3D analysis for security. A new era of multi camera, 3D and semantics allows better quality for surveillance systems;
- **SERKET** - multisensor scene analysis. SERKET developed a data fusion algorithm to enhance the security systems; and
- **GUARANTEE** - dedicated to home monitoring to reduce the number of home accidents. The technological focus is on sensor, signal processing and situation awareness for home command and control.

Behind any successful project, there are always the men and women who innovate and lead the team. It is my pleasure to honour in this issue William Vanobberghen, one of our best project leaders who, with his project team, has opened the door for the upcoming Single European Payment Area.

Take pleasure in reading all the innovations described in this issue and I am definitely sure that you will be convinced by the uniqueness of ITEA.

Sincerely yours,

Philippe Letellier

Philippe Letellier
ITEA 2 Vice-Chairman

Focus on Germany

Software-intensive systems crucial to German industry and to European competitiveness

The German government attaches great importance to information and communications technology (ICT) which generates annual revenues of €145 billion and provides 800,000 jobs in Germany, according to Maximilian Metzger, Director for ICT and New Services at the German federal ministry of education and research (BMBF). Software-intensive systems play a crucial role in adding value to products, production and business processes. Germany invests heavily in ICT research and is a keen supporter of cross-border co-operation in this key area for future European competitiveness. Specific support is available for SMEs.

"ICT technologies are today's most important innovation drivers and the origin of around 11% of new product developments," points out Metzger. "Our software market has shown steady growth and German companies have attained a lead in international markets with innovative solutions. This competitive advantage must be sustained, expanded and enhanced."

Germany provides wide-ranging support for ICT as part of its 'high-tech strategy'. The BMBF 'ICT 2020 – Research for Innovation' programme is providing €1.5 billion over five years for research in the principal application areas where ICT drives innovation and contributes significantly to overcoming societal challenges. In addition to the ICT sector itself, these include the automotive industry, mechanical engineering, healthcare, logistics and energy.

ICT 2020 focuses on strategic partnerships and innovation alliances between industry and science as well as on the promotion of small and medium-sized enterprises (SMEs). ICT companies and research facilities work closely to turn innovative developments into concrete applications.

In the past year, the Federal Government increased the annual budget for R&D from €9 billion to about €12 billion to stimulate growth and overcome the economic crisis. Additionally, economic stimulus packages provide substantial investments in education, research and innovation at large. ICT research profits of these measures substantially.

MAKING LIFE A LITTLE EASIER FOR SMEs
SMEs are in the vanguard of technological progress in many areas. However, the risks associated with cutting-edge research are often difficult for SMEs. The BMBF introduced the 'KMU-innovativ' scheme to ease their access to research funding. "This programme has simplified application and approval of national funding for SMEs," says Metzger. A central support service offers assistance and fixed processing durations allow reliable planning.

Through KMU-innovativ, the BMBF is supporting cutting-edge research in important areas, such as biotechnology, nanotechnology, ICT, production technology, optical technologies and technologies for the efficient use of resources and energy. In software systems, a total of 629 project proposals had been submitted from SMEs by the end of 2009. Of the groups involved, 582 SMEs – 52% – were seeking to participate in funding programmes for the first time.

IMPROVING EUROPEAN COMPETITIVENESS
BMBF funding for European co-operative research aims at improving competitiveness in key technologies – not only in Germany, but in the European Union as a whole.

"EUREKA and the EU Framework Programme enable the German ICT industry to access international market-oriented co-operation projects," explains Metzger. "This taps the full potential of experts, knowledge, institutions and financial resources in Europe to solve international challenges and fosters development of European standards and infrastructures. We therefore support European co-operation projects as an important complement to our national funding activities in software-intensive systems, aiming at improving both Europe's and Germany's competitiveness."

Metzger sees ITEA 2 as an important instrument for European co-operation in software-intensive systems

and services. "ITEA 2 projects are well suited to achieve fast exploitation of research results," he says. "Funding of such projects is a meaningful complement to our national research strategy. Synergies emerging from fruitful collaborations create an added value for all project partners in their own countries."

Examples of successful collaboration include the ITEA EAST-EEA and MODELISAR projects which have achieved and are still continuing to achieve important results for the automotive industry. "The results of EAST-EEA formed the basis for the automotive industry's AUTOSAR initiative, an European industry platform," says Metzger. MODELISAR will provide an integrated environment enabling automotive systems to be designed using MODELICA, the powerful open language for systems modelling developed in Europe. "AUTOSAR, setting worldwide standards, could only be successful because of its European orientation. This example clearly shows added value generated in transnational co-operation."

NEW INNOVATION PUSH AT EUROPEAN LEVEL REQUIRED
Metzger would like to see a new innovation push for R&D at European level because growth can only come from new ideas and smarter products. For best performance, different funding instruments are necessary. "We need instruments taking a long-term perspective that offer the best conditions for bundling resources, and we need flexible instruments which allow us to mobilise resources very quickly. These instruments should be based on the flexible co-operation of networks such as EUREKA Clusters," he says.

Although the coexistence of EUREKA Clusters and EU Joint Undertakings would appear comfortable for the potential beneficiaries, it does not mean more funding is available, since in many cases they are funded under the same thematic national programmes – not only in Germany. A number of aspects need to be discussed with regard to the development of the funding instruments, for example a clear definition of the interfaces of the various funding schemes in Europe.

"We are ready to share our experience with our successful high-tech-strategy in these discussions," concludes Metzger. "We actively support the development of clear strategic profiles for both ITEA and ARTEMIS to achieve co-ordinated actions."

SUCCESS OF SMEs IN INTERNATIONAL NETWORKS
An interesting example of a German SME that has participated in an international ITEA consortium

is MAGMA GmbH, which pioneered use of casting simulation in the 1980s, a major innovation in a highly traditional industry. This Aachen-based company works closely with foundries, casting designers and casting users. It focuses on the prediction and optimisation of the physical processes using simulation for steel, cast iron and non-ferrous castings; sand and die casting processes; core shooting; and casting component design.

Casting process simulation has helped to put the German foundry industry in the global vanguard in terms of productivity and quality. With 87,000 employees in 600 foundries and revenues of €14 billion, Germany is number one in Europe and number five worldwide. The casting industry also plays an important role in other key sectors such as automotive and mechanical engineering.

MAGMASOFT® software is used to optimise the complete production process from design through casting up to finishing. In addition to developing and marketing MAGMASOFT® software and the latest MAGMA[5] product, the company offers engineering services for the design and optimisation of cast components and casting processes.

DEVELOPED AS INDUSTRY STANDARD
MAGMA software has become an industry standard worldwide, used by 1100 companies in 51 countries. The continuous pressure to speed up developments and improve productivity requires the exploitation of the latest hardware platforms and IT concepts.

"Being able to look inside casting moulds using simulation revolutionised how castings components are developed and produced," explains Wilfried Schaefer of MAGMA. "Companies have saved a lot of money through deeper understanding of casting technology." The basic need in casting process simulation is to solve differential equations – requiring tremendous computer power. MAGMA models the whole production process, starting with filling of the mould, solidification and cooling, heat treatment and machining, including the development of stresses.

"Our vision is to consider all the physical processes in development and production, and there is continuous pressure to work ever faster," he says. "We wanted to take maximum advantage of new multicore architectures and so participated in the ITEA ParMA project. This has helped through the development and early access to the new tools for analysis of correct performance. These tools are very good and

we have increased the performance of our software significantly."

MAGMA was no newcomer to international co-operative projects and is convinced of their advantages to SMEs. Participation in ParMA was at the instigation of project leader Bull via a MAGMA customer. ParMA developed advanced technologies to exploit fully the power of multi-core architectures for high-performance computing. As one of the end users, MAGMA could use the tools being developed and provide feedback on industrial needs. ParMA thus shows how the development of software technologies in European co-operation, being advantageous for all project partners in different application fields, successfully fosters Europe's competitiveness in many application areas, not only in ICT itself.

More information:
www.bmbf.de
www.parma-itea2.org
www.magmasoft.de

Programme status

New projects of
Call 4

A2NETS
ACDC
ACOUSTICS
AMALTHEA
DIAMONDS
FF4L
FFCC
H4H
IMPONET
ISN
JEDI
LIFEWEAR
MEDIATE
MSS
OPENSAAS
RECONSURVE
SPY
TIMMO—2—USE

Programme status

The new projects of Call 4
A wide range of domains

A2NETS
Autonomic Services in M2M Networks
Project leader: VTT (Finland)

A2Nets tackles increasing complexity in machine-to-machine (M2M) systems and strongly fragmented vertical M2M markets. Complexity will be handled using autonomic computing. Market fragmentation will be tackled by developing common technical and standardised horizontal infrastructure solutions applicable to different domains. Using the same technologies would save costs, enable interoperability and boost growing M2M markets. Solutions will be evaluated in four business cases: car-sharing telematics; industrial production; smart metering; and wellbeing.

ACDC
Adaptive Content Delivery Cluster
Project leader: Thomson Grass Valley (France)

ACDC will develop and demonstrate an adaptive content-delivery cluster and intelligent user-aware applications based on a heterogeneous cloud-computing infrastructure for large-scale digital-content processing, storage and delivery. Applications will include novel user-aware multimedia and entertainment applications, such as web and mobile TV, video on demand, personal video recording and targeted advertising services over variety of networks to terminals such as set-top boxes, personal computers and mobile devices.

ACOUSTICS
Acoustic wave application for the analysis of the quality and safety of porous food and non-food matrices

Project leader: Kaunas University of Technology (Lithuania)

ACOUSTICS will develop an analytical tool and algorithms based on propagation and reflection of acoustic waves to characterise the structure of porous matrices and to determine rapid and non-invasive changes of micro structure by advanced acoustic spectrometers. Applications include food – such as contamination of grains and baking texture – and non-food products, including building materials and surface defectoscopy.

AMALTHEA
Model Based Open Source Development Environment for Automotive Multi Core Systems
Project leader: Bosch (Germany)

AMALTHEA is developing a consistent, open, expandable tool platform for automotive engineering based on the model-driven approach. Specific features are support for multi-core systems to be used in electronic control units (ECUs) in cars, combined with product-line engineering and AUTOSAR compatibility. The tool platform developed will be distributed under an Eclipse public licence.

DIAMONDS
Development and Industrial Application of Multi-Domain Security Testing Technologies
Project leader: Fraunhofer (Germany)

DIAMONDS will leverage systematic, model-based testing and monitoring to make possible highly secure systems by early testing and test automation. Advanced model-based methods will allow early identification of design vulnerabilities and efficient system/test design targeting security aspects. The methodology will be adaptable to different multi-domain security standards and enable risk-analysis-oriented test generation and risk assessments by evaluation of test results.

FF4L
Food and Fit for Life
Project leader: Philips (the Netherlands)

FF4L will investigate use of ICT to provide personalised, actionable solutions which motivate people to adopt a healthier lifestyle at home or on the move. ICT technologies will be combined with cutting-edge knowledge of nutrition science, psychological-motivational theories and user-centred development approaches to help people make healthier choices regarding their diet and daily activities.

FFCC
Family, Friends & Colleagues Connect
Project leader: Philips (the Netherlands)

FFCC explores, extends and introduces technological solutions to support enhanced inter-personal and group interaction acknowledging the diversity of personal needs, preferences and interests. The aim is to allow people to get in touch in natural and easy ways, to share activities while being apart, to meet when close and to work co-operatively in an easier way.

H4H
Hybrid4HPC
Project leader: Bull (France)

H4H will provide compute-intensive application developers with a highly efficient hybrid programming environment for heterogeneous computing clusters composed of classical processors and hardware accelerators. This environment should facilitate the development process of high-performance computing applications. The result should be a comprehensive, innovative, integrated and validated set of programming models, methods and tools to harness heterogeneous architectures.

IMPONET
Intelligent Monitoring of Power Networks
Project leader: Indria (Spain)

IMPONET will provide essential cornerstones to achieve a comprehensive, flexible and configurable information system to support the most complex and advanced requirements in energy management that will improve the stability of the whole electrical systems. It includes the modelling, design and implementation of the two main targets of IMPONET: power-quality monitoring and the remote-control-and-smart-metering platform.

ISN
Interoperable Sensor Networks
Project leader: Advantic (Spain)

ISN will create a wireless sensor network (WSN) based semantic interoperability platform, tested and validated in a selected set of vertical applications to enable future growth and consolidation in a key network sector. The key factor in these applications will be common, open information storage and search extent for all devices, regardless of their specific implementation technology.

JEDI
Just Explore Dimensions
Project leader: PACE (France)

JEDI is determining how 3DTV will develop and evolve for consumers. It will study the multi-view concept to identify issues and challenges and set-up a high quality end-to-end chain – Internet TV and cable – as a first step to multi-view, allowing evaluation of quality and acceptance. A user-centred approach will complement the technological and business orientation, leading to a comprehensive picture of the potential and future of 3DTV.

LIFEWEAR
Mobilised Lifestyle with Wearables
Project leader: Mobilera (Turkey)

LifeWear intends to improve the quality of life by integrating wearable devices into daily living to simplify use of electronic devices such as mobile phones and TV sets. The project will build on use scenarios and business models created by the consortium. In addition to technology to enable applications, user interaction will be a key topic as user acceptance is crucial.

MEDIATE
Patient Friendly Medical Intervention
Project leader: Philips (the Netherlands)

MEDIATE will increase productivity and effectiveness in healthcare and reduce patient risk and discomfort by supporting healthcare professionals in the transition from invasive, open surgery to minimally-invasive, image-guided intervention and treatment (IGIT). Clinical demonstrators for different disease areas will incorporate advanced technologies in imaging, analysis decision making and workflow management.

MSS
My Social Sphere
Project leader: Telefónica I+D (Spain)

MSS will develop a coherent architecture to integrate information from various sources, from social networks, blogs and forums to websites in general to understand how users interact with the Internet. Such information can be used for a wide range of applications such as brand communication, product recommendation, services or social activities and event detection. The effectiveness will be demonstrated in a wide brand-communication strategy.

OPENSAAS
European Framework for Software as a Service
Project leader: Gesfor (Spain)

OPENSAAS will develop an open-source software-as-a-service (SaaS) framework and platform for the European software-intensive systems industry to revolutionise the transformation from the development of traditional on-premise applications to SaaS-based applications and services. The project envisions innovating on new SaaS-valuable methods, models and technical solutions.

RECONSURVE
A Reconfigurable Surveillance System with Smart Sensors and Communication
Project leader: Aselsan (Turkey)

RECONSURVE addresses the need to control the rapidly increasing number and complexity of maritime-surveillance issues such as illegal immigration, interoperability between heterogeneous systems and automated cost-effective and efficient decision support. The objective is to develop an open interoperable maritime-surveillance framework with multimodal sensor networks to improve EU maritime security.

SPY
Surveillance improved Systems
Project leader: EADS (France)

SPY will design, develop and test a new automated intelligent surveillance-and-rescue framework, adapted to mobile environment and public safety force needs. It will define embedded intelligent solutions to minimise the amount of information to transmit over the wireless networks by adapting and extending state-of-the-art video/audio algorithms that normally exist as PC-based implementations to mobile and unpredictable contexts.

TIMMO-2-USE
Timing Model – TOols, algorithms, languages, methodology, USE cases
Project leader: Volvo (Sweden)

TIMMO-2-USE addresses significantly increased automation for more predictable development cycles to reduce development risks and time-to-market substantially. It will address the specification, transition and exchange of relevant timing information throughout different steps of the AUTOSAR-based development process and tool chain to increase reliability, safety, robustness and fault tolerance by a much higher degree of design automation.

Intelligent surveillance systems improve security and safety

Software-driven analysis of surveillance data from closed-circuit TV cameras and audio pick up systems to pressure sensors can help protect citizens and property against criminal and terrorist attack as well as increase the safety and wellbeing of the young, the elderly and the disabled. Several completed and continuing ITEA projects have and are playing an important role in the development of improved smart security systems that can help protect us and prolong independent living while also reducing the costs to society as a whole.

PUBLIC SECURITY

From intelligent surveillance to in-home safety systems

Concerns about terrorism have led to a growing desire for video surveillance to improve security for citizens and property and to allow back-tracking of events for criminal prosecution. Such security surveillance has become even more important following the events of 9/11 — the terrorist attacks in the USA on 11 September 2001.

The economic relevance of such surveillance has been highlighted in market research by companies such as IMS, Frost & Sullivan and J.P. Freeman. They forecast annual growth rates of 60 to 70% with the market for IP-based surveillance set to reach €4.7 billion in 2012.

However video surveillance has its limits. And with the trend to centralise surveillance operations, the shear mass of information can be totally overwhelming — especially with the growth in Internet-based security networks. A series of ITEA projects have developed ever more powerful video processing chains to increase the intelligence of the cameras involved as well as combining data from a variety of sources to enable the system itself to recognise security risks and take action.

These projects address three key improvements:
1. **CANDELA** developed technology to detect single objects such as an abandoned suitcase at an airport;
2. **CANTATA** added semantics to make it possible to identify and react to situations such as a bank robbery out of a sequence of moving objects; and
3. **ViCoMo** is now working on detecting behaviour of objects, persons and events in a 3D view taking the context into account by means of multi-camera video processing.

DEVELOPING CONTENT-AWARE SYSTEMS

CANTATA has made digital video processing systems content-aware to ensure optimal use of data in the shortest possible time. It exploited advanced analytical algorithms for content interpretation, a scalable platform facilitating analysis across a wide range of applications, and content presentation that adapts to the device, user and content. The first phase of video-content analysis (VCA) in CANDELA dealt with finding single objects based on specific features. Examples are identifying cars in a bus lane and detecting persons. The information architecture was based on a modular processing system in which one module communicated its findings to the next in a processing chain.
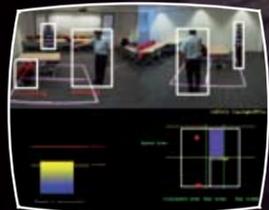
In CANTATA, research concentrated on classifying the actions and interaction of a number of objects and/or scenes. An example is bank-robbery detection, where a number of persons and their interactions create a dangerous situation; the interaction between these persons determines how the system should respond. The information architecture is based on a modular platform that is particularly suited for content analysis.

HUMAN INTERPRETATION NECESSARY

Surveillance applications often involve multi-camera security installations that function 24 hours a day, 7 days a week to secure areas, identify incidents arising and facilitate criminal investigation. However, such systems have no notion about content; some form of human interpretation is currently required to make full use of the data emerging.

Security officers in video-control rooms face an ever-increasing number of screens that are just not possible to control without some form of help. Embedded content-awareness technology can offer this assistance. CANTATA examined the economic feasibility of enabling systems to be aware of the content and to use this knowledge to establish an action or control the environment autonomously.

"We had a series of hurdles to overcome," explains project co-ordinator Egbert Jaspers of ViNotion — a high-tech spin-off from TU/e that specialises in automation systems based on VCA. "Project developments included: algorithms to analyse content in different domains; a platform able to run functions for different application domains; how to

offer the functions to users in terms of visualisation and user interaction; and methodology for validation of content-aware products."

Key results included:
- An intelligent surveillance camera providing advanced VCA combined with state-of-the-art video compression for streaming over Internet; and
- Robust software algorithms able to recognise the posture of human beings, allowing detection of abnormal behaviour such as a bank robbery. Such modelling of video content allows robust behaviour analysis and solid reasoning for decision making.

SHARING COMMON VALIDATION METHODOLOGY

CANTATA initiated the development and sharing of a

Identifying threats to public security

The ITEA SERKET project developed an innovative open software platform to automate processing, fusion and analysis of information from a wide range of sensors – from video-surveillance cameras and microphones to badge readers and intrusion detectors. The objective was to provide security operators at public events with timely warnings for effective preventive actions.

Public-order control at major events is complex since it depends on several factors: the presence of crowds or small violent groups, the variety and severity of

The project focused on adapting existing hardware and software, including cameras and other sensors, commercial off-the-shelf (COTS) mediation middleware,

strong need to improve the quality of the detection of alarms by both reducing the false alarm rate but also by detecting alarms from weak signals delivered

CANTATA
ITEA 05010

Egbert Jaspers
Project co-ordinator, Philips
Director, ViNotion

Partners		VTT — Technical Research Centre of Finland	Project start October 2006
Acic	Prodrive		
Barco	Solid		
CodaSystem	Telefonica	**Countries involved**	**Project end**
GoodMood	Traficon	Belgium	September 2009
CRP Henri Tudor	University of Eindhoven (TU/e)	Finland	
I&IMS	University of Kingston	France	**Project website**
IBBT	University of London (Queen Mary College)	Luxembourg	www.itea-cantata.org
INRIA	University of Paul Verlaine	The Netherlands	
Logica	University of Pompeu Fabra	Spain	
Multitel	VDG	United Kingdom	
Ortikon Interactive	VICOMTech		
Philips			

SERKET
ITEA 04005

François-Xavier Josset
Project leader, Thales

Partners			Countries involved
4C Technologies	INRIA Sophia-Antipolis		Belgium
ACIC	Ministry of Interior of Finland		Finland
Atos Origin	Ministry of Interior of France		France
Barco	Multitel ASBL		Spain
Bull	Nethawk		
Capvidia	Thales Research & Technology France		**Project start**
CEA – LIST	Thales Security Systems		December 2005
Deltabit	Universidad de Murcia		
EADS Defence & Security Systems	Uphill		**Project end**
Faculté Polytechnique de Mons	Vrije Universitei Brussel - ETRO lab		November 2007
INDRA Sistemas	Vrije Universiteit Brussel - MECH lab		
	VTT - Technical Research Centre of Finland		

common validation methodology with the community of content-aware system developers. Common data sets have been made available on the Internet. And the content-aware technology developed in CANTATA was validated according to this methodology.

Dutch SME VDG Security was able to launch an intelligent surveillance camera based on the technology developed. The project results have also been incorporated into VDG multi-camera and VCA channel video-surveillance systems which are used extensively for public transport and event surveillance. Recent applications include a video-surveillance system covering the entire metro network in Charleroi, Belgium and a 300-camera installation with 140 channels of VCA for the Formula One racetrack in Dubai.

More information:
www.itea-cantata.org

potential threats, the site layout, the control level of surveillance hardware, availability and ease of co-ordination of security forces, and overlapping demands of simultaneous activities.

Video surveillance is often used to provide evidence for criminal prosecutions, but there is a growing need to prevent risk situations developing in the first place. The problem is that the amount of information provided to central command-and-control rooms is overwhelming, making it impossible for security personnel to react in real time.

By analysing automatically the information supplied by different sensors – such as video-surveillance cameras, intrusion detectors, access control barriers and microphones – SERKET made 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.

robust video-content analysis algorithms for intrusion detection and standards for dynamic 3D display. But it also designed several innovative functions, 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.

The SERKET platform uses the latest technologies and standards — service-oriented architecture, mediation middleware and complex event processing for information fusion. This enables the innovative software layer to match the needs of both low-level processing algorithms and upper-level applications such as information filtering, correlation and combination for threat assessment and situation picture display.

It is hard to evaluate the overall business impact of this approach to active security as opposed to current passive security approaches. However, there is a

by standard sensors. The SERKET platform enables answering those needs and is expected to penetrate the security market rapidly and deeply.

Thales, co-ordinator of this project and also in charge of the Complex Event Processing module development, will use the results of this project by incorporating this new functionality in its next generation of security supervision solutions.

Ongoing project • ViCoMo

Three-dimensional analysis
ensures clearer view for security

As video-content analysis (VCA) becomes more affordable and usable, companies worldwide are competing for market share. However, most state-of-the-art solutions are based on single-stream video analysis, where a possible coupling of multiple cameras is provided only through user interaction. The ITEA 2 ViCoMo project intends to combine global localisation in three dimensions using multiple cameras. Choice of content-analysis algorithm will be up to the system itself.

ViCoMo
ITEA 2 08009

Egbert Jaspers
Project co-ordinator, Philips Director, ViNotion

Partners
Acciona Transmediterrannea
BVS
CEA LIST
CycloMedia Technology
I&IMS
Innova Vision Systems
INRIA
KEENEO
Mobilera
Philips Applied Technologies
Philips Consumer Lifestyle
Philips Research
University of Eindhoven (TU/e)

Thales
Tilda Communications
University of Barcelona (CVC-UAB)
University of Catalonia (UPC)
University of Valencia (UPV)
VDG Security
Vinotion
Vistek
Visual Tools
XLight

Countries involved
France
The Netherlands

Spain
Turkey

Project start
September 2009

Project end
August 2012

Combining 3D global localisation using multiple cameras with 3D presentation and navigation makes it possible to provide security controllers with an orderly overview of the situation. This will improve the controllers' effectiveness and the quality of their decision making. Adding real-world locations will help ViCoMo partners to open new opportunities within the surveillance market. A direct example of such a new market is crime analysis by the police and forensic institutes.
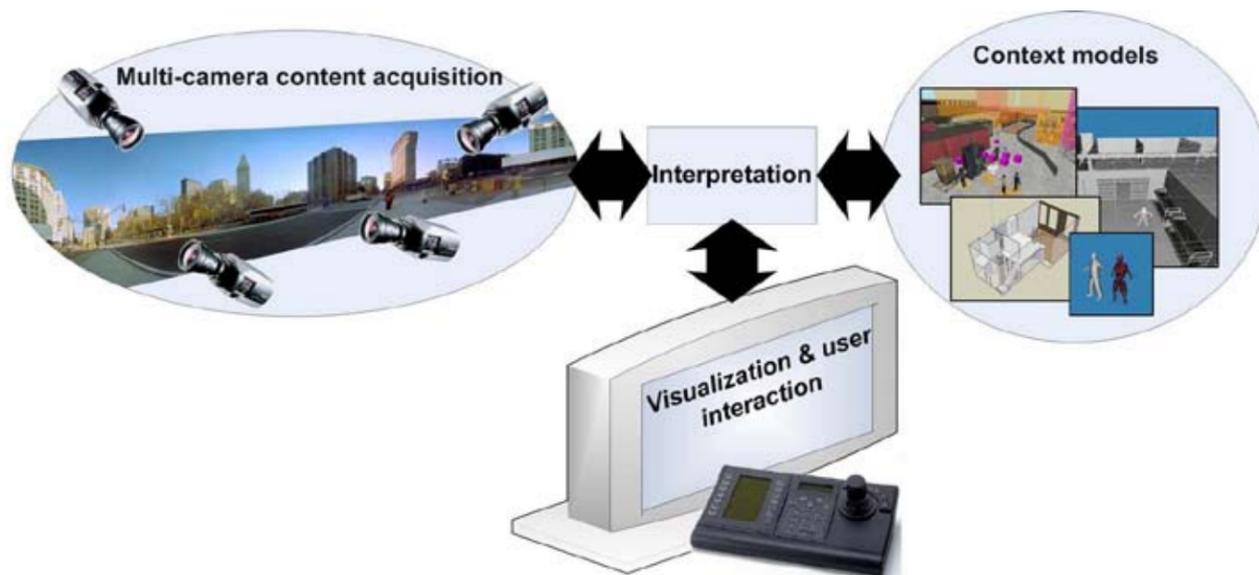
Apart from 3D reconstruction, deployment of multiple cameras can be used to observe greater detail. "The assembly of cameras acts as an omni-directional vision entity rather than independent observers," explains project co-ordinator Egbert Jaspers. "The system contains several content-analysis algorithms such as object tracking, human skeleton extraction and group behaviour analysis."

The system comprises an arrangement of different algorithms that perform coordinated actions for example to control autonomously the pan-tilt-zoom operation of the cameras with the final objective of building an extensive model of the visual context.

VIDEO-CONTENT ANALYSIS

Video-content analysis (VCA) is becoming widespread in surveillance systems. The enhanced interaction with users and environment means the complexity of such systems is increasing rapidly. "Systems in the past comprised simple operations that could be switched on and off," points out Jaspers. "Now these systems are highly adaptive to the settings and conditions or sensor signals they receive or transmit. An example is a surveillance system that sends an alarm and starts recording depending on specific object detection."

Although adaptation to internal system conditions and the external environment of such intelligent complex systems is desired, the amount of information that is used for this kind of intelligence is in practice limited, and the decisions of these systems are based on many implicit assumptions. This is where state-of-the-art intelligent systems currently fall down compared with human decision making: the context of information on which the adaptive behaviour is based is completely ignored.

"ViCoMo focuses on the construction of realistic context models to improve the decision making of complex vision systems," says Jaspers. For example, a human can instantly recognise a friend at a long distance, whereas an intelligent camera system would require face recognition from a close-up picture of the person. Not only are humans better able to recognise objects or events, but also 80% of their decision making is based on the context.

"Without explicitly reasoning about it, you instantly recognise your friend by combining various information signals, even though you cannot see any details from the face," adds Jaspers. For example, many other hints or cues are used subconsciously: height, manner of walking and style of clothing or the fact the friend lives or works in the neighbourhood, the time of occurrence fits his/her normal presence or his/her car is in the vicinity.

The principle results of ViCoMO will be:
- 3D environment modelling;
- Context- and metadata-centred output rather than video results;

- High-semantic reasoning; and
- Information filtering significantly improving information efficiency.

By modelling the context in which visual systems are used, ViCoMo will significantly improve their intelligence. Where state-of-the-art systems fail, ViCoMo will correctly recognise the behaviour of persons, objects and events in a 3D view. The key focus is therefore faithful image content interpretation using multiple cameras and context information.

ViCoMo concerns an enabling technology rather than an application and the resulting analysis system will be highly attractive for many areas. The consortium already aims at exploiting the context-modelling technology in domains such as: observation for surveillance and team training; 3D modelling of the real-world environment; observation of human behaviour for system control; and logistics control for traffic and transportation. All consortium partners will exploit the technology for their own products in their own domain.

In both images we see the same car but in totally different contexts. To automatically detect the danger of the approaching tram, the context of the image should also be taken into account.

Cutting healthcare costs
is no accident

Statistics show that as much as 6% of the European population needs hospital treatment every year after a home or leisure accident. This is not only a painful experience on a personal level but can also be costly for society in medical terms. The ITEA 2 GUARANTEE project intends to use smart technology to prevent accidents, particularly in the home environment.

A

Grandpa lives alone

He uses a Personalized Automated Emergency Response system
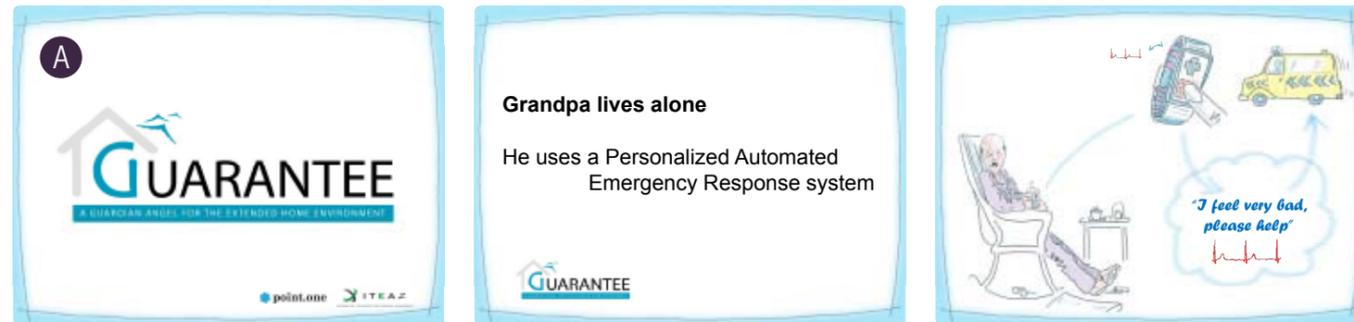
"I feel very bad, please help"

Figure A, B & C *Guarantee scenarios*

Taking into account medical treatment alone, the cost of home accidents exceeds €100 billion annually in the EU and €175 billion in the USA. Cutting such accident levels in the EU by 10% would offer €10 billion in medical savings. It would also improve life for the many thousands that would otherwise be suffering.

"Current approaches are relatively simple, our intention is to use smarter technology," explains project leader Bart van Rijnsoever of Philips Research. Existing safety products such as a fire or burglar alarm detect

dangerous situations while video cameras or panic buttons allow surveillance. GUARANTEE will add the intelligence to interpret human behaviour in context to prevent accidents from happening.

Software leverages the capabilities of existing sensor components, connectivity and communications infrastructure. The ITEA 2 project will develop signal-processing and decision-making algorithms for specific home safety situations. Furthermore, the project will develop the software architecture for in-home safety
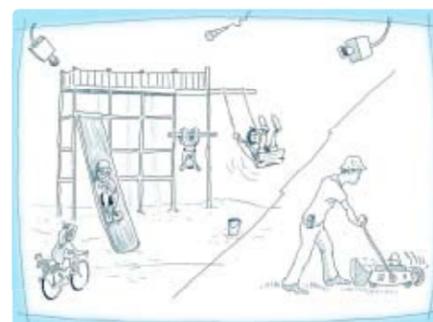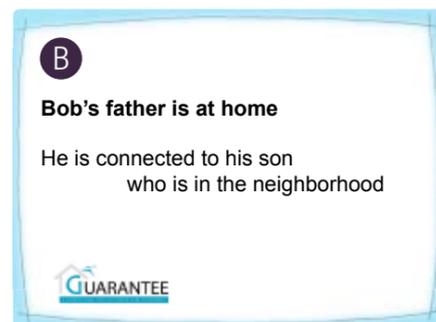
GUARANTEE
ITEA 2 08018

Bart van Rijnsoever
Project leader, Philips Research

Partners
Actimage
Altfactor
Armakom Bilisim Teknolojileri Yazılım
Arvento Bilisim Mobil Otomasyon Sistemleri
Bonavita/Well Life Center
COMmeto
Eagle Vision Systems
ESI - European Software Institute
ETIC - Embedded Technologies Innovation Center
Forthnet
Ibermática
iDeal Techologies
Innohome
Kaunas University - Fundamental science faculty
Kaunas University - Geriatric Clinic
Kaunas University - Institute of Cardiology

Laurea University of Applied Sciences
Noldus Information Technology
ORANGE LOGIC
Philips Applied Technologies
Philips Consumer Lifestyle - iLab
Philips Research
Rinnekoti-Säätiö
SIVECO Ramania
Sound Intelligence
Spikes
Technological Education Institute of Crete
UAB Kardiosignalas
Universidad Politécnica de Madrid
University of Deusto
University of Twente
Videra
Visual Tools
VTT – Technical Research Centre of Finland

Countries involved
Belgium
Finland
Greece
Lithuania
Luxembourg
The Netherlands
Republic of Korea
Romania
Spain
Turkey

Project start
September 2009

Project end
August 2012

systems, and for commercial and community-based home-safety services. User interaction is a key element for effective home safety operations.

GUARANTEE is focusing on the needs of babies, the elderly and the disabled. This involves three stages:
1. Sensing what is happening to people, using sensor technology software with a range of devices such as video cameras, microphones and pressure sensors;
2. Processing the resulting signals, using situational-awareness analysis algorithms; and
3. Taking action to help when necessary – such as controlling lighting automatically when an elderly person is trying to climb the stairs or improving the effectiveness of remote monitoring provided either by a support service, or family and friends.

To achieve all this, it is essential to develop a suitable structure and architecture as well as focusing on the signal-processing algorithms and situational awareness required to make decisions. Moreover, safety and security systems require a very high level of reliability.

"We develop solutions and products that are positive, that really help people all the time," adds van Rijnsoever. Moreover, the project wants to ensure that this intelligence monitoring is carried out in an unobtrusive and pleasant manner. Personal privacy is also being taken into account. Different ideas are being examined – such as a multimodal approach that would involve simple audio monitoring until a video channel is triggered by a call for help.

The three-year project involves universities, large companies and small and medium-sized enterprises (SMEs). The results will be demonstrated in two areas: one for children and the other for the elderly. Efforts will also be made to improve existing standards such as those of the Continua Health Alliance that involve use of smart technology to keep patients, caregivers and healthcare providers connected to manage health and wellness in the home.

B

Bob's father is at home

He is connected to his son who is in the neighborhood

C

Jane has a moment to relax

She knows that her baby is safe and supervised

Belgian card-payment interoperability
pioneer builds on commerce and computer science experience

William Vanobberghen
Head of International Projects, Groupement des Cartes Bancaires CB

Belgian William Vanobberghen is Head of International Projects at Groupement des Cartes Bancaires CB in Paris and first Secretary General of EPASOrg, established to drive global interoperability in card payments. The international non-profit organisation promotes the widespread acceptance of the protocols developed in the ITEA EPAS project, initially for the realisation of the Single Euro Payments Area (SEPA) in Europe.

A background in both commerce and computer science led William to his first job as banking technology adviser for the Belgian Bankers Association in Brussels where he was responsible for developing standards for banks. He was invited to join the European Savings Banks Group to lobby the European Commission and the European institutions on IT-related banking matters. He joined Groupement des Cartes Bancaires CB to defend chip cards in Europe. CB operates the interbank card payment and cash withdrawal system in France.

"Lobbying is nice but it can be difficult to show that your involvement has been instrumental in political decisions," he explains. "So it is a little frustrating in the long term as you don't actual create anything." This desire to create led him into a series of linked EU-funded projects. The first in 1996 was on use of chip cards to secure remote payments on the Internet. CB was working on a secure card reader and saw the interest in co-operating with Belgian electronic payment company BankSys — now part of ATOS Worldline.

SECURING INTERNET TRANSACTIONS
"Our idea was to develop a standard for securing Internet transactions with a card reader and to show interoperability between two different systems using the same process and protocols," says William. The project was funded through ISIS — an EU platform for developing standards. While successful, it was a little early as even today, since the market was not prepared to

pay an additional cost for an increased security. The experience of working with another organisation was interesting and CB learnt a lot about proposals and working with a European partner.

The FINREAD project took this work further in terms of security, protocols and defining a complete secure reader. This big project led to FINREAD Showcase which extended the promotion of the technology and processes in Asia and the USA. Embedded FINREAD looked at same principles in personal digital assistants (PDAs) and mobile phones. Then Trusted FINREAD developed the architecture for providing electronic X509 certificates to secure transactions.

EPAS was the first of William's projects not to be funded through the EU. "We wanted to develop a series of protocols to deal with exchanges between payment terminals and cash register machines in shops and the acquiring banks dealing with the merchants. Currently each country has its own protocols even though they have the same function." The objective was to support the development of a single payment area for Europe with a process that could be applied globally.

The idea came from CB but involved some other major card payment industry stakeholders which proposed ITEA to launch the project. "I had no experience of ITEA but saw the opportunity in the industrial orientation as we intended to develop a demonstrator and software," says William. He found a lot of interest and assembled some 20 European partners. The project passed all the hurdles and was selected. It was a bit more complicated in France

as the ministry was amazed to find a non-industrial company co-ordinating an ITEA project but the public authority was quickly convinced.

GOOD FEELING FOR BUSINESS
William finds some major differences between EU and EUREKA projects. "The major idea of ITEA is that it involves industrial partners that understand and have good feeling for business and so appreciate the value of a project," he emphasises. "This is quite different from the Framework Programme where those involved are not always business minded."

An important outcome of EPAS was the international not-for-profit EPASOrg that was established by the project consortium to take the results further with outside members. This organisation was established as a legal entity in October 2009 with William as the first Secretary General. A key objective is to support the approval of the process developed by the project in the ISO 2022 standard. CB is committed to pursuing this challenging objective of creating an open structure involving major actors in the card-payment industry.

William also maintains his technical interests that started with building his own computer with friends during his commercial studies. And he also keeps up his amateur radio hobby that has included developing use of packet radio operations.

Innovation Reports

D-MINT
(ITEA 2 ~ 06014)

Turning an academic testing discipline into an industrial reality

ESNA
(ITEA ~ 05023)

Developing effective business applications for wireless sensor networks

TWINS
(ITEA ~ 05004)

Optimising hardware/software co-design for software-intensive systems development

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D-MINT
(ITEA 2 – 06014)

Colin Willcock, Nokia Siemens Networks, Germany

Turning an academic testing
discipline into an industrial reality

The D-MINT project has turned the academic discipline of model-based testing into an industrial reality to cut the cost of producing complex software systems.

Demonstrators in industrial domains from street lighting to mobile phones clearly showed how such an approach can close the productivity gap in the cost-effective development of quality software. The resulting techniques are already being exploited in product development by several major European industries.

Quality is crucial to continuing European competitiveness. This requires a wide cross-section of software-intensive industries across many sectors to invest in and be the best at the development of complex software systems. Europe is challenged on hardware costs as it continues to be undercut by Asia. However, software is playing a greater and greater role in key industrial products. Half of the components in today's cars depend on software. And software is now the bottleneck in telecommunications as much of the hardware has become standard off-the-shelf components.

While the key to future European success lies in cost-effective and efficient development of complex software systems, 40 to 60% of the overall costs of turning that

software into a real product lie in testing. The ITEA 2 D-MINT project set out to develop a more efficient and more effective approach to testing complex software systems using a model-based approach.

In classical software testing, product and testing software are written in parallel. However, that involves the same level of complexity on the test side as on the product side. Moreover, the degree of reuse is virtually zero as the two sets of software are completely separate.

HIGHER LEVELS OF ABSTRACTION
Working at higher levels of abstraction with models rather than actual code makes it possible to reuse some of these models as the specification is in more

general terms. In addition to this reuse, another real advantage is that the modelling paradigm causes developers to actually think more at the beginning about what is being specified.

This means that more effort is invested in the initial specification phase and, because this is early in the development process, it is possible to actually save much time and effort because errors are detected far earlier. In other words, the classic advantages of model-based software development are also brought across to the testing side.

Model-based testing is not new, it has been investigated by academics for over 20 years. But this approach is not being used systematically and

pervasively in industry as there was a large gap between the academic work and industrial reality. While the academic approach is fine for thousands of lines of code and hundreds of states, a mobile phone needs software with millions of lines of code and 10,000 parameters.

D-MINT set out to resolve the problems and to turn an academic discipline into an industrial reality, with the necessary methodology, tools and training material to enable this approach to be used more widely.

The typical academic model-based approach applies the same language and tools throughout and therefore makes the tool integration very straight-forward. However, in the real 'industrial' world we do not have just one specification language, just one tool and just one level of abstraction. The basic requirements specification may be written in DOORS, the electrical system specified in MATLAB and software in UML – completely different specification languages with

development and real advantages were obtained in all the applications.

That all domains showed the same advantages gives great confidence that what has been developed is generically useful. This means that the results are not confined to specific areas such as mobile phones or automotive control units but can be applied to a very wide range of other industrial software developments.

Despite operating in so many different industrial domains, the results of the project were remarkable homogenous. The case studies indicated that adaptation efforts to model-based testing – such as initial training and integration into existing test processes – are high but are a one-off activity. They also showed that this approach is particularly beneficial for testing activities with several iterations.

The demonstrators involved parallel developments using classical and model-based testing approaches

the next version of its Softstarter control products as this approach proved significantly better than its current technology. And carmaker Daimler intends to use D-MINT technology for ECU software testing in the medium term.

Perhaps most impressive has been the case of Estonian ICT specialist ELIKO which has used D-MINT technology and tools for a street lighting control card that is now widely employed in Estonia.

The new board incorporates a GSM modem and a battery. The hardware had already been developed and the software for the CPU tested when the customer completely revised the specifications. The high cost of the lithium battery and the manpower required to change it led to a desire to save energy on the board when external power was not available and the battery voltage level has decreased to a level that can cause damage to the battery. This completely altered all the requirements at the top level. Using classical testing, it would have been necessary to start again with three man-months of effort

different semantics, different tool chains and different actual levels of abstraction.

One of the key innovations in D-MINT was the ability to extract the information from various different levels and various different abstractions of models and put that together into a single model-based testing framework.

ADVANTAGES ACROSS INDUSTRY
The new methodologies were found to offer many advantages when applied at an industrial scale and with industrial quality. Model-based testing was demonstrated successfully across a very wide range of domains in six separate industrial sectors. Applications ranged from street lighting control to video-conference units, from telecommunications to automotive control systems and from industrial engineering to machine tools.

Moreover, these techniques were used in real product

for direct comparison. Analysis of the real costs involved in time and investments across all the consortium members showed that not only could direct test costs be reduced by 15% using model-based testing, but that test coverage could be improved by 10%. This translates into an overall improvement of some 20 to 25% in test costs.

FAST EXPLOITATION POSSIBLE
While these figures may appear somewhat modest compared with some European projects, they can be backed up in real industrial cases with real figures and are more than sufficient to justify use of model-based testing. One result is that three tool vendors have already put their products on the market: iXtronics Toolbox, Testing Tech TTmodeler and Conformiq Qtronic.

Even more convincingly, several of the industrial partners are already starting to use the D-MINT techniques in their product development. Major industrial engineering company ABB has decided to use D-MINT results for

to get back to the current situation. Using model-based testing, working at a higher level of abstraction, ELIKO, working together with tool provider Elvior, was able to re-factor the models and generate the test cases needed with only ten days of effort.

In fact, after comparing the first iteration of the control board against classical software development, the effort for both approaches had proved to be about the same – not providing an overwhelming case for a switch. However, most of the effort with model-based testing was in the initial training – this learning phase should not be necessary in subsequent use. And this is exactly what happened with the radical redesign of the board.

So ELIKO validated that, when changes are made, D-MINT model-based testing is not just more efficient, but the greater the change, the more the improvement obtained.

More information:
www.d-mint.org

ESNA
(ITEA 05023)

Olle Olsson, SICS,
Sweden

Developing effective business applications
for wireless sensor networks

Results of the ESNA project have enabled effective development of business-oriented wireless sensor network applications with a standard architecture, technology and application-development guidelines, and proof-of-concept implementations. The open-source sensor network system architecture provides support for off-the-shelf sensor network nodes, including applications, software development kits and middleware services, based on documented interoperability specifications. And guidelines have been developed for dimensioning of networks, and type of nodes to use for different application domains, as well for requirements analysis and design at a systems level.

Wireless sensor networks involve the interconnection of matchbox-sized devices using radio communications. Such devices are becoming widely available as low-cost off-the-shelf elements and open up many new systems opportunities. They are battery powered and so very flexible as no power cabling is needed; they can be positioned where required and not where power happens to be available.

Moreover, the devices are multifunctional — nodes can be equipped with many different sensor capabilities, such as temperature, humidity, movement, radiation, gases and light. So each of these nodes can be a platform for many different uses — opening up a very broad spectrum of applications.

In addition, as they interoperate wirelessly, these devices establish their network dynamically. This means that if a node disappears, the system does not collapse. Instead, the rest of the nodes reconfigure themselves and continue. Such robustness is an important advantage.

CREATING FUNCTIONAL SYSTEMS
While such devices are becoming available in bulk quantities, mainly from Asia, the added value comes from the software that creates the system out of the individual components. The Swedish Institute of

Computer Science (SICS) realised the need for Europe to master this sector and found like-minded partners at the ITEA brokerage event in Barcelona in 2005.

The project was set up in ITEA as EUREKA encourages fast exploitation of project results. This enabled the ESNA consortium to develop solid technology with cross-border co-operation and push it to new levels to be able to satisfy concrete application needs subsequently.

ESNA had two different objectives:
1. To provide a strong and multifunctional advanced software platform which supports very flexible needs in applications from a technology push point of view; and
2. To create the application frameworks and architectures that support the needs in sectors such as:
  ▪ *Industrial applications*, mainly in the process industry, to monitor equipment wear for example as an unplanned stop in an industrial process can be very costly;
  ▪ *Monitoring physical space for safety* – for example detecting intruders in an enclosed space;
  ▪ *Next-generation home devices* – enabling consumer devices to interact wirelessly such as a fridge talking to a temperature-management system;

▪ *Construction/building automation* to control energy costs for heating, ventilation and air conditioning, providing a green approach to maintaining comfort;
▪ *Agricultural monitoring* for precision agriculture to manage irrigation, pesticides and fertilizers for optimum production without waste of resources; and
▪ *High voltage electricity transmission network* – proactively monitor the state of critical components in 110 kV and above networks to avoid disruption.

ENSURING STANDARDS COMPLIANCE
ESNA chose to be innovative in carefully selected technology areas. For instance, it looked at developing the basic generic platform – corresponding to the operating system in a computer – based on 'protocol' stacks for IPv6, which is the new Internet protocol standard. Above all, the ITEA project focused on being standards compliant but with innovative implementations – such as developing the world's smallest implementation of IPv6, ported to many different platforms.

A particular effort on innovation was made to reduce energy use. Wireless network devices are normally powered by AA batteries; ESNA looked at where

electrical energy is in used practice, and how use of energy can be optimised, so that the cost of changing batteries can be kept low.

The result was new software-controlled technology for very low power use to enable the devices to operate as long as possible on one set of batteries. This mainly involved optimisation of the radio communication between devices as radio transmission is much more demanding than computing. New methods were developed that are the most energy efficient currently available.

ESNA also worked on market-oriented frameworks for a series of specific areas. The project developed methods for interoperation with other IP environments as wireless sensor networks are not intended to operate as separate, stand-alone islands but rather as part of enterprise-wide IT environments. The ESNA system can now interoperate with a range of different environments and the devices fit smoothly into those environments.

This involved supporting industrial standards in various application areas – such as the WirelessHART open-standard networking protocol widely applied in industrial automation – and in building automation where stakeholders have yet another set of communications standards. All in all, at platform level, ESNA provided solutions that are innovative in terms of integrating other technologies and systems.

BUILDING EUROPEAN LEADERSHIP
A major achievement has been the development of a strong European lead in wireless sensor networks while this field is still emerging globally. On the basic software side, ESNA consolidated the open-source Contiki software. This highly portable, multi-tasking operating system is designed for microcontrollers with small amounts of memory and enables the development of memory-efficient networked embedded systems and wireless sensor networks. A typical Contiki configuration requires 2 kb of RAM and 40 kb of ROM.

The software was created using a set of tiny light-weight elements — much like Norwegian explorer Thor Heyerdahl's original Kon-Tiki expedition raft. What was a nice demonstration system when the

ITEA project started has now been consolidated and the open-source outcome is already being used by commercial actors who have picked up this as a very useful system for small devices.

On the applications side, the GAIA sensor node for precision agriculture was launched in Spain in 2009. And a spin-off — Ingeniería de Sistemas Intensivos en Software — also emerged in Spain using the technology developed in the ESNA project to target energy monitoring and management in the construction industry. The company involved is also looking at other new business areas based on the same technology toolbox.

In addition, several purely industrial components have been developed based on work in the project.

ABB for example now has sensors for use in process control that contain software solutions developed in this project. So ESNA has been highly successful from a concrete point of view in delivering things that are either being used as open source or are being marketed by specific partners.

Several members of the consortium are now working with new partners in a follow-up project which will reuse results and knowhow from ESNA. And SICS itself is heavily involved in other European projects that will take the software results further to validate them in different areas and develop the functionalities of the system.
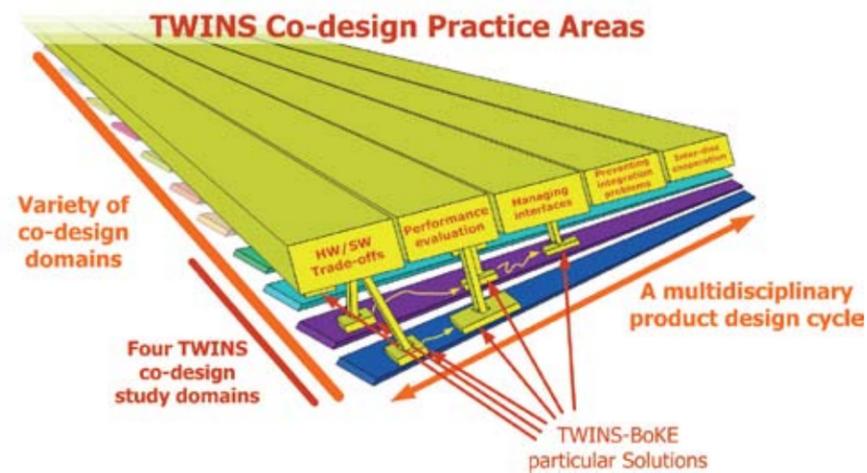
More information: www.sics.se/esna

TWINS
(ITEA 05004)

Dominique Segers, BARCO,
Belgium

Optimising hardware/software co-design
for software-intensive systems development

The TWINS project has elaborated a common set of methodologies and tools to simplify and accelerate the design, development and realisation of hardware/software intensive systems. The resulting solutions were generalised to provide practice areas to pinpoint bottlenecks and sources of quality problems in the hardware/software co-design lifecycle and help in the choice and tailoring of solutions according to specific domains and situations. These decision processes are based on real-life solutions for modern complex multidisciplinary product developments that have been proved in industry. The results of the project have already been applied widely in one of the major project partner's design processes.

TWINS Co-design Practice Areas

Variety of co-design domains

Four TWINS co-design study domains

TWINS-BoKE particular Solutions

A multidisciplinary product design cycle

With the ever wider proliferation of consumer electronics, the number of embedded systems is growing dramatically, while increasing in size and complexity. At the same time, there is a major trend to implement functionality increasingly in software. Design teams are using software to differentiate products, increase flexibility, respond to changing standards, enable inexpensive upgradability and get products to market sooner.

RE-EVALUATING FUNDAMENTAL DESIGN PRACTICES
This confluence of forces is confronting design teams with a host of new challenges – particularly designing hardware and software in concert – and encouraging them to re-evaluate fundamental design practices.

However, hardware/software co-design requires companies to face up to:
- An extended, discipline-independent design space,

posing challenges in the allocation of functionality to either software or hardware under given performance requirements in an efficient way;
- A wide range of different electronic, mechanical and software component that have to be highly integrated – often difficult to achieve in practice;
- Expensive prototyping that demands the maximum of verification and validation before building hardware; and
- Difficulties in modelling whole systems as different modelling paradigms, computational models and tools are used for various parts of the system as a result of the diverse engineering disciplines involved.

Specifically, co-design requires deployment of best practices in a seamless workflow but this is not easy. As technology gets deeply integrated in contemporary society, multidisciplinary designs are becoming omnipresent. Yet, academic engineering curricula are still predominantly monodisciplinary, as are the design methods and tools available, causing problems for high-technology industry.

FOCUSED ON INTEROPERABILITY
TWINS focused in the first half on interoperability of engineering methods and tools to decrease the gap between the problem and solutions. This involved

selecting, combining and extending mono- and inter-disciplinary co-design methods and tools used by the consortium partners, which included large and small companies, research institutes and universities.

The partners were grouped around the TWINS results in terms of application, knowledge and exploitation. Application partners posed and worked on their co-design needs and ideas; knowledge partners helped survey and categorise the needs and ideas, and proposed improvements of existing or contributed new tools/methods; and exploitation partners provided support for companies applying TWINS results both within and outside the consortium.

Major innovations are situated at two levels: development of new tools and methods; and/or integration of existing/extended tools and methods. For example: bridges were developed between well-established design methods such as SystemC and formal checking via the mCRL2 formal specification language developed by the Technical University of Eindhoven.

PRACTICE AREAS OFFERING DECISION PROCEDURE
A major outcome of the shared results is organisation of this very complex domain in a set of practice areas offering a decision procedure with the tools and methods to address typical problems. This allows a company to pinpoint bottlenecks and sources of quality problems in their hardware/software co-design lifecycle. They can then select and tailor solutions for the challenges identified according to their specific domain and situation.

TWINS generalised the Co-design Practice Areas from elaboration of the co-design imperatives in four typical domains covered by the consortium:
- Mechatronics;
- Balanced hardware, software and firmware;
- Information driven; and
- Electronic hardware modelling.

A sample co-design flow was proposed and tested for each of these domains. This offers a complete and integrated flow of solutions for the whole co-design process – a need clearly identified by the industrial partners. As each company-specific flow is different, the project worked on identifying flows that are tailored to the four domains selected.

Each of the domains' partners contributed their existing or extended tools to handle co-design domains workflows. By the end of the project, an analysis showed which methods and tools were the most useful also for inter-domain exploitation.

ACCESS TO KNOWLEDGE AND EXPERIENCE
When faced with a co-design problem, a prospective user is able to access the TWINS Body of Knowledge and Experiences (BoKE) in various ways to look efficiently for appropriate methods/tools or co-design experience. The TWINS Co-design Process Areas offer designers
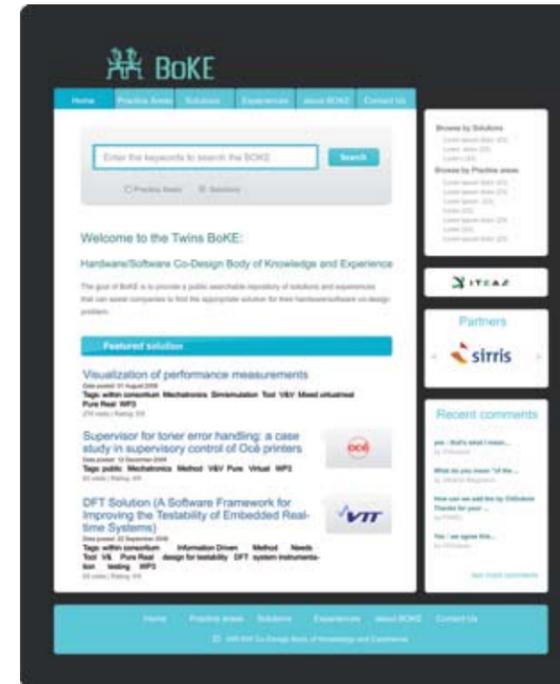
a method to access maturity in multidisciplinary co-design, and then identify the most useful results of TWINS to strengthen their own co-design workflows.

While not a commercial co-design platform, TWINS helped to build seamless co-design flows from existing fragmented solutions. It will have an important impact on users by helping in the faster selection of suitable architecture, avoiding integration problems and detecting any remaining problems earlier, so speeding time to market, reducing costs and improving quality of the shipped product.

TWINS BoKE makes an important contribution by providing a significant example of knowledge repository in the immature co-design super discipline. When

properly applied, TWINS Co-design Process Areas can provoke a rethinking of co-design processes and tooling in many high-technology companies.

Applications are numerous in industries as diverse as automotive, avionics, copiers and printers, electrical distribution systems and communications networks. The results of TWINS will enrich individual product offerings from tool and service vendors, help develop new advisory services for software-intensive product manufacturers and improve overall software-intensive product development in Europe.

REAL SUCCESS ALREADY ACHIEVED
TWINS directly addressed integration of several technologies that serve numerous and large markets. This ITEA project involved a consortium of European companies and research organisations with several global leaders in their respective fields. The integrating technologies chosen are state of the art in the targeted disciplines – such as model-driven development, formal methods and virtualisation in software engineering, visualisation in developing physical systems, and sophisticated analysis paradigms in integration of large-scale systems such as in telecommunications.

Several partner use cases executed during the project have already grown into real success stories. For example, by:
- Reducing project schedule overruns by more than 75% thanks to applying a co-design process that improved multi-disciplinary communication and interaction;
- Improving development efficiency by more than 10% thanks to the introduction of hardware/software interface simulation that reduced integration artefacts; and
- Cutting to all project design cost by 20% thanks to the use of emulation methodologies for concept validation that reduced the cost of making mock-ups/prototypes.

The impact of the project on how a large industrial development team manages its software development can be seen from its effect on imaging giant BARCO. This project partner has now based its new company hardware/software codesign methodology – used by all its development teams – on the TWINS results.

More information: www.twins-itea.org

News

Strong interest in CAM4Home
collaboration from FP7 NoTube project

The ITEA 2 CAM4Home project was invited to participate in the NoTube project meeting in Munich last December to present one of the main achievements of the project: the CAM4Home Metadata framework. The NoTube EU Seventh Framework Programme (FP7) project explores the future of the television in the ubiquitous web. It demonstrates a new generation of web services for context-dependent and personalised selection and presentation of TV content.

From a discussion between the two consortia, a common denominator has been identitied between NoTube and CAM4Home in the reliance on the metadata, which makes possible intelligent, community-oriented and interactive applications as targeted by the two projects.

The CAM4Home Metadata framework presentation received very positive feedback from the NoTube partners. In particular, they appreciated the lightness and the extensibility of the CAM4Home metadata model. CAM4Home also noted strong interest from several NoTube partners regarding the CAM4Home announcement of the creation and maintenance of the Open CAM4Home Metadata framework beyond the lifetime of the project. Several partners were very interested in using the services provided by the Open CAM4Home Metadata framework in NoTube application scenarios.

This interest from partners of NoTube encourages CAM4Home to reinforce the CAM4Home Metadata framework deployment efforts and will increase its usability.

More information:
CAM4Home: www.cam4home-itea.org
NoTube: www.notube.tv

Source:
CAM4Home Newsletter #3 – Marius BILASCO, CNRS, France

Metaverse1 project already
promoting real standards

During its first year, the ITEA 2 project Metaverse1 – Global standards among real and virtual worlds – has been active in its dissemination activities. From the start and even during the project-conception period, the project has been pursuing one of its major dissemination activities: a new standard with respect to interoperability with virtual worlds – that is is between the real and virtual worlds as well as between virtual worlds. This new ISO/IEC standard, initiated by the Metaverse1 project, is already reaching maturity and is known as ISO/IEC 23005 MPEG-V: Media Context and Control. It consists of seven parts: Architecture, Control Information, Sensory Information, Virtual World Object Characteristics, Data Formats for Interaction Devices, Common Types and Tools and Reference Software. Some of the parts have already reached the final committee draft (FCD) stage. Based on the activities related to this standardisation activity, a paper was submitted to the 2009 Networked and Electronic Media (NEM) Summit in Saint-Malo, France that received the 2009 Summit's best paper award. In addition, the project produced a compete issue of the on-line magazine 'Journal of Virtual Worlds Research' named 'Virtual Worlds: Technology, Economy, and Standards', based on a selection of many submissions on a call for contributions. Many of the selected contributions are from members of the Metaverse1 consortium; this online journal can be found at http://jvwresearch.org/index.php?_cms=1255457722.

More information:
www.metaverse1.org

ITEA 2 opened its fifth
Call for Projects

ITEA 2 opened its fifth Call for projects with a Project Outline (PO) Preparation Days event on 1 and 2 February at the Meliä hotel in Berlin, Germany.

Participation was higher again this year, with 30% increase over 2009. Some 280 people attended from 20 different countries. As expected, there was a strong presence from Germany, but there were also numerous participants from Finland, France, the Netherlands and Spain. The relatively 'new' ITEA 2 countries such as Egypt, Lithuania and Turkey were also well represented. The increase in participation shows the strong interest in funded research during the continuing economic crisis.

The interest in ITEA 2 Call 5 was not only shown by the higher number of participants in Berlin. Before the event even started, 66 project ideas had already been uploaded to the restricted PO Days website and 81 initial project idea presentations were sent in for the first group session presentations. Furthermore, over 40 posters were presented during the poster session. After discussions, this resulted in a total of 30 project ideas.

The event was highly appreciated and a lot of positive feedback was received from participants during the event. This appreciation was confirmed by responses to the online questionnaire sent out to all attendees. 40% of attendees responded and rated the event 4.0 on a 5-point scale. Particularly points highlighted included the usefulness of the group sessions with a high rate of 4.4 on a 5-point scale – this compares with 4.0 last year and clearly shows the value of the networking and brainstorm possibilities during the event.

The strong interest in Call 5 shown during the PO Days in Berlin was also visible in the number of submitted Project Outlines and their corresponding effort (deadline 26 March). Compared to last year, there was an increase of 42% in the number of projects, from 28 last year to 40 projects this year. The total effort in person-years augmented with 26% to a total of 5843 person-years and reached almost the same level as the effort of ITEA 2 Call 1: ITEA's biggest call ever with an effort of 5996 person-years.

The importance of the PO days was again evident as about 65% of the submitted Project Outlines was presented first during the event.

EUREKA: high profile events!

EUREKA Day – South-Korea

Korea's status as an 'Associate Country' of the EUREKA Network was announced at the 24th EUREKA Ministerial Meeting on 19 June 2009 in Lisbon, Portugal. Now, on 17 March 2010, a EUREKA Day was organised in Seoul, South Korea, organised by the Korean Institute for Advancement of Technology (KIAT), co-hosted by the Ministry of Knowledge Economy (MKE) and the German EUREKA Chairmanship.

The aim of this event was to promote the EUREKA Network within Korea. It also provided Korean and European research-focused organisations with a forum where they could promote their technological developments and meet potential EUREKA project partners.

The event included speeches from high-level public authorities – such as Chemin Rim, Vice Minister (MKE) and Georg Schütte, State Secretary, German Federal Ministry of Education and Research (BMBF) – and representatives from EUREKA, including Walter Mönig, EUREKA High Level Group Chairman and Luuk Borg, Head of the EUREKA Secretariat

The programme also included networking activities, matchmaking seminars and high-level presentations from several EUREKA Clusters and Umbrella. ITEA 2's Rudolf Haggenmüller was one of the speakers in these sessions.

Approximately 400 local engineers, businessmen and EUREKA representatives attended the event, with roughly 70 coming from Europe.

EUREKA and ITEA 2 at the Hannover Messe

For the first time, the EUREKA Network will be represented at the Hannover Messe – 19 to 23 April 2010. EUREKA will have a stand in Hall 2. Representatives of ITEA 2 will be present on the EUREKA stand, joining forces in promoting the Network and its Clusters. A matchmaking event involving a number of EUREKA/Cluster experts sharing their experience will also take place on the EUREKA stand during the whole duration of the fair.

In addition to the stand, several EUREKA speakers will give presentations during the event. Both Rudolf Haggenmüller and SmartTouch project leader Tuomo Tuikka will speak during the Tech Transfer Forum on 19 April.

Come and join us in Hall 2, stand A41!

German Chairmanship – Ministerial Conference 2010

The 25th Ministerial Conference will take place in Berlin from 22 to 25 June 2010. Israel has been selected to assume the presidency of the EUREKA Network for the working year 2010 to 2011. The EUREKA presidency will be transferred from Germany to Israel during this event. More information on the event will follow soon.

More information / source: www.eurekanetwork.org

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