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ITEA 3

PO Days 2015
Start preparing now!

Focus on Sweden

ITEA Success story:
Modelica

Contents

Editorial

Sweden is one of those countries where innovation is just a natural component of business. Swedish public authorities regularly claim they are ready to support more ITEA projects as soon as the quality is there. This is a very encouraging message to the Swedish partners to set up new projects in line with the national priorities. So, let me invite the Swedish ITEA community to rendezvous with us and come along with some good ideas in September for the PO Days during the second EUREKA Swedish chairmanship.

As Cecilia Sjöberg suggests elsewhere in this magazine, we observe an increasingly global perspective in the shift from technology push to user needs as a driver in the digital world. It is exactly the ITEA focus with, for example, our new international customer workshops, to extract from the end users themselves the future topics of our R&D projects. In his view, Jonas Bjarne stresses the impact of ICT in all business areas, and ITEA is there to support the digital transition for all these traditional industries. Just take a look at the Husqvarna, Volvo and Bombardier success stories.

The CREATE project is a good example of the important impact of digital transition on traditional industry like automotive. It develops a new flexible automation architecture to increase productivity, agility and quality of the production chains. Human specificity is reused on the basis of instance-based reasoning, which appears as the counterweight to big data.

The Community talk is always an interesting spot as it gives a more personal view of ITEA. I very much like how Erik Abenius regards ITEA "as a kind of facilitator or enabler that can help get SMEs to the bigger arena. This is where ITEA is at its best."

Success is not confined to the big players in ITEA. Check the Evalan story on rehabilitation support. Also have a look at the SME in the spotlight dedicated to Broadpeak who has developed in the ICARE project a transparent caching for the new audio visual content distribution on the cloud.

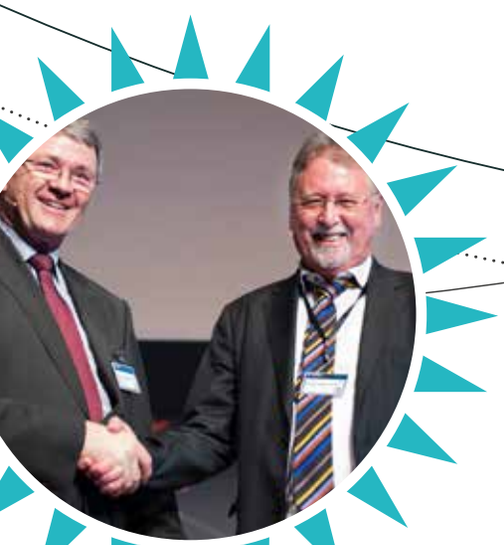
My last word will be for the next ITEA Call. We intend to continue to boost the quality of the ITEA proposals to increase our impact. We know that we have reduced the duration for submitting the proposals. The target was to reduce the time from idea to project start. This KPI is very important for ITEA as we want to stick to the market as much as possible and the speed of evolution is very quick. Thus I have a strong piece of advice for all our ITEA community: come to the next PO Days 22-23 September with ideas as usual but also be prepared in advance with at least a core team around your idea so that you can be more efficient during the PO Days.

Continue to innovate with ITEA.

Philippe Letellier

Co-summit Berlin, 2015

Convergence of common purpose in a once-divided city now unified by progress



Smart Industry: Impact of Software Innovation

The range and diversity of the projects on show in the mini-theatres that were their exhibition booths captured the imagination of the more than 700 participants and visitors to the Co-summit in March this year. The venue, the Berlin Congress Center, flanks Alexanderplatz, a bustling modern commercial centre surrounded by constant urban development in a city intent on leaving its past intact but heading irrevocably into the future. This was a perfect setting, therefore, to showcase the impact of software innovation and cyber-physical systems on the future of manufacturing – smart industry. It also highlighted the key role played by the ITEA and ARTEMIS projects in the creation of new, smart manufacturing and processing, and the impact of software innovation on business, industry and society.

Opportunities and challenges

The importance of the event was echoed in the addresses of the prominent keynote speakers during the opening. Herbert Zeisel, head of the German government directorate for Key Technologies for Growth, stressed the centrality of software innovation and cyber-physical systems in the emergence of Industry 4.0 while Khalil Rouhana, the European Commission's Director for Components & Systems at the DG CONNECT, pointed to the "large digital opportunities [that] lie ahead of us in areas where Europe is strong." However, he cautioned that a major challenge had to be overcome

if such opportunities are to be seized: "to develop a common strategy for software with complementary implementation mechanisms." The keynote addresses were completed by Jutta Schneider, Director of eDrive and Software Technologies at Daimler AG, who spoke about the importance of "software innovation as a key driver for a green, connected and autonomous mobility." Daimler, a leading player in a number of the projects on show, both entertained and educated with a fascinating simulator in its premium model range.

The co-organisers in the guise of Rudolf Haggenmüller, ITEA Chairman, and Heinrich Daembkes, President of the ARTEMIS Industry Association, introduced the theme of the Co-summit, specifically underlining the impact – the increasing influence that software is having on the entire value chain, "even defining the features of products and thus their competitiveness. It determines whether or not you will succeed in the marketplace." In this respect, Rudolf was very clear about the purpose of ITEA projects: "they are at the heart of business, one in which software innovation has a huge impact."

A 'guided' tour

More than ever before, this was an exhibition that demonstrated the role that ITEA projects play "at the heart of business", with tangible results and measurable impact resounding from every booth, tempting visitors and fellow exhibitors to (want to) discover more. Like the BaaS project leaders in their hardhats and hazard warning vests that attracted interest in the use of novel value-added services and applications for smart commercial buildings or the R5-COP autonomous WALL•E-looking robot wandering around the exhibition floor, an example of a smart solution for dirty and dangerous jobs – both winners of the Exhibition Award. The Co-summit gave both participants and visitors alike the opportunity to network and swap ideas that might lead to a new evolutionary wave in the smart manufacturing revolution.

An extra dimension was provided by a number of speakers corners where various projects had an opportunity to present themselves more expansively – the underlying philosophy, the challenges and achievements, the impact on technology, industry and society, and even a forum for discussion. The range of topics ran from mobile environments and smart healthcare to collaborative automation and mixed criticality applications.

The 'Magenta' corner saw global cooperation in ITEA take centre stage. It has become evident that ITEA project consortia see increasing needs for cooperation with a partner in a growing economy outside the boundaries of Europe. Some are already engaged in projects with partners from the Republic of Korea and Canada. These emerging economies often have global technology leaders that enable projects to set a world standard. In EUREKA this is addressed through the concept of Associated Countries and in this session representatives of Canada, Mexico, the Republic of Korea and South Africa presented opportunities for cooperation in ITEA. And vice versa, ITEA is a platform whereby such countries can gain access to European partners. The borders of Europe are no barrier to global cooperation and business – this message came across loud and clear.

Intriguing and thought-provoking

The panel discussion on the Co-summit theme on the Wednesday morning, moderated by Speak-Easy's Cathy Smith (former BBC correspondent) featured Thomas Lagerberg (ABB), Egbert-Jan Sol (TNO), Mürzel Yildiz (KaTron) and Carsten Rossbach (Roland Berger Strategy Consultants). While acknowledging the crucial role of software innovation and cyber-physical systems in smart industry, Egbert-Jan Sol, who leads the Dutch Smart Industry programme, suggested that we should be looking "not simply at software innovation but also business innovation and social innovation" if we are to both understand and facilitate the evolutionary process that is revolutionising industry. Thomas Lagerberg went further when he claimed that it is all well and good to have "all this big data and connectivity but it is important to ask what's in it for me, how can I make money out of it? We have to demonstrate the benefits to people."

This is also a central question that is at the core of ITEA projects, and ensures that they focus on tangible results. And a tangible requirement came from Mürzel Yildiz in his very real

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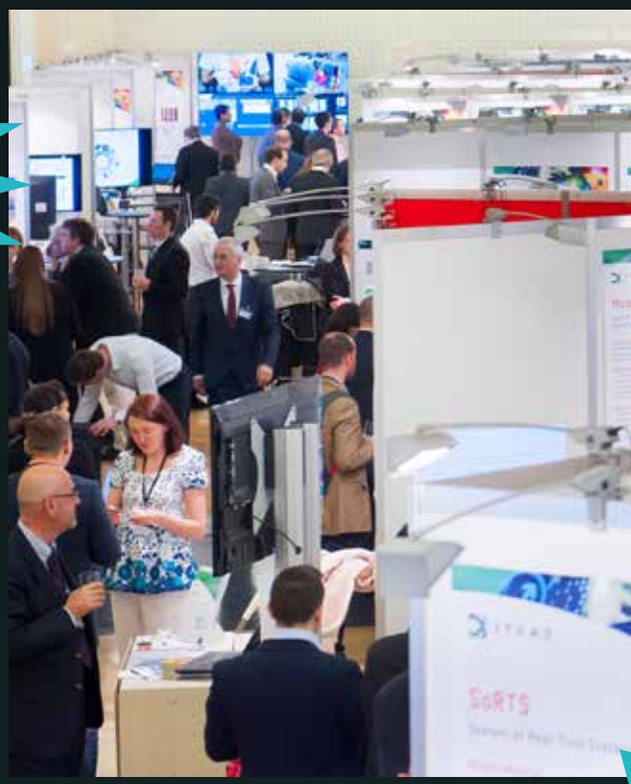
SMART INDUSTRY: IMPACT OF SOFTWARE INNOVATION

appeal for the smart industry engineers of the future to have a multidisciplinary perspective – hardware, software, customer demand, aesthetics and business contexts. Thomas Lagerberg suggested, along similar human resource lines, that "we need to understand what drives young people to spend so much time playing computer games and utilise that human potential for employment in the smart industry." The implications of smart industry go far beyond technological (software) innovation; a new type of manufacturing driven by software innovation also requires different business models and different skills packages. Carsten Rossbach brought up the question of European competitiveness in the smart industry domain, suggesting that, "standardisation, financing and cooperation are essential."

So, a quartet of different perspectives yet a shared view that while the smart industry revolution-cum-evolution is unstoppable, the complexity of the implications has to be both understood and controlled in order for Europe to be successful.

Demonstration of impact

This Co-summit set its sights firmly on demonstrating the impact – technological, business and societal – of the seventy-plus projects exhibited. The ITEA Community session highlighted the excellence and achievements of the projects. Philippe Letellier, Vice-Chairman of ITEA, reflected not only on the exceptional standards achieved in the past year but also on the significant and tangible business impact generated by the projects, three in particular:



EASI-CLOUDS (federated cloud-computing), MEDIATE (image-guided intervention techniques) and SAFE (functional safety in the automotive industry).

In summing up the impact achieved by the **EASI-CLOUDS** project, Philippe cited the "whole chain for cloud federation including simple application development tools amid the diversity of all the cloud offers." He went on, "You proposed some tailored SLA facilities. All your development enabled new business models via real-time rating, charging and revenue sharing." Through this award, ITEA recognised the results of fast exploitation: SAAS edition, including SLA negotiation, demonstrated between Amazon, CloudWatt, Numergy on use cases like cloud-based brain image processing; on-demand photo stitching; the hybrid cloud edition; the broker edition, demonstrated in the use case of evaluating game server performance; and the federation edition. Complemented by three added services – cloud development tools, billing as a service and security as a service. "The strong business impact," Philippe concluded, "was evident in the new business utility unit established by Orga Systems, the SoftwareInLife Launched csb.io, a cloud marketplace in Korea, Cloud Orbit and Amenesik start-ups building on the EASI-CLOUDS platform and Hexaglobe, a new edge computing feature for video on-demand while Nexedi customers are already testing dynamic CDN technology."

Moving on to **MEDIATE**, Philippe referred to this as a good example of a project delivering innovation. "You have already filed ten patents and a few others are on the way. You had an impact on standardisation with IEC/ISO on MR imaging and an extension of the DICOM standard for surgical planning and navigation. MEDIATE changes life in the operating room with a unique screen for all the enhanced modalities used in parallel." Furthermore, the ITEA Board was impressed by the business impact of the project. Philippe: "More than 250 Barco Nexxis unique screens deployed worldwide with FDA approval, open X-ray architecture that allowed Philips to sign two partnerships to integrate devices from other manufacturers in its offer, which increases Philips' leadership even more. More generally," he added, "Philips integrated a set of algorithms results from MEDIATE in its X-ray system product, in particular the video grabber that can grab video signals from multiple sources and display them in a flexible way on a large display screen (with Technolution). The Flexitron product release was launched by Nucletron at 2013 American Brachytherapy Society (ABS) meeting in New Orleans and a new version of the Digisens 3D-reconstruction software for X-ray tomography for a global market drive. And last, but not least, SQI announced a large part of its future business with the MEDIATE web-based collaborative clinical decision tool. And with many others in the pipeline, that's impressive."

Finally, turning to impact on standardisation, Philippe praised the significant contribution of the **SAFE** project that focused on Automotive Functional Safety and especially on the standard published in November 2011. "With ISO26262 defining more than a thousand requirements, your challenge was an acceptable level of risk

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for the automotive industry by ensuring process compliance with ISO26262. With SAFE you provided an architecture description language, a set of tools and some methods and application rules. Your involvement in standardisation bodies has been tremendous: some of the authors of ISO26262 took part in SAFE and through the first worldwide implementation you helped drive through a revision of the standard. Beside this major involvement you also took advantage of your key position in ISO26262 to have an impact on EAST-ADL, Autosar, EICOSE and OMG ensuring some coherence between these different standards. Furthermore, you ensured some fast exploitation with commercial tools, commercial training and change in internal corporate processes. You opened the door for the application of ISO26262. Your project is a successful example of having worldwide impact through standardisation."

New phase, new challenges

In his address at the closing of this Co-summit, Rudolf looked back on a highly successful event, one in which the projects had demonstrated their value to European industry in particular and society as a whole, and looked ahead to a new phase of impactful projects that would tackle new challenges. "We are witnessing the merging of the real world with the virtual world and the smart industry as a result is characterised by strong customisation of products, high flexibility, integration of customers and suppliers. Industry is being challenged to do many conflicting things all at the same time - increase productivity and reduce energy, increase flexibility and reduce costs, cut time to market and satisfy demand for high quality and variety of products. Without software innovation this would be inconceivable."

Country focus: Sweden

ICT is simply everywhere

Starting in July 2015, Sweden undertakes the chairmanship of the EUREKA Network for a year, taking over from Switzerland. The chairmanship, characterised by such Swedish core values as transparency, openness, simplicity and efficiency, will have the following priorities: to develop a lean and efficient governance model, to create a toolbox for Smart Globalisation, and to further establish EUREKA in European Innovation Policy.

Sweden is often regarded as a model for a modern social and industrial infrastructure in which ICT plays a highly prominent role. Sweden's dominating ICT company for many years has been Ericsson, though recent years have seen quite a few Swedish ICT innovations resulting in well-known companies like Skype, Spotify, Minecraft, MySQL, Soundcloud etc. One of the main aims of Sweden's innovation agency, VINNOVA, is to promote sustainable growth by improving the conditions for innovation, as well as funding need-driven research. VINNOVA's vision is for Sweden to be a world-leading country in research and innovation, an attractive place in which to invest and conduct business. The organisation promotes collaboration between companies, universities, research institutes and the public sector as well as strengthening international cooperation.

ICT roots are deep

One of VINNOVA's strategic areas is Services and ICT, which deals with meeting the changes and opportunities in society resulting from the innovative information technology and services. Cecilia Sjöberg, Head of Services and ICT Division: "Information technology has fundamentally changed the way we do business, develop products and services, run companies and act as consumers. And Sweden has an eagerness to adopt new technologies, something that is encouraged by the government also among consumers. Fifteen years ago everyone who bought a PC was even entitled to a tax reduction. Many families, which would otherwise not have considered buying this expensive technology, suddenly had an advanced computer in their homes. And their kids loved computer gaming! Fast-forward fifteen years and we find the EU Digital Economy and Society Index 2015 listing Sweden in the second position on connectivity, human capital, use of Internet etc." Yet while there are obvious gains, major challenges are apparent as information technology permeates increasingly deeper into industry and society. Personal integrity, security, accessibility and reliability are becoming more and more important.

"As a funding agency we see in our programmes a shift from a tech-push perspective to a tech-pull where the needs and demands of industry and public organisations drive the technology development and innovation. And that means that our focus is moving increasingly towards the end users in our projects. In Sweden we have a very large public sector and we are encouraging them to make more use of innovative ICT – customised and need-driven rather than off-the-shelf solutions – to help make their work more efficient and effective."

ICT is core business

Senior Programme Manager and also International ICT Coordinator at VINNOVA, Jonas Bjarne, explains. "What we try to do is to increase ICT in the more traditional industries, whether that is building cars and trucks, timber and pulp production or healthcare. This is done through collaborative projects between academia and industry. In fact, we almost always require companies to be partners in the projects to ensure industry transfer of the results. The success of innovation is increasingly finding its way into products and services, as also highlighted by the EU Innovation Union Scoreboard Report, which has Sweden number one in the EU for more than a decade. Take the Swedish company Husqvarna, a manufacturer of appliances like lawnmowers. It is involved in an ITEA project, SCALARE, which aims to support and enable industries to scale their software capability. People do not want noisy, smelly petrol-powered engines. They look for electrical alternatives and suddenly the competition is intensifying. By becoming involved in this ITEA project, it aims to integrate ICT into the next generation of 'smart' lawnmowers. This is a clear example of how ICT is increasingly getting into traditional industries. After a hundred years of pure mechanics, now there are sensors in the traditional SKF ball bearings to monitor maintenance schedules and enable new services."

Sjöberg: "At an ITEA-ARTEMIS conference we organised in February, Volvo was the keynote speaker – and it became clear that software innovations has become a core business in car manufacturing. The chip has replaced the wrench, you could say. What we see is ICT research not confined to ICT projects and programmes but as an integral part of research in domains ranging from manufacturing and transport to healthcare and smart cities. ICT is simply everywhere."

Collaboration catalyst

Interestingly, the collaboration is not just cross-domain but now cross-continental. Not confined to Europe but now with Canada, Brazil, Korea joining ITEA and EUREKA initiatives, a global environment for development is emerging. "This is also important for Sweden, whose industry and economy rely on international trade. It is a positive trend," Sjöberg suggests, "because not only does it expand the market – both import and export – but it also produces bilateral benefits. And EUREKA provides an excellent instrument for Swedish companies that we can help fund to collaborate with international partners in stimulating projects."

Funding schemes that involve SMEs are also growing fast in terms of volume and importance. These SMEs are becoming increasingly involved in international projects, like the Eurostars, ITEA and ECSEL programmes, and they are benefiting from participation with large international players and the contacts and knowledge that project involvement feeds back into their own work and business opportunities. "Sweden has many SMEs and large companies but not much in between," Sjöberg notes. "It seems to be the case that successful SMEs get 'spotted' and rather than grow into a medium-sized player, they get taken under the wings of the larger player."

Innovation for impact

There are different kinds of funding schemes and programmes available in Sweden, depending on the kind of research, whether that is of the more academic nature in fundamental research or the kind of innovation research in which VINNOVA invests. Bjarne: "We insist that at least 50% of the effort comes from industry in the projects in which we invest. And, of course, industry itself invests in research geared to product development. So, Sweden is quite a dynamic landscape in respect of investment in innovation."

"The projects we fund are essentially innovation focused," Sjöberg underlines, "but in terms of how funding can help drive innovation, I think we have to try to look at the impact of ICT innovation on other industries, and that's not such an easy task. One goal is to try to measure this impact in terms of products and services as well as in the wider social sense."

More information

http://www.vinnova.se

Bombardier
A microcosm of Swedish innovation

Bombardier Transportation in Sweden builds and develops a wide range of innovative products and solutions from the supply of vehicles, propulsion and controls systems to signal systems and a complete maintenance service. In 1978 Bombardier produced the world's first ATP (Automatic Train Protection) system and in its Green Train project, a new concept is being developed for high-speed trains to be used on both new high-speed lines and the normal rail network with the aim of faster trains combined with increased passenger capacity and comfort.

Software is a core component

"In the field of transportation, software is now extremely important," says Bombardier consultant, Stig Larsson. "As in the automotive industry, other modes of transportation are becoming subject to an explosion of computer controlled processes. And it is getting even more crucial nowadays, especially with the development of automatic trains with no drivers. Software is really a core component of our industry, without doubt. Bombardier also has its own software development department, basing the development on functional programming geared to engineering."

Value of collaboration

As senior researcher with SICS Swedish ICT, a non-profit research organisation that aims to boost the competitive strength of Swedish industry and the quality and efficiency of Sweden's public sector, Larsson realises the value of collaboration and involvement in such projects. "Public funded projects and programmes are essential for the research that companies like Bombardier would not be able to undertake alone. Another benefit is that while you may not be able to apply the technology developed within a project directly in your company, it is nonetheless valuable in terms of boosting the technology maturity within an organisation. You become much more aware of the possibilities, options and resources that are available."

Benefits begin early

Bombardier Transportation was a participant in the successful ITEA 2 project, ATAC, in which the company set out to achieve a number of objectives: to increase code test coverage at unit testing by 40%, decrease software errors found after first delivery by 20% and to cut the number of engineering hours used for validation and testing by 20%. "The ATAC project is a good example," Larsson says, "of where active collaboration between the partners through industrial case studies, sharing experiences and best practices really helped generate the fast exploitation initiatives launched during the project, of which Bombardier Transportation has benefited from the transfer and dissemination of the initial research results in Sweden."

"Overall, I would say that the organisation has been able to raise its standards through its involvement in this project. But really," he adds, "the benefits begin even before the project starts to generate tangible results because in the brokerage events, for example, you get the opportunity to network and find suitable partners for ideas and initiatives. That is certainly one of the main strengths of ITEA – it can attract enough prospective complementary partners to get project proposals up and running. And, of course, other events – like the Co-summit – are interesting because you can get to see what other projects are going on around you and these may even promote ideas about possible subsequent projects."

More information

http://www.bombardier.com

ITEA Success Story

Modelica

Making the whole greater than the sum of its parts

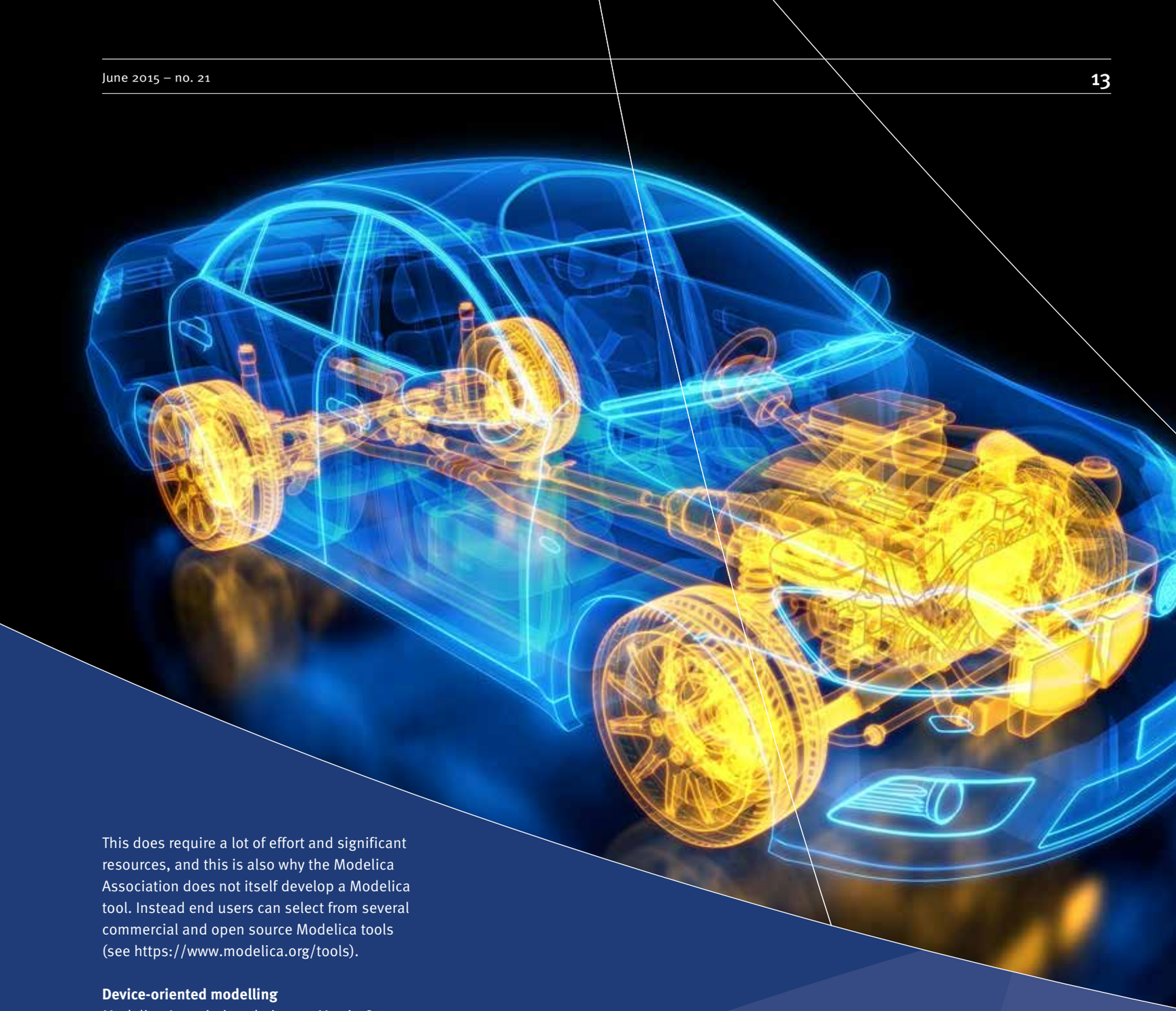
Modelica in a nutshell

Modelica is a computer language that is traditionally used to model the physical part of systems that are to be controlled, and thereby simplifies this task significantly. It conveniently describes physical systems in a standardised (non-proprietary), free format, including the physical equations, and visualises the physical components in the form of schematic diagrams. The components are structured and defined according to the underlying physics so that a mechanical shaft, for example, is modelled in Modelica as a component with two mechanical flanges. The whole definition is, as usual for computer languages, in textual form and basically stored on ASCII files.

The power of Modelica can be found in the system simulation of complex physical models, such as a full vehicle model, including 3D mechanics, drive train with automatic gearbox, the electrical and air conditioning systems. The underlying mathematical descriptions are differential, algebraic and discrete equations. With the addition of dedicated features for the implementation of sample-data systems, including state machines, in the most recent major Modelica release of 2012, Modelica is now particularly suited to modelling cyber-physical systems.

Modelica Association

But there is more to Modelica than the language. The Modelica Association, a non-profit organisation with individual and organisational members from Europe and North-America, and a few from Japan, is driven by end-users that want to improve cyber-physical system modelling for complex industrial applications and by tool-vendors that want to improve the language for their customers. The Modelica Association and its partners organise conferences and the income from these and from member fees enables Modelica-specific open source projects to be financed (for example, for a Modelica Language Compliance Test Suite to check tools for specification compliance). Furthermore, the Modelica Assocation is also developing a large open source library of physical components, called Modelica Standard Library (MSL), whose current version contains about 1300 model components, such as an electrical resistor, a 3D rigid body and a pump. The very liberal licence allows these models, or modified versions of them, to be used in commercial applications without essential restrictions. The MSL is important for both end-users and tool vendors: end-users can cover part of their applications with free components from MSL and thus start at a high level with little effort while vendors use MSL as a kind of a major benchmark to evaluate their tools. However, to conveniently create a Modelica model, simulate it and perform other operations like design optimisation, an appropriate tool is needed.



This does require a lot of effort and significant resources, and this is also why the Modelica Association does not itself develop a Modelica tool. Instead end users can select from several commercial and open source Modelica tools (see https://www.modelica.org/tools).

Device-oriented modelling

Modelica Association chairman, Martin Otter, explains his reasons for becoming involved in Modelica in the first place. "One of my motivations is the use of Modelica at DLR, the national aeronautics and space research centre of Germany, and here in particular the Institute of System Dynamics and Control (DLR-SR) ((http://www.dlr.de/rmc/sr/en) where application-oriented research is performed into system dynamics and control technologies for high-performance mechatronic systems in aerospace, robotics and ground vehicle applications. We already recognised 20 years ago that the traditional, signal-oriented input/output block description of control systems

The power of Modelica can be found in the system simulation of complex physical models

makes it hard to handle complex systems in industry. Therefore, I and my colleagues contributed, and still contribute, to 'device-oriented' modelling with Modelica." From the beginning, DLR-SR used Modelica models directly in controllers, which has the considerable benefit that non-linear models of the systems can be used in the controllers with acceptable effort, and the controllers are then potentially able to cover large operating regions.

The springs of success

There have been a few major factors that have contributed to the success of Modelica: (a) the technical innovation from Dynasim, (b) Dassault Systèmes entering the arena, and (c) several large ITEA projects. In the years 1996 – 2006, Modelica was developed and driven by a small community of people from universities, research institutes, small tool vendors and some industrial companies that believed in the Modelica technology. In 2006, the Swedish Modelica tool vendor Dynasim was acquired by Dassault Systèmes, and this entry of a large software vendor in the Modelica market suddenly changed the picture completely. More tool vendors and industrial companies became interested in the Modelica technology; most of the small Modelica tool vendors have since been acquired by large companies, such as Imagine (France) by LMS International in 2007, Maplesoft (Canada) by Cybernet in 2009, MathCore (Sweden) by Wolfram Research in 2011, deltatheta (U.K.) by CyDesign in 2012, and LMS by Siemens and CyDesign by ESI Group, both in 2014.

After the acquisition of Dynasim, one of the first things that Dassault Systèmes did was to co-organise with DLR-SR the ITEA **EUROSYSLIB** project (2007 – 2010, budget: €16 million). Never before had such a huge amount of resources been put into the development of Modelica technology. This gave Modelica a huge boost, not only on the tool level but even more on the level of enhancing the open source Modelica Standard Library as well as commercial Modelica libraries. Afterwards, other ITEA projects followed.

MODELISAR (2008 – 2011)

"Although Modelica is a great technology," Martin Otter explains, "there is a key issue. In every modelling domain there are specialised simulation environments, such as multi-body programmes like ADAMS or SIMPACK, or electric circuit programmes like Saber or Simplorer, that have been heavily used in industry for a long time. So a company needs very good reasons to change such established tools. On the other hand, there is considerable pressure on OEMs to perform simulations of their overall systems (and Modelica would be perfectly suited for this task) but suppliers use a wide variety of different, established tools. The MODELISAR project changed the game."

Co-organised by Dassault Systèmes and Daimler (with DLR-SR as technical advisor), the goal of this ITEA 2 project was to develop an open, low-level interface standard, known as Functional Mock-up Interface (FMI), to enable models from different simulation environments to be used conveniently in other environments. The MODELISAR project developed the FMI interface (based on XML interface descriptions and DLLs/Shared libraries with C-interfaces), provided prototype implementations in some ten tools, and evaluated FMI and some of the prototypes extensively in industrial use cases from Daimler and other companies. MODELISAR project leader, Patrick Chombart, of Dassault Systèmes, refers to "a strong vision, and the high professional commitment of the partners" that allowed the FMI fundamentals "to emerge and be proven; a long-term organisation is now bringing the newborn standard to maturity."

When the MODELISAR project ended in 2011, there was the question how to continue the successful FMI development in the future. Since the Modelica Association saw the FMI standard as very essential orthogonal technology to Modelica, the Modelica Association changed its mode of operation, and especially its statutes, for the future development of not only Modelica but also other standards in the modelling/simulation technology. As a result, such standards are now developed in Modelica Association Projects (https://www.modelica.org/projects), one of which is FMI. A separate dedicated website is used for the FMI standard (www.fmi-standard.org) to make it clear that FMI is not a Modelica add-on but a language- and tool-neutral standard. As of June 2015, there are 66 software tools supporting FMI, demonstrating the great success of the MODELISAR project.

> "The technical progress and economic success of Modelica and FMI would not have been possible without ITEA."
>
> *Martin Otter - Modelica Association*

All Modelica tools now support FMI both for export and import and therefore it is possible to export Modelica models to nearly every other simulation environment. This is a win-win situation for the Modelica community, domain-specific tool vendors, OEMs and their suppliers. OEMs can use different tools as an integration platform of model components and are able to run overall simulations with software components from their suppliers while domain-specific tools can suddenly import a large variety of model components from areas outside of their core-domain, and in particular Modelica models.

OPENPROD (2009 – 2012)

OPENPROD aimed to significantly improve open source Modelica tool chains based on OpenModelica and evaluate them in industrial applications. Peter Fritzson of the University of Linköping, one of the founding fathers of the Modelica language and currently leading the OpenModelica open source effort, says that OpenModelica "has now become as good as

(sometimes better than) several proprietary tools. It can now simulate 98% of the standard library examples. However, the leading proprietary tool Dymola is still a bit ahead, but the difference is becoming smaller. Moreover, OpenModelica is the only Modelica tool with an equation model debugger; which puts it ahead of all the proprietary tools."

Siemens Industrial Turbomachinery from Sweden with over 10 years of experience of Modelica applications organised the ITEA project together with the University of Linköping. Sune Horkeby, OPENPROD's project coordinator: "At Siemens we successfully use Modelica for development, design and testing of turbines and power plants. Our Modelica models are an important contribution to development projects when it comes to optimising start-up processes, meeting new market demands e.g. new EU codes for the electrical grid and product testing. The models can estimate and predict system behaviour early in the project phases and replace expensive and time consuming physical testing. The models help meet the market demands of new sustainable life cycle optimised products. We have very successful selling products in the market e.g. the gas turbine SGT800, and our simulation environment is of course a very important and critical part of this success".

In terms of the open source community, there are currently about 1600 downloads per month and the business impact is increasing all the time. Fritzson: "For example the tool vendors Wolfram MathCore, DHI, Ricardo Inc., are including parts of or all of OpenModelica in their distributed products. Several companies, like Bosch-Rexroth, Siemens, SKF and Saab, are using and testing OpenModelica for in-house purposes. The ITEA projects OPENPROD (which was especially open source oriented) and now also MODRIO have been very important for the OpenModelica open source development."

MODRIO (2012 – 2016)

The objective of this ITEA 2 project coordinated by EDF (France) is to use physical models in system operation, that is in real-time systems, to operate say a power plant, a vehicle or a train. In particular, complete tool chains are developed to use (high-level) Modelica and/or (low-level) FMI models on real-time platforms for non-linear state estimation and nonlinear model-predictive control. The primary goal is to enhance the operation of cyber-physical systems in terms of safety, dependability, environmental impact and energy consumption by using detailed physical models online or offline. MODRIO's project coordinator, Daniel Bouskela, explains the benefits of the MODRIO approach. "At EDF we need tools for modelling very large systems, from individual power plants up to the whole energy system. Modelica helps meet the challenges in operating the electricity system in the context of the energy transition in Europe while maintaining its competitiveness (e.g. optimise maintenance planning, knowing that 1 day of plant downtime costs €1 m, extend plant lifetime, optimise electricity production while ensuring grid stability, etc.). Using the open source Modelica approach is a good incentive to expand the use of modelling and simulation for systems engineering and operation at large. Modelica is now used at EDF in an operational way to model all types of plants: nuclear, fossil fuel fired, renewables. It is also used to model energy efficiency in buildings. Also, an added benefit is that the use of powerful tools enabled by Modelica helps to attract the well qualified graduates that this industry needs – they get the opportunity to put the modelling and simulation they have learned into real practice. So a project like MODRIO can leverage real economic advantages."

Impact on industry

A very tangible measurement of the success of Modelica can be found in the considerable business impact on the industry, as typified by just a few examples such as Dassault Aviation (France) that uses Modelica tools (CATIA DBM + multi physics libraries) in the DS Systems Engineering portfolio for the whole system engineering model-based (MBSE) approach or BMW (Germany), which has benefited from the early prototyping of solutions and early testing to reduce costs for gearbox, E-drive, powertrain, light assistance and driver assistance. Modelica (Dymola) and multi-physics libraries have been used by the French companies Alstom Transports – to model and simulate controller optimisation in the Tramway HVAC system – and Bertin Technologies Scope – to modernise and improve energy production plants. Bosch subsidiary, ETAS, made use of Modelica based (Dymola) multi physics in its embedded code development for engine management on cars as well as FMI for Model in the Loop (MIL) and the Hardware In the Loop (HIL) validation of software on vehicle and virtual ECUs (Electronic Control Units), benefiting especially from smooth integration and early validation. In designing electromechanical actuators (like the airbrake) for the Airbus A380, UTAS – UTC Aerospace systems used Modelica (Dymola) for multi-physics modelling and simulation to enable model-based design from requirements, provide decision making support and increase electrical-based actuation systems. In the US, Google used Modelica (Dymola and libraries) and FMI for model-based design and virtual validation to tackle the system engineering complexity in designing a new Google smartphone platform. A final example, which underlines the range of domains where Modelica has an impact is Eurobios, ENI (Italy). Its new framework for the simulation of offshore oil facilities at system level employed Modelica (Dymola and libraries) for modelling and simulating the behaviour of offshore devices during maintenance (of fluids, pipes, heat and flow transfers), thereby providing better understanding of phenomena during maintenance and resulting in better preparation of the operation and greater operational availability.

Growing stronger by the day

Summing up, Martin Otter concludes that "the technical progress and economic success of Modelica and FMI would not have been possible without ITEA. And besides the pure technical achievements and the growth of Modelica/FMI tool vendors, there is another aspect. In the past ten years, several small companies have been *newly* founded in Europe to provide engineering services as well as model libraries and specialised software in the Modelica and FMI field to industry, including Modelon AB (Sweden), Modelon GmbH (Germany, recently acquired by Dassault Systèmes), XRG Simulation (Germany), TLK Thermo (Germany), QTronic (Germany) and Claytex Services (U.K). The companies started with a few employees, and altogether they probably have already more than 200 engineers." A very tangible measurement of success.

Community Talk with:
Erik Abenius

ITEA is a kind of facilitator or enabler that can help get SMEs to the bigger arena

This issue sees Erik Abenius take up Medur Sridharan's invitation to give an insider view of the ITEA projects community. Erik holds an engineering science Master's degree and a PhD in which his thesis in numerical solutions to Maxwell's equations was part of a national Swedish project GEMS. This collaborative initiative aimed to develop a state-of-the-art suite of solutions for electromagnetic issues such as integrated antennas and the compatibility of different electronic equipment as well as stealth and radar signature prediction. Following his PhD, Erik worked with a start-up medical imaging company for a short time before seizing an opportunity in 2006 to co-found a company to work on the software he co-developed during the GEMS project geared to producing realistic electromagnetic simulation, for example, for an antenna in an aeroplane or on a satellite. In other words, a perfect marriage for Erik of academic research and industrial application.

Fast forward to 2011 and a major event in Erik's career happened when his company, Efield, was acquired by the ESI Group, a French-based global Virtual Product Engineering company. "With an increasing amount of work now being done within the smart and connected community, we have an important role in addressing new requirements. Take the modern car, for example. Much of the simulation done in the past has involved passive safety but now demand is increasing for tools like ADAS – Advanced Driver Assistance Systems – that can predict active safety performance and interact with other cars and surrounding infrastructure. This is a trend being pushed by almost every automotive OEM and the first automated cars driving on public roads is not such a fancy anymore nor is it too far off. With the modern car containing so many sophisticated sensors and antennas, the need for accurate simulation tools is crucial to the design of these sensors.

"My role now in the ESI Group has shifted from development, training and support to the business development for electromagnetic products, an activity in which I work closely

with end users and customers across the transport range and in the telecom sector to help solve problems they encounter. And this is, of course, what motivates me in my work. And indeed, what motivates me in respect of ITEA projects. I first became acquainted with ITEA in 2009 when, still as an SME, we were invited by another Swedish SME that had co-authored the H4H project proposal that was dealing with high-performance computing in hybrid systems, combining multicore CPUs and GPUs."

Erik looks back on the three-year project as an enriching experience in which he was able to both gain and give significant input. "This project gave us a good opportunity to work with other European experts from the academic world to large and small companies, and gave us a perfect platform to take our software to a new level of technology. Our role in the project was to test and use the platforms, the performance-tuning tools that govern how we write our simulation software to get the best out of it. We were, if you like, end users of these tools developed within the project so this helped us in directing the developments within the project and therefore making the tools much more accessible for software editors. And this is not something we could really have achieved on our own as an SME, especially in terms of getting access to all the hardware and initiating a project with the top European players."

Erik regards ITEA as a kind of facilitator or enabler that can help get SMEs to the bigger arena. "This is where ITEA is at its best. As an SME, of course, one of the benefits is the additional funding and support you can get that can act as a kind of springboard to become bigger and better. Now, as part of the ESI Group, the incentives are somewhat different. What becomes more important, as a larger company, is what you can gain from the collaboration. It helps maintain the focus on what you can do to improve your product. So the impact of companies in ITEA, and vice versa, differs according to the situation. In general, one could say that SMEs benefit from the experience and contacts, across the academic research and industrial application spectrum. I must admit to a bit of apprehension in the beginning at being 'directed' too much within a project but this was certainly not the case because there are actually no shackles and the somewhat loose structure allows for plenty of freedom and, therefore, innovation."

When he considers the maxim of 'seizing the high ground', the first thing that sprang to Erik's mind was 'playing King of the Hill'. He explains. "I grew up in the north of Sweden and this was one of the main activities during the winter. But one of the lessons you learn from this game is that it's a struggle to reach the top but it's perhaps even more of a challenge to stay there. Everyone wants to topple you. I think this has a parallel with science and technology in society. You have to stay on your toes in this competitive environment. Europe may be on the high ground in software innovation but there is strong competition from Asia and the US. So ITEA is key to helping us keep the high ground we have reached. And will be so over the next decade."

Erik is also convinced of the power of happiness as a driver for success. "It is often the difference between the mediocre and the exceptional. It is related to the softer values like team spirit and common purpose. It is a very important factor in producing innovation and to establishing a creative environment. And it makes me very happy to see that this aspect is recognised by ITEA."

ITEA project results enhancing people's lives

Rehabilitation support

People recovering from certain types of leg or hip fractures have to perform partial weight bearing exercises. Current practice among physical therapists is to use normal weight scales to help patients. Such scales provide the patient with a static reference only; they cannot support the patient during the exercise. This is where SensiStep makes the difference. It provides dynamic support and shows the actual weight that is exerted on a leg continuously and in real-time. This means that both the patient and the physical therapist can track whether the weight on the leg corresponds with the target weight.

Evalan developed a key software technology within the ITEA 2 MoSHCA project that is now used in SensiStep. In cooperation with the Radboud University and the University of Girona, smart operators that employ case-based reasoning and dynamic Bayesian Networks are being developed. These enable the duration of a patient's rehabilitation to be predicted from the weight measurements recorded during exercises. This will help the physical therapist determine whether the rehabilitation is progressing on track, or if the exercise programme needs to be adjusted accordingly.

ITEA 2 project MoSHCA

End user happiness MoSHCA

SME in the spotlight

Broadpeak

TV and home entertainment – anytime, anywhere out of the cloud: the ITEA ICARE project proposed using network cloud architecture to allow distributed, scalable and adaptive solutions from anywhere in the cloud to any destination, irrespective of audio or video format, together with multi-screen data and entertainment services. French SME Broadpeak, a spin-off from Technicolor, designs and manufactures multiplatform broadband video delivery solutions for Internet Service Providers and IPTV, cable or hybrid pay-TV operators. It played a role in the personalised services and novel cloud-based applications that came out of this project and that will help build a bridge between traditional media business and a new world of internet-based services. Nivedita Nouvel, in charge of communication and product strategy and positioning at Broadpeak, explains.

Elegant and innovative

"We provide video delivery solutions for both managed networks and the Open Internet so we were contacted initially by Thomson to participate in the ICARE project. We quite quickly realised what we wanted to focus on with the project, and that was transparent caching: how to use CDN technology for the video content that comes onto the networks but is not controlled by the operators. We first targeted the technical issue of transparent caching to identify the most popular video content, coming up, somewhat by necessity, with the idea of using the home gateways in the users' household as a kind of probe to inform the CDN what content needs to be cached. This turned out to be an innovative and rather elegant technical solution. It's also cost-effective because with all the processing divided between the home gateways there is no need for big servers in the network that have to analyse all the traffic to determine what content has to be cached. Another benefit is that you do not need to have one big night where you put the system on air – you can simply start by deploying the solution in a few hundred home gateways, which enables a very rapid launch of the system at low cost."

Win-win

"So we produced a prototype that will enable local caching of content and improve the quality of service for the end user." By streaming the content from a point closer to the user, there is less risk of degradation. As a business model this is something that can be monetised by operators of the system. So, having shown this prototype at various trade fairs, Nivedita says that Broadpeak is "now aiming to make a product by the end of this year or the beginning of next year. It's really a matter of integration – we still have to incorporate all the prototype modules into our existing solutions so that we eventually have a system solution. Our market is telecom companies – the operators that own their networks. But satellite operators may also be attracted to our solution. Really any operator that supplies the home gateways to the end customers. Also if the content is cached in the operators' networks the content providers don't have to pay for the traffic in the CDN as a service." This is a win-win situation for both content provider and operator since the content provider saves costs and the end user gets a better quality of service from the operator.

"The ITEA project was a kind of catalyst," Nivedita sums up, "since it provided both a framework for determining what we had to target and an environment in which we could discuss all the options with partners. Without this we may not have identified the problems we needed to solve or the solution may have taken longer."

More information

www.broadpeak.tv

PROJECT SHOWCASE

CREATE

Instance-based learning for more flexible manufacturing

Project details
10020 CREATE

Project leader
Peter Funk
Mälardalen University

Partners
Netherlands
CCM
TIE Kinetix

Spain
Asociación de empresas tecnológicas Innovalia
CBT
CEESA
DATAPIXEL
EPC
Software Quality Systems
Stäubli Group Spain
Trimek

Sweden
Mälardalen University
SEMA-TEC
Volvo Car Corporation
Volvo Construction Equipment

Start date
September 2011

End date
December 2014

Website
https://itea3.org/project/create.html

Automotive body assembly is a very complex, multi-phase process in which dimensional accuracy is a key quality factor. Manual intervention in the assembly process slows production rates and increases costs. So the need to optimise productivity by integrating automation systems in the human operators' workflow, and to decouple the production processes from extensive personal human experience, lay at the heart of the challenge posed to the ITEA 2 project CREATE: to develop a new software architecture and methodology for industrial automation based on modular solutions that communicate with each other.

Smart Neighbourhood Modules
Project leader, Professor Peter Funk of Mälardalen University in Sweden: "CREATE is developing an innovative, fully decentralised software architecture for industrial automation systems based on modular and autonomously cooperating components called Smart Neighbourhood Modules (SNMs). These monitoring and quality control modules with standardised interfaces will be an important feature of future automation systems and also make decisions or assist in decision support for corrective and preventive actions, enabling transfer between manual monitoring and control and fully automated control, diagnosis and correction by communicating with the SNM that is able to perform corrective actions. By building up and sharing experience amongst the monitoring modules which perform similar tasks, the modules will learn and improve their capabilities. The measurements and decisions will follow each manufactured part and can be used for corrective actions, classification or as a reference value later on in the product life cycle."

Small data
"Essentially," Funk explains, "we are doing big data with small data. What I mean is that big data normally assumes access to huge amounts of information but humans are very good at learning from small data, or instances. One instance is generally enough for us to know what

to do next time a similar event occurs. Which is very different from learning from volume. It uses methods from artificial intelligence and an instance-based learning approach. Big data has no domain knowledge. What we do is to filter the data with domain knowledge to make it fit for purpose in practical applications. Which makes it a very powerful tool. When we humans get a new problem, we look in our memory to find a solution that may have solved

a similar problem before and then try to reuse it or adapt it to solve the new problem. Doctors use this approach all the time. That is what we apply in the context of operators. We record everything they do and build up a case library – an empirical database that is not abstracted in any way. So what we create is all the experience from all the operators and complement this with a perfect memory that never forgets a case. The system therefore acts as an assistant for the operator. Eventually, of course, the next level will be to fully automate the process, and that is something Volvo has in its R&D pipeline."

In fact, the results from the project in the area of monitoring, diagnostics and quality control is already proving valuable for both Volvo CC and Volvo CE in improving manufacturing and achieving better integration in the production life cycle process from design, manufacturing and assembly to product use and maintenance. Not only does this new architecture lay the foundations for more flexible manufacturing but it also helps plants to meet changing customer demands and enhance customer satisfaction.

Funk provides another example, from the aviation sector, that highlights the power of instance-based reasoning. "Take the example of a black-box recording of a plane crash in which experts identify a particular sound – of an engine failure half an hour before the crash. If we put this sound profile into the collective memory of every aeroplane, pilots could be alerted whenever a similar sound profile occurs and this may prompt them to take action – to check it out or land as soon as possible – to avoid similar disastrous consequences. It is the same kind of instance-based reasoning that we have used and proved in production manufacturing."

Modules

A CREATE Integrator Module (CIM) allows the integration and communication of different robots and sensors, enabling the communication and management of data and operation from a single platform. Interaction between a metrology module and the production line allows the generation of automatic decisions, e.g. removing the object from the line when a defect is discovered. A Monitoring and Quality Control and Diagnostics (MQD) module underlines how the data fusion from production components and the use of artificial intelligence applications for decision support can lead to cost reduction and improved production quality. When applied to a car production line, such as the Volvo C.C. cross-member assembly process, the CREATE MQD module provides decision support for fast and correct adjustments. Annual savings are estimated at €0.3 million. Finally, a Cross-Domain Demonstrator has demonstrated hybrid instance-based reasoning, the integration of sensor readings and operator corrective actions. "The potential of these technical innovations in saving costs, improving quality and increasing flexibility is significant," says Funk.

Spin-offs

The project has spun off several products such as the TIE SmartBridge 3.0 that includes additional features developed through research in CREATE (product released by TIE Kinetix) while the TIE Smart Integrator, TSI extended within CREATE to support ontology schemas in OWL and RDF, is planned for product launch in 2015. INTERCEPTOR 16PRO (product by SEMA-TEC AB), developed as a SNM integrated in future flexible, intelligent and dynamic manufacturing solutions, is to be released as a product in 2015 as well. Among the in-house applications are Generic Substrate Carrier (GSC) based Production Lines provided with a highly portable interface for control and monitoring as well as a Proof of Concept for the reconfiguration of the production line support. Additionally, MQD in the manufacturing of gores was improved and is the main topic of a new two-year FFI VINNOVA project led by Volvo Car that uses the CREATE results as input. The MQD in the manufacturing of transmissions for wheel loaders was also improved by the CREATE project and continues to be researched by a PhD at the Mälardalen University, partly funded by Volvo Construction Equipment. The patenting of learning and self-improving algorithms are subjects of ongoing research at MDU.

More information

http://www.createintelligence.org

ITEA 3 Call 2:
Start to prepare now

ITEA PO Preparation Days 2015
22 & 23 September, Brussels

Once again, you have an opportunity to take advantage of the second Call for project proposals being launched by ITEA on 22 September, in conjunction with the ITEA Project Outline (PO) Preparation Days. This event is a stepping stone for you to start preparing a PO, to present, learn and discuss about new project ideas, to meet potential consortium members and find out more about the Call details.

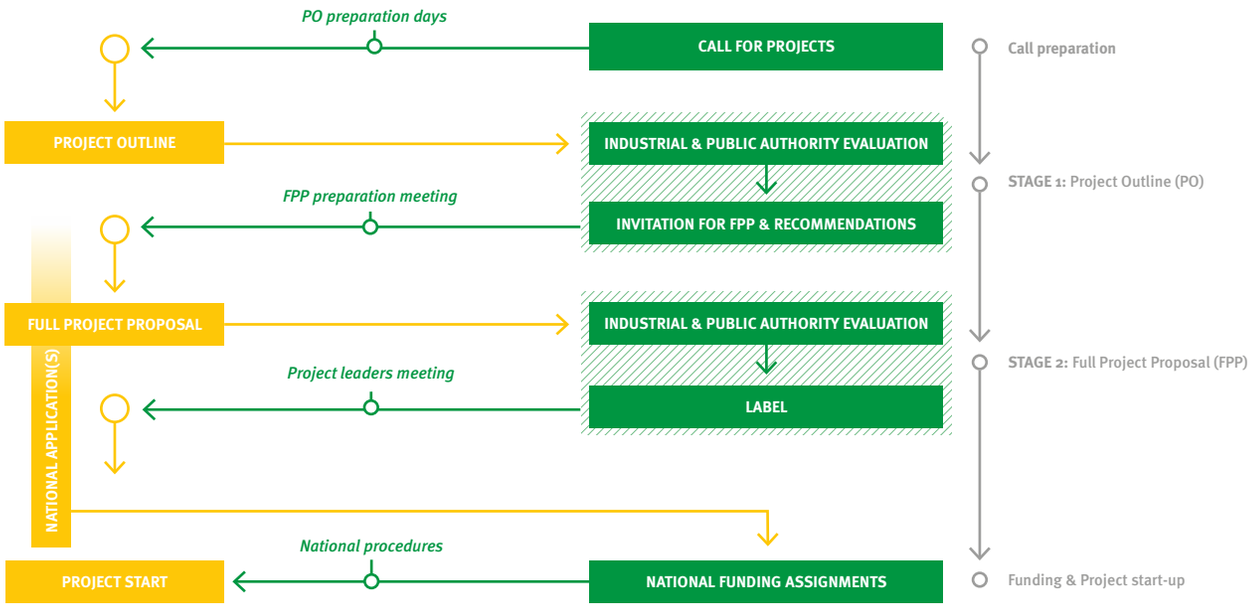
Last year, this tried and tested event saw over 70% of the submitted Project Outlines presented during the PO Preparation Days. So come along and find out how to:

- Prepare your project ideas upfront in the online project idea tool and, if desired, already share them with other attendees;
- Present your idea in a poster session and during parallel project idea pitch sessions;
- Discuss project ideas in workgroup session; and/or
- Contact other interested parties/potential partners from all over Europe and beyond.

Short plenary sessions will also give you general information about ITEA and the Call process.

Online networking tools:
Start shaping your project ideas!
You can already start to shape your project idea now! The ITEA Community website updated in May enables you to prepare your project idea and consortium well in advance of the PO Days event in Brussels.

- **Project idea tool:** This tool enables you to easily upload a project idea, invite and add partners, add partner descriptions, search for project ideas based on the full content of the idea, request to join a project idea and eventually transfer the data from your project idea to a Project Outline. (Some parts are only accessible when you have signed a Non-Disclosure agreement).
- **Partner search tool:** When you are still looking for some partners/expertise for your project idea, you can search for partners based on their expertise and invite them to join your project idea.



- **Message board:** Are you still looking for some partners with specific expertise, or are you looking for a project to participate in? Leave a message on the message board and get noticed!

This set of tools will optimise your preparations for your participation in the PO Days, where you can further shape and define your project idea during the different sessions and meet (new) consortium members face-to-face.

PO Preparation Days 2015 – Join us!
If you plan to participate in this Call and the PO Preparation Days 2015, register now on https://itea3.org/po-days-2015.html.

Registration is free of charge and open to all with an interest in our second Call.
Note: we have limited availability, so make sure to register in time!

PO template online

In order for you to prepare and see what is expected in the PO stage, the PO template is already available in PDF at the website: https://itea3.org/call-documents.html. An editable Word version will be released just before the Call 2 opening (22 September).

ITEA 3 Call 1 Projects

The future of happiness

Vice-chairman's summary
The first call of ITEA 3 delivered 20 FPPs submitted out of 21 invited, with a total of 3038 Person Years, involving 17 different countries. We again observe a good balance between the SME, industrial and academic partners, even though the SMEs are now predominant. It is a great success of ITEA to be able to mobilise year after year this number of innovative SMEs to work with the large industrials on projects that aim to achieve worldwide impact. This can certainly be attributed to the programme's known flexibility and market impact orientation. These characteristics are key for such delicate organisations.

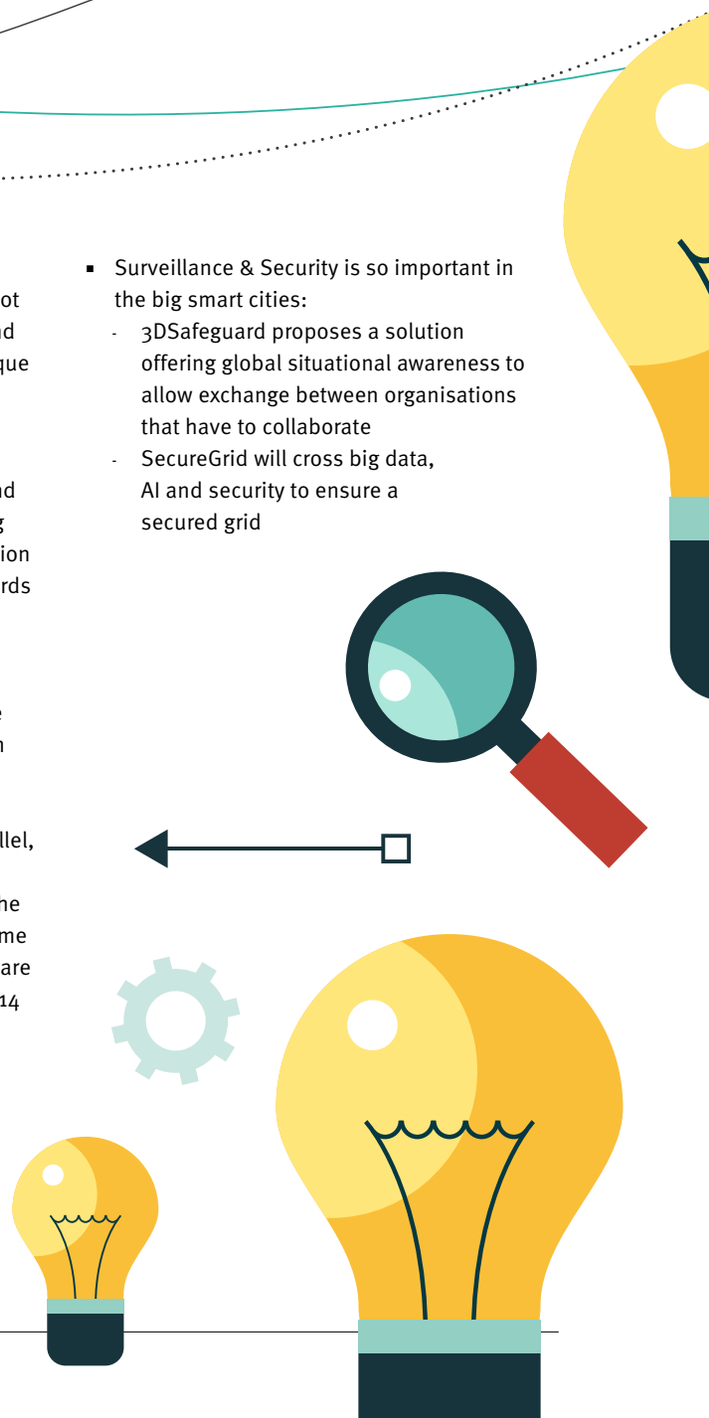
The countries most involved this year are France, Turkey, the Netherlands, Finland, Germany, Spain and Belgium and, of special significance, Romania which appears for the first time in this category.

We observe this year a shift towards rather innovative and new market projects even when we keep the pressure on business impact and fast exploitation. This shows that it is not incongruous to push innovation and demand immediate exploitation. It confirms the unique position of ITEA 3 in the R&D landscape.

In general, the proposals delivered a better understanding of the use of value chains and good quality SotA, which reveals interesting progress in this Call not only for the evaluation itself but also for steering the projects towards business impact.

Nevertheless, this Call 1 is actually the first to follow the new planning agreed by all the community partners to reduce the time from the idea to project start. It is clear that this pressure has led to some proposals having been abbreviated to deliver in time. In parallel, to cope with the time from idea to funding KPI we have decided to be more radical in the labelling phase because there is no more time for any negotiation for the proposals which are not perfect from this first step. It has led to 14 labelled proposals.

The main themes arising from this Call are:
- Surveillance & Security
- Engineering
- Healthcare
- Digital revolution
- Digital transition
- Surveillance & Security is so important in the big smart cities:
  - 3DSafeguard proposes a solution offering global situational awareness to allow exchange between organisations that have to collaborate
  - SecureGrid will cross big data, AI and security to ensure a secured grid



- Engineering remains a key topic for ITEA:
  - ACOSAR aims to integrate simulation and Real Time (RT) systems for automotive design.
  - SW engineering dedicated to continuous measurement of development process with MEASURE.
  - Affordable, safe multi-core development methodology for automotive with ASSUME.
  - OpenCPS focuses on interoperability between the standards UML, Modelica and FMI (one of the last ITEA success stories), improved execution speed of (co-)simulation, and certified code generation.
  - Reflexion will generate tools to extract the undetected user needs.
- Healthcare is back with three important projects:
  - 3D Pathology (a new technology to solve the problems of an existing important market) and Medolution (big-data technology to serve information exchange in the health domain) are two important innovative projects.
  - Medolution will develop an open platform to allow community exchange about health between patients and professionals.
  - EmoSpaces is a follow-up project on emotional management for Wellbeing IoT.
- Industry is also at the dawn of the digital revolution.
  - BEACON will simplify the commissioning of large-scale IoT network using geo-localisation.
- With Digital Transition at the heart of the ITEA focus, we have three applicative projects
  - CERVESA will use computer vision to strengthen the automatic Simulation analysis.
  - SOLOMON will support the traditional retail industry in its digital transition.
  - ETS will reinvent ticketing with digital services.

A total of 14 projects were labelled in Call 1. The projects address a wide range of topics, but can be clustered in the following main themes:

Project overview

THEMES	CALL 1 PROJECTS
Surveillance & Security	3DSafeguard, SecureGrid
Engineering	ACOSAR, MEASURE, ASSUME, openCPS, Reflexion
Healthcare	3DPathology, Medolution, EmoSpaces
Digital Revolution	BEACON
Digital Transition	CERVESA, SOLOMON, ETS

3DPathology 14001
Developing 3D digital pathology with spectroscopy
Project leader: *Barco (Belgium)*

A strong growth forecast in the digital pathology market for the next five years combined with a decreasing number of qualified pathologists will lead to a tremendous increase in workload in the pathology departments of clinical and pharmaceutical organisations. On top of this there is an urgent need for higher quality diagnostic information enabling more effective and efficient treatments. The 3DPathology project will address these needs by creating a fast, digital, quantitative, spectroscopic and multimodal 3D pathology analysis system.

Medolution 14003
Medical Care Evolution
Project leader: *Philips (Netherlands)*

Medolution's vision is a reduction in the cost of healthcare along with an improvement in the quality of life of patients. The project aims to apply long-term monitoring and real-time decision support in smart environments that integrate professional and user-created data. This leads to relevant information to support patients and healthcare professionals in their decision making on diagnosis, treatment and further monitoring; from reactive to preventive. Medolution builds upon the results of Medusa that provides collaborative cloud access to medical information relevant in critical situations.

ACOSAR 14004
Advanced Co-simulation Open System Architecture
Project leader: *VIRTUAL VEHICLE Research Center (Austria)*

ACOSAR will focus on the specification of a non-proprietary open RT system interface, a so-called "Advanced Co-simulation Interface" (ACI), for the efficient integration of RT systems, e.g. test beds, into simulation environments. A communication architecture (incl. protocol) will be set up, which will be independent of the communication systems actually used. Furthermore, a methodology for the seamless integration of RT systems during the late phases of the classical V-model development cycle (verification & testing, validation) will be defined.

MEASURE 14009
Measuring Software Engineering
Project leader: *Softeam (France)*

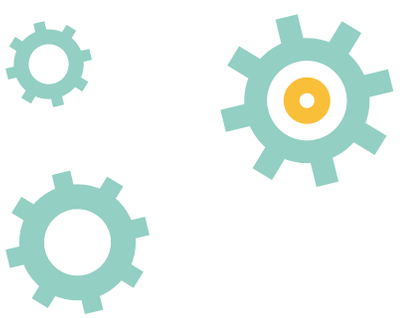
The goal of the project is to increase the quality and efficiency as well as reduce the costs and time-to-market of software engineering in Europe. By implementing a comprehensive set of tools for automated and continuous measurement, this project provides instruments for future projects to properly measure their impact. More importantly, it opens a new field for innovation. The real innovation will be in the advanced analytics of the measurement data enabled by the project.

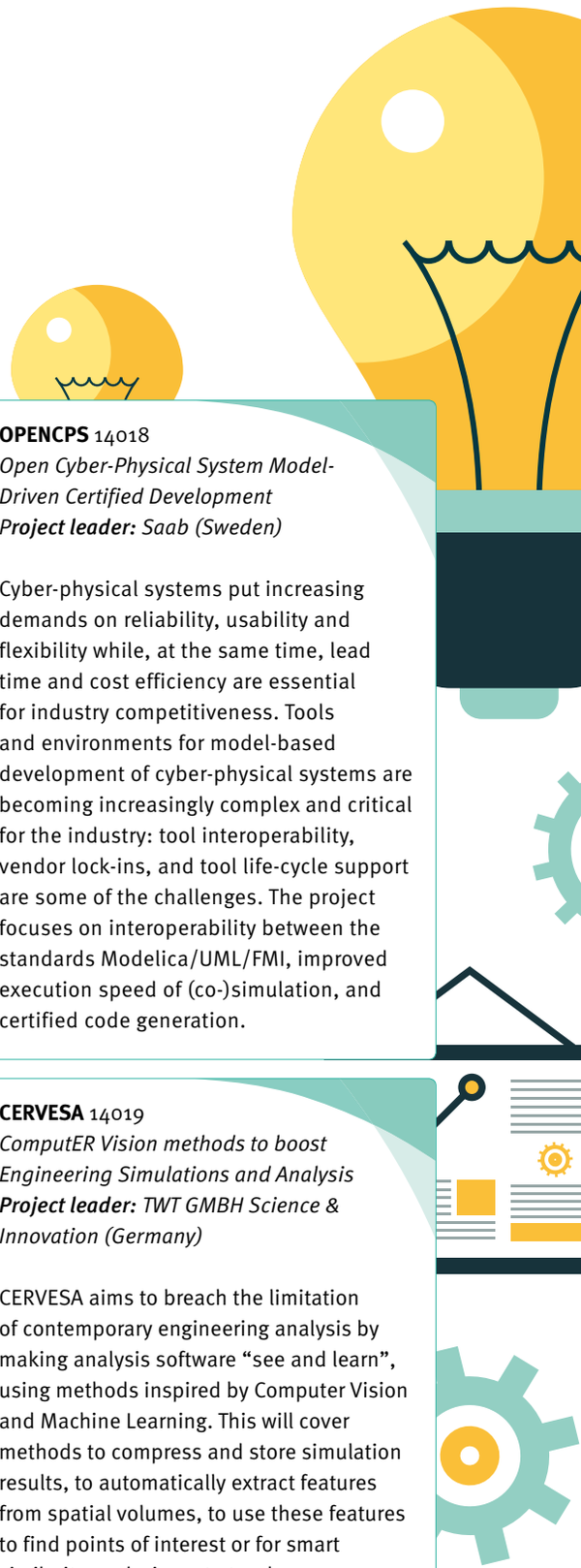
EmoSpaces 14012
Enhanced Affective Wellbeing based on Emotion Technologies for adapting IoT spaces
Project Leader: *Evoleo Technologies (Portugal)*

The Internet of Things (IoT) has evolved from being a far-fetched futuristic vision to something that can realistically be expected to become a mainstream concept in a few years' time. EmoSpaces' goal is the development of an IoT platform that determines context awareness with a focus on sentiment and emotion recognition and ambient adaptation. The main innovative aspect of EmoSpaces lies in considering emotion and sentiments as a context source for improving intelligent services in IoT.

ASSUME 14014
Affordable Safe & Secure Mobility Evolution
Project leader: *Daimler (Germany)*

Future mobility solutions will increasingly rely on smart components that continuously monitor the environment and assume more and more responsibility for a convenient, safe and reliable operation. Currently the single most important roadblock for this market is the ability to come up with an affordable, safe multi-core development methodology that allows industry to deliver trustworthy new functions at competitive prices. ASSUME will provide a seamless engineering methodology, which addresses this roadblock on the constructive and analytic side.





OPENCPS 14018
Open Cyber-Physical System Model-Driven Certified Development
Project leader: *Saab (Sweden)*

Cyber-physical systems put increasing demands on reliability, usability and flexibility while, at the same time, lead time and cost efficiency are essential for industry competitiveness. Tools and environments for model-based development of cyber-physical systems are becoming increasingly complex and critical for the industry: tool interoperability, vendor lock-ins, and tool life-cycle support are some of the challenges. The project focuses on interoperability between the standards Modelica/UML/FMI, improved execution speed of (co-)simulation, and certified code generation.

CERVESA 14019
ComputER Vision methods to boost Engineering Simulations and Analysis
Project leader: *TWT GMBH Science & Innovation (Germany)*

CERVESA aims to breach the limitation of contemporary engineering analysis by making analysis software "see and learn", using methods inspired by Computer Vision and Machine Learning. This will cover methods to compress and store simulation results, to automatically extract features from spatial volumes, to use these features to find points of interest or for smart similarity analysis, or to teach programmes to develop a general "hunch" about the quality of the result before the human even has to look at it.

SOLOMON 14025
Social Local Mobile iNdoor shopping experience
Project leader: *Institut Mines-Télécom (France)*

E-commerce has drastically transformed the retail industry. In SOLOMON the main target is to improve the customer experience in bricks-and-mortar stores. SOLOMON's innovation is to define a "shop operations & experience" platform connecting different technologies and information sources into seamless services for interaction with the retailers, shop personnel and consumers. Platform requirements are set by retail stores and technology providers who define the use cases that are demonstrated and evaluated during the course of the project in bricks-and-mortar stores.

BEACON 14027
Broadly dEployable geolocation-aware services over All-IP CONnected infrastructures
Project leader: *Irdeto (the Netherlands)*

The BEACON project aims to overcome three major roadblocks for further progress of the current IoT state-of-the-art: commissioning of large-scale networks, application development for these networks and security. The project will innovate in (the use of) geo-location services, all-IP networks, security mechanisms, and 3D-modelling and simulation to enable easy development, commissioning, distributed control and assistance functions (like maintenance or safety functions) for applications within buildings and industrial material handling domains.

3DSafeguard 14034
Global Situational Awareness in Rescue, Calamity and Inspection Operations
Project leader: *Eindhoven University of Technology (Netherlands)*

At present, calamities such as fires in buildings and bomb threats in stations/airports occur frequently. During such large incidents, organisations like fire departments, police, hospitals etc. work together, but the information about the actual actions is limited and information sharing between organisations is restricted. 3DSafeguard proposes a solution offering global situational awareness for both individual actors carrying out the operation and for the coordinating commanders. This situational awareness is enabled by integrated data, control and communication workflow between the abovementioned parties.

Reflexion 14035
React to Effects Fast by Learning, Evaluation, and eXtracted InformatiON
Project leader: *TNO-ESI (Netherlands)*

Reflexion will support high-tech industry by providing significant improvements in quality and stability during early product roll-out. The results will include the ability to react to unforeseen problems or emerging needs in a speedy and cost-effective way by augmenting products with a layer of data sensing and data-analytics to quickly infer 'missed' or 'misunderstood' end-customer requirements; detecting issues that escape product release testing and product items that need service and maintenance attention. This knowledge is used to further improve the product.

SecureGrid 14039
Security, Fraud Detection and Encryption for Smart Grids based on AI
Project leader: *Oberthur Technologies (France)*

Europe is transforming the current obsolete electricity network into an advanced, digitised and more efficient one known as the Smart Grid. One major innovative aspect of the project relies on applying AI and Big Data analysis techniques to the large amounts of data gathered by the Smart Grid. The massive collection of data occurring within Smart Grids also creates new threats that will be addressed by the second major innovative aspect of this project, which is security improvement.

ETS 14041
Electronic Ticketing System
Project leader: *Elektronet Inc. (Turkey)*

The Electronic Ticketing System project aims to take account the arrival of electronic ticketing and the geo-location devices to propose a new back-office system for electronic tickets in the fields of entertainment and transportation by providing additional services and mobile application, and a new transportation control system for open access travel (typically suburban trains, buses, trams, subways, ferries) to ease the access to platforms, usually through access gates or turnstiles while securing the electronic transaction, specifically for online purchases.

Calendar

23-24 June
TERATEC 2015 FORUM
École Polytechnique - Palaiseau cedex
http://www.teratec.eu/gb/forum

29 June
CELTIC-PLUS PROPOSERS DAY
Issy-les-Moulineaux, France
https://www.celticplus.eu

8 September 2015
9TH INTERNATIONAL WORKSHOP SOCNE
Luxembourg, Luxembourg
http://www.socne.org

16 September
ACQUEAU WORKSHOP MAKING WATER SMARTER
Paris, France
http://www.acqueau.eu/workshop-2015-paris

22 September
HOLLAND HIGH TECH ROADMAPEVENT
's-Hertogenbosch, the Netherlands
http://www.hollandhightech.nl

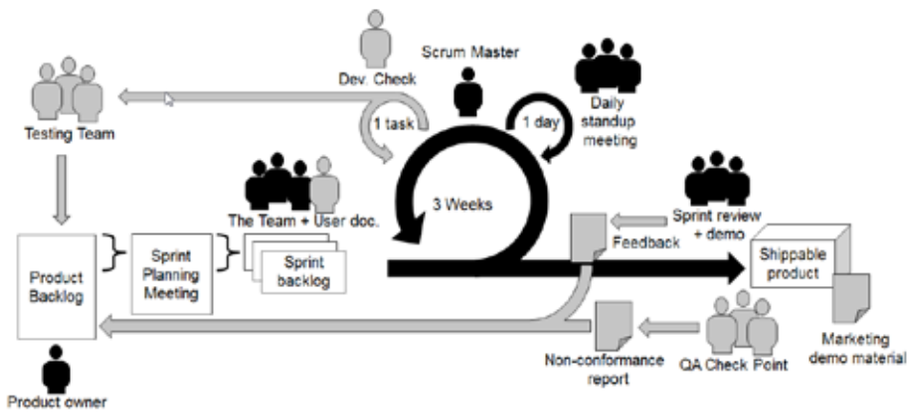
22-23 September
ITEA PO DAYS 2015
Brussels, Belgium
https://itea3.org/podays2015/index.html

6-7 October
ARTEMIS TECHNOLOGY CONFERENCE
Turin, Italy
https://artemis-ia.eu

20-22 October
ICT 2015
Lisbon, Portugal
http://ec.europa.eu/digital-agenda/en/ict2015-innovate-connect-transform-lisbon-20-22-october-2015

Scaling Agile Methods for Regulated Environments

Agile software development methods have become the most popular in use today. However, agile methods were initially thought to be only suited to small projects, with co-located teams, and in non-safety-critical domains. In the past 10 years, the first two constraints have been largely addressed, and agile methods are now often used for large projects with distributed development teams. However, the use of agile methods in regulated environments represents the final frontier. Regulated domains, such as automotive, aviation, financial services, food, medical devices, nuclear, pharmaceutical and railway, pose particular challenges for software development as software has not been traditionally viewed as core in these sectors. This has been a focus in the SCALARE project. QUMAS, an Irish company in the life-sciences/pharmaceutical domain, has created the agile R-Scrum (Regulated-Scrum) method (see Fig 1) which has been tailored to meet the needs of a regulated domain[1]. R-Scrum has yielded several positive impacts for QUMAS, including quicker customer feedback on software features – typically customer requests are translated into software within five weeks; quicker process for regulatory bodies to assess conformance – a half-day process replaces what formerly required two-days. Finally, QUMAS, was recently acquired by Accelrys (a Nasdaq-traded company), and this research, published in the leading International Conference in Software Engineering (ICSE), served as evidence of the quality of the Irish software development function, thus strengthening the case for retaining these high value jobs in Ireland following the take-over.



For more information: http://scalare.org

SCALARE

[1] Fitzgerald B, Stol, KJ, O'Sullivan R and O'Brien D (2013) Scaling Agile Methods to Regulated Environments: An Industry Case Study, Proceedings of 35th International Conference on Software Engineering (ICSE), IEEE Publications, San Francisco, USA, pp. 863-872.

Korea EUREKA Day 2015

Seoul, 20-22 May

"The KOREA EUREKA Day was very well organised by KIAT and welcomed all participants in a friendly atmosphere. It was a unique event with over 300 face-to-face matchmaking sessions."
Philippe Letellier
ITEA Vice-chairman

The Korea EUREKA Day 2015 was organised by KIAT and co-hosted by the EUREKA Network. The event gathered entrepreneurs and researchers from the entire Network, spanning Europe to Canada, South-Africa to the Republic of Korea and its Asian partner countries. The event offered opportunities to build partnerships in different global regions.

ITEA Vice-chairman Philippe Letellier was invited to join the event and moderate a session on 'IT and convenient life'.

EUREKA at the Co-summit 2015

At the Co-summit 2015 in Berlin, Andreas Gut, EUREKA National Project Coordinator Chairman representing the Swiss Chair gave a welcome speech. He pointed out: "ITEA is the benchmark for the EUREKA Network when it comes to global cooperation".

As in previous years, ITEA was very happy to welcome EUREKA Network in a joint ITEA-EUREKA stand at the project exhibition.

EUREKA celebrates 30 years of coordinated European Investment in innovation

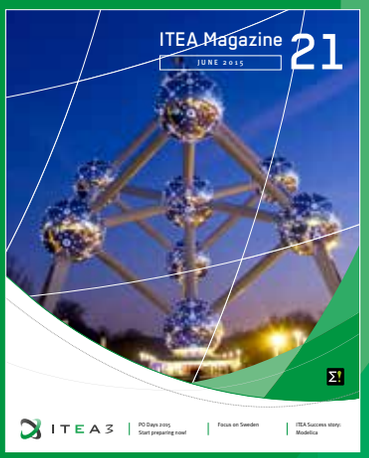
30 EUREKA yearsof innovation across borders

EUREKA, the Network for promoting cross-border innovation, is turning 30. In the coming year EUREKA is exploiting this important anniversary to showcase its history, achievements and its impact - and an investment of some €36 billion leveraged over its existence. Key elements of the Anniversary programme are:

- An anniversary event in Lugano, Switzerland on 1 July. The event will be organised under the auspices of the Swiss EUREKA Chairmanship with speakers including Jacques Attali, one of EUREKA's founders and a former advisor and G-7 sherpa to French President François Mitterrand. ITEA Chairman Rudolf Haggenmüller is invited to give a speech on the EUREKA Clusters and ITEA.
- A new promotional video including testimonials and illustrating just a few of EUREKA's many success stories.
- A 30 year anniversary publication looking back at the creation of EUREKA, its key milestones and success stories.
- Results of a technological trends report highlighting EUREKA's role in developing tomorrow's technologies and presentation of standout projects.

ACQUEAU	16 September	Workshop Making water smarter	Paris	www.acqueau.eu
Celtic-Plus	29 June	Celtic-Plus Proposers Day	Issy les Moulineaux, France	https://www.celticplus.eu/event/eucnc2015/
EURIPIDES²	25 September	Submission deadline - Project Outlines Autumn Call 2015		www.euripides-eureka.eu
	24 November	Submission deadline - Full Project Proposals Autumn Call 2015		
EUROGIA2020	18 September	EUROGIA2020 Call 05 Cutt-Off Date		www.eurogia.com
	20 November	EUROGIA2020 Call 05 Cutt-Off Date		

Colophon



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Submissions:
The ITEA Office is interested in receiving news or events linked to the ITEA programme, its projects or in general: R&D in the Software-intensive Systems and Services field.
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