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ITEA Success stories
MoSHCA, UsiXML and AMALTHEA

Focus on Belgium

EUREKA Global
Innovation Summit 2019

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Editorial

Dear ITEA Innovation Community,

Not only is the variety of usage of digital systems increasing but so is the complexity of digitalisation. Digitalisation grows in our lives just like time does in space;

- moving in smaller spaces such as in nanocomponents or deeper in the human body
- moving in larger spaces such as digital twins of production zones or billions of connected people in social media

Given these circumstances, it is not surprising that Artificial Intelligence is moving in our lives more, amplifying human intelligence to support innovation cycles. The size of data created by devices and humans is increasing logarithmically and the need for quality of service and speed of delivery challenge any conventional system. Artificial Intelligence will create disruptive change in human life, bringing new insights by processing enormous amounts of data in a matter of seconds in two ways:

- detecting repetitive data to simplify systems; and
- detecting anomalies in data to identify problems.

There are several ITEA projects that have already delivered a set of solutions. Please read the post of ITEA Vice-chairman Philippe Letellier on some of these ITEA projects that use AI or check his SotA highlight on Deep Learning.

In addition to Artificial Intelligence, open source platforms are necessary to enable a comfortable start and to support the first steps for solutions in a complex world. In ITEA, creating open source platforms and building communities using these open source platforms are also important priorities, just like creating global standards. The central point of focus in open source platforms is the problem itself, so the Community connects to each other with a specific purpose rather than through a hierarchical order. Open source leverages external resources and knowledge to increase innovation and product quality as well as to shorten time-to-market and is an enabler for a variety of problems. Open source communities also provide the blueprint for other industries to jointly solve big problems. You may enjoy reading the success stories of AMALTHEA and AMALTHEA4Public on open source platforms on automotive.

Additionally, complex systems need a set of diverse knowledge bases to tackle complex problems. In ITEA projects, large industry players enable the creation of international impact, SMEs bring in the innovative ideas and dynamics of the market, and academia and RTOs create deep knowledge and a scientific approach. So in ITEA projects, an innovation bridge is built between large industry, SMEs and academia in an international environment. The knowledge transfer is explained in the Community Talk article by Isabel Praça and value of international collaboration is elaborated in the Focus of Belguim by VLAIO and Siemens Industry Software.

Having the UK as the EUREKA Chair this year, I invited David Golding to the ITEA PO days in Stockholm last year. And now I am proud to announce his interview in this magazine in which he explains his impression of the ITEA PO Days and his viewpoint on potential collaboration between EEN and Clusters. He also invites the ITEA Community to join this year's EUREKA Flagship Event, the EUREKA Global Innovation Days 2019, to create more awareness of each other, which can help break down barriers and support companies, research institutes, universities and others to find each other.

In ITEA, our main purpose is to create a positive impact by using the latest technologies for today's industrial and societal challenges. By witnessing the impact that is created by the ITEA Community, it gives me an "Alice in Wonderland" feeling. Reading the Success Stories like MoSHCA and the End-user happiness story of ViNotion might take you there as well.

Happy reading!

Zeynep Sarılar


Duvel

Focus on Belgium

Collaboration is a crucial economic factor … and software innovation is an essential (integral) component

Head of the entity International Collaboration and Strategy at the Flanders Innovation & Entrepreneurship Agency (VLAIO), Maarten Sileghem, explains the crucial nature of collaboration in encouraging, supporting and strengthening innovation and entrepreneurship in the region, not to mention the vital role of software innovation throughout the industrial landscape.

Four spearheads
In brief, VLAIO works closely with local actors and with the support of international commitments in programmes like EUREKA, EEN and H2020 to focus on four strategic spearheads: the *stimulation of growth and innovation* through grants to business to enable ongoing growth, transformation and innovation, such as the SME growth subsidy, SME innovation and R&D projects; the *promotion of entrepreneurship*, working with strong partners that assist SMEs through start, growth and acquisition, also encouraging them to network for growth; *cluster support* whereby organisations are facilitated in galvanising cooperation and dynamics within a group of enterprises and knowledge institutions; and *improving environmental factors* through enabling the development of industrial areas.

Tools and instruments
Sileghem makes the point that VLAIO has more of an instrument-based approach. The VLAIO view is that the ICT industry, and especially the software and software-intensive sector, has really become an 'embedded' component of the entire industrial landscape rather than a separate domain in the context of expanding digitalisation. "Our focus lies in the businesses themselves and in trying to provide them with the tools and instruments to innovate so that they can be more competitive. Our approach is less thematically geared than our Dutch neighbours, so that makes us complementary, you could say, rather than being carbon copies." However, Flanders does provide a vehicle for some degree of thematic collaboration through a number of large research centres that work very closely with industrial partners. Sileghem gives a couple of examples. "We have the recent fusion of iMinds in the area of broadband technology and imec in the field of microelectronics and nanotechnology, creating a world-class research centre in the field of nanoelectronics, excelling in software and ICT. It is here that ICT, software, hardware and nanotech find their expression in an integrated approach towards industry. For us, the role of software in this whole process is a vital one, certainly in the two most innovative sectors in terms of R&D, pharmaceutical and ICT. But, of course," Sileghem explains, "we see that the nature of the software is becoming increasingly embedded. The same evolution is also evident in industry. A major player in software innovation in Flanders, Leuven Measurement Systems (LMS) International, known for its virtual simulation software, was integrated in the larger Siemens group some 5 years ago. As Siemens Industry Software NV the enterprise continues to be a crucial player and a spearhead in the Flemish innovation ecosystem."

Embracing digitalisation
This embedding process is penetrating the manufacturing sector where ongoing and far-reaching digitalisation seems to be unstoppable. "This is evident in the collaboration that is taking place within the pharmaceutical and ICT industries. In the processing and use of data in medicine, ICT has a key role to play. Also in the chemical and photography sectors, for example, the shift towards digitalisation is evident as is the need for software innovation. You only have to look at Agfa, for instance." The Agfa-Gevaert Group, a company whose international renown was built on photography and graphics, has embraced the digital revolution. It now develops, manufactures and distributes leading edge technology, affordable solutions and innovative ways of working, mainly for the printing industry and the healthcare sector, as well as for specific industrial applications. The company's credo is that 'investing in innovation and delivering top-quality solutions are key' to success.

Investment with results
Sileghem: "We are highly focused on Industry 4.0 and the needs that come with the digitalisation of industry. As I said, we do not have a policy of thematic-based investment but we try to look at where can we add value. We see this in aspects like artificial intelligence, cyber-security, autonomous driving and healthcare. We try to promote innovation in the software that has to be incorporated in order to drive digitalisation to the next level. As a government agency, we encourage companies to undertake R&D and also work in and with Clusters to get knowledge into these companies, support access to and dissemination of that knowledge, as well as provide R&D funding. Last year that amounted to 200 million euros – quite a significant investment 'pot'. But in encouraging innovation through R&D, we are aware that a good deal is high-risk, so it makes sense to share this risk. In addition, since it's the tax-payer who is actually funding the R&D when it comes down to it, he quite justifiably has the right to ask the question: what am I getting for my money? In other words, the investment has to produce results. This is where a platform like ITEA earns its spurs. Rather than R&D in isolation, which most companies are neither willing nor able to do on their own, by collaborating in projects that are driven by real industrial needs, an environment is created in which companies can learn, contribute, share and gain in all kinds of ways. Like acquiring knowledge and developing networks. Subsiding participation in this regard

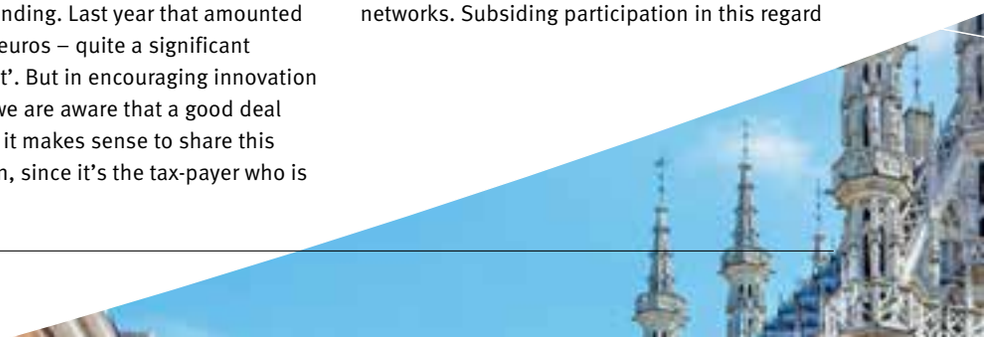
Brussels-Capital region

For project partners located in the Brussels-Capital region, funding applications are handled by Innoviris. Innoviris is the Brussels Institute for the encouragement of scientific research and innovation set out to create an active, competitive, innovative Brussels-Capital region supported by knowledge.

Innoviris' funding criteria for ITEA project partners:

- Develop all or some of its activities within the territory covered by the Brussels-Capital region
- Present an innovative R&&DI project likely to have a favourable impact on employment and/or sustainable development of the Brussels-Capital region
- Show one's ability to finance one's share in the project
- Have fulfilled its obligations in the context of previous support initiatives allocated by the region.

More information
http://www.innoviris.be/en/financial-aid-for-companies/european-aid/eureka/clusters/itea-3



can really act as a multiplier and make our companies that join such projects more competitive, especially on the international stage. It creates real impact."

Impactful innovation

It goes without saying that growing internationalisation is a significant factor in the collaborative approach towards R&D software innovation. Platforms that give industry and research the opportunity to come together to create impactful innovation are becoming increasingly important. "In this respect," Sileghem says, "ITEA has always played a key role in providing this opportunity. There can be no doubt that collaboration is absolutely crucial for our industry, both as a region and as a country. And in the future it will become even more crucial. This goes for the large players and the small and medium-sized enterprises, too, for whom we provide special support. After all, they are central to our ecosystem in which the importance of collaboration between SMEs and knowledge institutions cannot be underestimated. Our specific programmes stimulate this, like the Cluster policy that is intended to engage more SMEs with knowledge institutions. At a more downstream level, we also encourage the development of business skills to enable these collective activities to take place close to the market. In a nutshell, then, we aim to facilitate a process whereby research and industry can mutually benefit from each other, with the ultimate goal of creating impact."

More information

https://www.vlaio.be/nl/subsidies-financiering/subsidies-voor-ooi-een-internationaal-consortium/netwerken

Siemens Industry Software NV

Innovation is a collaborative art

Siemens Industry Software NV (SISW), based in Leuven, Belgium, runs the Simulations and Testing Solutions (STS) business unit of Siemens Product Lifecycle Management (PLM) Software, part of the broader Siemens Digital Factory division. SISW bundles a number of strategic acquisitions of technology leaders in advanced performance engineering for mechanical and mechatronic industries, among which LMS International, spin-off company of the KU Leuven university and respected research partner. By combining the strengths and the decades of experience of all these former companies, SISW can deliver an offering for simulation and testing during product ideation, that is unique in both application width and depth, and is brought to market as the Simcenter™ solutions portfolio.

Stijn Donders, Mike Nicolai and Bram Cornelis, researchers at SISW, explain what sets the company apart, and how publicly-funded projects can influence its R&D and product development roadmap.

Mission-critical performance solutions
SISW's Simcenter allows engineers to generate a set of ultra-realistic, multi-physics models and data that can predict real product behaviour during product ideation. These especially cover mission-critical performance aspects such as safety, fuel economy, noise and vibration, structural integrity and lifetime, and are an essential part of the holistic digital twin, the industry paradigm that helps companies face today's challenges with smart designs that combine mechanics with software, electronics, controls and new, lightweight materials. Simcenter customers are mainly in the automotive and aerospace sectors – around 75% – and apart from that, in diverse industries, from wind turbines to mobile phones. In fact, anywhere where mission-critical performance engineering is required.

Unique value proposition
"The power of Simcenter is in both the excellence of its individual components and in the synergies that can be achieved by combining them. The included physical testing, multi-disciplinary computer-aided engineering (CAE) and computational fluid dynamics (CFD), as well as the powerful multi-physics system simulation solutions are long-standing industry-leading applications. Simcenter merges those elements with robust design exploration and data analytics, which are managed in a product lifecycle management (PLM) context, powered by Teamcenter™ software. The alignment of all these applications helps engineers to be much more effective during development, for example by enabling constant interaction between test and simulation, facilitating multi-physics modelling, including controls, or by allowing the application of operational data at any time. And the close collaboration with Teamcenter connects product ideation and product use, paving the pathway for the holistic digital twin," explain the researchers. "On top of that, the parent company Siemens is a manufacturer of many interesting components and machinery as well. Having all this combined expertise in one house, is a unique added value for our customers."

Many automotive examples demonstrate the strength of SISW and Simcenter. Think of multi-body simulation models that can run in real time and can be connected to a driver simulation. Other examples are generative engineering, where engineers can explore and generate different powertrain architectures for hybrid and electric vehicles; or capabilities for simulating hybrid and electric vehicle noise. "Automotive companies have R&D teams working on design, modelling and optimisation of next-generation vehicles, so they need the right tools to do this efficiently. We offer them user-friendly software tools, helping them to deal with ever-shorter design and production cycles."

SISW is a global organisation with R&D centres throughout Europe, in the US and in India. The solutions the company provides are continuously innovated thanks to substantial investments in R&D. In this context, SISW closely collaborates with major end users, who can reflect on the actual market needs, as well as with leading universities and research centres, who contribute to the development of breakthrough technologies. As part of this strategy, SISW has a policy of hosting visiting students, researchers and experts, many of which pursue mixed industry-academic doctoral degrees.

R&D landscape
"Leuven is a very fertile environment for innovation and for finding new value for our customers," explain the SISW researchers. Mike Nicolai, who joined the company after a research career, confirms: "I never expected

such an innovation drive in a private company." This innovation drive is very well supported by national and regional funding agencies, as well as programmes like ITEA. The SISW researchers explain: "These are really important instruments for us. Public funding agencies and programmes enable us to undertake high-risk research and develop partnerships – they broaden the horizon for us in many ways, exposing us to greater diversity in terms of knowledge, culture and business. For regional R&D support, VLAIO in Flanders has a range of instruments, from R&D projects between industry and academia, to personal R&D grants. Another personal grant instrument is the Marie Curie programme from the European Commission, which offers a kind of industrial PhD to academic partners with an industry focus. This helps to advance the State-of-the-Art, both in technology and in methods used in the industry."

Innovation is crucial

Keeping a competitive edge in the software business by continuous innovation is one of the main reasons to participate in so many R&D projects. "We aim to deliver innovation, and that comes in all shapes and sizes, one of which is software. We see that, in the industry, both physical systems and their virtual counterparts become technically increasingly complex. So it's clear that innovations in software are mandatory to manage this. But there is more. Software innovation is crucial for the company to survive. The typical life span of software is about a decade. So software companies constantly have to innovate their solutions, first of all by developing new features inside existing products, and, in parallel, by developing new software solutions and platforms for the next decade."

The REFLEXION project

The drive for innovation is obviously also fed by the eagerness to gather knowledge. The researchers explain: "In SISW we have test and simulation, but we are still missing machine-learning in our portfolio. We saw the high potential of this technology already some years ago, so it was added to our research roadmap. For this purpose, we targeted new research opportunities outside our regular scope, such as in the services industry, where operational data is acquired during the actual usage of the end product. This led us to the ITEA REFLEXION project, for example." REFLEXION is an acronym for 'React to Effects Fast by Learning, Evaluation, and eXtracted InformatiON'. It aimed at helping high-tech systems companies to use operational data to improve the development lifecycles, maintenance and troubleshooting of products. In this project, open source frameworks provided the platform to develop self-learning and data-analysing systems that can accumulate useful knowledge during a product's lifetime.

Paying dividends

"We wanted to find out how we can get useful information from the data gathered during operation, and use this to inform the design and increase the product performance. One example is our collaboration with Océ, a REFLEXION project partner, active in the printing business. We could use that company's datasets to identify a mechanical issue in a printer component. Now that particular component can get maintenance before the problem evolves into a more dramatic defect that could lead to long downtime. Our unique contribution was that we could bring our expertise in the field of testing and simulating mechatronic systems. Through the project we could develop a potential service model, based on simulated failures, which can predict future issues, even without 'real' data. We see this is becoming an increasingly integral feature among our clients, so the decision to team up with the ITEA REFLEXION project three years ago, has paid dividends for us. Just think of the benefits this can bring – faster time-to-market, lower costs and risks, and more competitiveness, just to name a few."

Mastering the art

The ITEA project review process was a real plus in this project, agree all three SISW researchers. "It kept our focus right and probably led us to better project outcomes than without such reviews. The project was interesting, because even though the partners came from different fields, we all shared common challenges we wanted to address. But also the variety of projects within ITEA is appealing – ranging from small, rather intimate and focused projects like REFLEXION, to much more wide-ranging projects involving many partners in diverse countries that can allow to work towards new standards. We are looking forward to taking part in such a wide-ranging project, EMBRACE, in the next round of ITEA Calls. We can learn so much from each other, gain experiences also from other domains in open innovation. The ITEA project environment makes it easy to talk and swap ideas. You could say that ITEA is a master of the art of collaborative innovation."

> "Programmes like ITEA broaden our horizon in many ways, exposing us to greater diversity in terms of knowledge, culture and business."

More information

https://www.plm.automation.siemens.com/global/en/

ITEA Success story

MoSHCA

Mobile and Smart Health Care Assistant

The number of people experiencing chronic disease is increasing dramatically worldwide. One example is diabetes, which affects approximately 350 million people and is projected to become one of the world's main disablers and killers within the next 25 years. The impact of chronic diseases is evident: it has been estimated that the cost of five of the major chronic illnesses could reach USD 47 trillion over the next 20 years and could claim almost 400 million lives within 10 years. The ITEA 2 MoSHCA project was geared towards improving patient-doctor interactions, controlling chronic diseases, developing technological set-ups that significantly improve the self-management of chronic illnesses, promoting communication between the patient and the health provider and supporting health staff in providing better clinical follow-up.

Context-awareness and interoperability as key features

A MoSHCA solution typically involves a number of body sensors and other sensors that communicate wirelessly with a smartphone, transmitting relevant physiological and activity data such as cardiac and vascular information, glucose levels, etc. The intelligent MoSHCA software, installed on the mobile terminal, receives this information alongside subjective, patient-generated data such as pain and mood levels, stiffness, medication taken, etc.

With context-awareness and interoperability as key features, the technology was tested in medical environments with real patients and valuable feedback was gained from these patients and their care providers. The reliability and energy consumption of medical sensors were improved and a better understanding was gained of the balance between the privacy and security needs of healthcare data-mining and data communications. This was developed alongside the systematic means for privacy and security assurance. In addition, collaboration

between the SME and academic participants enabled access to medical data and the appropriate adaptation of algorithms, leading to a high degree of user orientation.

During the project, 7 use cases were performed, resulting in tangible products in the areas of mobility, general health, hypertension, COPD, baby monitoring and epilepsy.

A big step for healthcare professionals and patients

Evalan developed key software technology within the project. This has been incorporated into SensiStep, a rehabilitation support application being used in the Netherlands, Belgium and Sweden whereby people recovering from certain types of leg or hip fractures perform partial weight-bearing exercises. SensiStep 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 monitor whether the rehabilitation is progressing on track or if the exercise programme needs to be adjusted accordingly. Following the MoSHCA project, Evalan experienced a growth rate of 100% each year in 2016, 2017 and 2018. This growth is reflected in all metrics – employees, turnover, profitability. During that period, Evalan added 40 FTEs to its payroll. Evalan expects that growth to continue in 2019. Although the sales of the SensiStep are a bit lower than expected for now – acceptance of innovations in healthcare takes a while – the technology that Evalan developed within the context of the MoSHCA project greatly contributes to this growth, as the same technologies are now used in other products. There are some encouraging signs for SensiStep as well, as the number of inquiries and requests for quotation went up significantly in 2018. Many of those were through referrals from current users. In addition, UMC Utrecht, Maastricht UMC and the University of Uppsala completed a research trial that demonstrated that SensiStep reduces rehabilitation costs and rehabilitation time for patients with hip fractures.

A life-saving app

CLB Research and Sound Intelligence, who developed an individually tuneable sound recognition system, exploit the MoSHCA technology in an Epilepsy App. This is the first (mobile) product that can detect sounds affiliated with epileptic seizures, and is able to alert care providers to ongoing seizures without using physical sensors. This gives the added benefit of comfort, as no sensors are attached to the patient's body. Three big care groups – 's Heeren Loo, ASVZ and Baalderborg Groep – are currently using the algorithm to detect snoring, which is especially useful for acoustic surveillance during night care. With 's Heeren Loo, there is a ten-year contract that monitors 2000 patients. In addition, around 30 healthcare institutions – including the aforementioned groups and hospitals like Prinses Maxima,

Zuyderland, Elkerliek and Zaans Medical Centre – are using the 'critical messaging core' (part of the CLB Messenger) to send alarms from medical devices to nursing staff in accordance with the Medical Device Directive. In addition to very high reliability, the advantages are that patients can have both good care and more rest and privacy, fostering a faster recovery.

Reducing the healthcare burden of chronic diseases

At the Radboud University Nijmegen, Prof. Peter Lucas, Dr. Arjen Hommersom and Dr. Maarten van der Heijden were involved in developing a new system for predicting exacerbations for COPD (Chronic Obstructive Pulmonary Disease) patients at home. The results of the MoSHCA project were exploited in the follow-up project, COPD+, which is funded by EFRO OP-Oost. Four partners (Radboud Universiteit, Radboudumc, Apps4Air and Topicus) are developing this system further. This project will finish by the end of this year, after which it is expected that the product will be ready-to-market by commercial partners. The system enables self-monitoring of COPD patients by providing automatic recommendations to patients. This can potentially prevent many hospital admissions, in turn reducing the healthcare burden of chronic diseases. A patent has been acquired for the COPD use case on exacerbation prediction for COPD patients.

At Home programme for premature babies

Academics were crucial in helping the companies produce solutions that are fit for market. Artificial Intelligence specialist Beatriz López, of the University of Girona in Spain, helped develop a successful application for smartphones to help parents monitor premature babies (which represent 7.5% of all hospital births) at home. Babies wear a small device containing a sensor that produces a green, orange or red light, warning parents whether they need to take the baby to a hospital. This has increased the survival rate. Currently, there are 30-35 new-borns on the At Home programme per year, expected to increase to 40-45 in 2019. The reasoning module for premature babies has been developed in collaboration with the clinical staff of the Institut d'Investigació Biomèdica de Girona and Dr. Josep Trueta Hospital, and is protected by the Catalan Intellectual Property Office.

Autonomous predictive algorithms

During the MoSHCA project, Actimage developed a unique know-how that allows predictive algorithms to function completely autonomously on smartphones. Current solutions of this type only work in a connected way and require a permanent internet connection. This technology makes it possible to deploy personalised algorithms on patients' smartphones and represents a real advance towards personalised medicine. These evolutions have been integrated into the Actelin application – a mobile application for diabetics – using the technology of functional insulin therapy. The application integrates an intelligent therapeutic and pedagogical support system. Furthermore, Actimage has been deployed in Luxembourg on a first-care network, the ActiHome Pro solution, which simplifies day-to-day management for healthcare professionals working in their patients' homes. This smartphone application integrates advanced mechanisms for the protection of health data and the latest predictive algorithm advances through an interface adapted to the daily lives of health professionals. In addition, Actimage's Hol'Autisme introduces a technological breakthrough in the field of health and education by offering the first catalogue of mixed-reality applications to improve the social skills of children with autism. If the results are conclusive, the scientific understanding of autism can be improved and people on the autism spectrum will have the opportunity to improve their skills for integration at school and in their communities.

More information

https://itea3.org/project/moshca.html

EUREKA Global Innovation Summit 2019

Your connection to a world of collaboration and funding opportunities

Each year, the running EUREKA Chair organises a EUREKA Flagship event. This year it's the UK's turn to organise the EUREKA Global Innovation Summit (EGIS), which will take place from 14 to 16 May 2019 at the Victoria Warehouse in Manchester. The EGIS 2019 is an international meeting place for businesses and innovation agencies to share knowledge, network, collaborate and secure future business growth opportunities. Businesses from across the globe will join international innovation agencies, research organisations and policy makers for unique insights, practical ideas, inspirational stories and collaborative solutions. All EUREKA Clusters, including ITEA will contribute to this year's event as well.

What's on

The EUREKA Global Innovation Summit is full of features, stages and showcases with over 50 sessions to choose from and most importantly, plenty of places to network and make valuable new connections.

In the venue's Arena, a 3-day full-scale conference programme will be organised, where you'll discover the latest developments in AI & Data, Clean Growth, Healthy Ageing and the Future of Mobility. Furthermore, you can participate in interactive sessions with the EUREKA Clusters and info sessions on countries such as South Korea and Canada, just to name a few.

In addition to the conference programme in the Arena, a diversity of side events will take place at the venue. Get inspired at the Inspiration stage with engaging expert talks on 2019's central topics and trends. Take part in interactive and practical workshops led by innovation experts and innovators at the Innovation Labs. Get advice on the international funding landscape and the tools and instruments available to businesses, including ITEA and the other Clusters, at the Global Expert bar or visit the EUREKA Social area for informal networking throughout the summit.

Break down barriers

David Golding, Deputy Chair for the UK Chairmanship of EUREKA, interviewed for this Magazine edition (see page 14), invites you all to join the EGIS: "We're expecting around 2000 people to attend, from the UK, Europe and further afield. Part of the event is a major matchmaking brokerage event so this will give companies and organisations from the ITEA Community an opportunity to meet not only UK companies but also companies from across the globe. I think that one of the barriers to organisations working together is often down to a lack of awareness of each other. This is an event that can help break down those barriers and help companies, research institutes, universities and others to find each other. So, a great opportunity for the ITEA Community to both showcase its work and to find partners."

Register now

The event is free to attend, and your registration entitles you to participate in all programme elements and networking opportunities. So register now at egis2019.org. We look forward to meeting you there!

More information

http://www.eurekanetwork.org/content/eureka-global-innovation-summit-save-date

VIEWPOINT

European and Global Engagement – opportunities abound

An interview with David Golding, Deputy Chair for the UK Chairmanship of EUREKA

This year the EUREKA Global Innovation Summit takes place in May in Manchester, the UK. This EUREKA flagship event is being organised in cooperation with Innovate UK, which is part of UK Research and Innovation (UKRI), a non-departmental public body funded by the UK government. As Head of European and Global Engagement for Innovate UK, which involves building relationships and looking at future global opportunities for the organisation, David Golding is currently Deputy Chair for the UK Chairmanship of EUREKA. So he is perfectly placed to consider what can be gained from nourishing the collaborative links across and between the organisations, and especially in terms of ITEA.

David begins with a brief word about UKRI, a new body that brings together the seven Research Councils, Innovate UK and Research England with the aim of partnering with universities, research organisations, businesses, charities and government to create the best possible environment for research and innovation to flourish. “I’ve been with Innovate UK since it was established in 2007. Before that I had been working on innovation and policy for the government. So for the past 15 to 20 years this has been the core of my day job.”

Strong voice for research and innovation

UKRI has a combined budget of more than £7 billion to support and help connect the best researchers and innovators with customers, users and the public, invest taxpayers’ money wisely to maximise impact for citizens, in the UK and across the world. “We are an independent organisation,” David points out, “with a strong voice for research and innovation, both to government and internationally. Since 2007, when I started, Innovate UK has invested around £2.5 billion to help businesses across

the country to innovate. Match funding from industry pushed the total value of projects above £4.3 billion. We have helped 8,500 organisations create around 70,000 jobs and added an estimated £18 billion of value to the UK economy."

Power and value of EUREKA Clusters

There are three pillars on which the work of UKRI is founded and by which it is judged: pushing the frontiers of human knowledge and understanding; delivering economic impact and social prosperity; creating social and cultural impact by supporting society and others to become enriched, healthier, more resilient and sustainable. Innovate UK, as an organisation of almost 450 staff, drawn mainly from business, Innovate UK is headquartered in Swindon and works across the UK. "But of course," David says, "innovation and businesses transcend borders and so do we. Hence the importance of building and extending our networks beyond the UK. I found it a very positive experience last September when I attended the ITEA event in Stockholm. It coincided with the celebration of twenty years as a Cluster for software innovation. Not only did this event bring to light the power and value of EUREKA Clusters but it also underlined that it does take time to grow into a valuable and impactful community. It's only when you actually experience such events first-hand that you get a real sense of how important this Community is and how effective it can be in bringing people together. It's often the sharing of knowledge and collaboration between such diverse players that can be more important than the funding in producing the innovation and commercialising the results generated by collaborative projects. So it was fascinating for me to watch from the side lines, as it were, and see this process in action for a few days. By the end you can really see project consortia coming around and project proposals starting to form."

Going it alone is not an option

As coordinator for Enterprise Europe Network (EEN), David explores the opportunities for enabling businesses to find partners and collaborative networks globally. "EEN has 17 sector groups, like automotive and transport, agrifood and ICT and organises brokerage and matchmaking events across Europe and beyond. I think that this provides a good opportunity, too, for ITEA to work alongside EEN to broaden the access businesses can get to the wider tapestry of support. The more we can link up, the better it is for companies all round at the end of the day. Given the complexities of the global marketplace and changing political landscapes, companies are reaching out either by desire or need, or both, to find partners with whom they can collaborate to create impact. Going it alone is not an option."

Opportunity to showcase and find partners

And speaking of the power of collaboration, the flagship EUREKA Global Innovation Summit is an event that will showcase a world of collaboration and funding opportunity by a network of public innovation agencies that fund and support businesses carrying out close-to-market R&D and innovation. "We're expecting around 2000 people to attend, from the UK, Europe and further afield," David explains. "Part of the event is a major matchmaking brokerage event so this will give companies and organisations from the ITEA Community an opportunity to meet not only UK companies but also companies from across the globe. I think that one of the barriers to organisations working together is often down to a lack of awareness of each other. This is an event that can help break down those barriers and help companies, research institutes, universities and others to find each other. So, a great opportunity for the ITEA Community to both showcase its work and to find partners."

Why attend the EUREKA Global Innovation Summit?

The EUREKA Global Innovation Summit welcomes businesses from all sectors to benefit from unique insights into international funding, collaboration and investment. You'll receive practical advice on scale-up and pitching and valuable forecasting across topics ranging from the identity of the next disruptors to the locations of the new centres of manufacturing.

You'll also discover the latest developments in AI & Data, Clean Growth, Healthy Ageing and the Future of Mobility, which could impact your business and influence future global funding opportunities.

The EUREKA Global Innovation Summit is full of features, stages and showcases with over 50 sessions to choose from and most importantly, plenty of places to network and make valuable new connections.

The event is free to attend with an application process that ensures the 2000 international delegates are the best companies and contacts to help you progress your business goals.

ITEA Success story

UsiXML

A meta-language for user interfaces in multiple contexts of use

The international landscape is quite diverse in terms of interactive software systems as they should be used in a wide spectrum of contexts of use. Each context of use covers various types of users along with their interactive tasks, using potentially several computing platforms or devices in multiple physical, organisational and psychological environments and locations. In addition, practices for developing user interfaces of these interactive software systems are even more heterogeneous. Evolving in so many diverse contexts of use is particularly challenging when the same system should be deployed for several targets. In theory, a single version of the software should be produced so that it is adapted to each context of use. In practice, this is simply impossible to do due to lack of resources and knowledge.

USIXML
USer Interface eXtended Markup Language

User Interfaces for Multiple Contexts of Use
The ITEA 2 project UsiXML developed an innovative model-driven engineering method to improve the user interface design and development life cycle for multiple contexts of use. Instead of replicating efforts for each target, the method factors out what is common from what is specific to each target. Based on recognised activities for user interface development, the UsiXML method consists of a series of models that capture the context of use (i.e., user, platform and environment), the end user's task and user interface as well as the transformations between, while ensuring software quality. Since a large proportion of today's infrastructure tools, software tools and interactive applications are implemented on top of various programming languages and mark-up languages, this project focused on defining UsiXML, an XML-based meta-language by adding versatile context-driven capabilities to take it far beyond the state-of-the-art and lead to contributing to standardisation efforts. UsiXML can express a user interface at different levels of abstraction: computing independent, platform independent and platform specific.

The project involved 25 partners from 6 countries, including some industrial and academic members from the UsiXML End User Club. This consortium facilitated a challenging design and development process to enable the production of realistic and complex industrial applications.

Standardisation available to all

Thanks to the UsiXML project, the consortium has been able to submit its consensus work, to contribute and to vote on 7 standardisation actions, which would not have been possible without the project. The completed standardisation actions are publicly accessible so that any interested part can directly use them:

1. Recommendation issues by the W3C Model-Based User Interfaces (MBUI) Working Group. This WG aims at defining a common meta-language for describing user interfaces at task-based, abstract user interfaces levels. The UsiXML consortium was responsible for one of them: https://www.w3.org/TR/abstract-ui/
2. The ISO/IEC 24744 on Software Engineering: Metamodel for Development Methodologies, in which the consortium evaluated and improved the visual formalism and incorporated the task model explicitly. See https://www.iso.org/standard/62644.html
3. The User Interface Mark-up Language (UIML) led by OASIS (https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=uiml), which resulted into its fourth version representing the final documented version accessible today. See https://link.springer.com/chapter/10.1007%2F978-1-84800-907-3_7
4. Networked European Software and Services Initiative (NESSI). See https://cordis.europa.eu/project/rcn/86242_en.html
5. NEXOF-Ra, the Reference architecture for NESSI European platform with user interface and tasks definition
6. The COST 294 European Concerted Research Action (MAUSE) whose goal was to ensure usability of interactive applications across a wide spectrum of organisations - some members of this action also relied on UsiXML for their activities. See https://www.irit.fr/recherches/ICS/projects/cost294/
7. The Interaction Flow Modelling Language (IFML, http://www.ifml.org/ , the OMG standard for integrating the front-end design in an interactive application

μ7
Multi-device
Multi-user
Multi-linguality
Multi-organisation
Multi-context
Multi-modality
Multi-platform

Efficiency boost all round

The success of this ITEA 2 project reduces total application costs by between 15% for complex systems and 30% for information systems. A recent study[1] demonstrated that more than 40% of the user interface models were reused, resulting in a reduction of 55% of the size. Thanks to UsiXML, non-developers can shape the user interface of any new interactive application by specifying it in UsiXML, without requiring the programming skills usually found in mark-up and programming languages. For instance, graphic artists can use UsiXML prototyping tools to demonstrate a future user interface without any programming. This project offers a practical application of model-driven architecture (MDA) and engineering (MDE) that shows immediate benefits in day-to-day software engineering.

Innovations in UsiXML will help European software vendors and industrial systems makers to increase productivity by about 20% in average software development and reduce development costs. To give a concrete example, Defimedia, a Belgian SME, only needs 3 days to develop the back office of its website with UsiXML instead of 2 weeks without UsiXML. These results reduce time-to-market, speed up productivity, improve factorisation, accelerate change propagation and enable better assessment of usability and accessibility.

A wide series of software supporting the language, the method and its multi-path process has been developed by several partners, either for their own or their customers' use, or as a publicly available contribution. The most significant industrial projects include a maritime surveillance application on the French Atlantic coast, an application for a tourism federation covering a Belgian province, an application for services available on a large palette of smartphones and tablets supported by the largest Belgian internet service provider, and a spin-off company, Estrategia 360 S.A. De C.V., which delivers services based on the language and now has 10 employees. Some extensions have been developed for users with disabilities, for collaborative aspects.

Ongoing story

The UsiXML language has now evolved to its most mature version, V3.0, which is available through a cloud computing platform called UsiCentral. This platform gathers a full range of software starting from on-line model editors to code generators with a zero-install paradigm for the customer (no plug-in, no add-on, no setup, no software or package install) and a paying on-demand service.

And now, in 2018, five years after the end of the project, research and development efforts are continuing for user interfaces of the most modern and available technologies, like those based on gestures. The affordability of gesture acquisition devices and sensors (e.g. Microsoft Kinect, Thalmic Myo armband, PS-tech's optical tracker) as well as the availability of supporting software (e.g. MS Surface gesture collection, Myo basic gestures, 2D/3D touch+air gestures) have launched a new generation of gesture user interfaces that is important to master the whole route from design to deployment for the ultimate benefit of end users. In particular, system-defined gestures included in these systems may differ significantly from user-defined gestures in terms of usability or preference. But this is another story for the future…

[1] *International Journal of Human-Computer Studies vol 86 2016: https://www.sciencedirect.com/science/article/abs/pii/S1071581915001470*

Community Talk with:

Isabel Praça

The perfect ITEA 'love' match!

Isabel Praça has been part of the ITEA Community for just over five years – it is a romance that is flourishing by the day! An electrical and computer engineer by training, Isabel gained her PhD in the field of Artificial Intelligence applied to competitive electricity markets, in particular, using multi-agent systems and machine learning. "Since the very beginning I've been working in academia and research, first as a researcher in the Systems and Robotics Institute of Porto, then as a professor at ISEP, the school of engineering of the Polytechnic of Porto, and as a researcher at GECAD."

Dual challenge

"Being a professor at ISEP I was part of the team that started up the research group that is now called GECAD (Research Group on Intelligent Engineering and Computing for Advanced Innovation and Development)," Isabel explains. GECAD aims to apply Artificial Intelligence techniques to real and complex problems, always with an eye on innovation. "We are proud of the projects, tools and scientific papers our team has produced as well as the projects with industry in which we've shown our capabilities in solving real problems! I feel my research activities are very important for my students. Not only can I bring to classes what I learn from the challenges I confront in research projects, but I also get the opportunity to engage the students early on, still during their Bachelor studies, in projects that are aligned with my research activities and my projects with industry." Isabel is also R&D advisor to the ISEP Presidency. "It is very challenging and interesting work. My research background gives me the knowledge and motivation to help pave the way to keep ISEP both at the top of the research tree in Portugal and to grow our international recognition. Mind you," she adds, "there are times when it's not easy to manage both demanding roles – professor and researcher – but I could not give either of them up!"

Business value

Isabel's involvement in ITEA came in 2013 when she joined the SEAS project as a researcher in

“ITEA is the Programme that makes future a reality!”

the area of intelligent energy systems. Since then she has become active in ITEA PO Days and Summits, and in the FUSE-IT project as the technical coordinator, also leading one of the work packages. “In FUSE-IT I was involved from the outset of the project idea. I have grown a lot with these experiences, from the technical and business point of view, and as a person. I remember how important it was to keep the focus on the business value rather than at the technical level, which is a good exercise for academic people. Since both projects received ITEA awards, I feel really happy to have been part of the team and a contributor to their success. In the case of FUSE-IT, it was an enormous pleasure to host the final review, the first one to ever take place in Porto. Not only that but it happened in a real environment – a hospital – where the staff and patients were interacting while we were doing our technical preparations and rehearsals. Quite a challenge for everyone, especially from the management and coordination point of view. I must say, I am indebted to Centro Hospitalar São João for its availability and commitment to FUSE-IT, and for putting up with us, despite all the signs for ‘silence’!” Isabel is now working as technical coordinator and work package leader in the CyberFactory#1 project that started in late December 2018. “The challenge is once again very high,” she says, “and while we are still waiting for the National Authorities’ feedback in some countries, our motivation is very strong and I’m sure it will also be a success story.”

Guarantee for success

Isabel feels that ITEA provides the perfect environment to take the best of the collaboration between academia and industry, and to turn it into innovations that bring new business and new jobs, contributing for a better society. “Sometimes it seems that academia and industry are working on the same topics but along ‘parallel’ roads,” Isabel suggests, “but in ITEA academia and industry work hand in hand along the same road and in the same direction! The vision of the Presidium team, to always be at the forefront of innovation, is a guarantee of success for all the countries involved. I would also like to mention the professionalism of all the ITEA team and Steering Group members that ensure the high quality of projects results. From all the programmes in which I’m involved, ITEA is the one I should say that makes future a reality!”

Friends for life

Summing up “as a bit of a newbie in this Community of 20 years,” from what she has seen and experienced so far, Isabel complements the ITEA Board and Community for “always being at the edge of innovation. The number and relevance of industries that are involved guarantee that. ITEA is a community in which ISEP and GECAD have had the chance to show our knowledge and research capabilities, getting us recognised outside of Portugal, while at the same time bringing recognition of Portugal and Portuguese companies to top-level companies and academia in Europe. ITEA has certainly improved me both personally and professionally. I’m proud of my evolution, having started as *just* a researcher to becoming technical coordinator and making things happen! Having the chance to work closely together with companies like Airbus Cyber Security, Engie, Thales, etc… and the way my work has been recognised by the international Community make me feel very motivated and happy! From a personal perspective, ITEA has helped me discover people who enjoy work and life as much as I do, with whom working is a pleasure and a constant motivation, with whom the word ‘team’ takes on a very big scope! Some of them I’ll keep in my life! That is not usual in business! At the risk of stealing Philippe Letellier’s words, during the EUREKA Innovation Days in Helsinki, I can say ‘I love ITEA’!”

ITEA project results enhancing people's lives

Deep Learning for safe passage

The Port of Rotterdam processes 134,000 vessels every year. To guarantee safe passage of all these vessels throughout the harbour, operators monitor the movement patterns and contact the skippers if required. The detection of all vessels is performed with radar technology. Although they can detect ships from a large distance, radar suffers from reflections, limiting accuracy of positioning and cannot detect very small ships.

Within the ITEA project APPS, camera technology was developed to aid the radar system and make the detection of vessels more robust. Within the project, a novel detection system has been developed. This system uses Artificial Intelligence (AI) to localise ships in the camera video images. To obtain accurate localisation, a Neural Network was trained using Deep Learning.

The results from the APPS project have generated a broad interest from all over the world. ViNotion has further developed the recognition technology for the Dutch Ministry of Infrastructure and Water Management (Rijkswaterstaat) on the "Merwede" in Dordrecht and on a busy canal in Friesland. ViNotion is talking to multiple large harbours for integration of the vessel detection technology in their current operational Vessel Tracking Systems. In such remote locations, a camera-based system can be easily installed and integrated for rapid deployment.

In addition to aiding radar technology, camera-based vessel detection enables a low-cost 24-hour monitoring of waterways. Furthermore, it can be used to monitor bridges and locks and detect access to restricted and dangerous locations. Overall, the APPS technology enables the safe passing of ships on waterways and gives you data insight in usage of the waterways.

ITEA 2 project
APPS

Calendar

14-15 March 2019
5TH INTERNATIONAL B2B SOFTWARE DAYS
Vienna, Austria
https://www.b2bsoftwaredays.com/

18-21 March 2019
CONFERENTIE NEDERLAND DIGITAAL
Hilversum, The Netherlands
https://www.nederlanddigitaal.nl/conferentie-nederland-digitaal

Including:
18 March 2019
SMART INDUSTRY JAAREVENT 2019
https://www.smartindustry.nl/jaarevent/

19-20 March 2019
ICT.OPEN2019
https://ict-research.nl/ict-open/

25-29 March 2019
DATE 2019
Florence, Italy
https://www.date-conference.com/

1-5 April 2019
HANNOVER MESSE 2019
Hannover, Germany
https://www.hannovermesse.de/home

6-7 May 2019
EUROPEAN BUSINESS SUMMIT 2019
Brussels, Belgium
http://www.ebsummit.eu/

7-8 May 2019
GSVF 2019 - CONTINUOUS INTEGRATION AND AGILE ENGINEERING
Graz, Austria
https://www.v2c2.at/gsvf/

9 May 2019
INNOVATION DAY FOR SMES
Berlin, Germany
https://www.ira-sme.net/events/next-event-berlin-2019/

14-15 May 2019
FUTURESUMMITS: FACE-OFF THE FUTURE
Antwerp, Belgium
https://www.futuresummits.com/

14-16 May 2019
EUREKA GLOBAL INNOVATION SUMMIT
Manchester, United Kingdom
http://www.eurekanetwork.org/content/eureka-global-innovation-summit-save-date

11-12 June 2019
TERATEC FORUM
Palaiseau, France
http://www.teratec.eu/gb/forum/index.html

12-14 June 2019
UK EUREKA CHAIR EVENT "AI AND DATA ECONOMY"
London, United Kingdom
http://www.eurekanetwork.org/content/uk-chair-event-ai-and-data-economy-save-date

15-18 July 2019
EU-KOREA CONFERENCE ON SCIENCE AND TECHNOLOGY (EKC2019)
Vienna, Austria
https://ekc2019.org/

SAVE THE DATE:

3-4 September 2019

ITEA PO DAYS 2019

Amsterdam, The Netherlands
https://itea3.org/

SME IN THE SPOTLIGHT

Technolution

It's all in the name: technology solutions creating value for business

Technolution is a technology integrator that brings business, technology and knowledge together. The company focuses on four domains: mobility, energy, industry, and public safety & security. Technolution has been an active partner in seven ITEA projects to date, all of which have been significant successes. Serge de Vos, CTO, reveals what it is that puts the spotlight on this SME to find out what makes it tick.

Tomatoes and cucumbers

"The good old Dutch greenhouse horticulture is where our roots lie," Serge begins. "It was here that 32 years ago four young dynamic engineers put their microprocessor knowledge to work for the climate control in these greenhouses to enhance the cultivation of tomatoes, cucumbers and other vegetables. This was innovative at the time because until then all the climate control had been analogue, and we came along with our digital microprocessor designs, including the hardware and embedded software. Something we are still doing today."

Controlled growth

In the meantime, Technolution has gradually evolved and expanded and now employs around 200 staff. "The gradual development is important for us because we consider it essential to maintain the culture that made us what we are. So we try to control annual employee growth at around 10%. We want to hold on to the flexibility that makes us unique, and that means taking the time and care to ensure that people slot in to the culture." Serge speaks from experience since he also underwent the same process when he joined Technolution 20 years ago.

Technolution employs highly-educated professionals with a passion for technology, to create robust and attractive solutions that

matter. “We have a pretty open and informal character that ensures our doors are always open. We are highly technologically and practically driven, and our work atmosphere can best be described as informal and task-oriented. We think big but we work on solutions in small teams. That is a distinctive feature and keeps us dynamic and flexible. Given the pace of technology and the constantly changing environment in which we operate, to have such a structure and culture is indispensable in enabling us to perform at the top of our game.”

This game has been played largely in the Netherlands but, over the past five years or so, Technolution has witnessed a carefully managed expansion, particularly towards Scandinavia. “It began with the growing *Intertraffic* phenomenon in which Copenhagen wants to become a frontrunner, and we won a bid together with local partners to provide smart solutions to enhance traffic flow in the city. So this was our first independent step over the border. The next phase is to use our reputation to extend further to the other Nordic countries.”

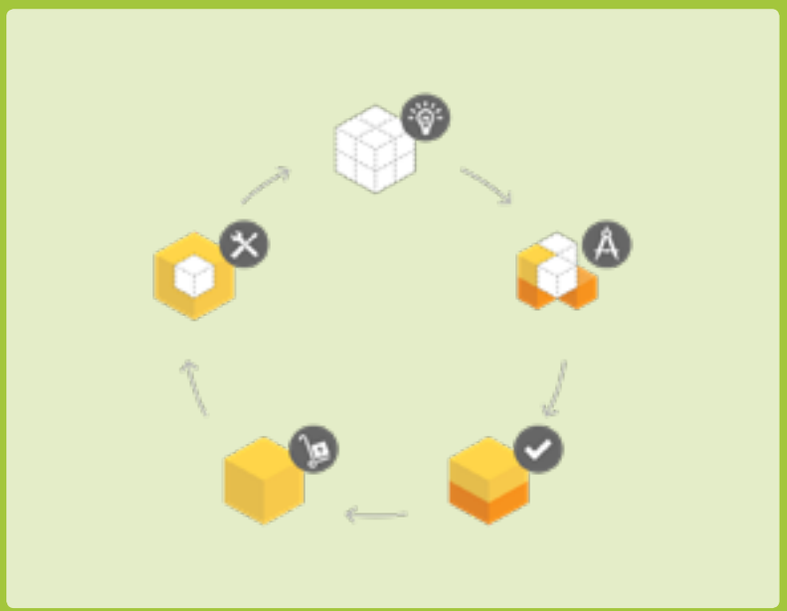
Good fit

However, Technolution’s European dimension already found expression in the ITEA context when a number of years ago, the company became involved in the ITEA 2 HiPiP project at the invitation of Philips, already a familiar project partner for Technolution. This particular project targeted the development of affordable high-tech medical image-processing applications based on high-performance computing multicore, multiprocessor technologies. “Philips needed an SME and we were keen to boost our image-processing knowledge at the time, so it seemed a good fit. That was our first involvement with ITEA and it gave us a great opportunity to experience the collaboration of a diverse consortium of large and small companies together with research institutes and academia.”

Free, open exchange

Technolution quickly felt at home in such an environment. Six more projects followed, with the likelihood of more to come in the future. “Our researchers were very enthusiastic – and still are – about this kind of collaboration. They get a lot from these projects, which means we do, too, as a company. Not only in terms of knowledge – that’s a give-and-take – but also in terms of building relationships and networks with other players in the industry, broadening cultural horizons and getting to know different business approaches. And, of course, they love working on a tangible end product, often a demonstrator. With the combination of hardware and embedded software together with electronics still very much a feature of our

The Technolution Circle



Development always starts with an innovation or an idea, which may occur to us, to the client or in a partnership. We take a proactive approach, thinking along with our client. This is followed by the design phase where concepts are made of a system or product. This involves such things as R&D, passion for technology and domain knowledge. Then we realise a system or product through production or implementation. If required, we can set up a full supply chain so that we can to deliver the product throughout its entire life cycle. We then deliver the system, the product or the service to the client. We carry out management and maintenance or life cycle management on the systems and products that we deliver. If new ideas for improvement arise from this, the circle starts again. In this way, we keep innovating, together with our clients.

current work, the physical end goal provides a real motivation and a real kick when you can actually demonstrate the proof of the pudding."

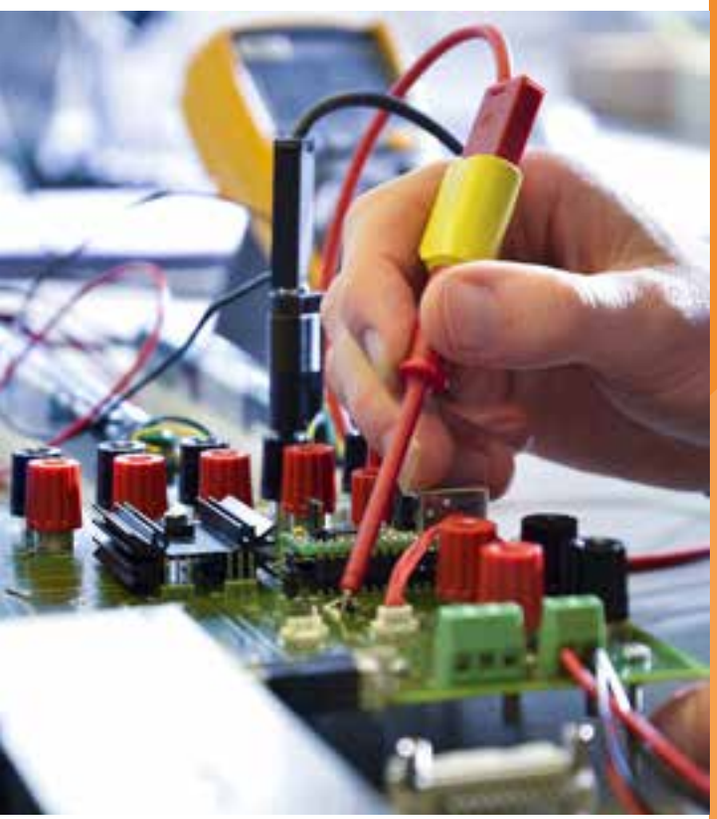
As a growing company, Technolution undertakes R&D for what it believes is absolutely necessary. "EUREKA, on the other hand, gives us the opportunity to be able to do more than just the necessary, so from this perspective EUREKA platforms like ITEA and PENTA are very important. They provide the context for a free and open exchange," Serge adds, "even though you may actually be competitors – in that room you are all on the same side focused on the same goals."

Powerful knowledge exchange

The ITEA project in which Technolution is currently involved is the Finnish-led APPSTACLE project, the aim of which is to develop a car-to-cloud platform that uses open, vehicle-independent protocols. What drew Technolution to this project that kicked off in 2017 was the security aspect. "This has already generated value for us because the security knowledge we have gained is being put to use in an assignment we are doing for the Dutch government. We had not anticipated that we would so quickly be able to make such tangible use of this powerful knowledge exchange. These things can surprise you now and then. After all, at the beginning of a project you have to try to imagine where you will be in two years' time and what your needs will be. Usually, the results come later but in this project they have come early and we have been able to put them to good use."

Value added

For Technolution, the core of ITEA projects – software innovation – lies very close to the heart of its business. "The research that we do in these collaborative projects and the results that come out of them provide pointers to where we might steer our business objectives in future. Where do we see potential? More and more, this lies in being innovative in the solutions that we seek for our clients. So when we engage in a project like Medolution that entailed innovation in real-time image processing, we look at whether we can transfer and translate this innovation into the solutions we provide.



Ultimately, it's all in the software, and in being able to optimise and maximise performance and security such that they match the capacities of the hardware."

Technolution maintains technology roadmaps to keep a close watch on technology trends. Active participation in collaborative projects helps in acquiring the knowledge of the technology developments that is needed to develop the right solutions. The Technolution Circle (see box on page 24) is a kind of blueprint for the solutions that Technolution creates for its clients. The parallels with the ITEA project process are fairly evident. "In a nutshell," Serge concludes, "this is what we are about and that is one of the reasons why ITEA is and will remain a key platform for us."

More information
https://www.technolution.eu/en/

SotA on Deep Learning

By ITEA Vice-chairman Philippe Letellier

Artificial Intelligence is the new wave of our digital society and it is visible in a large majority of the ITEA projects. Nowadays, we are already producing a huge amount of data with all of our products/services. The next challenge is thus to extract from this mountain of data, some new understanding of user usage and needs to enhance our products/services even more so as to actually strengthen their customer orientation. It is a typical ITEA target. A key tool in this direction is what we call Deep Learning.

In our ITEA living roadmap we have many SotAs on this Deep Learning topic. Among these I invite you to have a look at the "SOMEDI 2.2.3. DEEP LEARNING" document. It is a short State of the Art on two kinds of interesting neural network algorithms: Recurrent Neural Networks and Long Short-Term Memory. It also describes a set of open source tools for this deep learning approach.

Another document I recommend is the "PSCrimson 2.2. SotA overview", which is more focused on the Convolutional Neural Networks algorithm family for computer vision.

However, the best advice I can give you is to regularly browse the ITEA Living roadmap where you will find many interesting SotAs on Deep Learning and more in general on all the domains of Artificial Intelligence as already worked on by so many ITEA projects.

Have a good read of these SotAs and exploit them well to push new innovation in this promising Artificial Intelligence direction.

ITEA Success story

AMALTHEA & AMALTHEA4public

From individual approaches to a widely accepted open platform

The AMALTHEA and AMALTHEA4public ITEA projects are part of a 'string of pearls' in the automotive domain; successes that have pushed this domain into the next phase of its development.

Modelling the dynamic software architecture of embedded real-time systems

AUTOSAR, a result from the former ITEA project EAST-EEA, defined a methodology for component-based development of automotive software and a standardised software architecture for automotive electronic control units. However, AUTOSAR offered only limited support for detailed behaviour descriptions, which are indispensable for developing much more complex multi-core systems of high quality. Those require an increased exchange between tools. Especially multi-core optimisation relies on additional information like detailed timing behaviour.

The ITEA 2 AMALTHEA project (July 2011-April 2014) set about adapting existing development methods and tools and creating a common model that offers the required description capabilities on different abstraction levels. The follow-up project AMALTHEA4public (Sep 2014 - Aug 2017) was set up to foster the transfer into application and to create a sustainable open ("public") platform and a vibrant community of users and contributors. For this, the official Eclipse project APP4MC ("Application Platform Project for MultiCore") was created in 2015.

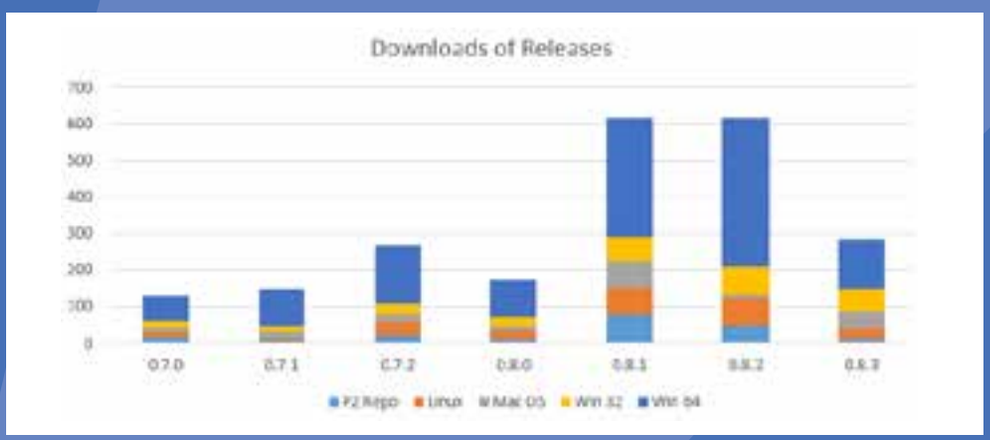
Platform for multi-core software and hardware modelling

One of the major achievements of the AMALTHEA consortium, consisting of 15 partners from Finland, Germany and Turkey, was a common meta-model for multi-core software and hardware modelling that enables integration

of heterogeneous tools in a custom tool chain to gain easy and efficient access to the overall characteristics of a multi-core system. The AMALTHEA platform is distributed under the Eclipse open source licence (EPL) and allows efficient data exchange between different cooperating companies but also between different (new and/or existing) tools used by a single organisation.

The AMALTHEA model was taken to a next level by the AMALTHEA4public consortium, comprising 20 partners from Germany, Spain, Sweden and Turkey, by adding additional features like verification and test generation as well as traceability of requirements.

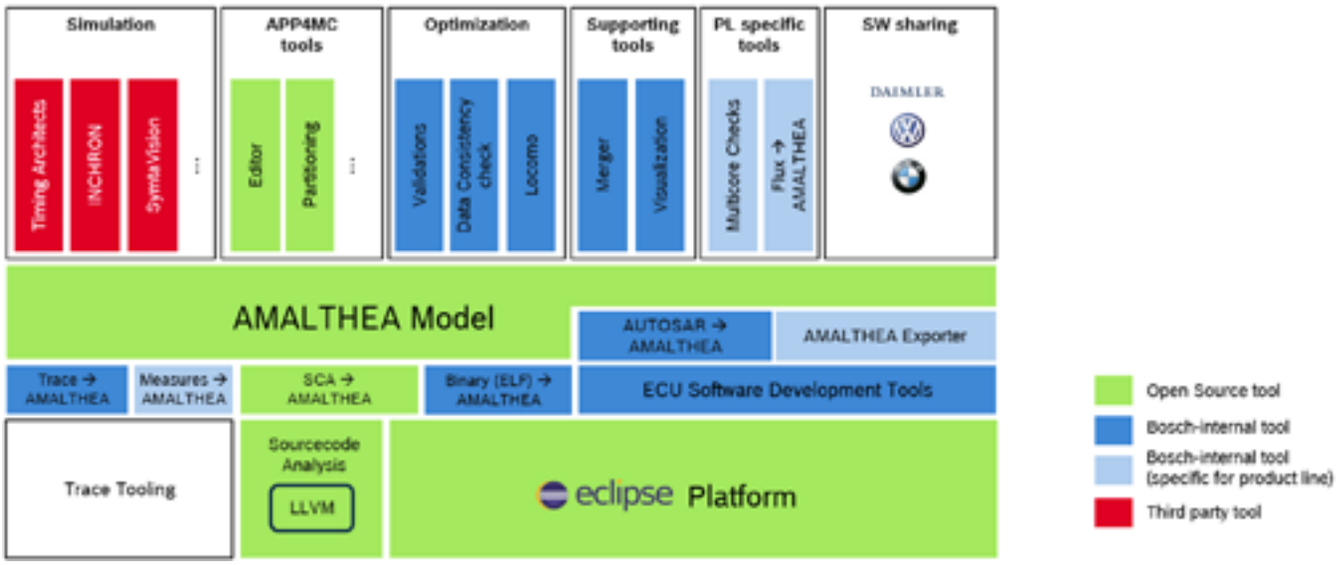
In 2015 the AMALTHEA4public framework was moved to the newly created open source project Eclipse APP4MC, an open tool platform for modelling, analysis and optimisation of embedded multi- and many-core software (www.eclipse.org/app4mc/). APP4MC was created by AMALTHEA4public project participants Robert Bosch GmbH, itemis AG, Timing Architects Embedded Systems GmbH, Dortmund University of Applied Sciences and Arts and Eclipse Foundation Europe GmbH. In 2016 a second Eclipse project Capra (www.eclipse.org/capra/) was created. It contains the traceability management tools mainly contributed by the Swedish AMALTHEA4public partners. Furthermore, community building is ongoing via the Eclipse Open Source network. This has led to a healthy community of currently 12 committers, 9 contributors and hundreds of users. A three-month release cycle has been established to keep the software and data model up to date. Users worldwide downloaded each release several hundred times.



Lubricating the links in the automotive supply chain

AMALTHEA4pubic partners AVL, BHTC and Bosch demonstrated the applicability of the project's results in industry in several projects incorporating different companies. The AMALTHEA data model or platform is currently in use with some major automotive vendors coming from several countries in the world. For example, BMW, Daimler, Volkswagen and PSA use the format and the APP4MC platform in cooperation with their tool vendors and tier suppliers.

The Bosch internal tooling for embedded multi-core is based on the AMALTHEA model as a central component. Several tools are extracting information, e.g. from source code or event traces. Bosch uses the consolidated model as input for (commercial and in-house) tools and to exchange timing information with customers. Bosch intends to publish some tools as open source to further support the APP4MC platform. The source code analysis tool "SCA2AMALTHEA"



was the first contribution of that kind in August 2017.

Dr. Michael Deubzer (Co-Founder and CEO of Timing-Architects Embedded Systems GmbH, now part of Vector Informatik) states: "AMALTHEA is the ideal format solution for many of our customers working with software modelling for real-time analysis. The Eclipse Framework APP4MC offers AMALTHEA users an easy start and supports the first steps on the path of introducing model-based timing analysis with well-developed and maintained basic functions, such as Import/Export APIs. The easy connection of market-proven tools, the possibility to extend it with specially developed plugins, as well as the possibility to connect in-house or unsupported 3rd party tools via the open interface by yourself, make APP4MC a practical basic framework for future-oriented software development. Some of our well-known automotive OEM and TIER1 customers have now set AMALTHEA as the internal Group standard for modelling the dynamic software architecture of ECUs."

Furthermore, in the official proceedings of the ERTS 2016 (http://web1.see.asso.fr/erts2016/uploads/pdf/erts_2016_Proceedings.pdf), Volkswagen/Audi and Continental published the article "Shared SW development in multi-core automotive context" in which AMALTHEA was promoted as a collaboration model between OEM and TIER-1. According to the proceedings, compared to ASAM-MDX and AUTOSAR, the AMALTHEA format (v1.1.1) adds features and more support for the dynamic description of the software. It extends the architecture and timing requirements and gives possibilities to describe more technical design properties, for example of the target platform with its hardware or the operating system. For use cases like software simulation and partitioning of the software in multi-core context, this is advisable. This format is suitable for the exchange of complete system description typically generated from the TIER-1 side, which is responsible for the integration.

Real-world automotive benchmarks for free

Due to its open nature, universities are able to use APP4MC successfully in teaching. For example, FH Dortmund organised several APP4MC-focused summer schools. In addition, several Master and PhD theses were conducted in the context of APP4MC at FH Dortmund, Fraunhofer IEM, University of Gothenburg, and Paderborn University. Furthermore, the project also provided the opportunity for about 60 students to use their expertise in the industry. Some 8 students involved in the project were directly hired by industry companies to ramp up and enhance their know-how in multi- and many-core performance and work in close cooperation with the Eclipse APP4MC developer team.

The introduction of multi-core systems strongly increased the problem space for timing analysis. In the last decade there has been a divergence between academic research and industrial practice because of the absence of realistic benchmarks, mainly due to intellectual property (IP) concerns. Meanwhile, with the help of the AMALTHEA format, real-world benchmarks are available and the exchange between research and industry is alive and ongoing. In 2016 and 2017 Bosch provided the problem description for the "Formal Methods for Timing Verification" (FMTV) Challenges as AMALTHEA models. The results were presented at international workshops at the ECRTS conferences (waters2017.inria.fr/challenge/).

A fundamental cooperation between academic and industry has been built to master the imminent performance challenges within the new EE architectures. Thereby, the AMALTHEA and AMALTHEA4public projects contribute to the training of future specialist and managers.

AMALTHEA and its successor projects have shown how an idea for a narrow application (timing analysis of multi-core automotive and telecom systems at some companies) can become an extensive application in many core systems for the most diverse applications in a big number of companies. And still a third dimension is the development and use by a project consortium towards publication as an open source project and thus further development and use by every possible company.

More information

https://www.eclipse.org/app4mc/
https://itea3.org/project/amalthea4public.html
https://itea3.org/project/amalthea.html

ITEA VICE-CHAIRMAN'S BLOG

Artificial Intelligence

A hype or a bit more?

Artificial Intelligence – it's a term that provokes endless dinner discussions. Difficult to escape nowadays from Artificial Intelligence – if a product is not controlled by artificial intelligence, it's no longer part of the modern world. We have seen innovative solutions related to and even beyond Artificial Intelligence that impact our lives and solve some tough unsolved residual problems. Artificial Intelligence is already partly reality and so a bit more than just hype. This Post shares a few exciting examples from our ITEA projects over the years.

Ontologies to control complexity

SEMbySEM a project that finished 8 years ago, developed a semantic approach to the monitoring and management of systems of all sizes. Intelligent reasoning requires a dedicated language to manipulate all the concepts, in a specific application domain, and an associated semantic. It is what we call in computer science an ontology. Many ontologies have been developed in ITEA projects. SEMbySEM developed its ontology offering simple and effective control based on the myriad of devices to be found in the 'Internet of Things'. In train signalling a higher level of security solving the interoperability of this heterogeneous system was demonstrated in terms of product to command & control and the actors involved. Thales, for example, demonstrated a systems application for a Spanish underground railway network, enabling the automation of decision processes in both normal and abnormal conditions.

SEAS developed a full ontology similarly to describe the new world of decentralised production, storage and distribution of renewable energy. This is key for the energy transition as we move from a centralised architecture under the control of a big operator to a decentralised world where large numbers of actors intervene to produce energy and distribute it locally. It was clear the command & control of such heterogeneous system was significantly more complex, and interoperability was at the heart. They found that the cleverest solution was for this ontology to describe all the products and automatically generate the command & control from this description. The DAPM architecture was chosen by ENGIE as the reference architecture for the company's overall service platform whose market potential including the applications (cumulative from 2017 to 2020) is some $70 billion for the geographical regions where the ENGIE competence already exists.

Intelligent platforms and frameworks

The **BaaS** dream was to transform a building into a building as a service. Since smart buildings of the future need comprehensive and extendible cross-domain management and control functionality, BaaS introduced a novel semantic IoT service framework for commercial buildings along with a reference architecture and corresponding software platform as a basis for current and future commercial building automation and management technologies. Materna's Open Source JMEDS platform, which was further developed in BaaS, has been downloaded more than 31,000 times all over the world (87 countries) since its publication.

ModelWriter provides a generic framework for automated traceability analysis, allowing the integration of two types of reasoning: the meaning of text and document structure. This target is very important for complex system documentation. For example the weight of the documentation of a plane is the weight of the plane itself. It is clear that to master such documentation you require a kind of automatic intelligent framework so an integrated authoring environment was developed in which a Semantic Word Processor (the 'Writer') and a Knowledge Capture Tool (the 'Model') were combined to reduce authoring effort by 20%.

Incredible results

APPS focused on safety, security and protection of an increasingly complex, diverse and 'smart' marine environment. It required multi-sensor architecture with data fusion and the solution of the semantic and organisational levels of the interoperability stack for the development of plug & play solutions. Advanced image processing based on deep learning on a huge database of ships images under tough climatic constraints resulted in incredible precision even when the picture quality was actually very low. The ship image dataset and ship detection using deep learning allow image classification for vehicles at a 98% success rate.

I could continue with such examples but there is only so much space available here. Suffice it to say that a large majority of ITEA projects push AI technologies to their limit to solve business challenges and deliver the impact of AI on business, in a way that is complementary to other, more academic programmes.

Valérie Blavette elected as Chairperson of the CELTIC-NEXT EUREKA Cluster

On 20 June 2018, the successor of the EUREKA Cluster Celtic-Plus, CELTIC-NEXT was labelled by the HLG and the Celtic Core Group elected Valérie Blavette from Orange France as the Chairperson of CELTIC-NEXT. She took over this role from Jacques Magen on 1 Juary this year.

Valérie Blavette, once started as an R&D engineer after graduating from Grand École Télécom Sud Paris, is now working at Orange Research, looking after open and employee innovation. In recent years she has been responsible for a Portfolio of cooperative projects including EUREKA projects. She had been coordinating Orange strategy for standardisation in the area of service platforms and home networks & services between 2004 and 2006.

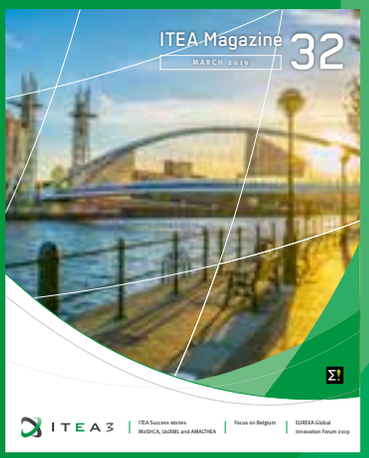
Valérie Blavette: "CELTIC-NEXT will continue to be the flexible industry-driven programme for innovation in communications technologies and its applications. We aim at expanding the CELTIC-NEXT Community in particular by involving vertical sectors. The bottom-up approach will be maintained. In parallel the interaction with the public funding organisations, the Public Authorities, will be strengthened. Increased synergy between Public Authorities and industry should be beneficial in many ways and is expected to lead to some flagship initiatives sustaining strategic national priorities."

Zeynep and Valérie look forward to a collaboration between ITEA and CELTIC-NEXT.

EUREKA Cluster events and Call dates

ITEA 3	14-16 May	EUREKA Global Innovation Summit 2019 (together with all Clusters)	Manchester, United Kingdom	
	3-4 Sept	ITEA PO Days 2019 (Save the date)	Amsterdam, the Netherlands	https://itea3.org
CELTIC-NEXT	8 April	Deadline CELTIC-NEXT Spring Call 2019		https://www.celticnext.eu/
	15-16 May	CELTIC-NEXT Event 2019	Manchester, United Kingdom	
EURIPIDES²	21 May	Submission deadline FFP - Synchronised Call with Penta		www.euripides-eureka.eu
metallurgy europe	17 May	Submission deadline PO - Call 2019		http://metallurgy-europe.eu/
Penta	21 May	Submission deadline FFP - Synchronised Call with EURIPIDES²		http://penta-eureka.eu
SMART advanced manufacturing	15 March	Submission deadline FFP - SMART Call 2		https://www.smarteureka.com

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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