# ITEA Magazine 31

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ITEA 3

Focus on Germany

Thank you ITEA Community!

ITEA Success stories ATAC & H4H

# Contents



Focus on Germany

4


Thank you ITEA Community!

18


ITEA Success stories H4H & ATAC

14/23

# Editorial

***20 Years of happiness and team spirit...***
***captured in 7 minutes***

Many of you attended our PO Days event in Stockholm on 4-5 September. At the end of the first day we had a short ceremony to celebrate our 20-year anniversary, which included a 7-minute video with testimonials* of many different members of our Community. The common message that came out of this is clear: ITEA is important for its Community and it is in the heart of many of its members. Personally, I found it heart-warming to watch it with the audience of close to 300 people with spontaneous applause at the end.

We have seen many changes in ITEA since its first labelling in October 1998. The shift in participation from mainly big companies to SMEs that grow based on their international exposure. The growth of our project Community: from tens of participants in our early PO Days events to around 300 at present. The growing attention for and involvement of customers and end users in, for example, the annual customer workshops. But also, the communication and ICT support to the projects with the ITEA Magazine, the Success stories, the Impact stream, and at the more operational side the tooling around project ideas, proposal submission and evaluation and the project action lists.

So, is it all finished and complete? No, by no means. When we gradually start to think about a successor programme for ITEA 3, we see many ways to further strengthen the contributions to the innovation landscape. At our DC-Board meeting in June, where both industry and public authorities were represented, several directions were already suggested. One of them was to open up even more towards becoming a real toolbox for industry and public authorities by means of, for example, topical project Calls or through bi- or multi-lateral Calls on some strategic target of participating countries. Also, we see clear and concrete potential to further strengthen the customer involvement.

So, as usual, there is still a lot of work ahead of us. But back to here and now: issue 31 of our Magazine that you have before you. It again describes a rich set of topics. From the impact of automated testing in the ATAC project to a personal story from one of the valued members of our Steering Group who started her own company. And, of course, we reflect on the PO Days in Stockholm with the 20-year celebration. Finally, I would like to highlight the second part of our story on how the State-of-the-Art has progressed in ITEA projects in a wide variety of areas. And, as usual, there is a lot more besides.

I wish you a good read,

Fopke Klok

** You are still welcome to share a video message on behalf of your organisation*

# Country focus on Germany

## Ready to meet future challenges

The importance of the ICT sector, along with its generic and service technologies in German industry, is evident from the 87,500 companies operating in the field of information technology, providing 715,000 jobs. Dr Herbert Zeisel, Head of the Directorate of Research for Digital Transformation at the Federal Ministry of Education and Research, and German representative on the ITEA Directors Committee, takes time out to explain the extent to which digitalisation affects every aspect of our personal lives and the economy. And the need for many more companies to deal with digital and information technologies if they want to be able to meet future challenges.

**Vitality of industry and society**
"Many companies currently involved in digital transformation are reporting increased orders," Zeisel says, "but, at the same time, they are scouting around for qualified staff to meet their digital objectives. I am afraid we may not be able to devote sufficient attention and resources for the necessary digital transformation of industry and administration. This is where I see a key role for the Federal Ministry of Education and Research (BMBF). We must cooperate to identify the areas which may help us secure the future vitality of industry and society. For example, we are still not sufficiently prepared for the challenges of the platform economy in the industrial sector."

**Focus on Artificial Intelligence**
"A focus of our current work is on Artificial Intelligence (AI). I am expecting a significant increase in the use of AI tools by the ICT industry, particularly in the area of software-intensive systems. Embedded and cyber-physical systems will in future rely more strongly on AI than today. This involves new challenges with regard to the safety and reliability of these systems. I believe the German Research Centre for Artificial Intelligence (DFKI) is doing excellent and successful work as a software lab."

With the recent launch of the High-Tech Strategy 2025 by the German Federal Government, which highlights the software-intensive field of AI among the key technologies, innovative solutions will be applied to address the challenges which Germany and Europe are facing in the areas of health, climate protection, energy supply, mobility, less developed regions and security. "Many of these innovations will be software-driven," Zeisel explains. "Advanced software technology ensures that software is safe and efficient. This means that we will mainly use Artificial Intelligence and software technology to support the further development of software innovations."

**Digital expertise and technology**
He continues. "We are closely monitoring current developments in Industrie 4.0 and Artificial Intelligence in particular. We consider these to be crucial elements in ensuring the future of German industry. Our research programmes, networks and platforms aim to directly help corporate practice and customers build and develop digital expertise and technology. Industries which are particularly successful in Germany will need more software innovations in future. We have long been aware of this need and already launched a major research programme for software innovation in the early 2000s." It was at about the same time that Germany started its involvement in ITEA, which continues to the present. "We are supporting embedded systems, software technologies and open source developments in particular. In addition, we recently launched direct support for the highly creative scene of freelance software developers. We aim to include our various activities in a 'Professionalisation Programme' that will cover the entire range from staff training and the application of AI methods for software-intensive systems to support for an innovative software industry."

Digitalisation affects every aspect of our personal lives and the economy

**Flexible nature**
"EUREKA adds the major aspect of international cooperation to our national strategy in application-oriented research. Above all, we appreciate its flexible nature. In addition, ITEA provides a flexible framework for research and development for innovative software-intensive systems." In this way ITEA provides a perfect match for the objectives of the BMBF.
"Large companies are involved as providers of requirements and small companies as developers in most research projects. A good consortium also includes universities and research institutions which combine their basic and transfer research with practical industrial requirements. Ideally, research projects supported under ITEA cover the entire value chain from research and development to application. We support the different partners in a research project in accordance with the role they play." The role played by SMEs in this respect is significant. "For example, SMEs accounted for more than 60% of all the companies funded by the BMBF in the area of software research in 2017. This is an outstanding percentage compared to other research areas."

# EKS InTec

## Virtual commissioning and digital shadows

**One of the multitude of ICT companies in Germany operating in the field of software innovation and embodying many of the aspects referred to by Dr Herbert Zeisel, EKS InTec GmbH, is based in Weingarten. It is a partner for the development, design and software as well as virtual commissioning of simple to complex production plants and special machines for the mobility industry and its system partners. Its range of services cover the whole spectrum from process planning, through the design of stations and complete production systems for body manufacturing to the simulation and optimisation of production processes. Dr Anton Strahilov is Head of Research and responsible for the R&D effort and the coordination of projects.**

"2014 was an important year for our company. Until then, we had gone by the name Rücker EKS GmbH," Anton explains, "but then FFT Produktionssysteme GmbH bought a 100% shareholding in the company and for the past three years we have been known by our present name EKS InTec. But our foundation goes back to 1994 when the company began with a focus on the engineering of production equipment and systems." Later a separate division was started to create a software application suite to simulate production systems, specifically with the goal of realising the virtual commissioning of entire production plants.

**From INVISION to RF::Suite**

"This new division was responsible for creating an innovative simulation system, INVISION,

that allows the planning and visualisation of production operations in real-time simulation. As a sequel to this simulation software package, we developed our RF::Suite," Anton continues, "which is a software family that contains a number of different tools that take a step further the specific functions developed in the INVISION tool, like translating the specific manufacturer's robot programs into a unified language and enabling the simultaneous processing of the kinematics and the I/O signal processing. RF::Suite allows innovative planning, analysis and predictive maintenance of real plants, acting as a digital shadow. You can see it, therefore, as both an extension of the earlier tool and extendible, too. We are now able to represent the complete digital development process. And this has proved very successful to date. These two tools played a role in the success of the ITEA AVANTI project."

**Family of tools**

EKS InTec is one of the very few suppliers of such kinds of virtual commissioning tools, and certainly the leading organisation in Germany in this respect. "What makes us unique," Anton says, "is our tool family, which is made up of several separate tools that you can use standalone or extend, depending on the requirements of the system. And the other unique aspects is our speed of response to customer needs. We operate with very rapid turnaround times. We can create a function for and with our customers that they can then use in their version within just a month. We are strongly geared to the automotive sector. In fact, we work exclusively in this area where our customers have a real need to optimise their production. So they need a digital twin of their actual production system. That is, running in parallel. Our software, therefore has to be able to ensure that they can do this. Therefore, innovating the software is a key feature of our work. We constantly have to improve our software, extend it, to change functionalities so that we keep pace with changing customer needs."

> The value of working in international projects is too good not to be involved

**Improve and innovate**

Cooperation with suppliers is equally as important as cooperation with customers for EKS InTec's tool development process. And as Anton explains, it is also one of the reasons why the company is involved in the kinds of publicly funded projects that Anton coordinates in his role as head of research. "We needed to get together with our component supplier, Schneider Electric, and the ITEA ENTOC project gave us that opportunity. Briefly, this project aims at developing standardised modelling strategies and optimising the engineering tool chains used for complex production plants. By collaborating with our component partners, we get to improve our simulations and we can use the knowledge we gain to make improvements and innovation. Currently we have five innovation projects either running or expected to start, four of which are ITEA projects. In one of these projects, SPEAR, which began in 2017 and runs until 2020, we actually take the lead." SPEAR is focused on the development of a flexible optimisation platform to help improve a broad spectrum of industrial production processes in terms of energy-related aspects. "In this project," Anton explains, "we want to optimise the energy consumption of plants' production processes, production lines and (industrial) buildings, both new and existing ones. The method we develop will be applicable to both virtual commissioning as well as actual operating production systems. This project signifies a really important step for us in a new industrial area."

**Too good not to be involved**

"But if we look at the current European funding mechanism, in terms of the definitions of the EU, we are, with just over 100 employees, too large to be regarded as an SME because we are a daughter company of FFT Productions system. This means that we don't get the national funding we would otherwise receive as an SME. Nevertheless, in order to develop our functionalities, extend our workflow and develop our networking, we need to work with other countries and with other partners. So while the funding situation can be improved," Anton concludes, "the value of working in international projects is too good not to be involved. It is through them that we can gain the knowledge and experience we lack. Like ITEA, which gives us the possibility to do research and create innovation in our area. We have benefited greatly from the projects in which we have been involved. By participating we also gain insight into the market impact we can have, not just in Germany but beyond, in Europe and even worldwide. This is all contained within the ecosystem of the ITEA Community and is a very important rationale for our participation in it."

**More information**

www.eks-intec.de

# ITEA contributed to the birth of BOB Assistant


We are pleased to introduce to you, BOB, a personal maintenance assistant created by ITEA partner Éolane in cooperation with CARTESIAM. BOB Assistant is the first solution using sensors embedding artificial intelligence for predictive maintenance. Once fixed on a machine in a factory, no wiring or configuration needed, BOB will carefully learn and analyse the vibrations and warn before a problem impacts the production line.

BOB communicates using the standard LoRa™ protocol: perfectly adapted to IoT, long distance communication and extra low power consumption. Éolane's participation in the ITEA projects CareWare and WATER-M enabled notably the design and development of a RF electronic design using LoRa™ technology to communicate and optimised in power consumption and RF performance as well as the development of a robust and simple LoRa gateway. These elements were key technological bricks which allowed the unique service and performances of BOB Assistant.

Key industrials players such as EDF and Veolia are already using BOB Assistant for the maintenance of their equipment.

*"…the solution was deployed on 3 Veolia sites in Germany for a period of 6 months and we were pleasantly surprised by its ease of implementation and the immediate added value perceived by our maintenance teams. Constantly having a dozen expert "assistants" who listen, analyse our equipment and alert us before any problems are triggered, has brought great serenity to our maintenance teams without changing any of our current processes…"*
Boris Lejean, Director of Innovation Veolia Germany
(Source: http://www.bobassistant.com/)

ITEA Vice-chairman Philippe Letellier highlights: *"This Éolane reflex sensor is an exciting fast exploitation of ITEA projects in the Smart Industry domain. It opens the door to predictive maintenance and, associated to the digital twin approach, to an enhanced command and control of our plants for more efficiency and quality. Europe pushes its advantage through innovation."*

**More information**
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# Korea-ITEA Networking event

On Friday 5 October, together with Korean Public Authority, KIAT, ITEA organised a Korea-ITEA Networking event at the Hilton Hotel in Rotterdam. The Korean delegation consisted of representatives of SMEs, industry and research institutes in diverse fields, looking for R&D opportunities with European partners.

The event started with an information session, during which participants had the opportunity to learn more about the ITEA Programme and how to participate in an ITEA project in the future. ITEA Programme coordinator Erik Rodenbach and Programme support officer Soo-Kyung Shin as well as representatives from funding agency KIAT were there to answer all questions.

The information session was followed by a presentation by Gjalt Loots (TNO), project leader of the ITEA project MOS2S. He shared his project's success story and his experiences in collaborating with a Korean consortium.

After the coffee break, an ITEA 3 Call 5 project idea leader Thomas Soddemann from Fraunhofer gave his project idea pitch to attract potential Korean partners. Four other project ideas from the PO Days 2018, which are open for Korean partners, were presented by Erik Rodenbach.

The Korea-ITEA Networking event was highly appreciated by the Korean delegation and the representatives of KIAT. Further collaboration between ITEA and KIAT was agreed to increase the visibility of the ITEA Programme and its collaboration possibilities in Korea.

# 20 years of ITEA

## The changing of the guard in the ITEA Steering Group

Double interview with Ronald Begeer and Maria de Álvaro Torán

**Ronald Begeer (ESI - TNO) and Maria de Álvaro Torán (Indra) are at the end and beginning of their ITEA Steering Group membership, the former having been ever-present since the early days and the latter having joined just recently. A perfect opportunity for a retrospective from an experienced campaigner and a first impression from a fresh face to ITEA.**

*Ronald Begeer*

*Maria de Álvaro Torán*

Ronald is no stranger to new challenges. In fact, he embraces them. But because of this, he has had to bid farewell to his ITEA Steering Group colleagues. Ronald will be familiar to many as the face of Philips in the ITEA Steering Group, but recently his lust for new challenges has taken him out of the industry field and into the research domain of High Tech Systems at ESI (TNO). Given this, and the fact that ITEA is an industry-driven Cluster, it became time for him to step down.

**Great opportunity**

When interviewed for the ITEA magazine's Community Talk column back in 2016, Ronald was Programme Manager at Philips Research and responsible for the Philips activities in both ITEA and ECSEL. To briefly recap what he said at the time, it was during the transformation period as ITEA 1 became ITEA 2 that Ronald was asked to become the Philips representative in the Steering Group. Ronald had already been involved in CANDELA, an ITEA project that ran between 2003 and 2005, seeing this participation as a good opportunity to network and gain knowledge at the same time. "I saw the potential not only for short-term business impact but also for the development of long-term competences. It was a way to fill in your roadmap. So, in that sense, it was not extra work but an enhancement of the work I was already doing. When later on Jan Bomhof, the Philips member of the Steering Group at that time, decided to stop, I did not hesitate to step into his shoes because I really saw the benefits of becoming a community insider, as it were."

**Three main activities**

The Steering Group is, of course, charged with the responsibility of steering the ITEA programme. Ronald explains how it works in practice. "Well, we start by evaluating the Project Outlines and Full Project Proposals and then provide feedback, which gives you the chance to really influence the quality, innovation and marketing of these projects. Through pinpointing these practical aspects, an idea can be turned into a project with impactful results. That's one part of the job. The other is tracking and monitoring the project via reviews and progress reports that help shape the content. It begins from a more informative perspective and gradually becomes increasingly a steering activity as the project progresses." These are the two formal activities, but Ronald explains that the contribution goes beyond the project focus. "There is an important third activity in which I have been involved, and that is helping to formulate the Living roadmap and evaluating the State-of-the-Art (SotA) documents that are components of the Living roadmap. So, in brief that sums up the task of the Steering Group members."

**Same core values in a 'smart' new world**

Over the years, Ronald has witnessed a lot of projects at first hand, "and they have taught me a lot, too! I have been able to enhance my own knowledge across a very diverse range of domains. From engineering and automotive to security and healthcare. And I have seen a lot of changes, especially in the world in which ITEA operates, from economic crisis to the

Being part of ITEA, there is certainly a feeling of being in a family: Work hard, play hard, and most of all, enjoy the company of the people around you.

emergence of a 'smart' new world and while the organisation is still relatively compact, it now has a much broader geographical reach than when I first started. But the values have changed very little. Collaboration and trust, constructiveness and commitment, informality and collegiality are still very much at the core of relationships within the ITEA 'family'."

**Family**

"ITEA calls itself a family, and being part of it, there is certainly a feeling of being in a family. Work hard, play hard, and most of all, enjoy the company of the people around you. That, for me, is the main highlight. The people you get to know. People from completely different backgrounds, whether educational, professional, cultural. I have discovered how Scandinavians survive their winters and how Spaniards can still get their work done even though they take out a big chunk of the day with a siesta! I remember that my first Italian food experience came though ITEA when we had a Steering Group meeting in Milan. I like technical innovation, people and travel. It always makes me proud when ITEA project results have impact on the market. With such a broad international canopy, ITEA allows me to feast on my interests!"

**Continuity link**

Ronald joined ITEA at more or less the same time as Rudolf Hagenmüller became Chairman. "But what most people probably don't know is that when I joined, Rudolf's successor and current Chairwoman, Zeynep, was head of a company that was part of a project for which I was Programme Manager within Philips. And if I remember rightly, she and her team also won a prize. That would have been in 2006. So we knew each other well before she rose to the lofty heights within ITEA," Ronald smiles. "Back then she already demonstrated her leadership qualities. Besides her technical contributions, she organised the project's social gatherings too. So I guess that it was inevitable that Zeynep would eventually head this family in which happiness, according to Rudolf, is such a strength."

**Inquisitive**

But now, as already mentioned, Ronald has had to withdraw from his role in the Steering Group, and in many ways that is down to one of the factors that made it so special to him: curiosity. "I have always been very inquisitive," he says. "It stood me in good stead as a Steering Group member but it is also the underlying reason why I stepped down. My curiosity to discover new things led me to look for new challenges. And when I happened to get into a conversation with a former colleague of mine on a train travelling from Brussels, I became intrigued by the work he was doing at ESI, a department of TNO, the Netherlands Organisation for Applied Scientific Research. To cut a long story short, an opening appeared and I took full advantage of it. Since May this year I have been Senior Project Manager at ESI in Eindhoven supporting the Dutch High Tech Systems industry with methodologies for improved system development, and, given the nature of the beast, my job was not commensurate with my role as an ITEA Steering Group member. As ESI is also involved in ITEA as an RTO, I will continue being part of the ITEA family and be involved in future projects too. So while my inquisitive nature meant having to step outside the Steering Group as an active member, curiosity is a characteristic that every Steering Group member should have. And for all the newcomers to this role, I would say: enjoy discovery on all kinds of levels, from new innovative technology to travel, culture and, at the very top of the list, people!"

It is this kind of knowledge and experience that Ronald and his more seasoned colleagues are passing on that is becoming a legacy for the process of renewal, and which is always a vital component of progress. Taking that legacy further is Maria de Álvaro Torán, a very recent 'acquisition' as a reviewer in the Steering Group activities.

**In the middle of everything**

Maria works as a Programme Coordinator at Indra, one of Spain's leading global technology and consulting companies and the technological partner for key business operations of its customers worldwide in specific market segments from transport to defence and from healthcare to information and digital technologies. "We have a high-value focus and a strong innovation component," Maria explains. "Just to give

you an idea of the scope, with around 40,000 employees and a local presence in 46 countries and business operations in over 140 countries, you can imagine that with all the different divisions having an R&D team to support their commercial activities, I really am in the middle of everything here! It's my job to advise our staff that wish to participate in projects to achieve specific results on what their best options are, in terms of funding, networks, domains, and so on."

**Fresh face**

While Maria's contacts with ITEA began in 2009, it is only recently that she has been at the Steering Group table. "I guess I'm a pretty fresh face when it comes to the ITEA Steering Group. It was just a couple of years ago that the coordinator within Indra for ITEA changed his job and left me with the baton in my hand … so I took over the next leg," Maria says. "My direct collaboration with ITEA began in 2016 but I was already pretty familiar with ITEA projects and their aims, acting as a kind of conduit for our researchers and others who were and are keen to join particular projects. In that sense, therefore, I was very much involved with the whole procedure of an ITEA project, from start to finish. Which is a really good way of getting to know ITEA. Nowadays, I have more contact with the people at the ITEA Office and I share these contacts with a colleague of mine who is stationed in Brussels and with whom I hold regular meetings to ensure that we are on the same page."

**Lubricating the market**

"Currently we are not involved directly in any ITEA projects – that's largely a national funding issue. I hope this will change in the future. The fact that we are not participating as a company in ITEA at the moment takes nothing away from the importance of ITEA as a platform. I think it is a vital lubricant in the way companies can work together with the authorities and academia to achieve things they would otherwise not be able to do. And the fact that this is a Europe-wide, or even global, network. It means that through ITEA, there is the possibility to have an impact on the market, on society and on the goals and priorities we are setting for the future."

**Constructive coaching**

"I am very happy to be contributing to this effort in my role as a reviewer in the Steering Group. I really do derive value from my work as a reviewer. It's very interesting work, seeing all the different kinds of projects being done all around the world. Working in a company like Indra where there are so many different technologies, you learn so much, not just about the technologies themselves and the innovations being generated but also about the processes, approaches and, especially, the people themselves. So the work I do in my day job, as it were, helps me in my Steering Group role to enable project partners get a Full Project Proposal off the ground, improve and keep a focus on the results. In a constructive way. That is the job of a reviewer, I believe. We coach – it's what I do anyway on a daily basis, so it's a great fit with my work. I really enjoy that aspect of it, passing on my expertise and experience to others."

**Thanks to my older brothers!**

"It has also given me the opportunity to get to know a lot of contacts around Europe. You never quite know who or what you may come across. There is always the possibility of meeting potential partners with whom you can collaborate in the future. And, of course, you get to know the other reviewers. You feel like you are part of one big extended family. I remember my first Steering Group meeting. It was a bit hectic around that time for me, but I still felt I had to be present because I knew that by being there I could become informed about how such meetings go. And it was great. It was like a big family meeting where your older brothers show you what should happen and how you should behave. I felt as if everybody was there for me."

I really enjoy the aspect of passing on my expertise and experience to others

# ITEA Success Story

# H4H

## A new era of optimisation for High Performance Computing

**High-Performance Computing (HPC) is essential in meeting the demand for increased processing power for future research and development in many domains, such as aircraft and automotive design or multimedia. The goal of the ITEA project H4H (Hybrid for HPC) was to provide a highly efficient, hybrid programming environment for heterogeneous computing clusters to enable easier development of HPC applications and optimise application performance. The project also aimed at providing a new infrastructure for HPC cloud computing and a new cooling technology to reduce energy needed to operate the HPC system. The H4H project assembled a consortium of Supercomputing Centres and HPC Research Labs, a European HPC manufacturer, HPC software tools editors and a range of HPC users to validate the proposed technology in real applications from various domains.**

Key to the technological progress achieved were the extensive collaboration and workshops in which the partners engaged to develop and test the various technologies, customisation and optimisation options, and ultimately produce significant innovations to all the H4H technology components. Support was improved for heterogeneous architectures (GPU / Xeon Phi) along with portability for the various types of architectures. New programming approaches (e.g. OpenACC, OpenMP 3.0 tasks, PGAS), faster development phases for applications developers and better use of application resources for an energy-efficiency objective were released or improved along with a new promising cooling technology for future extreme computing needs. Key results included:

- A new HPC architecture including new accelerators based on GPU and MIC technologies delivering best performance for applications
- A tailored development environment


including optimisation tools and libraries supporting the new hardware architecture, allowing performance improvements (by an acceleration factor of 2 to several tens in application execution time)
- An advanced cooling design enabling a large reduction of the energy needed to operate the future Exascale HPC systems
- Best practices about the security for an HPC cluster

**Setting the tone for future High-Performance Computing**

If the proof of the pudding is measured in the eating, then the recipe developed by the H4H project has resulted in a range of technological outcomes whose benefits will be felt from research to industry and, as a consequence, by society in general.

The H4H project made important contributions to the Bull Exascale Program, which aims to design and develop the next generation of supercomputers that will contribute to producing world-class solutions for both research and industrial purposes. H4H contributions were packaged within the Bullx Super Computer Suites 4 & 5. In 2015, Bull launched Sequana, an open range of supercomputers that is ready to support future Exascale technologies, which will make it possible to process a billion billion operations per second. Bull/ATOS cooperated with EADS Astrium in a new advanced cooling design solution based on diphasic thermal exchangers and saw 0.144K/W achieved on a target of 0.17K/W against a State-of-the-Art of 0.22K/W. Bull benefited from these H4H developments as the new cooling technologies lead to new cooling improvements in the Sequana commercial range, currently being sold as Bull Sequana X offer, in which the X1210 blades integrate the latest Intel's Xeon Phi technologies. The research and development emanating from such projects have attracted customers through the years and gained new entrants. CEA, CINES, SurfSARA, STFC, ZIH-TUD are among the major customers, accounting for several million euros. The H4H project has left its mark in the European HPC activities not only on the business side but also on the technological and community side.

During the project, H4H project partner RECOM achieved performance improvements of its 3D combustion simulation software, enabling the company to benefit from extremely fast software that can perform a large number of simulations to parametrise new models and verify accuracy.

RECOM reduced the simulation time for furnace optimisation from 12 to 1.5 hours, a big achievement as modelling and repeated simulations allow the best values to be found to optimise production and prevent slag growth. This is important because slag growth can cause an unexpected outage of the furnace, which will require several weeks for repair and can easily lead to more than €5 m of loss of earnings with respect to the electricity that cannot be produced but has already been sold by the energy companies.

With a major shift taking place in Europe, shortly after the H4H project, from coal-based to renewable power generation, the results of the H4H project have enabled RECOM to make the necessary transition from traditional contracts in the coal-based power generation sector towards other industrial sectors within less than two years, allowing the company to recover more than 50% of lost turnover and stay in business.

The H4H project has enabled Efield to drastically improve the performance of its electromagnetic solvers to successfully address the industry's evolution towards higher operating frequencies, complex materials and increased density of ICT equipment. Being able to handle larger complexity (5 to 60 million of unknowns), has allowed cars and planes to be more efficient and safer. The result of the performance improvements was (and still is) a highly competitive software package for electromagnetic analysis in the wireless communication and defence industry. In the last year of the project, a record contract was closed with a major Asian service provider for defence industry resulting in a 50% increase in revenue. Efield is now part of a larger group, ESI Group, leader in software simulations tools.

Optimisation strategies developed in H4H have been implemented by Dassault Aviation on proto-applications referring to highly computational parts from its industrial code. Thanks to the ITEA COLOC project, a follow-up to the H4H project where proof-of-concept work in H4H was confirmed, Dassault Aviation was able to improve the parallel efficiency of its in-house software to maintain its competitive edge in the aeronautics industry:

**The H4H project made important contributions to the Bull Exascale Program, which aims to develop the next generation of supercomputers**

- For Dassault's Computational Fluid Dynamics (CFD) software, the D&C (Divide & Conquer) work with proto-applications, started in H4H, was confirmed and led to improvements in Dassault's software, both in terms of scalability (almost perfect at x 16 cores) and overheads in memory and storage (same performance with 16 times less Message Passing Interface (MPI) blocks).
- For Dassault's Computational Electromagnetic (CEM) software, capitalising on notions like data locality and asynchronicity developed during H4H + Perfcloud extension, a novel asynchronous message-passing scheme was implemented which lead to a 60% - 80 % improvement of the MPI communications.

Based on H4H, CEA improved its CEA Computing Complex infrastructures in terms of computational power and energy efficiency. One of the CEA laboratories, CEA-LIST, also signed a commercial contract with the "Gendarmerie Nationale" for its image-based stolen object retrieval. The contract is still ongoing in 2018 evolving to other types of recognition features.

The H4H results have enabled the German SME INTES to reduce the simulation time from 6 days to 2 hours, for the analysis simulations of noise, vibration and harshness of vehicle bodies. Thanks to the valorisation of its work and involvement in the H4H project, partner Jülich Supercomputing Centre got the opportunity to work in a Siemens-funded collaboration (2014-2015) together with the Corporate Technology Multicore Expert Center of Siemens AG on runtime analysis of parallel applications for industrial software development.

On the basis of H4H, Scilab Enterprises developed and released two major improvements in the use of HPC with Scilab, its Open Source software for numerical computation. During the H4H project, Scilab Enterprises worked closely with industrial partners to share expertise in the use of their products, to provide updates or new implementation for functions required by domain-specific applications, resulting in improvements for industry. Scilab Enterprises has also been acquired by ESI Group.

Several H4H improvements have also been integrated in open source code releases (SLURM, MAQAO, FoREST, UtoPEAK) like the MAQAO (Modular Assembly Quality Analyser and Optimiser) performance evaluation framework developed by the University of Versailles Saint-Quentin-en-Yvelines (UVSQ). This was enhanced by Xeon Phi support, which is a major advancement in performance and compatibility designed for highly-parallel workloads. MAQAO is being exploited by Bull, CEA, Dassault Aviation and Intel. With MAQAO, partners were able to monitor the performance of their applications, detect hotspots and have recommendations, enabling them to globally improve the performance of their applications running on heterogeneous infrastructures. As a concrete example, Dassault was able to improve the data locality in their DEFMESH use case and got a 2x speedup for matrix assembly (on Intel Xeon Phi KNC, 2015). Improvements made in FoREST and UtoPeak resulted in an average 20% gain in energy efficiency at less than 5% loss in performance.

H4H has had a significant impact on the HPC market by being state-of-the-art, closing the gap from the simulated to the real world and making HPC technologies more accessible.

# Calendar

13-15 November 2018
**SMART CITY EXPO WORLD CONGRESS**
Barcelona, Spain
*http://www.smartcityexpo.com*

19 November 2018
**DEADLINE PROJECT OUTLINE SUBMISSION SMART EUREKA CALL 2**
*https://www.smarteureka.com*

20 November 2018
**LAUNCH SYNCHRONISED CALL EURIPIDES²-PENTA 2019**
*http://euripides-eureka.eu*
*http://www.penta-eureka.eu*

20-22 November 2018
**EFECS**
Lisbon, Portugal
*https://efecs.eu*

22 November 2018
**SWISS INNOVATION FORUM 2018**
Basel, Switzerland
*http://www.en.swiss-innovation.com*

26-30 November 2018
**10th EUROPEAN INNOVATION SUMMIT**
Brussels, Belgium
*https://www.knowledge4innovation.eu/k4i-events/10th-european-innovation-summit*

29 November 2018
**CELTIC ONLINE PROJECT IDEAS PITCHING 2018**
*www.celticplus.eu*

4-5 December 2018
**SLUSH 2018**
Helsinki, Finland
*http://www.slush.org*

4-6 December 2018
**ICT 2018: IMAGINE DIGITAL – CONNECT EUROPE**
Vienna, Austria
*https://ec.europa.eu/digital-single-market/en/events/ict-2018-imagine-digital-connect-europe*

7 December 2018
**CUT-OFF DATE EUROGIA CALL FOR PROJECTS**
*http://eurogia.com*

14 February 2019
**DEADLINE FPP SUBMISSION ITEA 3 CALL 5**
*https://itea3.org*

# 20 YEARS OF ITEA COMMUNITY

Thank you all for making the innovation, business impact and happiness happen!

For the future, continue to be curious, open to learn from each other and ready to adapt.

# Community Talk with:
# Çiğdem Çavdaroğlu

**Çiğdem Çavdaroğlu may be familiar to the ITEA Community as a technical reviewer, someone who evaluates Project Outlines and Full Project Proposals as well as monitors progress during project reviews, and all the other aspects that help create the conditions for projects to be successful. Her credo that "innovation has no purpose unless it results in exploitation" stands her in good stead to help steer the direction of projects and ensure that they maintain their focus on exploiting their innovation. In fact, she has more or less the perfect portfolio to add value to the Community.**

**Straddling two worlds**

Çiğdem straddles the two worlds of academia and business. She graduated in Mathematics Engineering at Yildiz Technical University in Istanbul, where she also later gained her Master's degree in Remote Sensing and Geographic Information Systems (GIS) before successfully completing her doctorate in 2016 on the subject of Face Recognition by Feature Detectors and Virtual Reality. In 2016 she became assistant professor in the Department of Information Systems, Management Information Systems at Işık University. During the period from 2013 until very recently (June 2018) she worked as R&D manager at KoçSistem, which she left very recently to begin her own company, together with a colleague from KoçSistem. The start-up, Sense4B, is based in Istanbul and was launched to give Çiğdem and her co-founder a vehicle to turn their concepts into products with real customer value.

**Advanced technology sensor network solutions**

"Sense4B moves in the fields of Wireless Sensor Networks (WSN), Environmental Security Systems, IoT, Factory Automation, Intelligent Cities, M2M, Predictive Maintenance, Machine Learning, Signal Processing and GIS," Çiğdem explains. "We want to develop advanced

## Innovation has no purpose, unless it results in exploitation

technology sensor network solutions that are targeted to the requirements of specific customers." Among the products that her company delivers are Sense4B Fence Watch, Sense4B Pyton, Sense4B Octopus and Sense4B Enki, all of which currently focus on security and automation "but we want to take the technology further," she explains, "and develop new products in different fields that add value to industry and the economy."

**Hands-on**

Being hands-on in this way and also being engaged with the academic community, Çiğdem is able to pass on her knowledge and experience of business and industry to her students so that they are better prepared to dovetail their learning with the real demands of the world in which they will later become the engineers of the future. And it is this same approach and conviction that makes Çiğdem so well suited to her task in the ITEA Community to which she was first introduced through her former employer, KoçSistem. "I was asked to take over responsibility from a colleague for the ITEA contacts concerning the project proposals. I must say that this was one of the most important and positive steps I have taken in my professional life. Before I started the Steering Group reviews, I had not had any prior experience of doing this but given my background and focus on transforming knowledge into products, I soon realised that I could help others maintain this essential focus. As I've already said, if your customer cannot get value from your product, what good is the innovation you are developing?"

**The root of the need**

"When I look at the various initiatives and events organised by ITEA for its Community, I can only but admire the work it is doing. Like the customer workshops. They really do try to get to the pain points, as Philippe Letellier likes to put it. But that's vital, because only by doing that we can get to the root of the need. And that really ties in with what I am trying to do in business – find out what the real need is among my potential customers and develop a solution for it. I want to use my knowledge to create something new for industry. In other words, exploit the innovation. So, in that respect I am on the same page as ITEA."

**Broader, fuller perspective**

Being involved in the ITEA Community has clearly enriched Çiğdem's life, from both a professional and personal viewpoint. "I think all the ITEA projects are wonderful projects. I like the fact that they are multi: multicultural, multidisciplinary, multi-perspective. Not always easy to manage when you think of all the different people from different companies and countries coming together to achieve a set of goals. But that is also the big plus. Collaboration and cooperation, sharing and networking. I have taken the opportunity to mix and engage with all these different people and companies from around Europe, and that's a really positive benefit. Contact with project participants and with the different ITEA teams has also helped to broaden my vision. I think I have become a fuller, rounder person, and that would make anyone happy!"

# ITEA project results enhancing people's lives

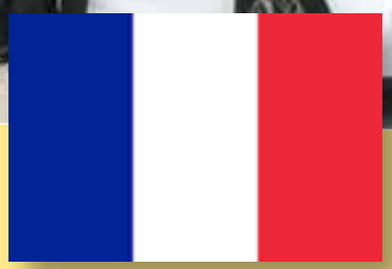
## Mitigate the stress of traffic jams

A Traffic Jam Assist (TJA) is a partially autonomous driving (AD) system that can reduce the stress and fatigue of a driver in traffic congestions. The TJA system controls the vehicle's steering, acceleration and braking. It keeps the vehicle within its lane and at a safe distance from the vehicle in front. In addition, it monitors the surrounding environment for any obstacle within its immediate trajectory.

The DANGUN solution implements a TJA system using commercially-ready sensors, namely, a front camera, around view monitor cameras and radars. These are integrated on a Renault Zoe electric vehicle which was converted into a computer-controlled robotic platform. The core technologies include lane detection, vehicle recognition and vehicle control for safe driving. The innovation in this system reduces a driver's workload in traffic jams and prevents car accidents triggered by carelessness. The TJA system is validated both in Korea and France, on public roads. The DANGUN working groups were formed in each country, for evaluation purposes.

This solution presents safe and comfortable driving that avoid drivers to perform repeated and tedious operations, whilst at the same time improving traffic flow and reducing accidents. When the system is activated, the driver can relax, it thus reduces the stress experienced in traffic jams.

**ITEA 3 project**
**DANGUN**

## ITEA Success Story

# ATAC

## Developing automated testing for complex real-time systems

**Ever more functionality is demanded by end customers from the software-intensive systems they use. At the same time their expectations with respect to the correct operation, safety and security of these systems have become higher than ever. Severe system failures can lead to significant damage or even loss of life, while successful cyber intrusions can destroy their reputation. Such breaches in both safety and security can have a significant adverse impact on business and reputation. Due to the dramatic increase in the complexity of the software itself, the intricate interaction modes between the software and the external world, and the sheer magnitude of the customisability of the software, these systems have become increasingly difficult to develop and verify by traditional development processes and testing methods.**

The ATAC project, involving 3 SMEs, 5 academic and 7 large industrial partners from Belgium, Finland, Lithuania and Sweden, ran from October 2011 to September 2014 and took on the gauntlet to resolve such challenges by researching, evaluating and rolling out a number of methodologies, associated processes and tools to efficiently and automatically verify complex and highly configurable software-intensive systems. The overarching goal was always to push the functional, safety and security requirements coverage envelope while minimising the number of test cases required to achieve the necessary degree of coverage and confidence in the software, hence greatly reducing the required testing effort for both the fully automated and remaining manual test cases.

To ensure that the researched solutions and tools solve real industry needs and to maximise their potential application in other settings, all


R&I activities were anchored around a jointly defined set of industrial case studies in different application domains. During the project, a flexible and heterogeneous portfolio of different tools and methodologies was developed to cover the needs of these different application domains as it was soon recognised that one-size-fits-all approach would be less than optimal.

**Impressive reduction of test effort**

The heterogeneous portfolio of different tools and methodologies has had a remarkable impact for the ATAC project partners.

For example, Barco, the project coordinator and traditionally a hardware-oriented company, was faced with higher costs due to lower quality and higher expenses to test and fix issues in its transition to mixed hardware/software offerings. During the ATAC project, its Collaborative Media Team developed a framework that provided better support for tracing system requirements down to detailed requirements and linking them with corresponding test cases on all levels of the V-model. This framework reduced the software verification and validation effort by 20% and has since been rolled out company-wide thanks to this success. Within the ClickShare product range for example, more product variants can now be tested in a shorter time as the in product-line regression testing has now been largely automated. This has given a boost to ClickShare, the main contributor to the corporate segment, which is a growing part of the Enterprise division representing approximately 30% of Barco sales in 2017.

Bittium Wireless (formerly Elektrobit Wireless Communications) developed an automated VoIP network test tool in ATAC and introduced a production testing platform for a Bittium product family, both of which Bittium has continued to develop after the project's end in 2014. Today, the automated VoIP network test tool is used in Bittium as a standard testing framework in all VoIP-based products and the company automated more than 90% of its functional testing for VoIP-based products resulting in significant verification cost savings. The production testing platform, introduced as a result of ATAC project, has been deployed across Bittium's complete product portfolio cutting the required test development effort by 70% for new products. This results in hundreds of thousands of euros in cost savings for every new product compared to the situation prior to ATAC.

Maximatecc (formerly CrossControl), a developer of rugged hardware and software for mobile machinery in construction, mining, cargo, transportation and other industries, collaborated closely with Bombardier and increased the number of active licences by more than 300%, from 30 to over 100. Ken Lindfors, Global Software Platform Manager

at Maximatecc explains: “ATAC has made it possible to develop our products and services for the simulation of embedded systems and applications. Especially, ATAC has given us the opportunity to boost and develop our simulation platform SimTecc. We now have more customers using it and in total also a lot more developers directly affecting the number of licenses sold. The flexibility of SimTecc is that it can be applied both at component level for module testing and at application level for testing complete machines and vehicles, e.g. a complete train. In addition to the development of the SimTecc product itself, ATAC has also generated more application development services for us, where we help customers to design their simulation and test systems and also to integrate SimTecc with their test system.”

The ATAC results helped Bombardier Transportation reduce the verification effort for software parts with a safety impact, which comprise a large part of the systems to be verified, by 80%. The prototype tool developed in ATAC minimised the number of test vectors required to demonstrate sufficient code coverage, massively decreasing the time needed by testers to demonstrate these coverage objectives. In addition, the tool gave a figure on the achieved code coverage by testing when the automatically tool-generated test vectors were used. “The ATAC project is a good example,” says Bombardier consultant, Stig Larsson, “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.”

In addition, the ATAC results have enabled Valmet Automation, leading global developer and supplier of technologies, automation and services for the pulp, paper and energy industries to run over 1500 automated tests in less than one hour, where manual testing would take days and be much more error-prone.

**The ATAC project is a good example of where active collaboration really helped generate fast exploitation during the project**

On an academic level, Mälardalen University (MDH) successfully bridged the “valley of death” by refining the results from academic test automation research, conducted in a well-controlled academic environment where many day-to-day industry constraints are not considered, into practical results that can be adopted by industry. By going downstream to the actual problems that the partners were encountering, concrete solutions were targeted, and achieved. The ATAC results even led to the creation of a start-up company geared to further exploring the test tooling prototype created in the project. With the help of the MDH University business incubator (IdéLab), Compratio AB was officially launched in December 2015. In 2017, Vinnova granted €30k as part of their Innovative Start-ups Call (phase 1) to further explore usage of the Compratio tool/method in a non-regulated domain and, in 2018, undertook consultancy work at ABB in the area of test analysis and process improvements.

Furthermore, ATAC has been instrumental in securing substantial financial support for follow-up industrial collaboration and research at MDH. In addition, the ATAC project has been a key ingredient in the formation and establishment of the Software Testing Laboratory (STL) research group at MDH, one of the largest of its kind in Sweden. Expanding dissemination, the results of ATAC have been used in several courses at MDH like the successful development of Master-level online courses on industrial software testing for people active in industry within PROMPT, a Swedish educational initiative in cooperation with several academic parties and a number of leading Swedish industrial companies and organisations.

Ericsson and MDH set up a follow-up ITEA project, the TESTOMAT project, which brings together 36 partners from 6 countries, and will ultimately result in a Test Automation Improvement Model that will define key improvement areas in test automation, with the focus on measurable improvement steps. In the ATAC project, Ericsson automated millions of test cases that are executed daily in different test systems, and test code is now delivered together with software code and executed with every change to the system. This can easily save 80% execution time and enables a much faster turnaround in the projects, cutting delivery times by months. However, automating the test case is not enough in itself as the cost of the test is still very high. Therefore, reducing overlapping test cases and being more adaptive in what is tested is important. The TESTOMAT project aims to find new and different approaches in the test suite and better ways to identify how and what to improve in the different areas of test automation.

Finally, Kaunas University of Technology (KTU) further collaborates with Singleton Labs in the area of software test automation research and the use of innovative testing methods in its Software Engineering Master study programme in which several Master theses have been defended. KTU also founded one of the largest mobile application testing laboratories in the Baltic States.

These testimonials clearly highlight that the participants were very successful in translating the technological innovations resulting from the ATAC project into tangible business advantages and results. These technological innovations were facilitated by both national and international collaborations amongst the partners clearly highlighting the importance of international collaboration frameworks like ITEA.

SME in the spotlight

# BEIA

## A strong Romanian presence in the ITEA landscape

**BEIA Consult International was founded in 1991 by George Suciu with a view to exploiting the potential in telecommunications applications. Now one of the leading providers of telecommunications equipment and solutions in Romania for enterprise cloud communications and telemetry, the company's references include over 5,000 turnkey projects for advanced IT and communications solutions.**

**Well travelled and well versed**

George Suciu is General Manager of this Romanian R&D consulting SME. An electronics engineer by education and training, he specialises in project management, electronics and telecommunication, ERP, cloud computing, M2M, IoT, Big Data acquisition and signal processing. He also teaches university students and has a good working knowledge of German, French and English. He is a well-travelled CEO too, but we managed to catch up with him at home in Bucharest where he explained how BEIA became such an integral part of the ITEA Community, resulting in a long list of projects in which BEIA has been involved. So what is it that makes this familiar family member tick?

**The winds of change**

George takes it up from the beginning when he started up the company following the major political and social changes that swept across Eastern Europe at the end of the 1980's. "Of course, at that time the research angle was a difficult one to pursue due to the lack of funding. Add to that the infancy of the market at the time and the lack of organisation, you can imagine the difficulties," George explains. "We began life as an integration company actually. Hardware and software. More hardware than software at the start. Now after 27 years, unsurprisingly it's the other way around. Software has the advantage that you can constantly add features and reduce time and costs. That's how the world increasingly seems to be working these


days – more for less and with as little waste as possible. So in that sense, this trend is unsurprising."

**Unique**

"I would like to mention that despite the somewhat bare landscape in which we were operating all those years ago, our telecommunications and IT expertise enabled us to establish an end-to-end IoT infrastructure 15 years ahead of time. It was then known as telemetry and it meant that we could enable monitoring in the mountains or along the Danube. It led to new applications for agriculture and new forms of energy. To develop this platform was a good decision, and even now we don't really have any competitors in this respect. We are pretty unique, and that can be attributed to the relationship we have with our academic and research partners as well as our industry partners like Alcatel, Siemens and Panasonic." Which just shows how the company has successfully spread its wings from very Spartan beginnings in 1991.

**Family ties**

"Having a foot in both worlds, research and market, means that we can identify demand and supply. We can help innovation get to the market in a very targeted way. Also a unique aspect of the company is the family link. Both my boys are involved. They have grown up in the company and this helps provide a kind of stability for the future. Our clients know they can be assured of a level of trust and commitment for a long time to come."

**Salvation**

"Of course, it is vital for us to continue to improve our capabilities and keep in step with technological advances. Research is vital. We decided to invest in research when the recession hit in 2008, and it proved to be a very good decision. We came out of it stronger than many other bigger and financially stronger companies at the time. Investment in R&D proved to be the salvation of our company, the salvation of Romania and I believe it will be the salvation of Europe. Especially in the light of competition from the Far East."

**1+1 = 2**

George cites participation in international projects, most notably those of ITEA, as one of the keys to BEIA's continuity. "I am so pleased to be a part of this Community. We get the opportunity both to learn from others and to contribute our knowledge to the greater benefit so that the project goals can be accomplished. It's also a nice feeling to be invited to participate. I enjoy the collaboration. You come in with one idea and your partner comes in with one idea – the result is that you go away with two ideas! And often a new friend! I think that in some projects, too, we have been invited to participate because of our market experience. For instance, we were in the project ACCELERATE. The aim was to accelerate time to market, from idea to product. We were able to bring our platform-building experience to bear in this project. It's very satisfying when you see that your contribution makes an impact on succeeding and benefiting future generations."

**Sign of success**

Another positive aspect of being part of the ITEA Community is the events that are organised. "I really enjoy finding out what's going on in a wider perspective. Like the EUREKA Innovation Days in Helsinki and seeing all the different projects exhibited – and to see yourself at six project booths along the ITEA corridor! It fills me with pride. In Romania we are the top ITEA contributor, so for us ITEA is very much a sign of success."

**More information**

www.beia.eu

# Festive edition of PO Days in Stockholm kicks off ITEA's fifth Call

**On 4 September, ITEA 3 Call 5 opened with the ITEA PO Days 2018 in Stockholm. During this festive edition of the event, the ITEA Community both celebrated 20 years of impactful innovation and looked to the future with the presentation of 61 new project ideas.**

**PO Days – a look to the future**

Nearly 300 participants from 13 countries participated in this lively 2-day brokerage event. Most participants came from the host country Sweden, followed by Turkey, the Netherlands and Germany. For the fourth time in a row we welcomed a Canadian delegation to the event.

On Tuesday, 54 project ideas were presented as a poster and 44 ideas were pitched during the parallel pitch sessions. The following brainstorm sessions resulted in 20 final project ideas presented during (one of) the closing sessions of each day.

The project ideas were clustered by 7 societal challenges. Next to this year's Customer workshop topic "Smart communities", Smart industry, Smart Cities, Safety and Security, Smart

engineeringand Smart health were all well represented. However, it should be noted that POs submitted in ITEA do not necessarily have to specifically fit these challenges; all innovative projects on software innovation are welcome!

**20 years of impact**

As ITEA was officially labelled as a EUREKA Cluster in October 1998, these PO Days were an excellent opportunity for the ITEA Community to celebrate ITEA's 20 years of impact in Software Innovation.

ITEA Chairwoman Zeynep Sarılar kicked off the celebrations by presenting an ITEA timeline with special milestones. As impact is one of the core values in ITEA, Zeynep also introduced the addition of 7 new inspiring stories to the ITEA Impact stream, which will keep on growing over time with impactful ITEA project stories.

For 20 years, ITEA's project impact has been achieved by a growing Community of close to 1600 partners from large industry, SMEs, universities, research institutes and user organisations in 32 countries worldwide. As ITEA would not have existed without its valuable Community and its strong projects, we invited our Community members to share their ITEA experiences in a short personal video message. A collage video of these heart-warming messages was shown at the end of Zeynep's speech.

(Scan the QR code to see the 20 years of ITEA impact video).

The celebratory evening ended with a social gathering with cake and champagne.

**Highly appreciated**

Nearly 40% of the attendees took the effort to evaluate the event and share their thoughts and suggestions with the ITEA Office. With a 4.12 on a 5-point scale, this year's event was evaluated as the best PO Day event ever. Overall, there was a very positive vibe during the event. Among the highlights were the set up of the programme, the quality of the plenary presentation, also the newly introduced sessions for Public Authorities, the venue (Stockholm Waterfront Congress Centre) and the location (Stockholm).

The organisation of these PO Days was strongly supported by VINNOVA, the Swedish Governmental Agency for Innovation Systems, for which we are very grateful.

**ITEA 3 Call 5**

Even during the PO Days event, the first 5 Project Outlines for ITEA 3 Call 5 were already shaped. At the deadline of 30 October, 23 Project Outlines were submitted. Currently, all these Project Outlines are being reviewed. On 3 December the projects will be informed whether they will be invited to submit a Full Project Proposal.

## PO Days 2018 in numbers

- 276 participants from 14 different countries
- 61 project ideas uploaded in the Project Idea Tool before the event
- 54 project ideas were presented during the poster session
- 44 pitches during the parallel sessions
- 20 final project ideas presented

PO Days 2018

# Getting ready for the future and its challenges through ITEA

*"Remember to celebrate milestones as you prepare for the road ahead."*

*- Nelson Mandela*

By ITEA Chairwoman Zeynep Sarılar
and Programme coordinator Erik Rodenbach

**As we celebrate the 20th year of ITEA this year, let us celebrate what has been achieved via ITEA and take a walk along some of the achievements accomplished by ITEA projects that have a direct impact on future challenges.**

**Artificial Intelligence, big data, security, smart industry, modelling, simulation are some of buzzwords that we hear every day, even in our daily conversations. But how ready are we for these challenges? What is being achieved by today's technology still needs clarification and explanation.**

**Here we present a set of project outcomes that have a direct impact on resolving a challenge or that identify potential solutions. These projects are just a sample of ITEA achievements and there are many outcomes like these that are shared on the ITEA website, e.g. in the ITEA Impact stream and Success stories.**

**Big data… How does it have an impact in our lives?**

There is a set of ITEA projects that provides a direct solution for big data challenges. Knowledge on the potential of HPC, the newest technology on sensors, a set of new analytic tools, and platforms to keep and to understand big data are some of the verticals needed to have a sustainable big data solution. Below are some outcomes that may speed up big data solutions to create a better tomorrow faster, more reliably and more sustainably.

*High-Performance Computing*

High-Performance Computing (HPC) is essential in meeting the demand for increased processing power for future research and development in many domains, such as aircraft and automotive design or multimedia. The goal of the ITEA project **H4H** (Hybrid for HPC) was to provide a highly efficient, hybrid programming environment for heterogeneous computing clusters to enable easier development of HPC applications and to optimise application performance.

Extensive collaboration and workshops during the project generated significant innovations such as new programming approaches (e.g. OpenACC, OpenMP 3.0 tasks, PGAS), faster development phases for application developers and better energy-efficient use of application resources along with a new promising cooling technology for future extreme computing needs. The project developed a new HPC architecture, including new accelerators based on GPU and MIC technologies, and a customised development environment including optimisation tools and libraries supporting the new hardware architecture, allowing performance improvements (accelerating application execution time by a factor of up to several tens). Furthermore, 3D combustion simulation software benefited from the extremely fast software that can perform a large number of simulations to parameterise new models and verify accuracy, thereby reducing the simulation time for furnace optimisation from 12 to 1.5 hours and so boosting production and preventing slag growth.

*Making Big Data a valuable asset*

By positioning the target open-source architecture to support Big Data, ecosystems and value chains, the ITEA **CAP** (Collaborative Analytic Platform) project contributed to the development of new but sustainable business models and laid the foundation for a market value proposition of 'Big Data as a Service'. While the arrival of enabling technologies has

made a wealth of public and organisational data available for analytic processing, access to the data and to efficient analytic tools is often difficult. Furthermore, combining such sources of massive data can yield much richer applications and greater insights into intelligence reporting. This requires a collaborative platform, which makes it easy for the participants to share data securely and to easily gain access to the latest technology tools.

In cloud computing, new service models that take advantage of virtualisation and remote access have broadened the significance of multi-tenancy architecture. A Software-as-a-Service (SaaS) provider, for example, can run a particular application on a specific database and provide web access to multiple customers. In such a scenario, each tenant's data is isolated and remains invisible to other tenants. In the CAP project, a concrete CAP platform with multi-tenant architecture enabled the development of an interactive CCTV monitoring service that analyses CCTV metadata together with data from external systems (e.g. weather, traffic, accident, etc.) and recommends key CCTV recordings and situations to focus observer attention on them. In another use case of the CAP project, several terabytes of data were analysed to qualify the quality of the data and then to extract useful conclusions about the processes, with the focus on the franking fraud and data visualisation of the real process inside a sorting centre.

In another Big Data platform, the Wind Power Icing Atlas (WIceAtlas), data from over 4500 meteorological stations worldwide with over 20 years of observation data and 35 years of MERRA reanalysis data makes it possible to estimate, for example, the resulting long-term iced turbine production losses and provide valuable Annual Energy Production (AEP) estimates for financial calculations.

**Smart Maritime Surveillance**

Current surveillance systems in the maritime domain consist of radar (to detect and track vessels) and visual sensors (for securing borders in and around large infrastructures, e.g. along a coast or in a harbour). These sensors are never used in conjunction in their full capacity and have severe limitations. Radar is only capable of detecting large vessels minus details about the type and identity, whereas visual sensors are too static and hamper 3D capabilities.

The **APPS** project developed a plug & play solution that improves interoperability of surveillance activities, effectiveness of operations at sea and implementation of relevant legislation and policies. The APPS platform provides data flow between an application and the APPS Data Distribution Service (DDS), interoperability and mediation with other systems or interoperability components as well as algorithms and devices to boost recognition performance. At device level, the technology allows sensors to plug & play into a surveillance system whose layers can reconfigure themselves and operate uninterrupted. At the other end of the stack, surveillance systems operate as a system of systems, exchanging and fusing information and sharing situational awareness.

The project generated several innovations such as acoustic sensors, collision detection algorithms, an automatic filter selection and vessel detection and classification.

**Security is mandatory for daily life with Internet**

Our life is surrounded by Internet and solutions based on Internet. And this opens a door for a crucial need for security solutions not only for the Smart city challenge but also for Smart healthcare, Smart industry, and for all other challenges of ITEA.

*The dilemma between efficiency and security in intelligent buildings*

Sustainable, reliable, user-friendly, efficient, safe and secure Building Management Systems in the context of Smart Critical Sites is a must. Commercial and government buildings are subject to increasingly stringent regulations and policies in terms of safety, energy efficiency, facility management, information systems and security. Identifying the limitations of existing sensor chains, optimising the network infrastructure, enabling cross-domain building model and analytics, unifying building management interfaces and enabling cyber-physical security management are challenges.

The **FUSE-IT** project solves the dilemma between efficiency and security in intelligent buildings by combining Building Management Systems (BMS) with Security Management Systems (SMS) and stimulating cross-domain innovation between activities that are traditionally very segmented. FUSE-IT developed a Core Building Data Processing & Analysis module that processes data reported by secured shared sensors, effectors and devices that are robustly interconnected through trusted federated energy and information networks.

*Safety*

The project **SAFE** developed new concepts to model safety and architecture as well as methods for safety analysis, variant management and safety code generation based on the existing modelling languages EAST-ADL and AUTOSAR. It enabled an effective and compliant application of the new ISO26262 safety standard in the automotive industry processes. Innovations were made on three levels: concept, tools and process.

An exchange format compliant with the existing standards and enriched with the SAFE meta-model formats allows a major step to be made in the direction of integrated, model-based design in the tool market of the automotive industry. This provides functionality for integrated development and safety analysis on each of the abstraction levels: requirements, architecture, HW design, SW modelling and coding. Finally, a guideline developed by the SAFE project and formalised in a process model that includes an assessment model provided the industry with a unique, commonly agreed interpretation.

**Smart Engineering is a need for Smart Industry**

Smart Industry, or Industry 4.0, needs a set of new components, including software tools, sensors and testing methodologies. In ITEA, all these subjects are defined as important challenges and hereafter are some of the outcomes of ITEA projects related to these challenges.

*A quantum leap for technical authors*

The complexity of software systems in safety-critical domains (e.g. avionics and automotive) has significantly increased over the years. A text and model-synchronised document engineering platform that provides a generic framework for automated traceability analysis is a necessity for complex systems. This platform needs to allow the integration of two types of reasoning: about the meaning of text and about document structure.

In the **Modelwriter** project, a platform is delivered to reflect the quality (consistency, completeness) of documents produced by technical authors (such as software or systems engineers) as the enhanced quality of companies' products.

ModelWriter envisions an integrated authoring environment, which combines a Semantic Parser (= the "Writer" part), capable to "understand" pieces of text and transparently creates models from them; and a Knowledge Capture Tool (= the "Model" part) that understands the semantics of industry standard notations and languages such as UML, ReqIF and Java. This allows technical authors to interactively configure and analyse traceability among different parts of work products produced in the system development process to perform different review activities such as consistency checking, change impact analysis, structural coverage and repairing broken traces.

**Smart Manufacturing**

While Europe has a high level of automation and high-quality products, its production systems are still highly complex and need flexible production system design, optimised time to market and extremely high product quality. Against this background the ITEA project **AVANTI** developed a virtual commissioning test methodology to help leading European OEMs, component and tool providers to gain a competitive edge through two key innovations: (1) virtualisation of the testing process for industrial production lines and (2) the combination of different models and tools for simulating production to create and perform tests for virtual commissioning and industrial application.

The AVANTI project developed a co-simulation framework that contains behaviour models and co-simulation, the modelling and simulation of mechatronic components, fast and lightweight FMI-based (Functional Mock-up Interface) co-simulation of physical behaviour models, and the integration of co-simulation approaches into existing processes. The Virtual Commissioning Test Generation and Execution Tool developed for users in the manufacturing sector automatically generates detailed test cases, performs them and provides a detailed overview of the results.

*Advanced Co-simulation Open System Architecture*

In the key area of virtual system development ("frontloading") aimed at reducing development times, stranded costs and time-to-market, co-simulation is a particularly promising approach for interoperable modular development. However, the coupling and integration of real-time systems into simulation environments (especially of systems of distributed HiL (Hardware in the Loop) systems and simulations) still requires enormous effort. The aim of **ACOSAR** was to develop both a non-proprietary "Distributed Co-simulation Protocol" (DCP) for integration of simulation and testing environments and corresponding integration methodology, which will be a substantial contribution to international standardisation (FMI). The result is a modular, considerably more flexible as well as shorter system development process for numerous industrial domains that will also enable the establishment of new business models.

Modelling and simulation represent key methods for the successful development of technical devices and machines and while the FMI is an existing standard used for the exclusive integration of simulation models, there was no standardisation for the integration of real-time systems and no standard for distributed co-simulation before ACOSAR. Within ACOSAR, the development of a DCP (Distributed Co-simulation Protocol) specification aims to reduce time and effort spent by OEMs.

The DCP was intended as an open standard for fast industry adoption, which means that having DCP compliant integration, there is no need for component providers to negotiate protocols with their customers, which gives them a competitive boost. System integrators also benefit from the DCP integration of the subsystems. The ACOSAR project also ensures that safety engineers are beneficiaries of systematic development methods and well-defined interfaces between system components – the DCP gives them confidence in the reliability of their system testing results so that they can focus on what to test rather than how to test. In this way, they can do more tests in less time, which ultimately makes products safer.

With many different components provided by different partners, the required integration is reduced to an interface specification in order to exchange IP-protected components. This supports the fast and smooth integration of heterogeneous IP blocks and leads to an open market. A publicly available, industry-accepted interface not only facilitates the horizontal approach that is needed but also opens up the possibilities for SMEs to have significant market shares.

All in all, the impact of the results of ITEA project collaborations on the challenges of the future, from technological, business and societal perspectives as well as the need for innovative software solutions, has been significant over the past twenty years. There is, then, every reason to be confident that in the coming two decades, this impact will continue to grow for the good of society.

# UK Chairmanship priorities

**The UK is proud to be taking on the Chairmanship of EUREKA for a third time. While much has changed since EUREKA was established over 30 years ago, its mission is as relevant today as it was then, if not more so. Science and innovation remain key drivers of productivity and the need for businesses of all sizes to collaborate beyond national borders and to operate globally is now even more vital to their future success.**

**UK PROGRAMME**

The UK's Chairmanship programme aims to make EUREKA fit for the future, through three priorities:

**Global EUREKA**

Global collaboration in research and innovation is essential to enable companies not only to access knowledge, skills and partners globally, but also to significantly improve their access to markets. The UK Chair will work to deepen existing relationships as well as broaden and expand EUREKA's global reach, supporting the adoption of a more strategic approach to the involvement of more countries to best support business collaboration opportunities.

**Valued EUREKA**

Since 1985, EUREKA has supported over 6,800 projects and has been at the heart of a number of major developments. It is important to ensure that EUREKA remains a trusted and valued network and that its true impact is recognised. Value can be seen through different lenses, whether providing the framework to facilitate collaboration between countries or delivering economic benefit for the businesses involved.

**Agile EUREKA**

The EUREKA network is a unique asset and the UK Chairmanship wants to ensure that it is fit for the future. To be agile, the governance of EUREKA needs to be both robust and responsive to changing market dynamics. The UK Chair will work with the network to ensure that EUREKA remains a robust organisation, ready for the future and well positioned in the European innovation landscape.

Scan the QR code to download the UK EUREKA Chairmanship Programme 2018/19:

*Source: EUREKA Secretariat*

## EUREKA Cluster events and Call dates

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|---|---|---|---|---|
| ITEA 3 | 14 Feb 2019 | Deadline ITEA 3 Call 5 FPP Submission | | https://itea3.org |
| Celtic-Plus | 29 Nov | Celtic online Project Idea Pitching 2018 | | www.celticplus.eu |
| EURIPIDES² | 20 Nov | Launch synchronised Call EURIPIDES²-PENTA 2019 | | www.euripides-eureka.eu |
| eurogia2020 | 7 Dec | Next Cut-off date | | www.eurogia.com |
| Penta | 20 Nov | Launch synchronised Call EURIPIDES²-PENTA 2019 | | http://www.penta-eureka.eu |
| | 20-22 Nov | EFECS | Lisbon, Portugal | https://efecs.eu |
| SMART advanced manufacturing | 19 Nov | Deadline Project Outline Submission 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.
Please submit your information to communications@itea3.org.

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