# ITEA Magazine

March 2023 – Number 44


**25 years of ITEA**

Country focus:
**Germany**

ITEA Success stories:
**PARFAIT & STARLIT**

25 years ITEA 1998–2023

# Contents

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25 years ITEA 4 1998–2023

ITEA is the Eureka Cluster on software innovation

eureka

# *Dear ITEA Community,*

After 25 years of ITEA we can look back with pride and conclude a lot has been achieved. And so it should be; my son is 25 years now and if I observe him I see that many things have been achieved in 25 years. Sometimes this is comparable with innovation - you experiment and try out things, accepting that some of the efforts will never lead to any return, in a tangible way. Lust for life and innovation are closer to each other than they seem.

During the last 25 years much has changed for ITEA as well, as it has for the rest of the world. Back in the 90s I remember internet connections still were a rarity at city offices now calling themselves Smart cities. Or if you walked along the street using a mobile phone, the size of a brick, you'd get looks as if you were walking on water.

Just some examples of life-changing innovations, disruptive and eventually part of our daily life. At ITEA, too, many ground-breaking innovations found their roots before moving to global markets. See the exciting examples that were developed during the early days of ITEA: Digital Cinema, which signified a radical change in the world of film distribution and displaying quality. And of course, a market breakthrough for our board member Barco. Or the great innovation that the project STARLIT delivered for cancer treatment, allowing the targeting and finetuning of radiation treatment doses against the tumour, and keeping the patient's healthy tissue as unaffected as possible. An example of precision medicine, the buzzword in modern day healthcare.

ITEA's current projects are still building the new blocks for solutions and issues that matter to the world. See how Safety and Security benefited from the PARFAIT framework developed for personal data protection in IoT applications within connected ecosystems. And read about the newly labelled Sustainability Call projects, whose innovations make industry more sustainable and greener.

Over the last 25 years software has become an enormous growth market and key pillar of our economies as well as interwoven with all sectors of our economy and society sectors. Professor Ina Schieferdecker (BMBF) explains how relevant this is for Germany. ITEA is a fruitful instrument to keep fostering the software innovation needed for the German economy, for example in the strong automotive sector, where complex and optimised supply chain and manufacturing 4.0 networks are key for its global position. Software is increasingly important, as Harald Schöning of Software AG explains. A company that goes back even to the early days of software, when it was not yet an asset, but merely an operating tool to be able to work with the mainframes of that era.

Software innovations with promise and projects with concrete impactful results were part of ITEA's DNA when it started 25 years ago. But, moreover, something less tangible and magical has also been in the ITEA air since the early days. In the conversation between ITEA Chairwoman Zeynep Sarılar, and former ITEA body members Karlheinz Topp and Luc Desimpelaere, we read how trust between the partners was of the essence, and how the fun of working together with people with the same passion and vision, created happiness, one of the key characteristics of the ITEA Family. That hasn't changed, whether the project topic relates to a mainframe or a digital twin.

I invite you to discover the inspiring and personal stories in this magazine for yourself.

Jan Jonker

## Success built on the inheritance of a very strong base

# 25 years of ITEA

A conversation between Zeynep Sarılar, Karlheinz Topp and Luc Desimpelaere

*"From the beginning we were looking towards the future and tried to bring forward ideas. We all shared the same common purpose. It clicked."*

**This year, we celebrate 25 years of ITEA. Zeynep Sarılar, current ITEA Chairwoman, admits to feeling very lucky that when she joined the ITEA Community many years ago, it was already very strong. She is very grateful for the work that had been done in those first days. Work that created the conditions for the success that ITEA has enjoyed since. Here, she invites Karlheinz Topp (former ITEA STG member from Bosch) and Luc Desimpelaere (former ITEA Board member from Barco) to share their recollections of those early days.**

### Birthday cake

Karlheinz kicks off. "The real start was the 'ITEA Rainbow Book', ITEA's first roadmap which was approved by the Public Authorities and in 1998 I became involved after my colleague at Bosch decided to switch departments, leaving me to take over the work he started in the first Steering Group in Paris. It coincided with my birthday and, would you believe it, they even had a birthday cake for me. The meeting? We had fun, right from the beginning. And that's the way it was for the next 20 years. Of course, sometimes it was really hard; in the beginning with meetings every month to define all the procedures for getting proposals, evaluating the proposals and all these things, along with preparing the first ITEA Symposium in 2000. But all that hard work was fun at the same time."

Zeynep wonders whether this was when the sense of ITEA being a community of family and friends developed. "Well," Karlheinz replies, "we met up frequently, on a monthly basis at least, for the next couple of years, so we got to know each other pretty well, almost like family and friends. Not that it was always birthday cakes! Actually, creating this special feel – our Community – was not so much a process as a spontaneous happening. We just met and understood each other. We had no need for any team building process or whatever. From the beginning we were looking towards the future and tried to bring forward ideas. We all shared the same common purpose. It clicked."

### Increased importance of software

At this point, Luc joins the conversation and Zeynep asks him how he became involved in ITEA. "Well, the fact is that we were invited," he explains. "ITEA was launched by a core group of large companies that saw the need to advance State-of-the-Art in software engineering in Europe. Barco was informed by Philips of the initiative to create a collaborative platform for software systems research. At that time software-intensive systems was a growing part of our total R&D effort but participation was only possible if there was financial support from the participating member states. At a meeting with the Flemish funding agency IWT (now VLAIO), responsible for innovation at that time, the interested parties were invited to discuss the proposal and IWT decided to support the programme, with Barco representing Belgium in the ITEA Cluster. It was a time when we were starting to grow, and software was becoming more and more important for us. Since my responsibility was to initiate new projects in ICT and software, I convinced my management to go for it. So, I joined these initial discussions and writing the ITEA Rainbow Book. We were backed up by the Flemish government, which, after all, and even today has been, let's say, a very constant, active supporter of the system."

### Open innovation

Luc then touches on the potentially sticky issue that could have confronted the collaborative spirit in the early period: intellectual property. "People said to me, this will never happen because, you know, you cannot imagine that Bosch or Philips or whatever company is going to show you some strategic information. Remember, this was well before the concept of open innovation became commonplace many years later. Yet this group of people was working together to find ways to develop a sort of roadmap with a common mindset geared towards gathering ideas that were quite far from the immediate market requirements and hype." Music to Zeynep's ears: "We're talking here about a concept that was being put into practice at a time when the term 'open innovation' had not been invented. People coming together, collaborating in an environment of trust."

Karlheinz recalls that this sense of openness was prevalent, on the technical level. Politically, as one might expect, the differences were more in evidence.

*"I also see that ITEA has been able to adapt to an ever-changing world. Agility is one of the key strengths of ITEA's ongoing success."*

"Inside the ITEA Steering Group, I know there were more problems on the political level. But luckily, I was not directly involved. I had a colleague who was very adept at 'playing the game' and presenting the arguments for undertaking the necessary measures to help us, the technical people, to get our proposals up and running. But as I said, I was involved in the technical Steering Group and all these technical things were much easier. "

## Transparency and alignment

Luc's experience was somewhat different because he was in a smaller company at that time. "Although I was technically engaged, I also did everything in the political sphere, so I became well informed about the discussions with the agencies and so on. Gaining insight into the requirements of the various countries afforded some transparency to the process and enabled alignment. I suppose you could call it the political equivalent of open innovation. Put the two together – politics and technology – with a common purpose and you have a recipe for success. Therefore, for me, from the beginning, I understood how essential the role of the ITEA Office was in the success of the whole thing as the facilitator to bring the people together, to coordinate the technologies and options for funding, to sort all of the projects and give direction to the roadmaps."

## Challenges and achievements

Turning to any specific challenges and achievements, Zeynep wonders whether there are any that stick in the mind. Karlheinz explains that, coming mostly from the automotive industry as he does, he remembers the EAST-EEA, a four-year project, which aimed to bring common expressions and wordings into software development for the automotive industry. Out of this emerged the AUTOSAR association which was founded at the end of this project. "So, by bringing a common understanding about software development to the automotive industry, the automotive players knew how to talk to each other, in software terms."

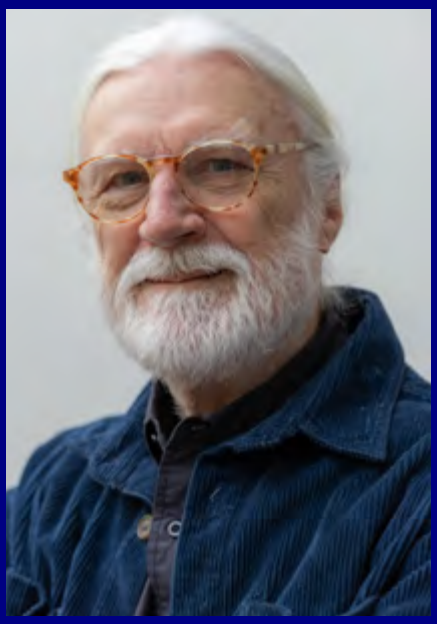
Luc adds, "I think what you're saying is quite fundamental. This understanding of the platform and software development. I remember there were some objections in the beginning but I worked to convince people of the need to use these platforms, new methodologies, along with the changes in software development methodologies, model-based development and simulation and so on. We had to show how fundamental this was for everyone to bring efficiency to development. I remember the start of the Digital Cinema project. At that time we were developing our business with partners in Germany, but this was not perceived by Germany as being strategic. Nonetheless, we attracted a German SME that saw the relevance and benefits to its software development. As such, this demonstrated the power of collaboration and possibilities of innovation as a fundamental principle." Karlheinz recalls that story. "It was very hard to bring companies together and especially to get funding from the Public Authorities when a new domain entered the ITEA Community. It was one of the challenges we had to overcome. We needed to appreciate the whole picture."

## Criteria for success

All of which presents a very familiar picture to Zeynep in terms of her own ITEA experience. "Key words like open innovation, international

Zeynep Sarılar
ITEA Chairwoman

Karlheinz Topp
Former ITEA STG member from Bosch



Luc Desimpelaere
Former ITEA Board member from Barco

collaboration and trust. Trust is so important in being able to share the challenges or to create a platform together. This also applies to communicating with Public Authorities. I think that trust and collaboration create a good positive atmosphere. I think these aspects must have been important in convincing the automotive industry to work together in one platform or in creating a totally new idea in digital cinema. How did you create the environment or the consortium that led to success?"

Karlheinz: "One word: preparation. I think it's very important to invite companies for just one or maximum two days to get together on a technical basis and then help the consortia to describe the project and to get confirmation from Public Authorities that they also are interested because in all these projects funding is required from all parties involved. After that, step up to the company management level. It's also a bottom-up approach that enabled ITEA to grow."

Luc agrees. "Yes, you need some sort of structure, some environment where you can gather ideas, like the ITEA Project idea tool and give people the opportunity to provide an initial outline of their project. Perhaps I could just say something about hype and substance. I think there is a danger of getting wrapped up in hype and buzzwords – artificial intelligence and stuff like that – while we should focus on the framework and the 'meat' or substance. The work of the Steering Group in determining roadmaps was instrumental in generating a common understanding of what we could do. And what was important for the future. In recent documents I sometimes see the use of these things as buzzwords and the lack of 'meat' for a potentially interesting project. But overall, if I look at the recent project proposals that have been submitted, the process is still working effectively. Of course, nowadays you see the inclusion of more SMEs and startups. They were there at the very start in the creation of the ecosystem we know today. But there are more of them. ITEA still has a vital role to play in this new ecosystem. It has the right instruments, the right methodologies, and the role as a facilitator to bring people together with a procedure for working out proposals. I also see that ITEA has been able to adapt to an ever-changing world. Agility is one of the keys strengths of ITEA's ongoing success."

**Trust**

Rounding off this very convivial conversation, Zeynep concludes: "Having this ecosystem and having new people all the time bringing fresh ideas to the ITEA Community is important for us indeed. And going beyond the challenges, I think having our bottom-up approach and being agile helps the industry. In the end, though, everything is glued together through trust. This is how I see it. I would like to thank both of you, Luc and Karlheinz, for sharing your insights and experience with us, and reminding us of the family spirit that has been at the heart of the ITEA Community for the past 25 years."

# Focus on Germany

**In Germany the ICT industry, and especially the software and software-intensive sector are key drivers of the economy. In 2022, the tech sector comprised over 119,000 companies, more than 1.5 million jobs and sales revenues of about 200 billion euros, equivalent to about 5% of German economic output (2021). Software and services have been the core drivers of growth in the tech sector.**

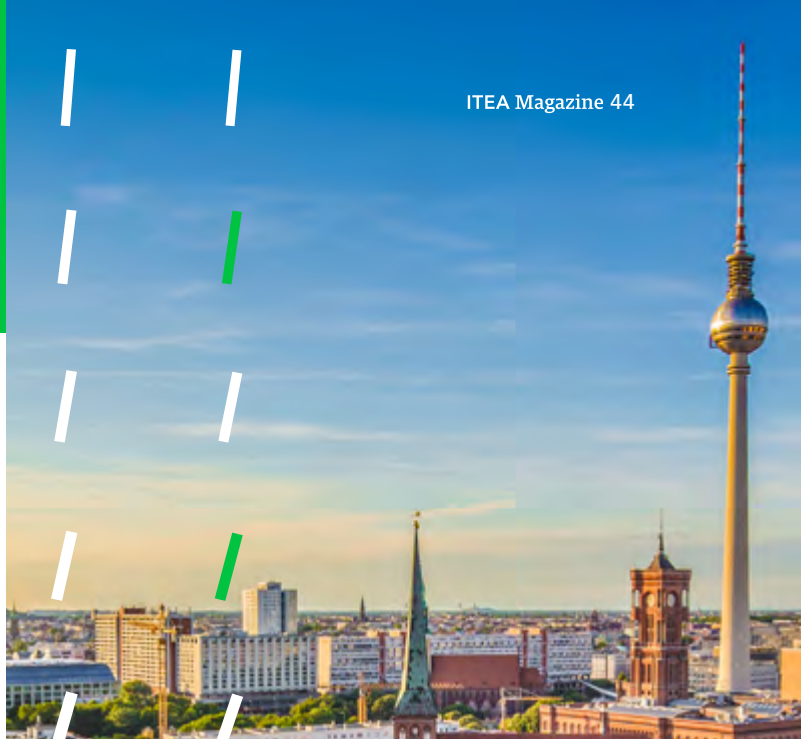
# Driven by digitalisation, supported by networks

## Software integral to synergies

Professor Ina Schieferdecker, Director-General for Research for Technological Sovereignty and Innovation at the Federal Ministry of Education and Research (BMBF), describes how the digital transformation has affected all branches of industry. “Software-based systems form the foundation of Germany’s economic capacities. The ICT industry has caught up with traditional industries like automotive or manufacturing and, as a result, has become an integral part of many synergies. More than two thirds of the revenue share of software products can be traced to the B2B segment, which is a strong indicator for the integration of the tech sector with other sectors. Software, especially software-intensive systems, services and AI, has become commonplace in nearly every area of the German economy. It is key for innovation in important areas like mechanical engineering, robotics or Industry 4.0 where Germany assumes a leading role. However, software innovations are also an important driver and enabler for solving societal challenges such as sustainability, enabling higher resource and energy efficiency or, simply, completely new ways to solve issues.”

## Flagship projects

Germany has generated some remarkable flagship projects in the ICT domain in recent years. For example, the industry-driven AUTOSAR initiative, resulting from the ITEA project EAST-EEA, as an international alliance of OEM manufacturers, automotive suppliers, semiconductor manufacturers, software suppliers, tool suppliers and others significantly changed software development methods in the automotive industry and set new standards. Schieferdecker: “An innovative methodological approach for structuring the development processes for cyber-physical systems was developed within the BMBF-funded Software Platform Embedded Systems (SPES), along with the foundation for a semantically precise description and analysis of systems.” Another important example is the BMBF-funded BaSys framework, in which a reference architecture for production systems was developed that enables an efficient transformation to Industry 4.0. The developed asset administration shell concept is used by the community as industrial standard for digital twins.



## Unleashing potential

Schieferdecker considers these R&D activities as a basis for ground-breaking innovations in software development. “Mind you,” Schieferdecker says, “we also still see a lot of challenges ahead, and thus R&D on software development and operations need to continue. In general, we expect the ICT landscape to gain further momentum. The ongoing megatrends for new business models based on IoT, 5G/6G, AI, Anything-as-a-Service, etc. in interaction with cross-sector application areas such as Industry 4.0, autonomous mobility or intelligent robotics will continue unfolding huge innovative potential that might change the ICT landscape profoundly. New developments in neuromorphic computing or quantum computing might even change the way we use, develop and deploy software-intensive systems completely. In the near future, collaborative, connected, intelligent, autonomous systems will become more and more important. Some of the key challenges continue to be around the questions of how to design, compose, validate, control and/or operate such systems so we will have to continue focusing on the trustworthiness and resilience of software-intensive systems, including security, safety, performance, traceability, or accountability as well as their verification and validation also at runtime.”

## National strategies

Germany has two national strategies, the *Digitalstrategie* and the *Zukunftsstrategie Forschung und Innovation*, which were recently adopted by the Federal Cabinet – they define Germany’s goals regarding digitalisation as a cross-sectoral objective and express policy guidelines and goals, while the core motivation is to strengthen Germany's technological and digital sovereignty and to support the overarching goal of Europe’s strategic sovereignty. “We see digital as a very important area alongside technological sovereignty and as a priority in our industrial, digital and innovation policy,” Schieferdecker explains. “The development of a vibrant European open-source ecosystem will play a central role in this. We want to accelerate digitalisation, catch up and explore the possibilities of digitalisation for research and innovation as well as for individuals. Opportunities for social participation and good work will be exploited more systematically. These, in turn, are preconditions for competitiveness, innovation and societal resilience. In this respect, to achieve technological and digital sovereignty, we aim at funding targeted innovation and the expansion of competencies in key technologies.”

## Advice and support

BMBF wants to strengthen Europe and Germany as a competitive location for industry by creating a reliable framework for research and innovation activities through targeted public funding of excellent R&D projects and transfer. “In ICT, we especially support innovations in leading-edge technologies, research activities for methodological and tool developments, and research on the foundations of software engineering and AI. In these activities, the involvement of industry partners is highly important with regard to applicability, usability, acceptance and standardisation.” On behalf of the BMBF, the DLR project management agency (DLR-PT) supports implementing government funding measures, monitors R&D projects and gives advice and support to funding recipients for the duration of R&D projects. Furthermore, BMBF promotes AI in Germany through service and competence centres as well as provides special funding initiatives to support young AI scientists.

## SMEs are among the pioneers of technological progress

More than 99 percent of all enterprises in Germany are small and medium sized enterprises (SMEs) with sales volumes ranging from € 2 to 50 million. SMEs are among the pioneers of technological progress in most sectors of German industry, so BMBF lays special focus on supporting SMEs with funding measures such as KMU-innovativ or KI4KMU to provide public funding for high-risk research and innovation projects in the ICT domain. SMEs are also specifically encouraged to participate in all the BMBF funded R&D projects. Dedicated support to

*"In Germany the ICT industry and especially the software and software-intensive sector are key drivers of the economy."*

assist SMEs in their applications for funding under these programmes has been established. "For example, we have set up various advisory centres to which companies can address their specific project ideas and get advice regarding suitable funding opportunities," Schieferdecker says, "as well as advice on European initiatives. In the case of Eureka, for example, this is via the advisory service by the Eureka office at DLR-PT. We especially support collaborative projects between science and industry to exploit the full potential of innovation and to enable the development of new methods and pre-competitive products in line with the actual needs of society and industry. Politics can set the general conditions and provide funding. However, research, industry and other stakeholders need to provide support and commitment in defining and developing the next important steps to the innovations of the future."

## Think internationally

Schieferdecker underlines the need to think internationally and develop innovation and research networks due to globalisation and major societal challenges like the climate crisis and demographic change. "To be competitive, industry is looking for cross-border cooperation in Europe and beyond. The Eureka Clusters Programme (ECP) is essential to support this need. ITEA, as the Eureka software innovation Cluster, is a good match for achieving the goals of BMBF regarding software innovation. We strongly support the goals of ITEA to bring together industry and research institutions or universities on an international level in a network that has grown over the years to work on the challenges of the future. ITEA has many characteristics that make it extremely attractive for all parties – for the project partners as well as for public funding authorities. Its advantages include flexibility and openness to all kinds of partners, including SMEs, and the bottom-up creation of projects, which ensures that they are geared towards actual market demands and business needs. We can look back on a history of successful ITEA projects and are looking forward to ongoing joint international efforts in research and innovation."

Schieferdecker adds, on a personal note, that she had the opportunity and pleasure to lead the DIAMONDS project in ITEA 2, and was the recipient of a Eureka Innovation Award in 2016. "We learned a lot not only from working within ITEA projects, but also by meeting partners from other projects at the ITEA networking events and conferences. From my current perspective in BMBF, ITEA and Eureka make important contributions to facilitating international scientific and economic collaboration and provide great opportunities to harness synergies."

## Crucial to meeting the challenges facing our society

In order to strengthen the position and competitiveness of Europe, and of Germany within Europe, it is indispensable to complement the value-adding production networks with European and international research and innovation networks. Eureka and Horizon Europe are essential to support these cross-border research and innovation networks. The German Federal Government sees the further development of the European Research Area as an important engine for strengthening Europe's overall scientific performance and expanding its innovative capacities in all areas. Summing up, Schieferdecker suggests that "transnational cooperation and the coordination of research efforts are crucial to meeting the challenges facing our society, and Eureka, and ITEA in particular, as well as the EU Framework Programme are key elements in making this cooperation possible."

## More information

https://www.bmbf.de/bmbf/en/home/

# Software AG

## A one-stop shop where innovation is crucial

**Dr Harald Schöning is Vice President Research at Software AG, responsible for all publicly funded research projects at Software AG. He is member of the Board of ITEA, NESSI (Networked European Software and Services Initiative), the Big Data Value Association BDVA as well as a member of the steering board of the German national platform 'Industry 4.0'. For more than 25 years, he has been working for Software AG. Who better, then, to give the inside track on Software AG.**

### Digital backbone

"Software AG is quite an old company for the software market because we were founded in 1969. Which is actually the reason why we could call the company Software AG because, back then, selling software was not the usual business model. Hardware manufacturers such as IBM, also sold the software or even gave it away for free to their customers. It was very unusual to unbundle the hardware and the software business. We grew fast with our first area of business, which was a database system and so-called third generation programming language. The main programming languages were COBOL and Fortran (which was used for scientific applications). But since COBOL was not very easy to use, we invented a programming language that included, for example, database accesses. It proved very successful and later, of course, we extended our business to other areas. Nowadays, Software AG delivers integration technology for the truly connected enterprise, integrating processes, data and software packages. So, we are more or less the digital backbone of companies, allowing our customers to build and connect applications so that data and information can be drawn from various sources, combined and analysed. In fact, 50% of the top 500 companies worldwide are our customers."

### One-stop shop of innovation

Such impressive figures suggest that Software AG has an appeal that others lack. Harald explains that while competitors cover many of the same areas as Software AG, no single competitor covers the same range. "We're a one-stop shop where innovation plays a crucial role," Harald says. "It's our daily business more or less because we have to deal with ever-changing environments among our customers and with ever-changing technologies. For example, we are looking into quantum computing, what that might mean for us. In fact, this applies to all of the major trends and developments in the domains that are of relevance to us. So we have to be innovative, and that's one of the reasons why we do research projects, for example, under the umbrella of ITEA."

### Context to create ideas

Software AG is a fairly recent addition to the ITEA Community and, having been invited to join ITEA, quickly became a Board member. "ITEA gives us the context to create ideas for projects. Our first ITEA project, AIToC, funded by the Federal Ministry of Education and Research, is about using AI for supply chain management to support the manufacturing sector and its tool chain." Artificial Intelligence-supported Tool Chain in Manufacturing Engineering, to give the project its full name, employs artificial intelligence for optimisation and monitoring

*"The ITEA connection helps us to achieve our mission to develop an industry-leading suite of products."*

Dr Harald Schöning
Vice President Research at Software AG

based on sensor data in the plant and synthetic data in a digital twin. The interoperability of engineering tools is a key aspect of this. "We are currently part of four ITEA projects. We recognise that software is the ultimate value driver, which is why we set out to become the software pioneers of a truly connected world. The ITEA connection helps us to achieve our mission to develop an industry-leading suite of products."

## Multiple benefits

The benefits of being part of these projects are multiple, Harald suggests. "First of all, we get a very close contact to potential customers. Secondly, we get a lot of insights into certain domains, which is of course important because you have to understand the domain to sell to successfully in that domain. It's much easier to convince a potential customer if you have that insight. Thirdly, we learn about possible application areas of software or the limitations. And finally, if we find such shortcomings, we can also improve our software during the course of the research project. And we can apply the results of the research in our products and consulting."

## Value of funding

In addition to the ITEA programme, Software AG is also involved in national publicly funded research projects as well as European Commission programmes. Involvement in any of these programmes can be a burden in terms of money and time, so public funding and support are essential. Harald: "If we didn't get funded, it would not pay off for us to participate. After all, the benefits then would be too small to spend all that money. So we need the funding to be involved in such research projects. I mean, you have to spend your resources wisely. In Germany, we are in regular contact with the Public Authorities about what the hot topics are and which would be of interest to them, and quite often that includes our topics in the next research programme.

## More information:

https://www.softwareag.com

# PARFAIT

# Connecting IoT with greater security

**By 2020, Internet of Things (IoT) had transformed the internet into a global network connecting billions of communicating objects – 52% of which featured no security countermeasures. The threat of personal data misuse makes security the most significant barrier to the growth of IoT applications. Additionally, a lack of structures for interoperability increases the complexity of services and application development; complexity increases production and maintenance costs. These challenges must be met if IoT is to redefine human-computer interactions for the better.**

Success story

To open the path to more securely connected ecosystems, the ITEA project PARFAIT, which successfully ran from the beginning of 2018 until the end of 2020 and gathered 11 partners from France, Romania and Türkiye, has developed a framework for personal data protection in IoT applications. This defines indistinct aspects of IoT, interoperability and privacy through the implementation of rules, guidelines and methodologies. The framework's modules and guidance can be combined and utilised in the development of new solutions and have already been implemented in two use-cases: Smart Home and Smart Hotel, in which each partner had a strong contribution.

### How can you benefit from the PARFAIT outcomes in your daily routines?

Let's imagine that you are a business (wo)man and travel a lot. Your home is

equipped with smart features, and you can communicate with it through text and voice messages. Once you arrive at your local airport, you can send a text message via Turkcell's instant messaging service, BIP, to your home to say that you will be arriving soon. The equipment in your home uses its artificial intelligence, which is processed in the semantic layer of Turkgen. Thanks to the information that results from this process and your preferred settings that have previously been registered, a window can be opened to bring in fresh air, the air conditioning can be activated to cool down the temperature or the heating can be turned on to make it warm and cosy. This can all be achieved thanks to the connection to the IoT platform of Ericsson Türkiye for control of the sensors. Once arrived, you can send voice messages via Pertimm to have other settings adapted to your wishes.

At home, you see that another meeting is coming up in Paris and you book your preferred hotel using the smart hotel system supplied by Softeam. The hotel booking system uses a FIDO token supplied by Thales, which utilises the highest security standards. Hotel credentials are also automatically uploaded to your digital safe (PIMZ), implemented by Softeam. Secure gateways developed by SIS are available to easily link your environmental preferences from your Ericsson Türkiye account through the interface developed by BEIA.

When arriving at the hotel, you connect to the website with your phone in order to download the door credentials to your NFC mobile wallet developed by NXP. This wallet allows you to use your phone to open the hotel room door in a secure way, equipped with a smart lock designed by the University of Burgundy. In the room, sensors collect different measurements such as temperature, pressure and humidity. These data might reveal sensitive information about you, so you can use an application developed by the University of La Rochelle to protect your privacy and report a noisy version of your collected data.

This example shows the strong outcomes of PARFAIT and the collaboration between the project partners. The development of the Smart Hotel platform to TRL 4 (a hardware and software-based demonstrator) is an important technological result and a vital step towards validation in an operational environment.

## Huge business potential

As interoperability and security issues currently limit the deployment of global IoT applications, huge business potential lies in the standardisation of frameworks and practices. This brings benefits for companies of all sizes.

Romanian SME BEIA, for example, expects revenues of EUR 150,000

*"PARFAIT offers knock-on benefits in better communication, reduced costs and greater access to services."*

within five years of PARFAIT exploitation and five new customers each year, while the Dutch giant NXP expects to maintain its largely dominant share and leadership position in the mobile NFC market despite rising competition.

The end-to-end Voicebot platform developed by French SME Pertimm, can be installed on premises and is fully secured and guarantees user privacy, which is essential e.g. for banking, insurances and smart home platforms. Thanks to the participation in PARFAIT, Pertimm has established partnerships with more than 10 companies and universities. Currently, the Voicebot platform has been used by many companies and Pertimm has tripled its revenues and doubled its staff, partly because of the PARFAIT results.

In addition, the Personal Information Management system (PIMZ) developed by French industry partner Softeam will help the end-user to aggregate personal data and manage what data is shared. After PARFAIT's completion, contacts were made with safe providers to propose partnerships, which resulted in a collaboration with Digiposte (a French safe provider managed by La Poste, the French postal service) and further PIMZ features based on blockchain that allow end-users to act on data sharing (in relation to GDPR rights).

Turkish SME Turkgen expects to sell the PARFAIT project outcomes locally to two estate companies which construct smart houses, including smart devices such as connected curtains and heating systems, and internationally to one company in the EU. Within the PARFAIT project, Turkcell has realised a proof-of-concept of their secure and easy-to-use BIP platform with a smart home scenario, to communicate with the IoT devices installed. Ericsson Türkiye developed an IoT manager capable of managing free format text messages. After the project's completion, this solution was presented to telecom operators in the Middle East and Africa. Currently the IoT manager is used as an internal product in which Ericsson showcases IoT vertical business cases, including 5G technologies. Business engagements are still ongoing with customers.

Finally, the gateway solution developed by SIS extended their market share, which was traditionally represented by SCADA applications. The solution mainly addressed hotel owners and small industrial applications in Romania. SIS expects around 250 implementations by 2025.

Other notable achievements include the recruitment of 22 new personnel across seven of the project's partners and a patent by Thales. In regard to standardisation, Thales has met its target of reaching level 3 in FIDO implementation and has involved over 130 FIDO2-certified authenticator providers. This will help to transfer knowledge from PARFAIT worldwide, leading to greater security, lower IoT production and maintenance costs and a paradigm shift in our interactions with machines.

**Project start**
Januray 2018

**Project end**
December 2020

**Project leader**
Isil Ozkan
Turkcell Teknoloji, Türkiye

**More information**
https://itea4.org/project/parfait.html

# IVVES Project benefit story

## Create higher value thanks to automated ESG score calculation


### What issue has been addressed?

In today's business, there is an increasing tendency and demand for the concept of Socially Responsible Investments (SRI); the new standard for success is People, Planet and Profit. To be able to see how successful a company is in this respect, its Environmental, Social and Governance (ESG) practices need to be rated. According to Bloomberg, an ESG score is a measure of how well a company addresses risks related to ESG. ESG practices show, for example, how a company deals with human rights, responsible working procedures and sustainability. These ratings can be based on information from external companies who provide this kind of analysis and from different mathematical and Machine Learning (ML) models. This is where auto-adaptative systems will make the difference as they allow automated information processing from news and blogs about companies.

### What has been developed to solve this?

In the IVVES project, Spanish industry partner SII Concatel developed an ESG Investment Tool - a web tool capable of testing and validating ML models, evaluating the quality of the data and providing insights about financial assets. Using NLP techniques, SII Concatel can extract information (subjects and the positive, negative or neutral biases of a text, called sentiment) from news and blogs, as well as the entities that appear in the text (such as people, places, companies, events and dates), and finally classify the information qualitatively and quantitatively to automatically calculate an ESG score.

### How can you benefit from this?

Thanks to the ESG Investment Tool, a company can save a lot of time on data collection and analysis. In addition, the model provides 'opinions' about the news analysed, including source reputation, level of veracity, sentiment and the news topic. It also explains the process it has followed to come to such conclusions.

The results also need to be justified from an analyst point of view, and this is where explainability comes into play. For Concatel's customer zero, an agency specialised in sustainable portfolios, the implementation of this tool in their daily business activity (which has been estimated for Q3 2023) will be the main gamechanger for their business; it will completely transform their business activities compared to what they have been doing for the last five years.

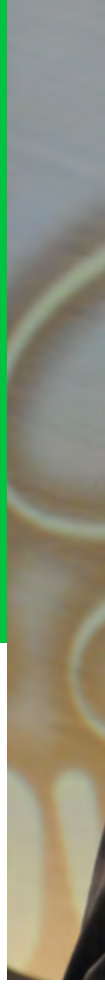
So, if you want to check how your organisation scores in terms of SRI, Concatel's solution will enable you to do so in an efficient and responsible way!

### More information

https://itea4.org/project/ivves.html

Community Talk with **Alain Coulombe**

# Disruptive entrepreneur to the core



**Alain Coulombe, CEO of the Canadian company 3DSemantix and leader of the recently, and successfully, completed ITEA project SAMUEL, was so convinced that the entrepreneurial path was the route he would take, that after one year of study at the Ecole Polytechnic in Montreal, he switched from civil to industrial engineering. "Industrial engineering turned out to be a perfect fit for me, combining my wish to be an entrepreneur and my love of technical stuff." After graduating as an industrial engineer, he started his career at IBM in a semiconductor plant. In less than three years, he became a manager and thought he would spend only a few years there because he wanted to start a company. "During my studies, I had the opportunity to work in SMEs and the adrenaline, the thrill, the power, the decisions you make ... all that excited me."**

## An entrepreneurial test

But Alain stayed at IBM for ten years, gaining experience after experience. "I didn't stay more than a year in one job. Or if I did, I had to deliver on different challenges, and this was very exciting. One of my biggest challenges was a technology transfer that was critical for the plant. With more challenge comes more responsibility. You may get carte blanche to deliver but limited time to do it. Between unplugging the testers to implementing production, 24/5 but that was not enough. It had to be 24/7, but IBM had never operated on Saturdays and Sundays in Canada so we made weekend work attractive, offering a full salary for two 12-hour shifts per weekend. It worked and was a big success because the rest of the week was free – working for 24 hours but being paid for 40." This and other challenges were like a test of being an entrepreneur. "If you are to be an entrepreneur, you will have to do things you've never done in your life. You're going to have to think outside of the box. And this opportunity inside IBM was quite fantastic for me. When I decided to leave, I sold my house and went to do an International MBA in Europe with the aim of starting my own business afterwards."

## Fast Moiré Interferometry

In 1994 Alain did just that, entering the machine vision industry with SolVision. He 'poached' the best engineer he had worked with at IBM. "For the first four or five years we did one-off projects and grew a team of about 15 people. In this emerging technology we targeted

the semiconductor industry, having seen where it was going in terms of miniaturisation and took a big bet that the laser triangulation method of measuring connectors would eventually start to lack accuracy and capabilities. What could be the solution? Phase-shift Interferometry. It's a very accurate technology, where you get height measurements for every pixel of your camera. We could be ten times faster and eight times more accurate. I told my team that if we could do this, then we would have a winner. With the help of some very smart guys in our research team, we came up with a solution, got 25 patents for this technology and within three years, we became market leader with 55% market share worldwide. We were selling to Intel, AMD, Samsung, NEC in Japan, you name it, the big guys. Before you knew it, we grew the team to 175 people and made an acquisition in Singapore as well as created a subsidiary in Japan to be close to the semiconductor industry in Asia."

## A new innovation

Then, in 2008, the shareholders decided it was time to sell the company and Alain started looking for another business opportunity because it was no time for him to retire yet. "And then I found this group of researchers that had invented geometric search. I said wow, this is very disruptive. You know, it's like Google but you give it a 3D model instead of keywords to trigger a search." 3DSemantix creates semantics that allow one to search for similar parts using a 3D MODEL as input to the search engine, not alphanumeric characters, avoiding the need to duplicate new parts and saving both time and money. "Our first product using this new semantics is a shape-based search engine: 3DPartFinder," Alain explains. "You don't even have to guess the right key words to launch your search. A CAD file or and STL file of a current part or a quick 3D sketch of the part you have in mind will do to launch your initial search. That's it! 3DPartFinder will then search the database and present a 3D view of all the similar or identical parts in an assembly."

## An irresistible offer

"And then, in 2016, came another development in my career and life. I came into contact with ITEA through IRAP, the Canadian Industrial Research Assistance Program, when I was invited to share a roundtable with Zeynep Sarilar, who more or less directly invited me to participate in the ITEA programme there and then on stage! I could hardly refuse." It was quite a learning process for Alain, and while his first full project proposal (FPP) did not come to fruition, a year later at the PO Days in 2017, the SAMUEL project was born and he had the lead, thankfully assisted by his Fraunhofer and Sirris colleagues. "You realise immediately the value of experience – it's the most precious asset we have." The major goal of the SAMUEL project is very much related to this notion of experience, combining the engineer's experience through data mining and machine learning methods and advanced analysis concepts to create an Additive Manufacturing (AM) knowledge base that can assist an engineer or business developer in all major AM steps.

## Addictive

Despite the daunting challenge of writing a full project proposal, Alain admits to having become an ITEA addict. "It's a pretty unique platform that gives entrepreneurs like me a real opportunity to come up with disruptive innovation through interaction with other experts. In fact, ITEA could also serve as a model for what we could or should be doing in Canada. Do I have a suggestion for ITEA? Spin off the concept in Canada and other countries and get the same kind of programme up and running elsewhere. The country-level ITEA programmes could later feed the international ITEA with bigger projects. Could be a game changer, and a real win-win!"

# Ground-breaking innovations we're still grateful for today

This year, we're celebrating 25 years of ITEA – a good moment to reflect on what has happened and has been achieved over these past decades. And in looking back on this, we can be very proud of the results that project partners from Europe and beyond have achieved thanks to software innovation and international cooperation. People's lives have improved a lot and ITEA project partners have contributed to that.

In today's world, innovation moves very fast; when one innovation has only just been implemented, the next one turns the world upside down again. But sometimes, a project comes along that lays the foundation for a whole series of new innovations. If that foundation had not been developed, the world might look very different now. In ITEA, we also have a few of such foundations: projects that we continue to benefit from on a daily basis and which we are eager to share with you.

This whole year, we will be celebrating 25 years of ITEA, including in our three ITEA Magazines. In this edition, a small selection of ground-breaking innovations from the first ITEA programme, which ran from 1998-2006, will be revealed. The July Magazine will highlight the gems from ITEA 2 and, in the November Magazine, we will take you to ITEA 3, so enjoy the journey!

# Digital Cinema

2001-2003

## Defining the architecture of today's digital cinema

Barco headed the ITEA project Digital Cinema to develop the key components for the transition from analogue 35mm film to digital technology. The shift in the film industry to enable digital distribution was a major – and risky – step to produce change in a century-old industry that required a universal, long-term digital cinema standard that could meet the needs of exhibitors, studios, equipment manufacturers and others involved in this effort.

The completion of this project kicked-off 10 years of digital cinema pioneering for Barco, resulting in undisputed global market leadership for Barco in digital cinema today. Barco achieved a #1 worldwide position with overwhelming market shares of 60% and higher in China and Latin America, a leading position in Europe with around 40% market share and a strong position in the US and the rest of the world with market shares varying between 25% and 35%.

These technological developments paved the way for a new generation of film distribution. Now, as a result of the project, digital cinema allows us all to enjoy movies with a much better image quality wherever and whenever the movie is watched. Smaller cinemas can have access to movies of the same quality. Moreover, the new system developed during the project enabled 3D movies to achieve commercial success. Finally, movies can now be released all over the world at the same time.

https://itea4.org/project/digital-cinema.html

25 years

# EAST-EEA

2001-2004

## A revolution in automotive software development

In the evolution of vehicles, the challenge posed at the beginning of the new millennium was the implementation of integral electronic control of nearly every function in order to improve safety and comfort in all areas of the vehicle – from engine, steering and braking systems to communications, entertainment and human-machine interfaces. The problem was that when a new component was introduced, both this component and all existing components had to be tested thoroughly to ensure none of them had been adversely affected. As a result, the introduction of new electronics put development costs and cycle times under enormous pressure. 23 partners from across the European car industry joined forces in the ITEA project EAST-EEA in order to tackle this challenge.

The newly developed software architecture allowed the easier integration of new electronics in cars through plug-and-play technology, dramatically reducing development time and costs to market. On top of this, new systems, such as new electronic steering systems, were quicker to design and market. Furthermore, the project also guaranteed a level of quality that is essential to the competitiveness of European cars.

Thanks to the EAST-EEA approach, vehicle manufacturers acquired an integrated framework for software and communication interfaces, tool environments and rules while suppliers benefited from standard solutions and re-use became possible, with new vehicle models able to be developed faster and product quality improved.

The EAST-EEA project acted as an important reference platform for further development in several ITEA projects and standards over the course of many years. EAST-EEA paved the way to the automotive industry's standardised platform for automotive applications: the Automotive Open Systems Architecture (AUTOSAR). AUTOSAR is now a global industrial initiative that is bringing together about 250 original equipment manufacturers (OEMs), Tier 1 automotive suppliers, software suppliers, semiconductor manufacturers, tool suppliers and others worldwide.

The AUTOSAR software – and therefore the results of EAST-EEA – are now part of every single embedded Electronic Control Unit (ECU) throughout the automotive sector worldwide and the component-oriented software development method is now state-of-the-art in the embedded environment.

https://itea4.org/project/east-eea.html

25 years

# EPAS

2006-2008

## Making easy card payments possible across Europe and beyond

The ITEA project EPAS (Electronic Protocols Application Software) was initiated in 2006 within the framework of the Single Euro Payments Area (SEPA). SEPA aimed to facilitate payments in Europe beyond national borders in order to achieve a single domestic market of payments.

The project gathered various important actors belonging to the European card payment industry, such as Groupement des Cartes Bancaires, Ingenico, ATOS Worldline, Verifone, Wincor-Nixdorf, Total, Equens and many others. The aim of this project was to deliver global standards that would enable European retailers to rely on common specifications for their card-acquiring operations.

EPAS has paved the way to a series of universal ISO standardised specifications for European card payments, free of royalties and charges. Ultimately, this has been extended worldwide as a global ISO 20022 message standard with the endorsement of the EPAS specifications (CAPE).

This project has provided benefits to all industry stakeholders through the use of these universal standards, which were made available not only in Europe and SEPA but also worldwide. The standards enable banks, retailers, card schemes, processors and manufacturers to rely on or deliver on-the-shelf, readily-available specifications, free of charge, to all card payment stakeholders, as well as meet SEPA requirements for a single market for payments in Europe.

In a nutshell, EPAS made easy card payments possible across Europe and beyond!

https://itea4.org/project/epas.html

# SmartTouch

2006-2008

## A long-lasting connection with the world around us

SmartTouch ran from 2006 to 2008 and was the biggest project piloting near-field communication (NFC) technology applications in Europe. It involved 24 partners covering an extraordinarily wide combination of technology and service producers, researchers and companies examining the role of NFC technology in terms of city life, the home, wellness & health, technological building blocks, security & privacy, and business building blocks. The main breakthroughs in SmartTouch were the technology to make NFC possible, the provision of mobile handsets with relevant toolsets, protocol-level achievements in standards, the enablement of payments, and methods for security in the production of NFC-enabled SIM cards. In addition, these elements were used in the creation of vertical applications, ticketing devices, locking devices and domestic electronic devices.

Thanks to SmartTouch, the project partners were able to develop and integrate NFC in more than 20 products and Touchatag, a spin-off from Alcatel-Lucent, was launched. But more importantly, SmartTouch provided the needed basis for secure NFC services in the future.

Nowadays, NFC is an indispensable part of our daily lives, and its importance continues to grow. It allows contactless payments in shops and information sharing at schools and museums. It can be used to purchase a transportation ticket, enable better real-time tracking of patient information in hospitals and facilitate social networking, to name just a few examples.

https://itea4.org/project/smarttouch.html

By and for end users

# Junkkari brings predictive maintenance to unchartered domains

**In the South Ostrobothnia region of Finland, Junkkari Oy has been collaborating with farmers and the wider agricultural machine trade for three generations. Following their fundamental principle of listening to the experiences of the customer, they design, market and manufacture machines for sowing, transportation and forestry – products which they've recently taken to a new level via participation in the ITEA project SMART-PDM (A Smart Predictive Maintenance Approach based on Cyber Physical Systems).**

### Robust but low-tech

Today, even cars have internet connections, yet the agricultural and forestry domains continue to rely on robust, low-tech machines which cannot easily be connected to cloud services. Predictive maintenance – the capacity to determine the condition of machinery while in service – is uncommon even for tractors, which are typically the most crucial piece of equipment for farmers. This translates into a reliance on visual observation and simple alarm systems, leading to big downtimes when a machine runs until failure. Given the short length of the sowing season, such an approach is needlessly risky.

### No more unnecessary subscriptions

Having recognised the need for improvements, Junkkari was interested in SMART-PDM from the moment that they were contacted by Finnish consortium leader VTT. As a whole, the project aimed to acquire manufacturing data to provide diagnosis and prognosis information while improving the financial feasibility of the underlying technology. Within this, Junkkari became the owner of two use-cases (seed drilling and woodchippers) and developed the idea of using operators' mobile phones as gateways. This would negate the need for their customers to acquire separate SIM cards and monthly subscriptions from local teleoperators when the products in question are only rarely used.

### A menagerie of measurements

This new connection system in their products was an eye opener for the company, leading them to explore what else could be monitored. For woodchippers, the subsequent implementation of sensor systems has allowed them to measure hydraulic pressure, temperature and blade condition. For seed drills, the same technology covers the entire spectrum of ground moisture, seeding depth,


coulter pressure, fertiliser moisture/temperature and the seeding conditions of air humidity and temperature. Crucially, this monitoring can take place in real time thanks to data prepossessing in cloud services, which will also help to further the development of precision farming.

## The best of all worlds

Of course, such results could only be achieved through close collaboration with the rest of the ITEA project consortium. As Junkkari's representative in the project, Research and Development Manager Tarmo Kukkola provided their partners with information on what their end-users consider added value, helping to keep these customers at the centre of all developments. Junkkari was also able to contribute a large number of expert mechanical designers, but held less experience in coding, data processing, hardware and sensor technology. As the consortium had experts in all of these areas and more, Junkkari's knowledge and understanding of predictive maintenance has expanded enormously, allowing them to effectively add features that are beneficial for their end-users while maintaining their goal of simple, easy-to-use products.

## One of a kind

Following the conclusion of SMART-PDM in 2022, Junkkari is now working on the integration of its results into the following model series of woodchippers and seed drills, as well as further dissemination through participation in major events like the International Conference on Smart Farming. By providing a digitalisation boost to both products, they expect to increase customer satisfaction via reduced downtime costs, better troubleshooting and greater usability overall. In turn, this will boost Junkkari's brand value and increase their sales – especially as no other comparable system exists for handfed woodchippers.

## The virtuous circle

In the longer run, SMART-PDM has created a virtuous circle for Junkkari: the ability to gather useful data efficiently will improve their R&D, allowing them to make even better products and gather more data. The project will also have a large impact on challenges that are currently in the spotlight worldwide. Smartphones, for instance, are so prevalent that their use removes the need to build separate modem systems and use up precious semiconductors during the global chip shortage. By minimising machine downtimes, predictive maintenance will also help to boost wheat production at a time of instability. This expansion of new technology to the domains of agriculture and forestry is only the beginning of advancements which will likely be felt for generations to come.

## More information:

https://itea4.org/project/smart-pdm.html
https://www.junkkari.fi/

# STARLIT

# Aiming for 'first-time-right' treatment for cancer patients

Success story

**The global incidence rate of cancer is expected to grow by 70% over the next two decades, with Radiation Therapy (RT) treatment currently recommended for 52% of new patients. Although radiation oncology has caused a drop in mortality for several cancers, the need remains to reduce side effects such as incontinence or dysphagia. The solution lies in 'first-time-right' treatment in which the right dose is given to the tumour while keeping the dose to healthy tissue as low as possible to prevent side effects.**

The ITEA project STARLIT - a follow-up to the award-winning ITEA project SoRTS - gathered 14 partners from Austria, Canada, the Netherlands and Sweden and developed technology to improve treatment accuracy and minimise the unintended dose in image-guided radiation therapy. A focus area for both projects was to improve the real-time connections within a system of systems called Elekta Unity, comprising a Philips MRI scanner for imaging and an Elekta linear accelerator for radiotherapy. STARLIT improves the results of SoRTS by reducing the latencies even more, allowing tumour movement to be followed with the treatment beam. In addition, during therapy, the delivered dose is continuously evaluated. First and foremost, this improves quality of life for cancer patients by reducing unintended side effects; it also provides greater efficiency in healthcare as a whole thanks to the reduced number of fractions.

## Real-time adaption of cancer treatment

STARLIT has improved Elekta Unity's software to speed up imaging, thereby allowing a number of intervention and monitoring processes to be carried out in real time. The STARLIT system is integrated with low-latency connections, causing minimal delay in the processing of computer data, and a feedback loop, allowing for real-time adaption of treatment based on separate monitoring processes. These verify that the delivered dose and the position of the tumour are correct.

The project's main focus was technical feasibility, which resulted in several very successful outcomes. Before the project, for example, low-latency motion detection for tracking was clinically unpracticable or suffered delays of over 500 ms, whereas STARLIT has created a prototype with delays of just 200 ms. High-resolution imaging has also seen an enormous boost: an echo time reduction from over 100 ms to 70 ms,


a 20-30% increase in signal-to-noise ratio (this ratio compares the level of a desired signal to the level of background noise) and a decrease in distortion from more than 10 mm to less than 1 mm. Thanks to these strong technical improvements, physicians can benefit from higher confidence and control of treatment delivery and potentially reduce margins while the patient, as a result of margin reductions, can potentially benefit from a risk reduction of side effects or tumour control in case the maximum dose is limited by the adjacent organs at risk, thus improving the overall safety of the treatment.

## Personal treatment

Unfortunately, the project leader himself needed radiotherapy during the last year of the project. The traditional process would have involved 20 treatments over four weeks. However, the MR-LINAC treatment, based on the SoRTS project results, offered a treatment of five sessions over 20 days. This reduced the burden of travelling to the hospital substantially and the side effects, like fatigue, were also much less significant. As less tissue is damaged, the recovery time in general is also much shorter. In fact, he was even able to work about half of the time during these 20 days instead of being out of work for four weeks. Additionally, possible discomfort, like being partially out of action for a few months, did not occur with the MR-LINAC treatment.

As a result of the STARLIT project, the number of treatments will be reduced even further and so too will the side effects and burden for patients in the future. And in addition to the clear benefits that the MR-LINAC treatment offers patients, there is also a strong benefit for hospitals. As fewer treatments are needed per patient, they can treat many more patients in the same amount of time. In the above-mentioned situation, for example, four patients can be treated instead of one in approximately the same timeslot.

## Treatment of pancreatic cancer

In December 2022, a milestone was reached in radiation therapy as the first patients completed their full course of radiation therapy treatment with Elekta Unity using Comprehensive Motion Management (CMM) with True Tracking and automatic gating functionalities. A patient with pancreatic cancer was treated at University Medical Center Utrecht using Unity's CMM developments. This first ever treatment delivery using CMM went smoothly and did not increase the total treatment time per fraction. The beam was automatically turned on when the patient was in the exhale phase of breathing, so they were not required to hold their breath for extended periods. Based on initial results, there is great potential in using Unity's CMM functionality to treat abdominal cancers, lung tumours, prostate tumours – wherever there is motion, regardless of the cause.[1]

## Strong complementarity

STARLIT's commercial side has also seen great successes, helping to position Europe for dominance in the MR-guided RT market. The projected annual top-line revenues for the consortium are over USD 650 million after 2020. Real-time tracking is a fundamental step towards a 10% annual growth rate for this market as a whole, while the brachy market may also grow by 20%.

As for Elekta, updates have been done to the already successful Unity. A user

**Project start**
October 2017

**Project end**
September 2020

**Project leader**
Frank van der Linden
Philips, the Netherlands

**More information**
https://itea4.org/project/starlit.html

group also exists for Unity, meeting one or two times a year to discuss improvements. This allows potential users, such as hospitals, to first test the system before buying it. Over 80 orders have already been placed in more than 25 countries.

In addition, Philips had sold roughly 10,000 Compressed SENSE software licences by Q4 2022, which have been used in nearly 25 million examinations.

The STARLIT partners show a real complementarity in their collaboration, in which the involved SMEs have a unique role as the creators of additional products that improve STARLIT's efficiency. For example, IT-V Medizintechnik from Austria created the Head & NeckSTEP M and the HeadSTEP MRL PushPIN, respectively the only head and neck positioning devices for iCAST and PushPIN masks officially certified for use with Elekta Unity. So far, a couple of devices have been sent for testing and demonstration and some of them have already been sold. IT-V expects a strong increase in sales numbers in the next years.

Tesla Dynamic Coils (TDC) from the Netherlands developed a head-and-neck (H&N) coil for the Elekta Unity system. The outcome was a radiolucent flexible coil that demonstrated a threefold increase in signal-to-noise ratio (SNR, the quality indicator of MR images) compared to the traditional coil in the Elekta Unity and was also compatible with other Philips 1.5T systems, such as the PET MR and MR SIM. This breakthrough in technology inspired TDC to create multiple other coils with increased SNR that create a better fit due to the flexibility of the coil and, at the same time, reiiiduce the likelihood of claustrophobia for patients. Thanks to participation in the project, TDC was able to address a new market for flexible and wearable coils which increase the comfort for the patient, especially children. They were able to hire an engineer who specialises in flexible coils and are maturing the technology to TRL 8. Overall, the STARLIT consortium played a crucial role in driving TDC's progress forward.

Modus QA from Canada contributed to quality assurance during project testing with the Quasar MRI$^{4D}$ Motion Phantom, which is the world's first MR-safe programmable motion phantom. The 4D motion phantom has a patented deformable tumour target, reduces measurement latency from over 50 ms to roughly 500 µs and improves target position precision from 1 mm to 0.25 mm. Modus QA has continued to develop the deformable tumour target with the goal of better addressing evolving market requirements. The product development process is nearing completion and Modus QA expects 4D MRI gating to be available on all MR-LINACS in the future.

Quantib from the Netherlands developed and improved upon their Visual Scoring Tool. By performing image quality assessments using the Visual Scoring Tool, image tuning parameters can be optimised, including image acquisition parameters between different imaging techniques. This tool has played an important role in image quality assessment for Quantib's current line of products, including those for brain and prostate MRI. Using the tool, sub-optimal medical images, e.g. due to acquisition artifacts or obtained using poor imaging parameters, could be easily identified. By excluding these cases, Quantib ensured that only the highest quality images were used to develop novel algorithms, thereby improving algorithm performance. In addition to generating 19 full-time positions within the consortium, STARLIT has led to eight Master theses, one PhD thesis and four new courses at Utrecht University. Combined with the 51 publications so far, the ongoing standardisation work of Philips and Elekta and the development of a 4D deformable QA/QC phantom platform by Modus QA, this will drive adoption of the project results to the benefit of patients across the globe.

## Improved quality of life for patients

Promising uptake paves the way for STARLIT's most important result: improved quality of life for patients, who currently go through the radiation procedure up to 20 times. Higher doses with greater accuracy could reduce this to two or three times – perhaps even just once. This means less travel to hospital and potentially fewer side effects. Philips plans to extend its image-guidance MRI technology to other treatments, such as cardiac catheter intervention, oncological ablations and neuromodulation, cascading STARLIT's technology throughout the healthcare system.

[1] Source: https://ir.elekta.com/investors/press-releases/2022/first-ever-patient-treated-for-pancreatic-cancer-with-new-advanced-radiotherapy-motion-management-using-elekta-unity-mr-linac/

# Eureka Clusters Sustainability Call 2022 projects

## Innovations making industry more sustainable and greener

In 2022, the Eureka network together with the Clusters launched the Eureka Clusters Sustainability Call 2022. The Call was jointly implemented between the Eureka Clusters CELTIC-NEXT, EUROGIA, ITEA, SMART and Xecs, and the Eureka Public Authorities of Austria, Belgium, Canada, Denmark, Finland, Hungary, Ireland, Luxembourg, Portugal, Singapore, South Africa, South Korea, Spain, Sweden, Türkiye and the United Kingdom.

At the deadline 15 project proposals were received, ultimately resulting in 11 labelled projects involving 482 PY and 68 partners from 14 countries. The most represented countries are Türkiye (nine projects), Portugal (six projects) and Belgium (four projects). ITEA is the primary Cluster for four projects and a secondary Cluster for four additional ones. With a representation of 65% of the total effort, SMEs are the main contributors to this Call. Large industry covers 16% of the effort, followed by universities with 11%.

The projects of the Sustainability Call 2022 cover many themes:

| Theme | Eureka Clusters Sustainability Call 2022 projects |
|---|---|
| Circular economy | AgAPP-e, NRPCES, RETAILL |
| Sustainable logistics and supply chain management | ReSource2Tab, RETAILL |
| Green ICT | DefectFree, iDT4GDC |
| Sustainable manufacturing | DefectFree, SMCMSSPPA |
| Renewable energy | ONE, Valkyrie |
| Distributed intelligence and low data transmission | RETAILL |
| Earth, Ocean, Space observation systems and exploitation | UAV-GG |
| Power electronics and management | ONE |
| Other | SmartAgroInsurance |

We invite you to discover the innovative solutions related to ITEA. The first four projects have indicated ITEA as their main Cluster and the last four have indicated ITEA as a secondary Cluster:

## AgAPP-e

SUS2022-020

Agriculture's digital Analyser of Production for Phosphorus efficiency

Project leader: Experteam (Türkiye)

For improved production and environmental protection, fertiliser management needs to be local or site-specific; depending on the regional metabolism, agricultural efficiency can be increased even fourfold if the flows and stocks are well-observed. Digital solutions will greatly improve the management of such essential resources, but these are currently missing, leaving the farmer without simple tools capable of providing targeted diagnoses for targeted treatments. AgAPP-e aims to automate fertiliser recommendations and thereby improve accuracy and increase the phosphorus efficiencies of a nation.

https://itea4.org/project/agapp-e.html

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## RETAILL

SUS2022-071

REtail using Technology based on Artificial InteLLigence

Project leader: Polytechnic Institute of Porto (Portugal)

Food waste is one of the main problems in the current food supply chain. According to the UN Sustainable Development Goals, food losses along production and supply chains must be halved by 2030. In view of this, RETAILL aims to develop an IoT and AI-powered platform that will be adaptable to most countries' food supply chains. This system will improve the food lifecycle, ensure that food waste is valued and make logistics more efficient, thereby reducing the use of resources and increasing the profits of all actors in the value chain.

https://itea4.org/project/retaill.html

# SmartAgroInsurance SUS2022-036

Agro Insurance Data Management Platform with API Services

Project leader: SFS Danışmanlık Bilgi İşlem San. ve Dış Tic. A.Ş (Türkiye)

Agricultural insurance is a global, fast-growing billion-dollar industry and, due to the effects of climate change, it is becoming more important every day. Effective insurance policies stabilise farm income, reduce poverty and ensure a climate safety net for food producers. SmartAgroInsurance aims to develop a Smart Agriculture Insurance Data Management Platform to provide, analyse and integrate agricultural data from different sources with insurance industry know-how so that insurance companies can achieve better premium calculations, claim automation and fraud prevention and provide supportive, damage-preventing advice to the farmer.

https://itea4.org/project/smartagroinsurance.html

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# iDT4GDC SUS2022-042

Intelligent Digital Twin Platform for Climate-Neutral Data Centres

Project leader: Red Dot Analytics Pte Ltd (Singapore)

Data centres are estimated to consume approximately 1% of global electricity use and contribute to 0.3% of all global $CO_2$ emissions. Climate-neutral data centres have therefore become an important challenge. iDT4GDC aims to develop Artificial Intelligence and Digital Twin technologies into a cloud AI platform to digitalise, optimise and automate data centre operations for sustainability purposes. iDT4GDC will guide data centre operations and management towards a sustainable future along the five pillars of power, carbon, water, circular economy and governance.

https://itea4.org/project/idt4gdc.html

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# DefectFree SUS2022-048

Machine learning and artificial vision for 0% waste in textile production

Project leader: Smartex (Portugal)

With the aim of reducing defective textiles to close to 0%, this proposal intends to develop a new system based on artificial intelligence and machine vision that, when installed in circular knitting machines, can detect defects in complex fabrics at the time that they are produced. The economic and environmental benefits of this proposal are evident given that the textile industry is one of the biggest in the world but, at the same time, one of the most polluting.

Primary Cluster: SMART

# Resource2Tap

SUS2022-066

Integrated Resource Management Platform for Water Distribution System

Project leader: Reengen (Türkiye)

An integrated monitoring system will be developed to prevent water losses and indirect energy losses in urban water distribution systems and to optimise the energy consumption of the distribution system. The water leakage prevention system will offer hardware and software solutions to be developed for the detection of technical losses in the water distribution network and an end-to-end monitoring system. Resource2Tap will develop a product with high commercialisation potential that will prevent technical losses with an IoT-based endpoint monitoring system and conventional neural network-based data analysis software.

Primary Cluster: EUROGIA

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# SMCMSSPPA

SUS2022-031

Saw Machine that Can Make Smart and Sustainable Production with Prediction Algorithms

Project leader: Beka-Mak Makina Sanayi ve Ticaret A.Ş. (Türkiye)

Sawing machines, used to bring raw material to the desired dimensions in industrial production companies, are of great importance since they are at the beginning of the production line and have a great effect on production efficiency. In this framework, the aim is to manufacture sawing machines with smart and sustainable production techniques which automatically optimise the cutting parameters (cutting speed, surface quality, etc.) with the data to be collected from the field and provide error and lifecycle estimation for machine equipment.

Primary Cluster: SMART

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# UAV-GG

SUS2022-0072

Monitoring Greenhouse Gases with Long-Range Unmanned Aerial Vehicles and Novel Spectroscopic Sensors

Project leader: Romaeris Corporation (Canada)

The project will use novel, long-range, large payload Unmanned Aerial Vehicles (UAVs) to carry innovative spectroscopic sensors to monitor multiple greenhouse gases (GHGs) over large geographic areas, locate emissions sources, take action and vastly improve our understanding of GHG emissions. A data portal will be created to make such GHG information available to governments and industry worldwide and the data will be made compatible with other sources of information, such as satellites, so that comprehensive and accurate GHG reporting is possible at last.

Primary Cluster: EUROGIA

# Dedicated ITEA session at Sweden Innovation Days


### Enabling innovation that makes a difference

Sweden Innovation Days is a free 3-day, global digital event, dedicated to fostering international collaboration. Taking place on 21-23 March, 2023, this is the third time this event brings together innovation actors from around the world to share best practices, knowledge and foster partnerships with clear and actionable missions to create a more sustainable world.
This year, Sweden Innovation Days will focus on how we can enable innovation that has a positive environmental, economic and societal impact.

### Dedicated session organised by Vinnova and ITEA

On day 3 of the Sweden Innovation Days, Vinnova and ITEA will organise a dedicated session about funding opportunities for international research projects on software innovation and digital transition This online session will take place on Thursday 23 March from 10.00 - 11.00 CET and is meant for Swedish companies that are looking for international partnerships/consortia and non-Swedish organisations that are looking for Swedish partners to develop or strengthen their ideas on software innovation.

The session is illustrated by best practice cases of participation in ITEA projects, presented by an international large industry collaborating with Swedish partners and a Swedish SME that benefitted from collaborating with international partners in an ITEA project. Furthermore, Vinnova and ITEA will be explained by Susanne Liljeblad from Vinnova and ITEA Chairwoman Zeynep Sarilar in an interactive setting, which will provide sufficient room for Q&A.

### Join us!

This session provides a great opportunity to discover more about ITEA and learn from experienced project partners. So if you are interested in joining in one of our future Calls for project proposals and collaborate with Swedish partners, register for free. We hope to see you there!

**https://swedeninnovationdays.se/**

# ITEA present at the International B2B Software Days


On 8 and 9 May the International B2B Software Days will take place in Vienna, Austria. ITEA will participate with a dedicated open session during which attendees will be able to learn more about Eureka, the Austrian conditions for participating in ITEA, the benefits of participating and why it is good to include Austrian partners in your (future) ITEA consortia. The event will also host a small exhibition where ITEA will have a booth and we will be active in the B2B session to provide 1:1 information.

### Virtual Day - 10 May

This year, the event will be extended with a virtual B2B Software Day, which will take place on 10 May. During this day, ITEA will give an introduction to ITEA's Innovation Challenges and provide pitching opportunities. This will offer a great opportunity to jumpstart your preparations and create some first partnerships for the ITEA Call 2023 for project proposals or to look for additional partners for your ITEA Call 2022 project.

### Information

More information and registration can be found at the event webpage. The first 100 onsite participants can register for a reduced participant fee of 100 euros. A regular ticket for the onsite participation on 8 and 9 May 2023 is 180 euros. So register now and join us!

**https://2023.b2bsoftwaredays.com/**

# Saving time in the clinical workflow thanks to AI

Deep learning is currently revolutionising many research fields and can be used in health care to save a substantial amount of time in the clinical workflows. One example is radiotherapy treatment planning which requires 1) segmentation of the tumour to be killed by radiation, 2) segmentation of risk organs which should receive as little radiation as possible, and 3) generation of an optimal treatment plan from these segmentations. Deep learning can be used to save time, e.g. 10 – 60 minutes, in each of these steps. However, large, annotated datasets are required to train the complex AI models which usually contain millions of parameters.


In medical imaging, sharing sensitive data between hospitals is difficult due to ethics and regulations like GDPR. In addition, the number of patients with a rare disease in a specific city may be low. One way to enable large datasets in medical imaging is to train the AI models using federated learning, where the data stays at each hospital. In federated learning a powerful computer at each hospital uses the local image data to train the AI model (such as a segmentation network), and the computer at each hospital sends the updated local AI model to a combiner. The combiner aggregates the updates from each hospital and sends out a new global AI model to all hospitals from which the training continues.

In the ASSIST project, several partners in Sweden, the Netherlands and Belgium collaborated to train a brain tumour segmentation network using Swedish SME Scaleout's FEDn framework for federated learning. The combiner was located in Uppsala, Sweden. Each partner used a unique part of an open dataset (BraTS) containing brain tumour images and annotations of each tumour. Future plans include improving the aggregation function, as well as using local radiotherapy treatment planning data from different cities.

**More information**
https://itea4.org/project/assist.html

# Calendar

**21-23 MAR 2023**
**Sweden Innovation Days**
Online event
https://swedeninnovationdays.se/

**16-20 APR 2023**
**16th IEEE International Conference on Software Testing, Verification and Validation**
Dublin, Ireland
https://conf.researchr.org/home/icst-2023

**17-21 APR 2023**
**Hannover Messe 2023**
Hannover, Germany
https://www.hannovermesse.de/en

**19-20 APR 2023**
**World Summit AI Americas 2023**
Online event / Montréal, Canada
https://americas.worldsummit.ai/

**8-10 MAY 2023**
**B2B Software Days 2023**
Vienna, Austria
https://2023.b2bsoftwaredays.com/

**24-25 MAY 2023**
**Intelligent Health UK 2023**
London, UK
https://london.intelligenthealth.ai/

**31 MAY-1 JUNE 2023**
**Forum Teratec 2023**
Paris, France
https://www.forumteratec.com/en

SAVE THE DATE

12-13 September 2023

**ITEA PO Days 2023**

Berlin, Germany

SME in the Spotlight

# The REUSE Company

## Constant evolution in systems engineering

**The REUSE Company, founded in 1999, envisions knowledge reuse which is fully integrated into a system's entire lifecycle from inception to retirement. This is a vision which has evolved alongside this Spanish SME, from its roots as a spin-off of Carlos III University of Madrid to its participation in the ITEA projects ReVaMP2 and EMBrACE. Professor Juan Llorens, Chief Technology Officer at REUSE, looks back on the journey so far.**

### Commonly changing

"In the 1980s, software reuse was very, very hot. Everybody wanted to do reuse but the main technologies were and are, even today, about pre-defining what is common in advance," begins Juan. "That's nice if what you define as common remains common down the years but, in the software world, this is not the case. People are crazy about changing things: functionality, programming languages, computers, new processors. So, what happened at the beginning of the 1990's was that all the effort that you used to find the commonality of something was out of date when you were interested in reusing it and you lost money because you invested more than you got out."

This issue was the spark that created the REUSE Company, which initially sought to provide commonalities without the need for investment via a search engine-like repository of software products, model requirements and test cases. "If you want to find a requirement which is similar to another, you cannot use standard Google technologies (or similar) because Google is too weak in semantics. So, in order to get into semantics, we created the first ontologies," Juan explains. These definitions of categories, properties and relationships between concepts, data and entities allow REUSE to connect, for instance, the models and requirements of different kinds of aircrafts in a consistent manner.

### Crucial, essential, unavoidable

By 2010, REUSE had come to view its niche not as classical software engineering but as systems engineering, which has exploded in the last 20 years as companies search for processes to improve their systems. Juan: "We are in the market with the unique idea of improving systems engineering based on semantic capabilities and artificial intelligence. For us, innovation is crucial, essential and unavoidable. Why? Because the established systems engineering industry is huge and we are an SME which wants to join these markets. We must ensure that our unicity works as a commercial approach because otherwise we will not be in the market long."

As examples of such innovation, he points to the digital thread and digital twin. In the former, companies attempt to digitalise their system lifecycles from conception to dismantlement – a timeframe which typically lasts 40 to 60 years. Taking the example of aircraft, initial plans may have been blueprints and, via the digital thread, REUSE can digitalise these and connect them with the modern system to trace back possible issues in the design and prevent future problems. With digital twin, on the other hand, a virtual version of the aircraft system is created to enable testing and tweaks prior to production – but this is impossible unless every aspect of the process is digitalised, no matter how small. By offering processes, methods, tools and services for system, software and knowledge reuse within any organisation, REUSE is helping to make these future trends a reality.

## A unique set-up

"There are two ways to do such innovation," continues Juan. "The first one is that we do innovation alone. That's it. The second one is that we do innovation together with someone else that can help us to fund this innovation. In the beginning, we did the innovation ourselves because we were a little bit afraid and wanted to protect ourselves from the big boys. But once our products stabilised, we started to receive invitations from customers or companies that were active in ITEA."

So far, this has resulted in participation in two projects: ReVaMP2, which developed the first comprehensive automation toolchain and associated executable process to support round-trip engineering, and EMBrACE, which provides an open environment for the co-design of cyber-physical systems based on a common requirements modelling language. REUSE's ability to play a key role in these projects alongside much larger companies lies partially in its unique set-up: all R&D has been maintained at the university, providing a strong link between fundamental research and real-world problems. "Whatever project we do, we do together," notes Juan. "The benefit of putting these two teams together is huge because a clear focus is presented by the company and the research is done professionally by the university."

## The golden rule

In addition to the ITEA programme, REUSE has been involved in projects from other European initiatives such as Horizon 2020, national projects in Spain and regional projects in Madrid. The main benefits, as Juan highlights, are commercial prospects and the capacity to actively demonstrate one's own developments as an SME. As a company that sells software technology for lifecycle digitalisation, REUSE's growth prospects are enormous compared to companies requiring factory space, for instance, and such evolution will be the company's primary drive in future projects for ITEA and beyond.
"When we receive ITEA invitations, we have an unbreakable rule: we never go into projects that are not crucial to our roadmap. And if it is 10 degrees outside of the roadmap, we can negotiate with the leaders to shift a little in our direction. This mainly means that we only join projects when we can put them on the market almost at the same time as they finish. We have just finished EMBrACE and everything that we did there is already sellable. So, what's the role for ITEA? It helps us to create this virtuous circle," Juan concludes. "What we are going to do in a project is something that we already wanted to do, but now we can get some help."

## More information

https://www.reusecompany.com/

# Türkiye takes over the Chairmanship of Eureka 2023/2024


Türkiye will take over the Chairmanship of the Eureka Network from July 2023. The term will end in July 2024.

Türkiye's candidacy for the Chairmanship of Eureka was unanimously approved at the High Level Group Meeting held in Belgium, with the support of all members. Türkiye follows Portugal that held the Eureka Chairmanship from 1st July 2021 – 31st December 2022.

Actively operating in Eureka since its establishment, Türkiye previously held the Chairmanship of Eureka for two terms, in 1998-1999 and 2012-2013.

The Turkish Chairmanship will be carried out under the coordination of TÜBİTAK (The Scientific and Technological Research Council of Türkiye). In this context, in November 2023, March 2024 and June 2024, three big meetings will be hosted by TÜBİTAK and the Global Innovation Summit will be held with the participation of companies from Eureka member countries.

**More information**
https://www.tubitak.gov.tr/
https://eureka.org.tr/

# Eureka Clusters Call dates

| | | | |
|---|---|---|---|
| smart advanced manufacturing | 3 May 2023 | Submission deadline FPP - SMART Call 6 | https://www.smarteureka.com/ |
| CELTIC-NEXT | 24 May 2023 | Submission deadline for the CELTIC-NEXT Spring Call | https://www.celticnext.eu/ |
| Xecs | 25 May 2022 | Submission deadline FPP - Xecs Call 2 | https://eureka-xecs.com/ |

# Colophon

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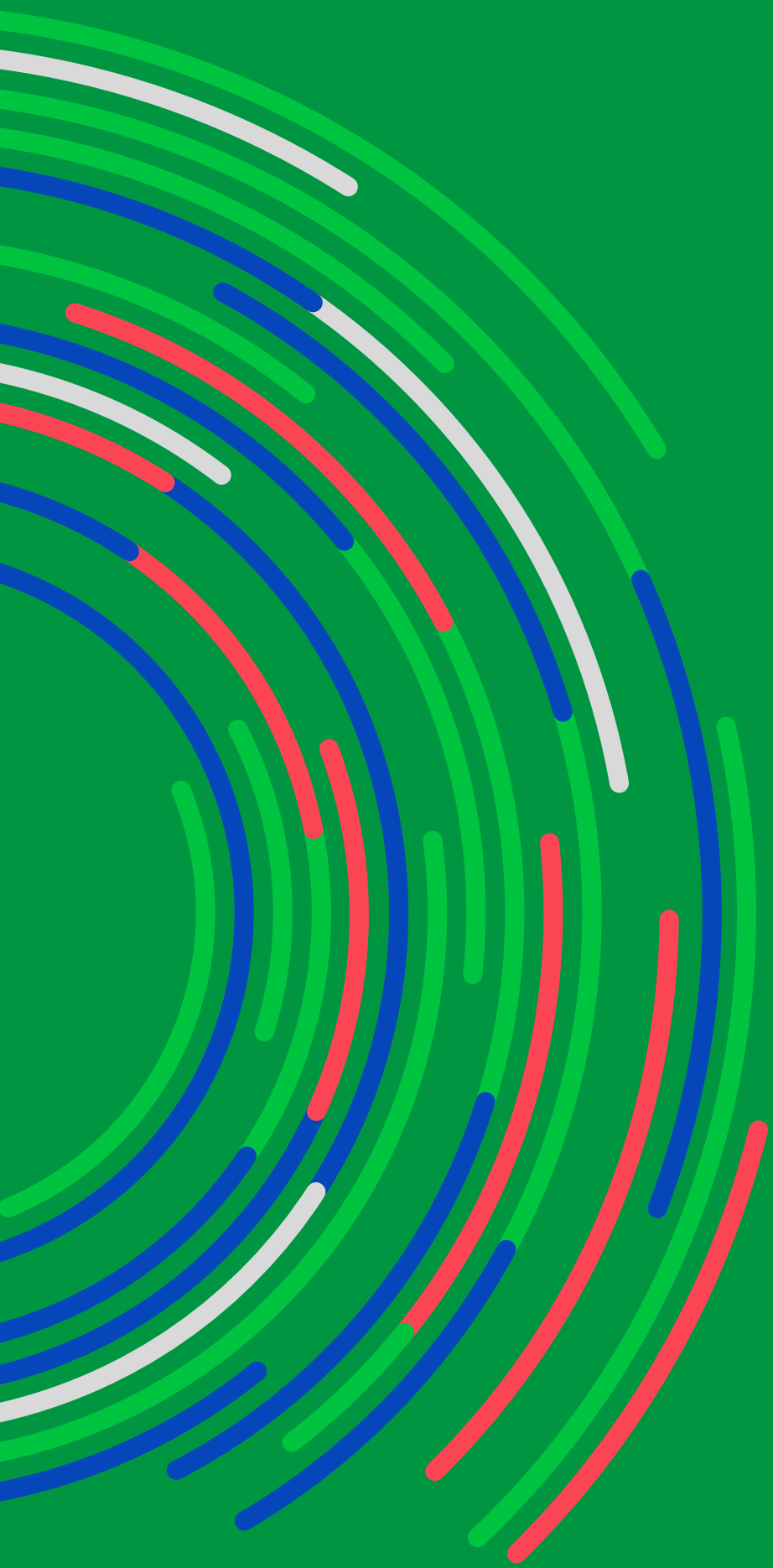
**Submissions:**
The ITEA Office is interested in receiving news or events linked to the ITEA programme, its projects or in general: R&D in the software innovation and Digital Transition domain.
Please submit your information to communications@itea4.org.

**Subscription:**
communications@itea4.org



25 years ITEA 4 1998–2023



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