

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

#### Impactful innovation

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

#### More information

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

# Siemens Industry Software NV

## Innovation is a collaborative art

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

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





### Mission-critical performance solutions

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

### Unique value proposition

“The power of Simcenter is in both the excellence of its individual components and in the synergies that can be achieved by combining them. The included physical testing, multi-disciplinary computer-aided engineering (CAE) and computational fluid dynamics (CFD), as well as the powerful multi-physics system simulation solutions are long-standing industry-

leading applications. Simcenter merges those elements with robust design exploration and data analytics, which are managed in a product lifecycle management (PLM) context, powered by Teamcenter™ software. The alignment of all these applications helps engineers to be much more effective during development, for example by enabling constant interaction between test and simulation, facilitating multi-physics modelling, including controls, or by allowing the application of operational data at any time. And the close collaboration with Teamcenter connects product ideation and product use, paving the pathway for the holistic digital twin,” explain the researchers. “On top of that, the parent company Siemens is a manufacturer of many interesting components and machinery as well. Having all this combined expertise in one house, is a unique added value for our customers.”

Many automotive examples demonstrate the strength of SISW and Simcenter. Think of multi-body simulation models that can run in real time and can be connected to a driver simulation. Other examples are generative engineering, where engineers can explore and generate different powertrain architectures for hybrid and electric vehicles; or capabilities for simulating

hybrid and electric vehicle noise. “Automotive companies have R&D teams working on design, modelling and optimisation of next-generation vehicles, so they need the right tools to do this efficiently. We offer them user-friendly software tools, helping them to deal with ever-shorter design and production cycles.”

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

### R&D landscape

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



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

with an industry focus. This helps to advance the State-of-the-Art, both in technology and in methods used in the industry.”

#### **Innovation is crucial**

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

#### **The REFLEXION project**

The drive for innovation is obviously also fed by the eagerness to gather knowledge. The researchers explain: “In SISW we have test and simulation, but we are still missing machine-learning in our portfolio. We saw the high potential of this technology already some years

ago, so it was added to our research roadmap. For this purpose, we targeted new research opportunities outside our regular scope, such as in the services industry, where operational data is acquired during the actual usage of the end product. This led us to the ITEA REFLEXION project, for example.” REFLEXION is an acronym for ‘React to Effects Fast by Learning, Evaluation, and eXtracted InformatiON’. It aimed at helping high-tech systems companies to use operational data to improve the development lifecycles, maintenance and troubleshooting of products. In this project, open source frameworks provided the platform to develop self-learning and data-analysing systems that can accumulate useful knowledge during a product’s lifetime.

#### **Paying dividends**

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

#### **Mastering the art**

The ITEA project review process was a real plus in this project, agree all three SISW researchers. “It kept our focus right and probably led us to better project outcomes than without such reviews. The project was interesting, because even though the partners came from different fields, we all shared common challenges we wanted to address. But also the variety of

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projects within ITEA is appealing – ranging from small, rather intimate and focused projects like REFLEXION, to much more wide-ranging projects involving many partners in diverse countries that can allow to work towards new standards. We are looking forward to taking part in such a wide-ranging project, EMBRACE, in the next round of ITEA Calls. We can learn so much from each other, gain experiences also from other domains in open innovation. The ITEA project environment makes it easy to talk and swap ideas. You could say that ITEA is a master of the art of collaborative innovation.”

#### **More information**

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