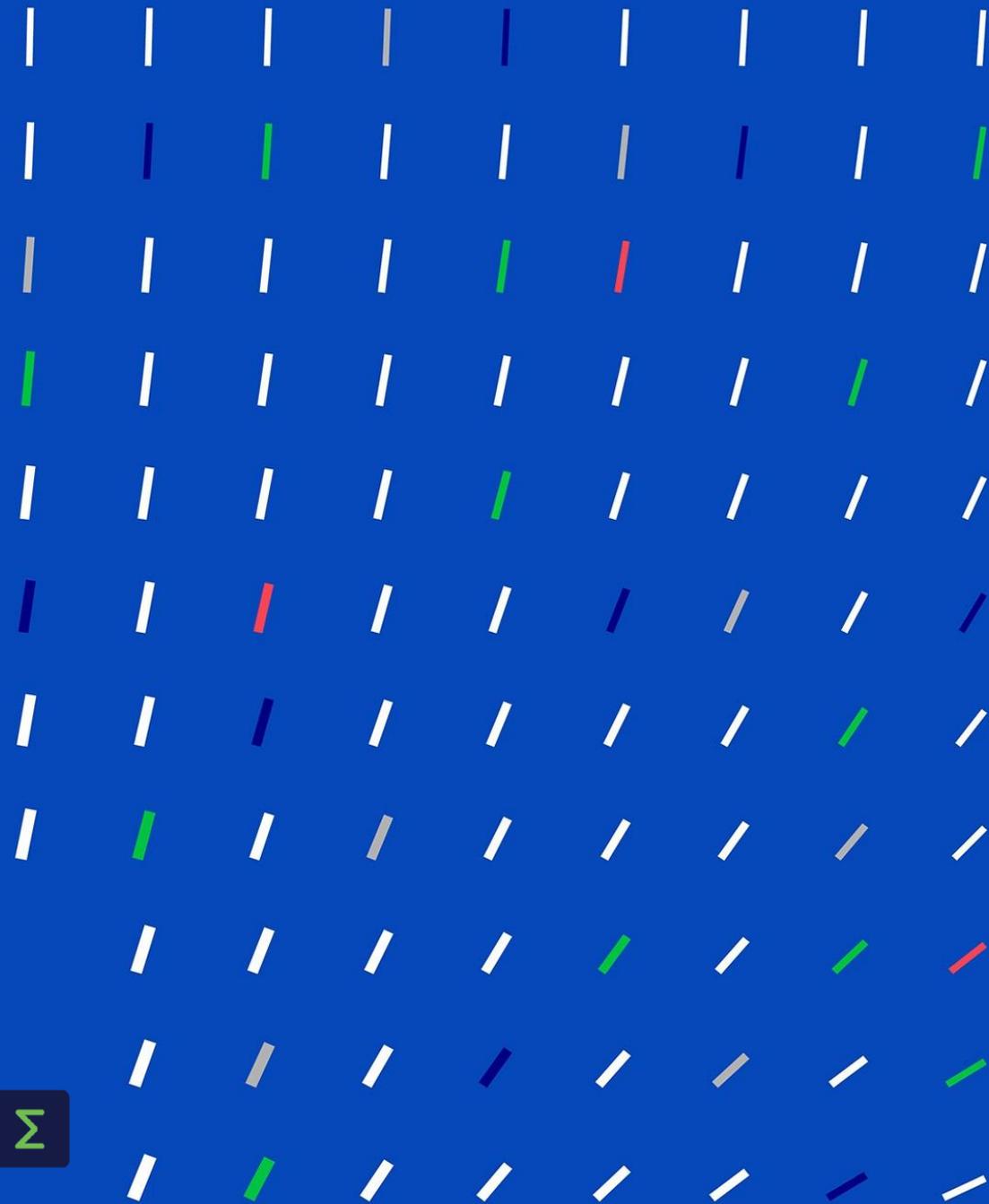


# ITEA Award of Excellence winners with Swedish participation

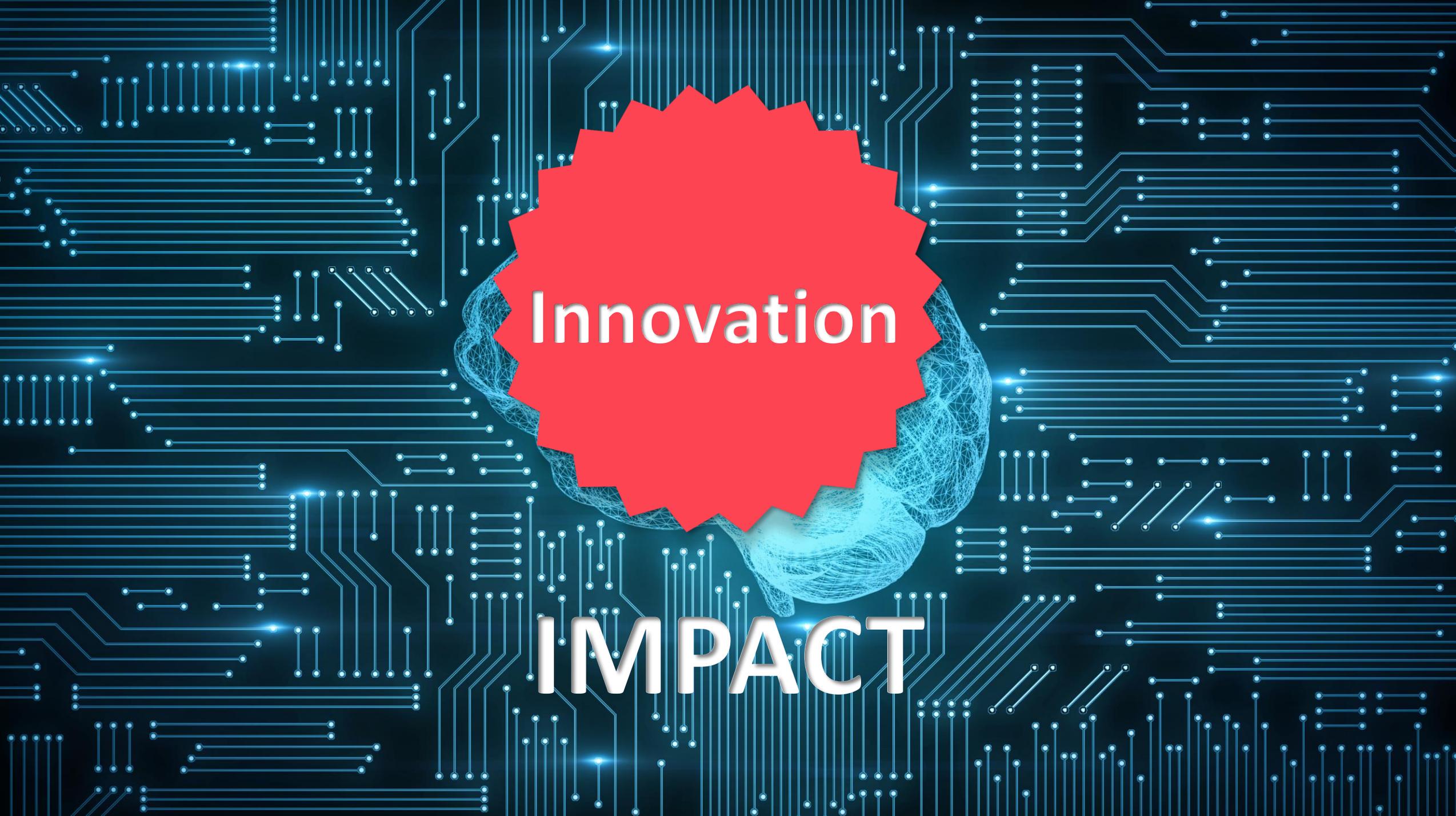


Status December 2022



ITEA 4 is the Eureka Cluster on software innovation





**Innovation**

**IMPACT**

# IMPACT

## Healthcare made more efficient, accurate and cost-effective

Winner ITEA  
Award of  
Excellence  
'Innovation'  
2022

Healthcare faces many challenges including improving personalised patient treatment and working more cost effectively, while the demand is growing, staff capacity is declining, and new clinical and technological developments succeed each other quickly.

IMPACT centered around data intelligence as a solution to the combination of personalisation and multidisciplinary work. The team focused on the question which automations and improvements can benefit the individual patient and the medical team surrounding them, in clinical uses cases on cardiac treatment, liver oncology and brain oncology.

### Start date – End date

Oct 2018 - Sep 2021

### Website

<https://itea4.org/project/impact.html>

<http://www.impact-itea-project.eu>



# IMPACT

## Examples of impact highlights

- Data analysis for clinical business intelligence has been accelerated, reducing the time needed for data analysis to less than five minutes, which is a tremendous improvement compared to the days or weeks it previously took to retrieve and manually combine data.
- The outlining of tumour tissue during surgical planning has been improved, allowing the margin for tumour excision to be reduced by 20% so that less healthy tissue is removed.
- HEARTguide has reduced procedure time by 30%, meaning the use of 25% less x-ray contrast agent and 14% less radiation exposure for patients.



# Standardisation

6550	4321.1
178 56.524	4321.1
555 44.221	4321.1
34 5878	4321.1
2244 55.62	4321.1
00.12 42145	4321.1
8877 4244.7	4321.1
5512 7772	4321.1
4992 82.221	4321.1
666.6 2.4	4321.1
0202 0555	4321.1
9090 2.4	4321.1
2450 1.22451	4321.1
00.2 66241	4321.1
8524	4321.1
145 56.524	4321.1
555 44.221	4321.1
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9090 2.4	4321.1
2450 1.22451	4321.1
00.2 66241	4321.1



# PANORAMA

2500 5000 10000 12500 15000 17500 20000

# PANORAMA

## Supporting the shift to open source

In the automotive domain, many similar control units are used, but different organisations often use heterogeneous functional domains, hardware and teams. This complicates collaboration, while this is very important as many stakeholders are involved.

PANORAMA has created an open-source meta-model and framework that promotes collaboration on software and hardware development using heterogeneous tools and practices and without losing control of one's own data.

### Start date – End date

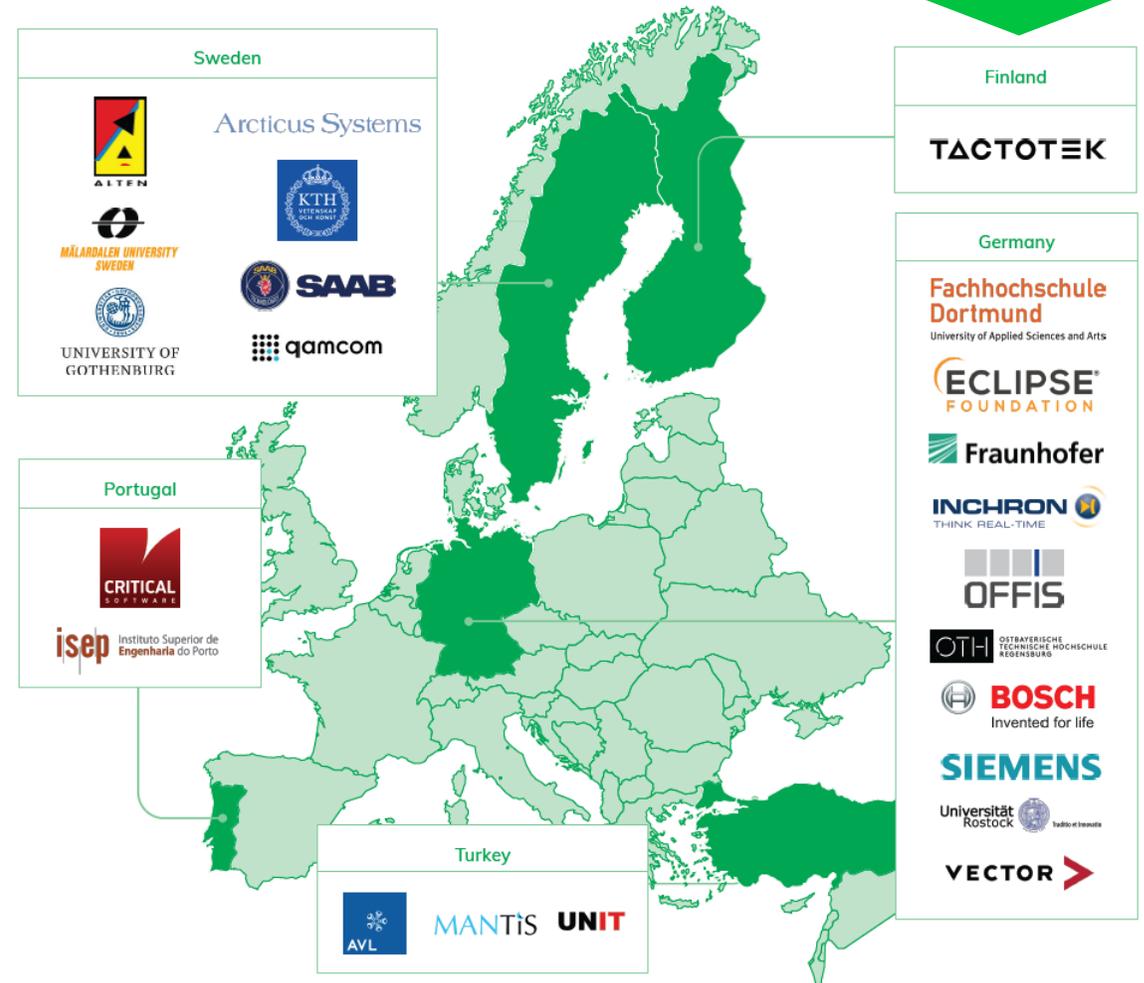
Apr 2019 - Sep 2022

### Website

<https://itea4.org/project/panorama.html>

<https://www.panorama-research.org/>

Winner ITEA  
Award of  
Excellence  
'Standardisation'  
2022



# PANORAMA

## Examples of impact highlights

- The project focused on open-source collaboration in a business-friendly ecosystem. This approach has resulted in the emergence of a global community: partners in Europe, Asia, Africa and the Americas are already making use of PANORAMA, including the huge automotive and avionics markets of Germany, China and the USA.
- Clear benefits can be seen in maintainability (time reduction from 57 to 12 days), reliability (A grade for code quality from the industry standard SonarQube) and efficiency (reduction of local set-up of the installation and integration of several tools from eight hours to 0.8 hours).

A futuristic highway with a glowing blue circuit board pattern on the ground. A car is driving on the highway, its body covered in binary code (0s and 1s). The scene is set against a white background with a clear sky. A red starburst shape is overlaid on the image, containing the text 'Special Vice-Chair Award'.

Special  
Vice-Chair  
Award

EMPHYSIS

# EMPHYSIS

## The missing link between digital simulation and embedded software

Winner ITEA  
Award of  
Excellence  
'Special VC'  
2021

EMPHYSIS delivered the new, global standard for smart industry, "eFMI standard" (embedded Functional Mock-up Interface), for digital model exchange among manufacturers.

It accelerates the development of embedded software, with a focus on automotive industry, thanks to which up to 90% gains can be made in productivity. Another successful outcome is the official approval of a new Modelica Association project to further develop, standardise and promote eFMI.

### Start date – End date

Sept 2017 - Feb 2021

### Website

<https://itea4.org/project/emphasis.html>

<https://emphasis.github.io/>



# EMPHYSIS

## Examples of impact highlights

- A 25% reduction in run-time performance was achieved and 25% greater memory consumption versus state-of-the-art manual code.
- In addition, FMU requires 9% less data memory.
- The knock-on benefit for productivity saw a reduction in development time for five use-cases, including by 93% for a PID controller, 92% for a drive train controller and 88% for a slider crank controller.
- eFMI's versatility was also demonstrated: the air system use-case required the same modelling time but saw a radical drop in embedded implementation and validation for a 52% overall increase in productivity.

A person in a grey suit is holding a black tablet. The background is a blurred industrial factory floor with various machines and equipment. A red starburst graphic is overlaid on the tablet.

Innovation

ENTOC

# ENTOC

## The next stage in virtual engineering and commissioning

Winner ITEA  
Award of  
Excellence  
'Innovation'  
2020

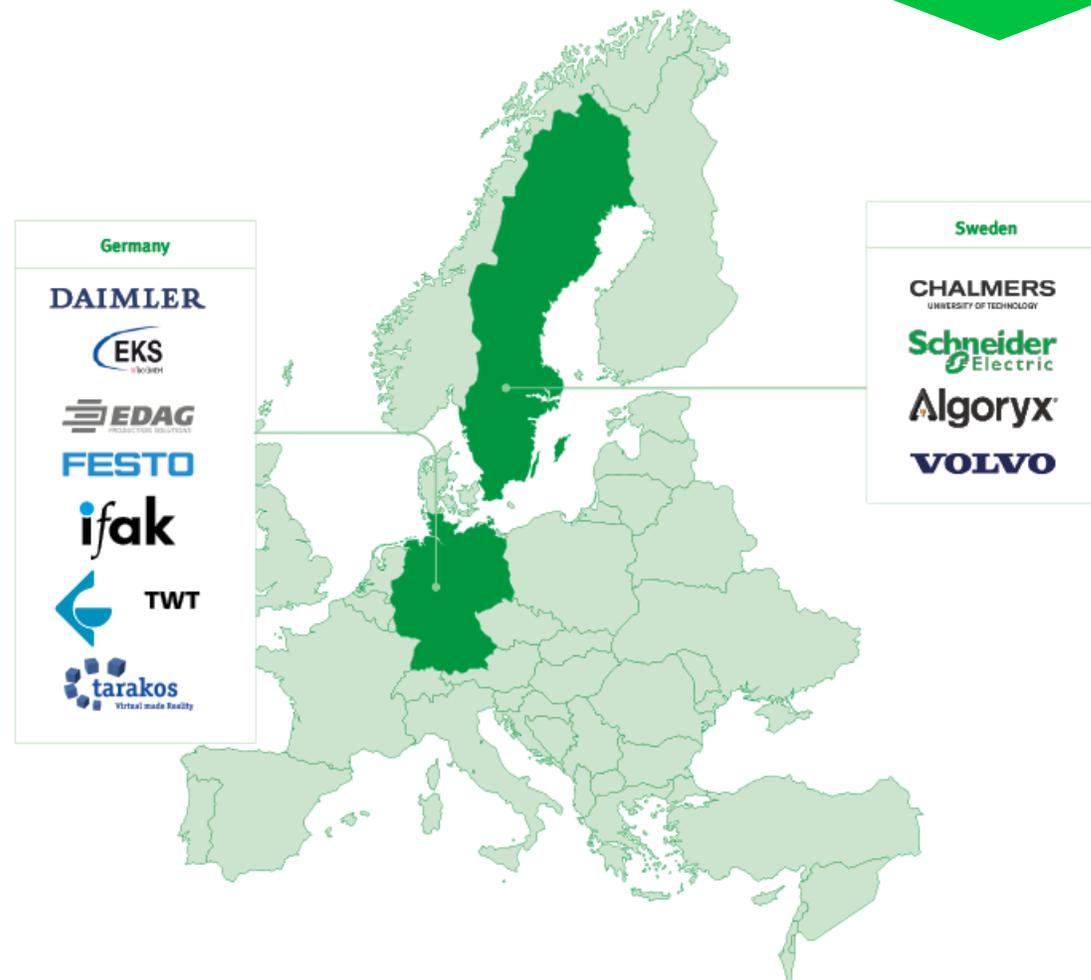
Engineering is the most time-consuming aspect of innovation and products are increasing in complexity. ENTOC minimises the time and effort involved in engineering without compromising on reliability or integrity, by formalising specification requirements for production equipment and establishing standardised mechatronic component models. One of ENTOC's primary innovations is the generation of a formalised specification of requirements that enables the automatic creation of proposals for car/truck manufacturing and machine building.

### Start date – End date

Sept 2016 - Aug 2019

### Website

<https://itea4.org/project/entoc.html>



# ENTOC

## Examples of impact highlights

- Standardised component behavioural descriptions and models can be easily exchanged between companies, reducing the need to re-engineer existing know-how and thus reducing overhead. Across all manufacturing domains, engineering process chain duration can thus be reduced by up to 10% for the creation time of virtual production models, leading to greater competitiveness.
- In a joint effort to cover and formalise large parts of requirements specifications, each partner covered different types of requirements, which were combined by means of a common data model exchanged in the AutomationML data format. Whereas the current state-of-the-art is completely manual, ENTOC has achieved a 30% requirements formalisation rate. Using the concept of formalised requirements, the time for the creation of production equipment specifications can be reduced up to 20%, improving the quality in parallel.
- To lay the foundations for future innovations, ENTOC is now pursuing IEC standardisation. Within the project, OEMs, tool providers and component manufacturers agree that this is the next stage in virtual engineering and commissioning. In recognition of this, most ENTOC partners are still working on the topics in the ongoing ITEA project AIToC, which combines requirements engineering and Artificial Intelligence in the tool chain to further extend the efficiency, quality and adaptability of manufacturing.



Exceptional  
excellence

OPENCPS

# OPENCPS

## New opportunities for high-quality systems modelling & simulation

Winner ITEA  
Award of  
Exceptional  
Excellence  
2019

OpenCPS (Open Cyber-Physical System Model-Driven Certified Development) has been a three-year international R&D project concerning methodology, standards, and open-source tools for the efficient development of cyber-physical systems.

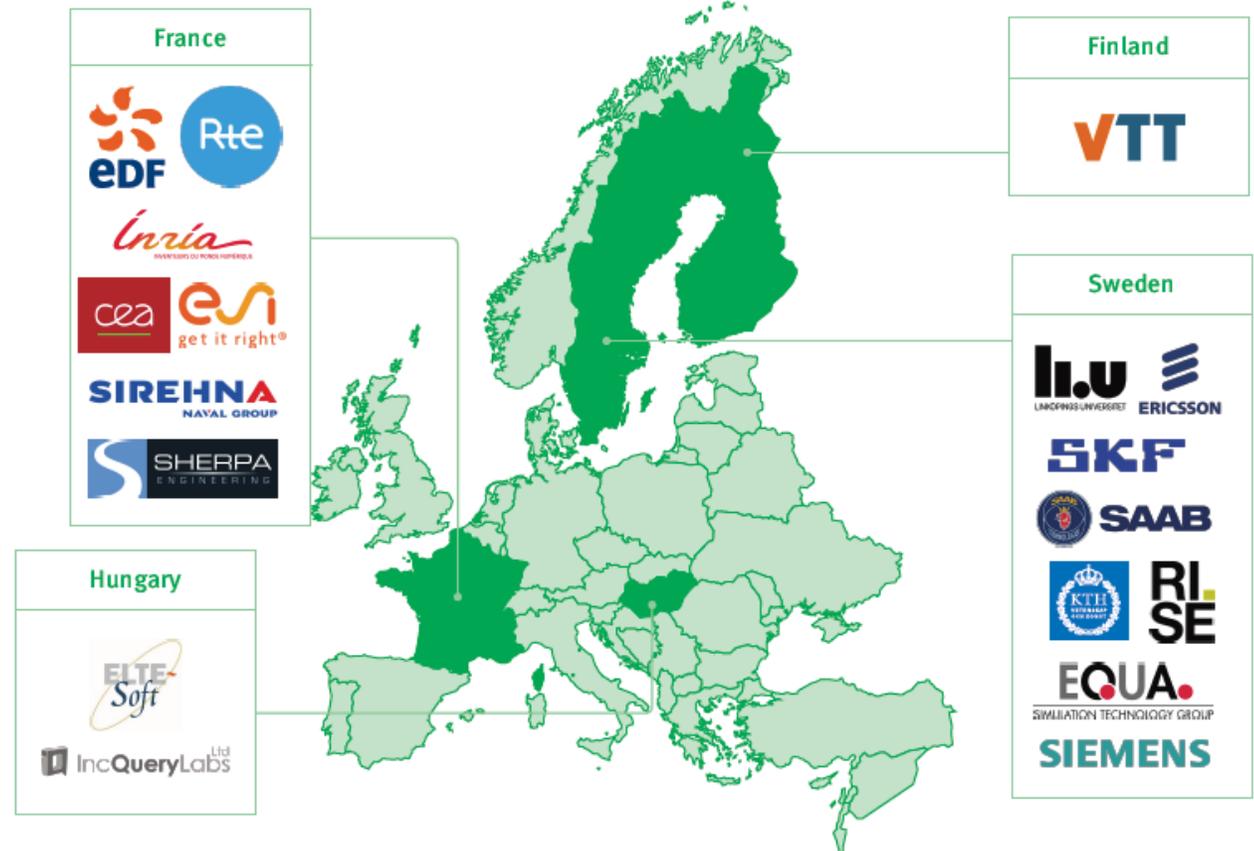
OpenCPS achieved to create a solution that enabled effective modelling and simulation of CPS throughout the entire value chain and system lifecycle.

### Start date – End date

Dec 2015 - April 2019

### Website

<https://itea4.org/project/opencps.html>  
<https://www.opencps.eu/>



# OPENCPS

## Examples of impact highlights

- One main joint result from the project is the brand-new master simulation tool, OMSimulator for the standardised import, interconnection, and efficient distributed simulation of system simulation models. The tool is open source letting end-users control and add features, allowing new users (including SMEs) to more easily access the market.
- Although unable to afford existing intellectual property, SMEs can enter the world of modelling using this open-source alternative, allowing for faster lead times, easier maintenance and new business models.
- For larger companies, OpenCPS is a means of sharing knowledge, avoiding tool vendor lock-ins, and reducing development cost thanks to improved frontloading capabilities.



**Business  
Impact**

**BENEFIT**

# BENEFIT

## Advancing evidence-based medicine for better patient outcome

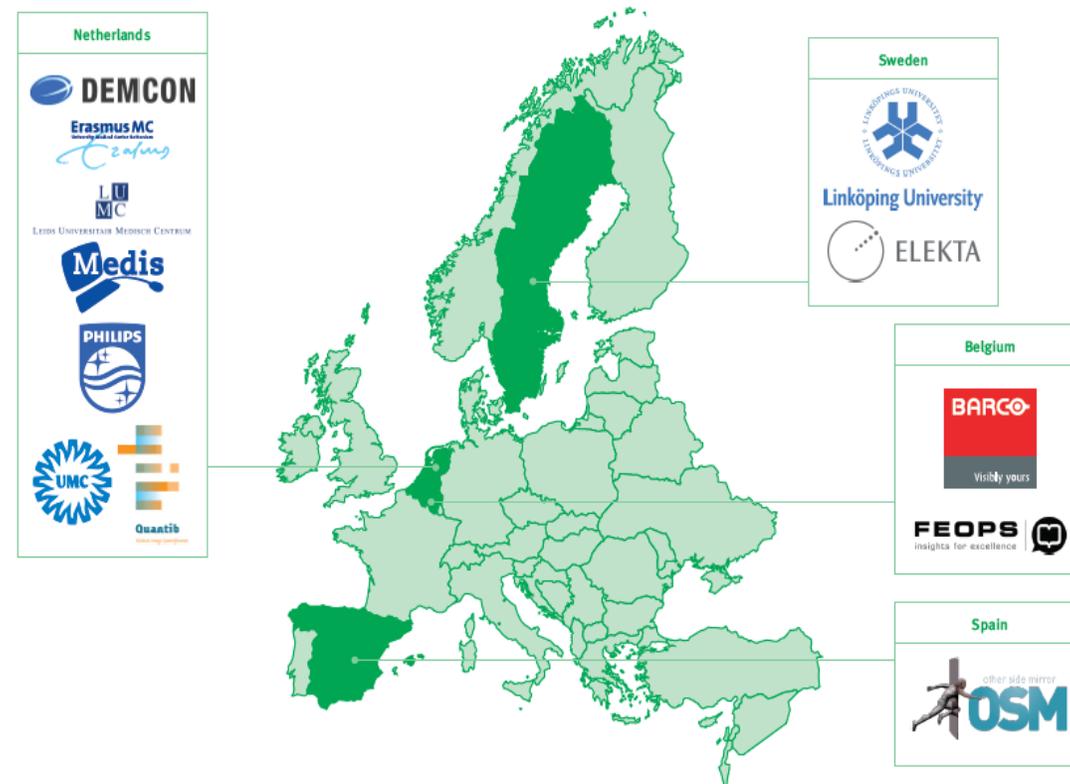
The BENEFIT project tackled three main challenges: the societal aspect of coping with the increasing number of minimally invasive image-guided interventions; the economic dimension of delivering care with quantified targets in terms of quantity, price and quality of care; demonstrating the technical feasibility of an integrated infrastructure that includes all relevant imaging and data sources, the modelling, analysis and presentation of these data and the integration into a Clinical Decision Support System. Current diagnostic and therapeutic solutions do not offer the flexibility, quality and integration to automatically extract all the relevant quantified data and process flows. The ITEA project BENEFIT aimed to support clinicians in selecting the optimal diagnostic and treatment pathway for patients.

### Start date – End date

July 2014 - Dec 2017

### Website

<https://itea4.org/project/benefit.html>



# BENEFIT

## Examples of impact highlights

- Elekta gained CE and FDA approval for its Leksell Gamma Knife ICON system with Cone beam CT (CBCT). By September 2019, 107 systems have been installed and are clinically in use while 200 existing systems can be upgraded worldwide. The planning time for test cases is reduced significantly by around half.
- Linköping University (LiU) in Sweden has published a paper for functional MRI in PNAS (Proceedings of the National Academy of Sciences) in 2016, which has been covered by Science, The Economist, The New York Times, has been downloaded over 200,000 times and received over 1800 citations.
- In total, the project partners applied for 7 patents.
- The Belgian SME FEops gained CE approval for its TAVIguide product and secured an investment injection of €6m for the FEops HEARTguide™. FEops has grown from 4 to 15 employees.

# BENEFIT

## Examples of impact highlights

- The Dutch SME Medis gained CE and FDA approval for its analysis that calculates pressure drop from X-ray images leading to a reduction of the excessive use of stents and the need for a disposable pressure wire of €500-1000, and thus saving costs.
- At the end of 2019, Philips sold over 250 copies of its new commercial tool AneurysmFlow for treating cranial aneurysms. Philips also created an automatic 3D detection of liver tumour feeding vessels, boosting detection accuracy by 26% and resulting in at least 20% less recurrence than with 2D feeder detection.
- The Dutch SME Quantib gained CE and FDA approval for its brain analysis software and secured €4.5m in fresh funding to support the company in its international expansion ambitions. Between July 2014 and end of 2019, Quantib grew from 6 to nearly 30 employees, developed 4 products including certification, has installations in over 20 countries and initiated partnerships with 3 top medical university centres in the Netherlands.



Innovation  
&  
Business  
Impact

SoRTS

# SoRTS

## A system of real-time systems for more effective healthcare

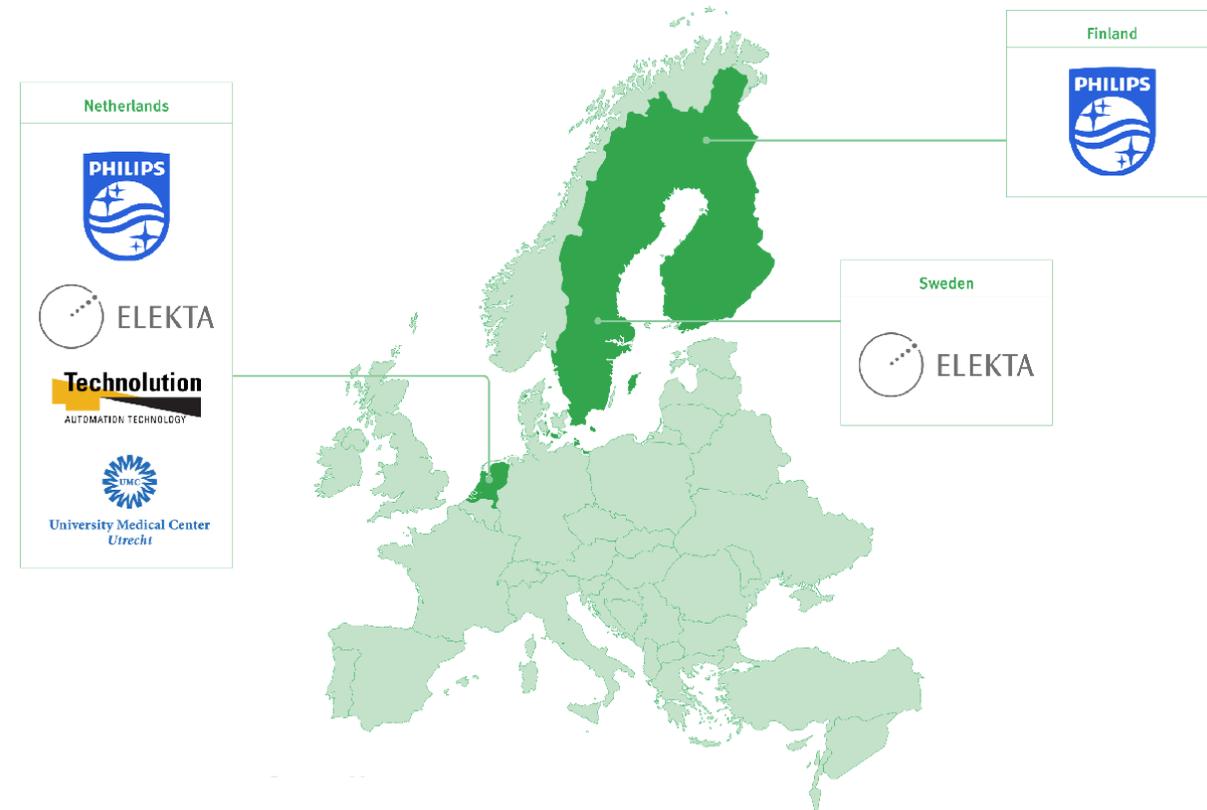
While there have been considerable advances in recent years in the oncological and radiotherapy treatment of cancer, a major challenge still faced by image-guided intervention and treatment is the availability of coupled real-time feedback of the imaging and therapy systems during interventions. The goal of the SoRTS project was to develop a System of Real-Time Systems to support healthcare professionals in the transition from invasive, open surgery to minimally invasive, image-guided intervention and treatment (IGIT). The outcome not only significantly lowers healthcare costs through shorter hospital stays and higher throughput, but it also boosts the productivity and effectiveness of cancer treatment and reduces patient risk.

### Start date – End date

Jan 2014 - Dec 2016

### Website

<https://itea4.org/project/sorts.html>



# SoRTS

## Examples of impact highlights

- For Elekta, the results from the SoRTS project represent an order opportunity of over USD 700 million until 2019. As of April 2018, Elekta began installing 18 high-field MR-adaptive linear accelerator systems - Elekta Unity - worldwide. The target is to generate orders for 75 systems before the end of 2019.
- With the key innovations from the SoRTS project, Philips MRI will sell 50-100 systems in Europe in a new market, meaning an addition of more than 5% to the present MRI market of €4.5 billion
- On 19 May 2017, less than six months after the end of the SoRTS project, the University Medical Centre (UMC) Utrecht treated the first patient as part of a clinical study with Elekta Unity.
- Based on the SoRTS results, Technolution released its SigmaXG product platform for video switching over standard IP infrastructure successfully to the market through its partners/resellers. An exploitation example: the Erasmus MC university hospital in Rotterdam has selected Technolution partner Inter Visual Systems' Sensumed platform for 26 new operating theatres in it is building.