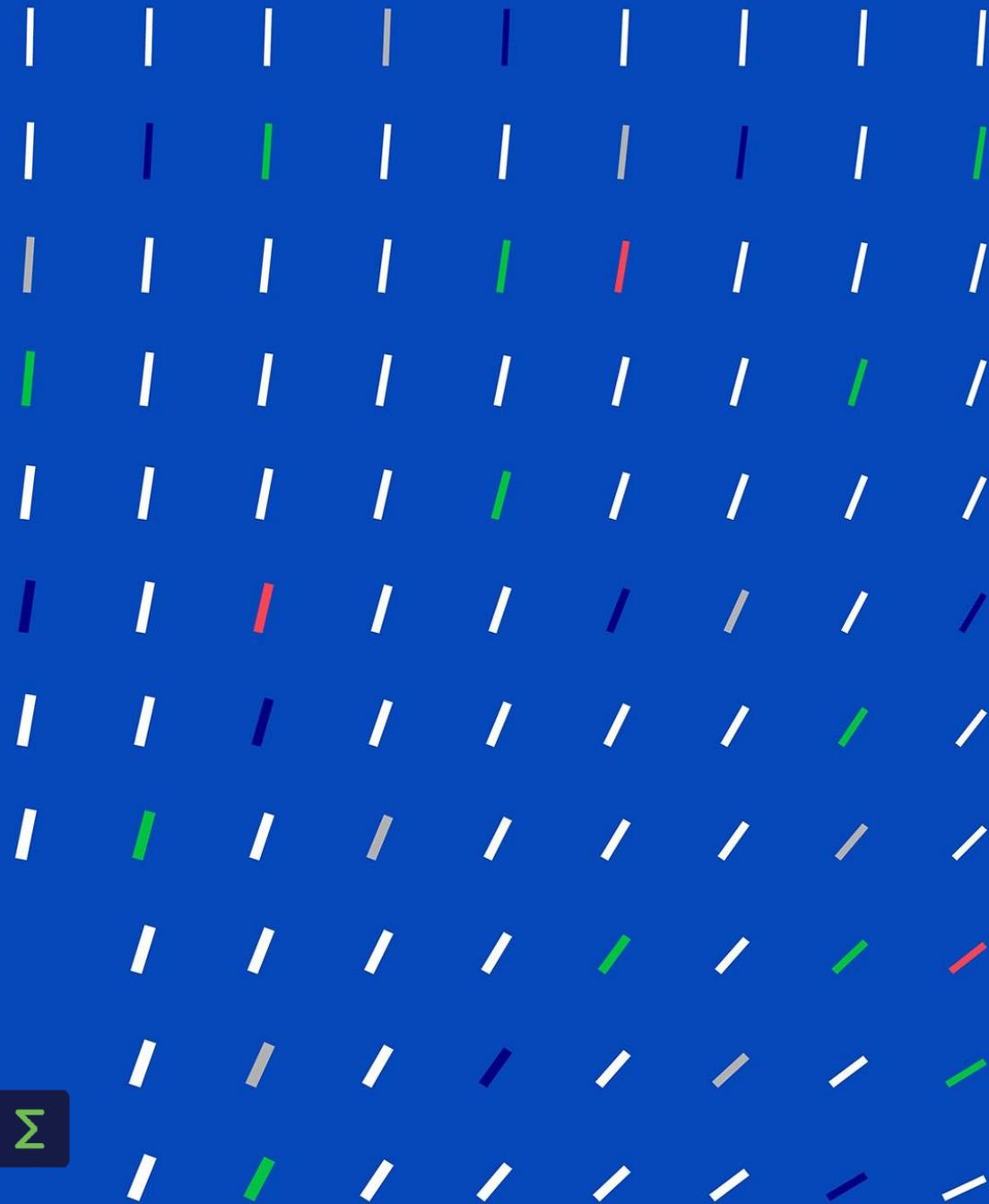# ITEA Award of Excellence winners with German participation 🇩🇪

Status December 2023

ITEA4

ITEA 4 is the Eureka Cluster on software innovation

Exceptional Excellence

I2PANEMA

I2PANEMA
Bringing the value of IoT to ports

By bringing Internet of Things (IoT) solutions and added-value services to the world of ports, the ITEA project I2PANEMA (Intelligent IoT-based Port Artefacts Communication, Administration & Maintenance) has made their operations more efficient and sustainable across various business cases.

Start date – End date
Oct 2018 – March 2022

Website
https://itea4.org/project/i2panema.html
https://www.i2panema.eu/

I2PANEMA
Examples of impact highlights

- I2PANEMA has demonstrated that ferry arrival times in Hamburg can be accurately predicted to within 15 seconds, which has resulted in a 100% reduction in average processing time for stop announcements.

- In the Assan port in Türkiye, sensor-based container localisation has enhanced operations by over 10% in a single shift, with completion time reduced by more than 15% and accidents decreased by more than 50%, boost

- Accurate prediction of PM10 emissions in Gijón Port has been demonstrated with 100% reduction in average processing time for environmental alerts and emergency protocol activation.

Business impact

CyberFactory#1

CyberFactory#1
Fostering the optimisation and resilience of the Factory of the Future

To enable the Factory of the Future, optimisation must be reconciled with security. The growing integration of Information Technology into Operational Technology exposes manufacturing systems to a growing number and diversity of threats. The ITEA project CyberFactory#1 has designed, developed, integrated and demonstrated a set of key enabling capabilities to foster the optimisation and resilience of the Factory of the Future.

Start date – End date
Dec 2018 – June 2022

Website
https://itea4.org/project/cyberfactory-1.html

CyberFactory#1
Examples of impact highlights

- Airbus in France is collaborating with Bittium in Finland to deploy CyberRange to simulate and monitor their distributed manufacturing environment. Airbus is also offering Security Operation Centre (SOC) services that monitor a factory's traffic, raise alarms and respond to anomalies. Across the project, commercialisation will target the digital twin, Industry 4.0 and IIoT security markets, with impressive results expected in each: by 2025, partners can expect revenues of EUR 8 million and 82 new jobs in the digital twin domain, EUR 28 million and 114 jobs in Industry 4.0 and EUR 114 million and 256 jobs in IIoT security. This total impact equals EUR 150 million and 452 jobs across the consortium.

- RoboShave has achieved 100% traceability of processes and products from the shop floor and 100% accuracy of (near) real-time information on dashboards, both of which started at zero. By automating machine and manufacturing execution system communication, it has also seen a 100% reduction in the time spent by human operators on manual machine data collection. In turn, this reduces human error while improving worker satisfaction by allowing them to focus on more stimulating tasks.

- The project has been recognised as a pioneer of Industry 5.0, which goes beyond efficiency and productivity and reinforces industry's contribution to societal goals. With its focus on a sustainable, human-centric and resilient industry, CyberFactory#1 has paved the way to the next industrial revolution.

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 heterogenous tools and practices and without losing control of one's own data.
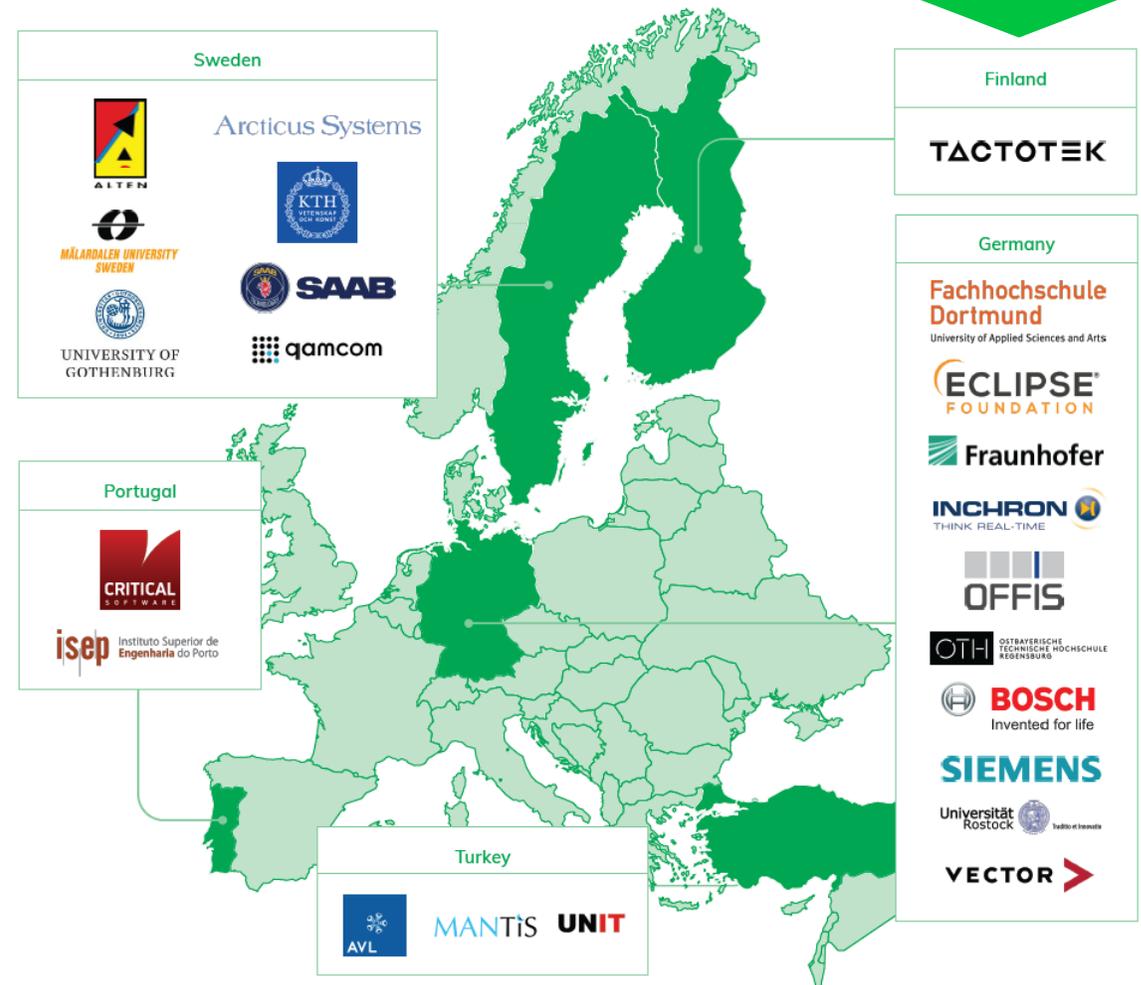
Start date – End date
Apr 2019 - Sep 2022

Website
https://itea4.org/project/panorama.html
https://www.panorama-research.org/

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).

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Exceptional Excellence

OPTIMUM

OPTIMUM
Offering greater efficiency, safety and usability in future smart factories

In today's factories, machines such as cranes are typically operated manually using heterogeneous hardware. These are usually not interoperable and diverse control environments are in use; static machine configurations also make evolution hard to achieve. OPTIMUM enables machines of different kinds and from different manufacturers to communicate with each other and their operators, improving the worker's and equipment's safety.

Start date – End date
Nov 2017 – June 2021

Website
https://itea4.org/project/optimum.html

OPTIMUM
Examples of impact highlights

- OPTIMUM's innovative assistance functions will significantly reduce assembly times in semi-autonomous processes; an 18% reduction was already achieved during a Proof of Concept.

- DEMAG sold a crane to the Fraunhofer Institute for Factory Operation and Automation (IFF) in Magdeburg for its new research factory (Elbfabrik), which will be enabled with innovative assistance functions from OPTIMUM. Consortia partners will support the implementation of the OPTIMUM functionalities.

- NXP is developing an integrated hardware solution based on OPTIMUM results to serve an Evaluation Kit for the industrial market.

- TARAKOS has extended their software solutions (taraVRbuilder & taraVRcontrol) and has significantly improved the planning of material handling processes with cranes. The roll-out to the market took place in August 2022 and the extended software is also being sold to the Fraunhofer Institute for the Elbfabrik.

- BEIA has developed its IoT telemetry solution with OPC UA for cranes to be used by NAVROM, the biggest river shipping company in Romania.
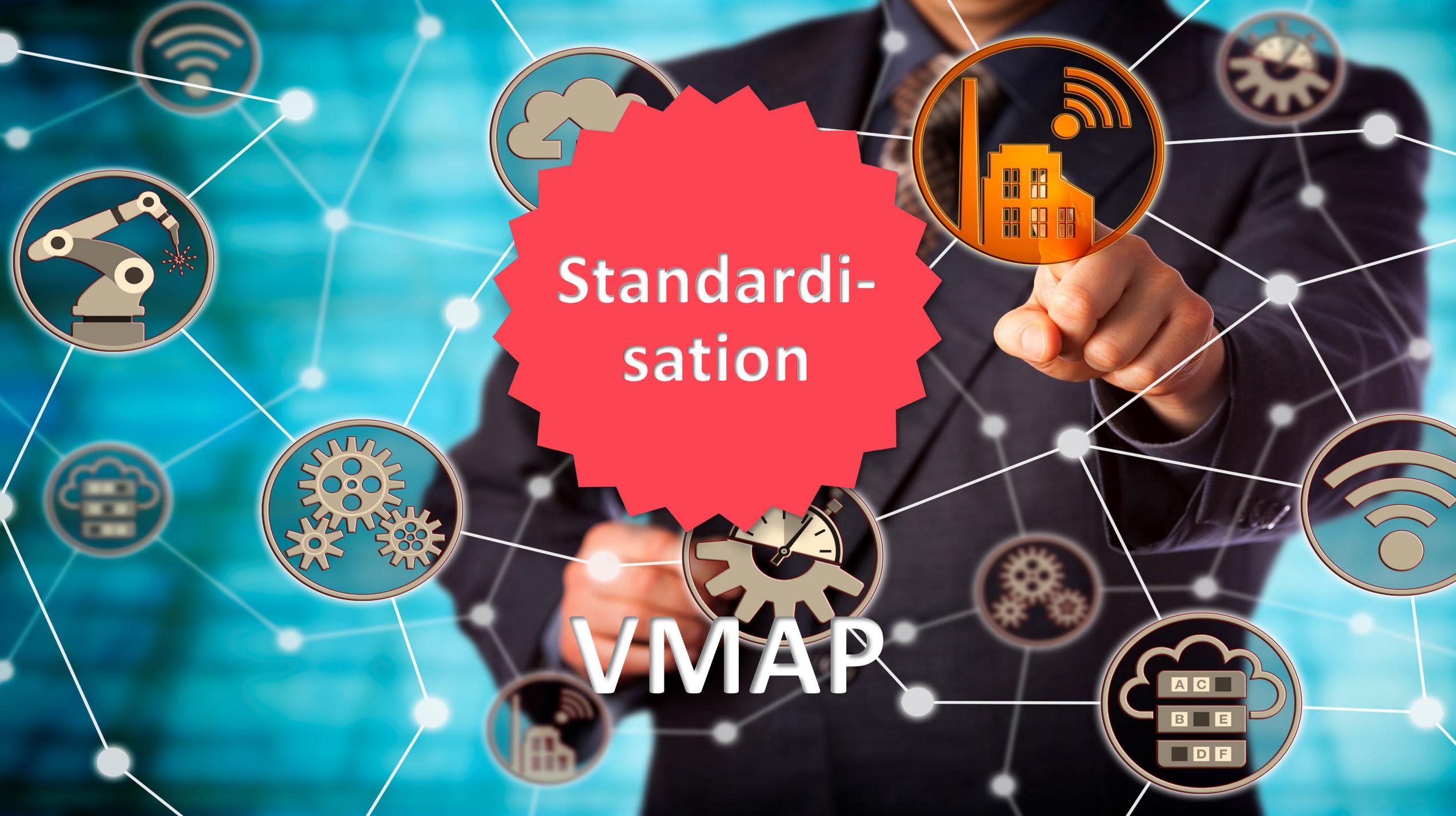
Standardi-
sation

VMAP

VMAP
Enhances interoperability in virtual engineering workflows

VMAP created a vendor-neutral standard for Computer-Aided Engineering data storage and transfer to enhance interoperability in virtual engineering workflows, increasing innovation speed by 50% and reducing setup time for virtual process chains by 40%. To further disseminate the VMAP Standard and its development, the VMAP Standard Community has been established.

Start date – End date
Sept 2017 – Oct 2020

Website
https://itea4.org/project/vmap.html

VMAP
Examples of impact highlights

- The VMAP project has created the world's first CAE workflow interface standard for integrating multi-disciplinary and multi-software simulation processes in the manufacturing industry. This standard is vendor-neutral, cost-free and completely open. The first public version of the standard was announced by the VMAP project in January 2020, before the end of the project.
- As a result of VMAP, Philips boosted the innovation speed of highly complex parts by almost 50%.
- The time spent on strength assessments in the moulding of plastic parts by RIKUTEC Richter Kunststofftechnik in Germany has been reduced by 42%.
- The set-up time for virtual process chains for lightweight automotive components with composites within a prominent German car manufacturer fell by 40%.
- The VMAP Standards Community e.V. (VMAP SC) was created in December 2022 by 16 founding members and it It currently contains more than 150 entities, including large players such as Bosch and Philips, and has good links with other standardisation groups such as Modelica/FMI, the European Material Modelling ouncil and the ISO STEP 242 community.

ITEA4 Σ

Special
Vice-Chair
Award

EMPHYSIS

EMPHYSIS
The missing link between digital simulation and embedded software

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/emphysis.html
https://emphysis.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.

Innovation

ENTOC

ENTOC
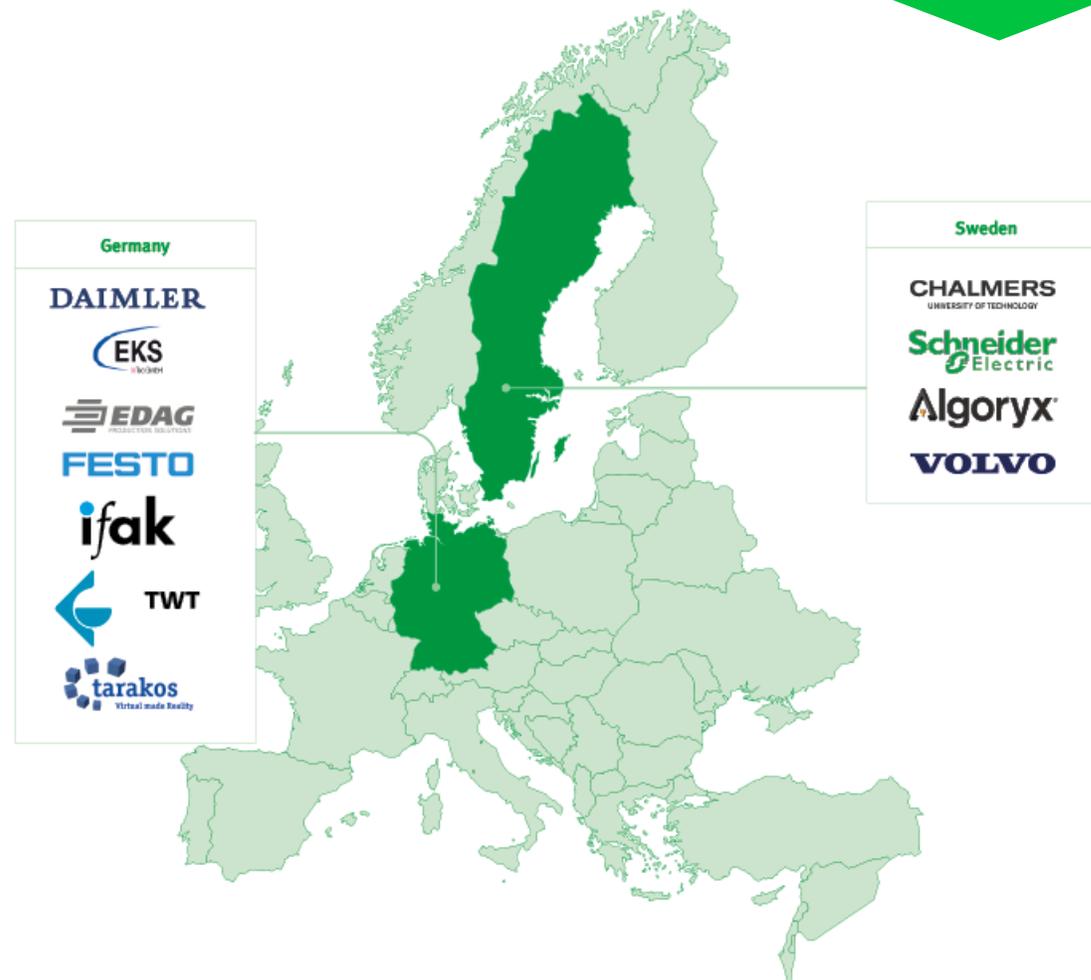## The next stage in virtual engineering and commissioning

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

Germany
DAIMLER
EKS InTec GmbH
EDAG PRODUCTION SOLUTIONS
FESTO
ifak
TWT
tarakos
Virtual made Reality

Sweden
CHALMERS UNIVERSITY OF TECHNOLOGY
Schneider Electric
Algoryx
VOLVO

ITEA4 | Σ

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.

ITEA4 Σ

Impact & Exploitation

Flex4Apps

Flex4Apps
## Deep customer understanding, backed by data

Software providers increasingly need to focus on the optimisation of their services, including the ability to react to customer preferences. Through its flexible framework and algorithms, the ITEA project Flex4Apps creates a full loop that allows companies to offer more complex services while advancing the digital transition.

Start date – End date
Nov 2016 – Oct 2019

Website
https://itea4.org/project/flex4apps.html
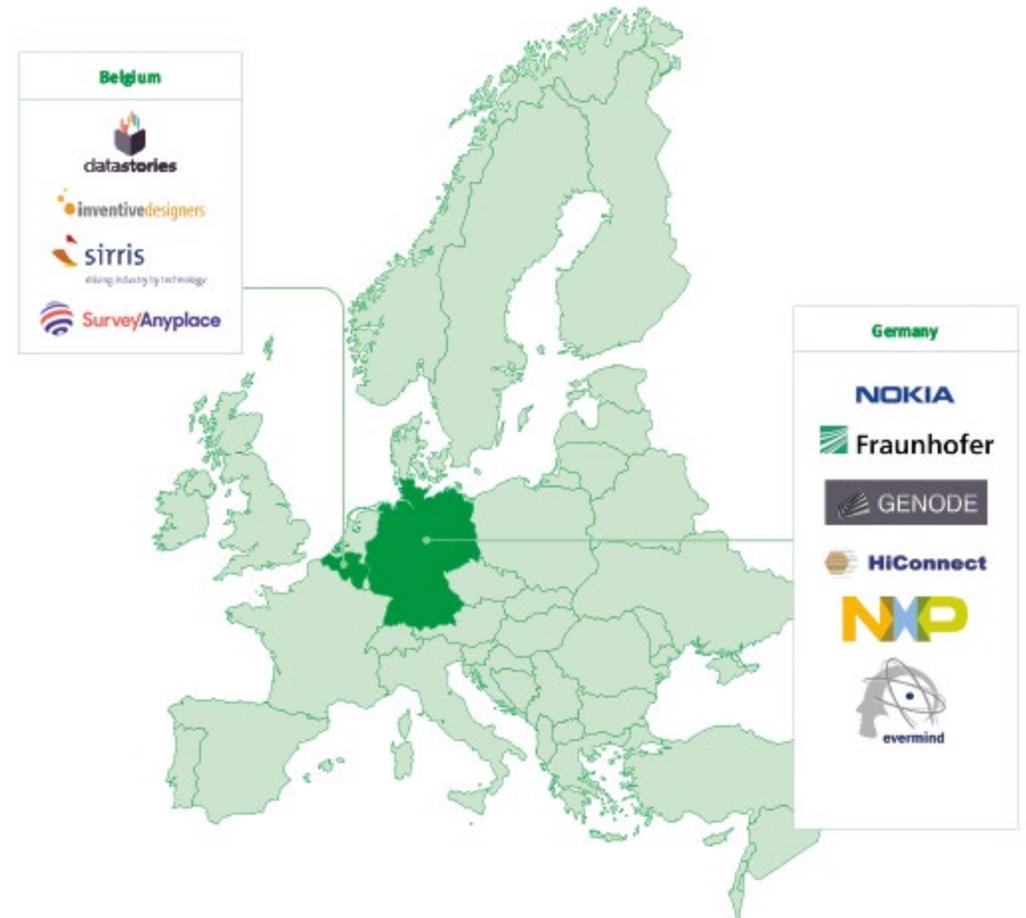
Flex4Apps
Examples of impact highlights

- Nokia brought down the monthly costs of fixing bugs detected in both early and late development from over 16,000 euros to 1,900 euros – a yearly saving of 180,000 euros.

- For Unifiedpost, the success of this project has led in 2021 to the creation of a dedicated data warehouse and machine learning project team of 15 persons, expanding on the original ideas and assisting in the rapid growth of the company.

- Flex4Apps enabled the SME DataStories to grow from 6 to 18 employees.

- evermind, which has connected Flex4Apps to the home automation platform Eigenheim Manager, has increased sales by 50-100,000 euros per white-label customer.

- Genode predicts a 200% growth in licence revenue within two years, with the smart home market expected to be worth 19 billion euros in Germany alone by 2025.

- The SaaS tool Survey Anyplace has increased their conversion rate by 33% and their activation by 54%.

ACOSAR
## An innovative simulation that saves time and money

The development of vehicles has become increasingly complex, involving over 50 different suppliers who need to ensure that all components, parts and devices work together. Modelling and simulation represent key methods for a successful development. To facilitate this, the introduction of co-simulation methodologies and the interoperability of simulation tools and infrastructure had already taken root. But there was no standardised way of integrating distributed simulation and test environments back in 2015. In the ACOSAR project was set up to accelerate development steps with new simulation technologies.

Start date – End date
Sept 2015 – Aug 2018

Website
https://itea4.org/project/acosar.html
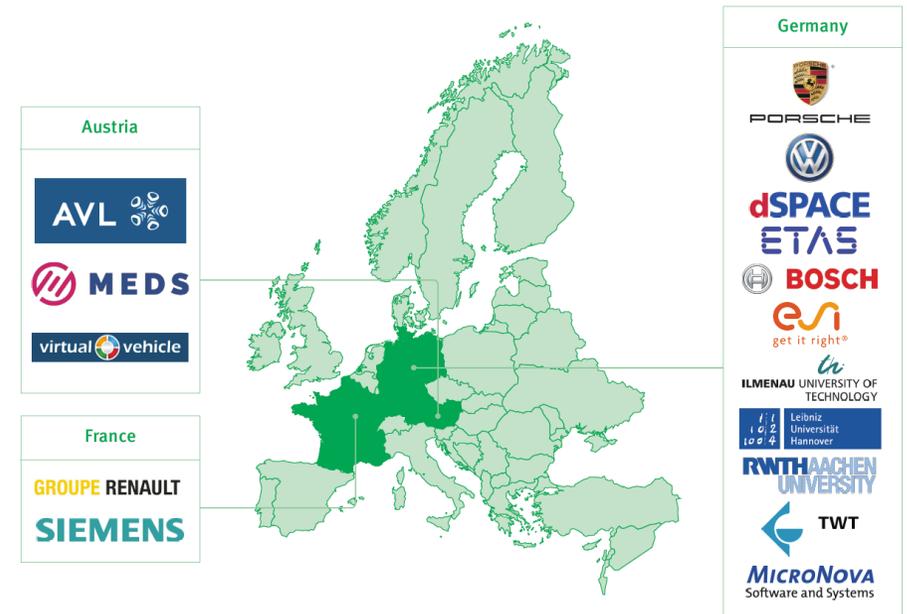
ACOSAR
Examples of impact highlights

- Since July 2018, the main and sustainable project outcome, the Distributed Co-simulation Protocol (DCP), is developed as a Modelica Association Project (MAP) and is available as an open-access international standard.
- Competitors and non-funded partners collaborated in this project because of its importance.
- International technology leaders such as AVL, Volkswagen and Boeing are already applying this solution.
- A prominent German sports car manufacturer reports over 13,000 developer days which could be saved in the next five years thanks to this developed protocol – which corresponds to a value of around five to seven million euros.
- This prominent German sports car manufacturer represents less than 1% of the market share of car manufacturers, thus this clearly shows the huge impact the ACOSAR project results can have in the automotive domain.
- The international partner network of Virtual Vehicle Research GmbH now consists of 30 national and 50 international industrial partners (OEMs, Tier 1 and Tier 2 suppliers as well as software providers) as well as 18 national and 30 international scientific institutions.