ITEA 4

Project Profile

UPSIM

Unleash the potentials of simulation

Increasing trust in system modelling and simulation is essential for enabling Digital Twin enriched system development, production, and operation. The ITEA project UPSIM aims for system simulation credibility via introducing a formal simulation quality management approach, encompassing collaboration and continuous integration for complex systems.

Addressing the challenge

Numerical simulation is now common in the development, production and operation of product lifecycles, which means that it is no longer the competitive differentiator. Given current trends towards product personalisation and supply chain deverticalisation, real testing is also proving practically and economically impossible for smart systems – yet less than 1% of today's physical machines and components use models that capture and mimic behaviour. Computer-assisted engineering costs, staff training, tool license fees, computing infrastructure and data management are all obstacles to raising this figure.

Proposed solutions

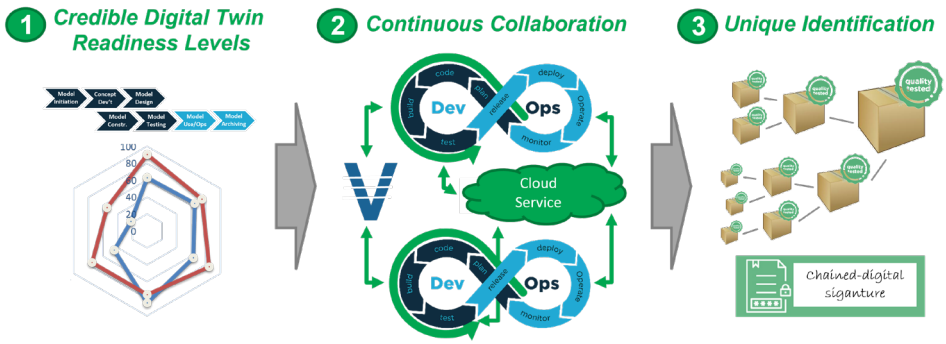
The UPSIM (Unleash Potentials in SIMulation) project addresses these issues through four innovations in simulation governance:

1. Modelling and simulation reference processes and a metric for determining the Digital Twin Readiness Level.
2. Collaboration patterns for efficient Digital Twin development.
3. AI-enriched Hybrid Simulations for simulation reality convergence.
4. Infrastructure for the 'chained' identification of Credible Digital Twin simulation artefacts.

The identification of simulation artefacts over a product's lifecycle – unique to UPSIM – will enable third parties to create domain-specific Credible Simulation Applications. Overall, this will enable the collaborative development of smart systems based on Credible Digital Twins and emerging horizontal supply chains, thereby speeding up development within new business models. Project outcomes will also be made available via open access and an open-source repository in order to ensure technological sustainability, market uptake and long-term added value.

Projected results and impact

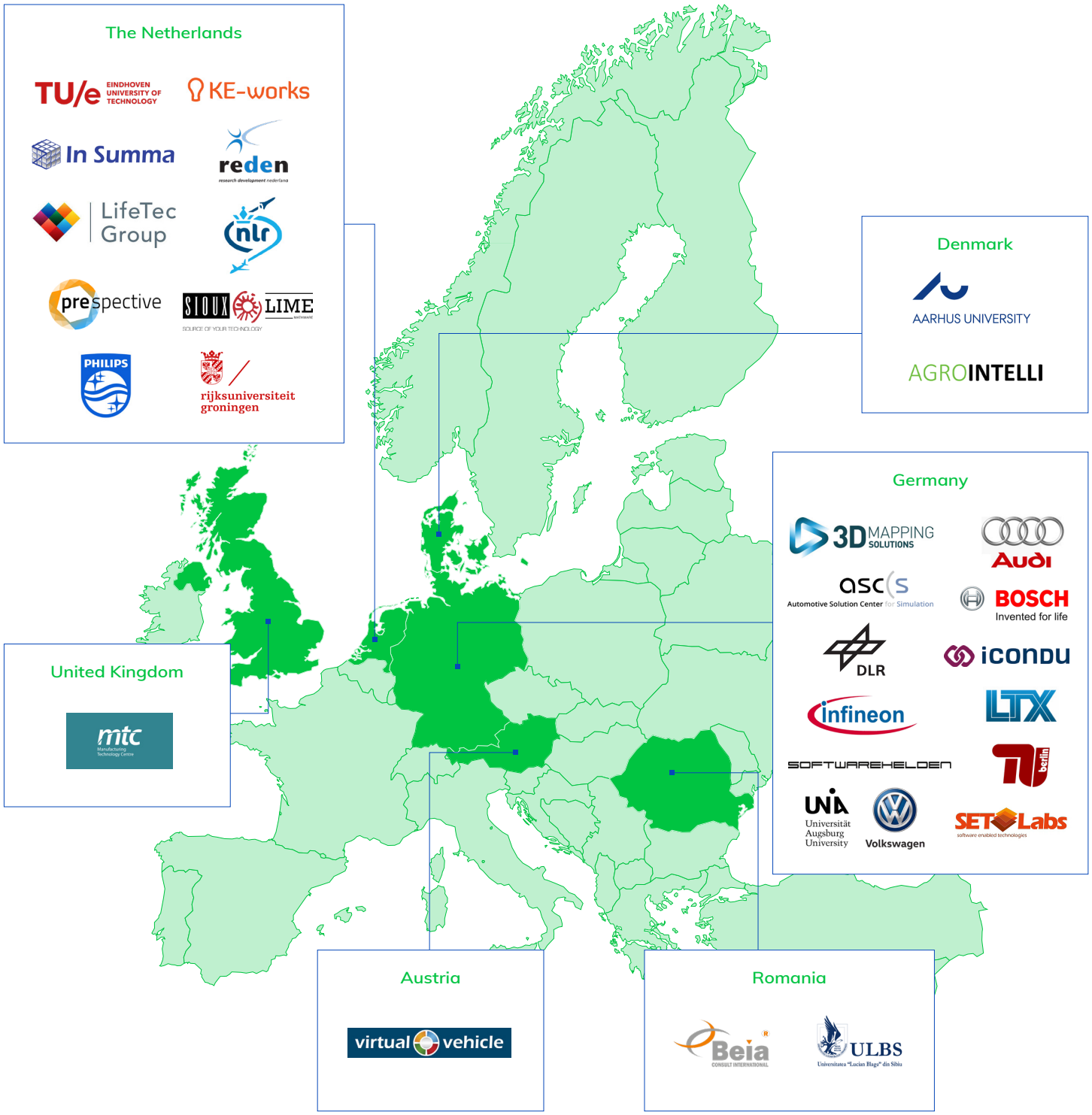
UPSIM's key outcomes are standardisation for simulation quality assurance and democratisation for enabling broadly use of simulation. The benefits are multifaceted. On a technical level, the project will ensure simulation reliability for both analysts and non-experts, aiming for 15-25% better test coverage and a similar percentage reduction in remaining defects. The commercial advantages of this improved productivity are clear: 35-55% fewer costs in defect removal and a 20-25% improvement in time-tomarket. The project's uniquely-identified Simulations Apps will be instrumental to exploitation and allow third-party entry into new markets. One example is predictive maintenance, set to grow to a global worth of USD 10.7 billion by 2024 at a compound annual growth rate of 28.8%. UPSIM therefore represents a crucial paradigm shift from real testing to virtual approval.



UPSIM approach for providing Credibility Digital Twins

Project partners

UPSIM
19006



Project start
October 2020

Project end
September 2023

Project leader
Martin Benedikt Virtual Vehicle Research GmbH

Project email
martin.benedikt@v2c2.at

Project website
http://www.upsim-project.eu/

ITEA is the Eureka R&D&I Cluster on software innovation, enabling a large international community of large industry, SMEs, start-ups, academia and customer organisations, to collaborate in funded projects that turn innovative ideas into new businesses, jobs, economic growth and benefits for society. ITEA is part of the Eureka Clusters Programme (ECP).

https://itea4.org

ITEA 4

eureka