PROJECTS WEBSITE

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COORDINATION:	**VIRTUAL VEHICEL RESEARCH GMBH**
PROJECT LEADER:	**DR. MARTIN BENEDIKT**

DOCUMENT HISTORY

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0.1	02/03/2021	Kerstin Drexler	Draft
0.2	21/06/2021	Sonja Kaiser	Revision according to website content
1.0	26/08/2022	Medina Ćustić	Final Version

Executive Summary

This document describes the public and internal UPSIM project website, which is restricted to UPSIM partners (SDE and MS Teams). The website was launched on October 1st 2020, close to the official UPSIM Project start, under the domain http://www.upsim-project.eu.

Embedded basic functionalities:

- Newsletter
- News & event update
- Download section
- Progress overview

The creation of the public UPSIM project website is part of the dissemination plan and strategy, which is further described in the confidential Deliverable D5.3a – D5.3c.

Contents

1 UPSIM Project Website

The UPSIM website was launched in October 2020. It contains all information, facts and figures, news and events related to the project.

The UPSIM website has been designed for the general public and third parties interested in the progress and/or results of the UPSIM project. It provides a short and clear overview with the possibility to find detailed information about this project. The partners involved in UPSIM are briefly described and links to their websites are provided.

The aim of the website is to inform the general public about ongoing and completed research activities through dissemination material and technical project publications. All information on the project website is updated regularly.

2 Contents

The website is divided into six categories, which appear in the header of all pages. The header serves as a navigation aid, using a structure that makes it easy to browse the content and find all the information required.

2.1 UPSIM: Home

The main page shown in Figure 2-1**Error! Reference source not found.** is the default page for all visitors of the USPIM website.

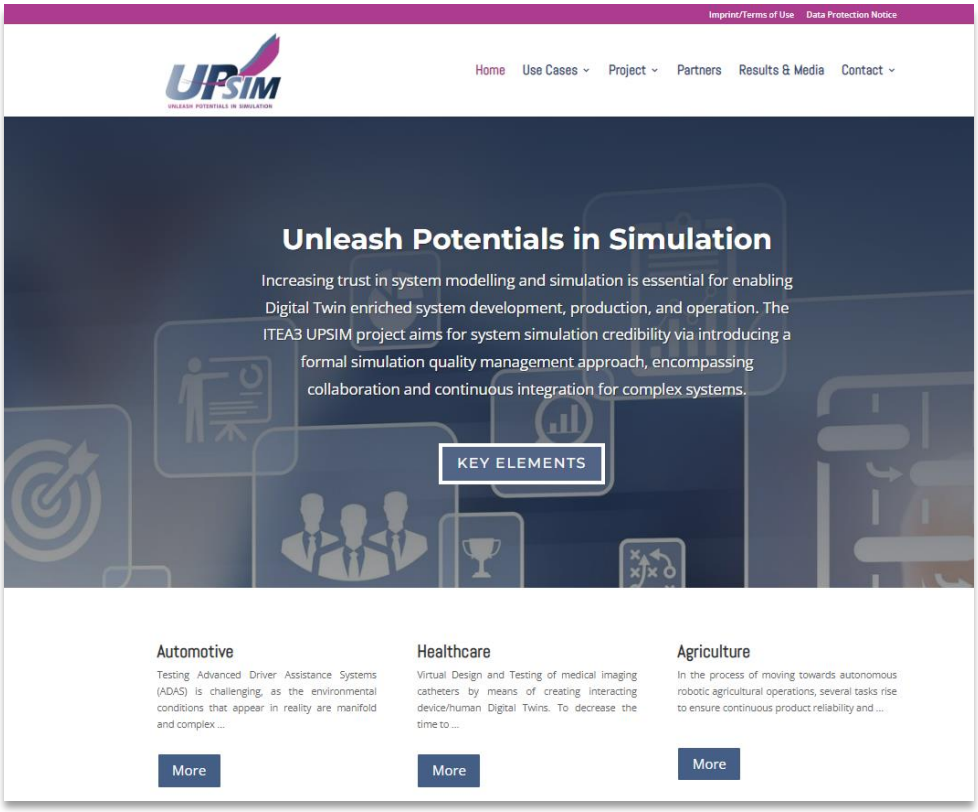


Figure 2-1: UPSIM Homepage

In addition, a public project video was created. It briefly introduces the project and is directly linked to YouTube.

Figure 2-2: Public UPSIM Project Video

The website also contains a News section. This section is updated regularly and contains short entries informing the public about the latest developments in the UPSIM project.

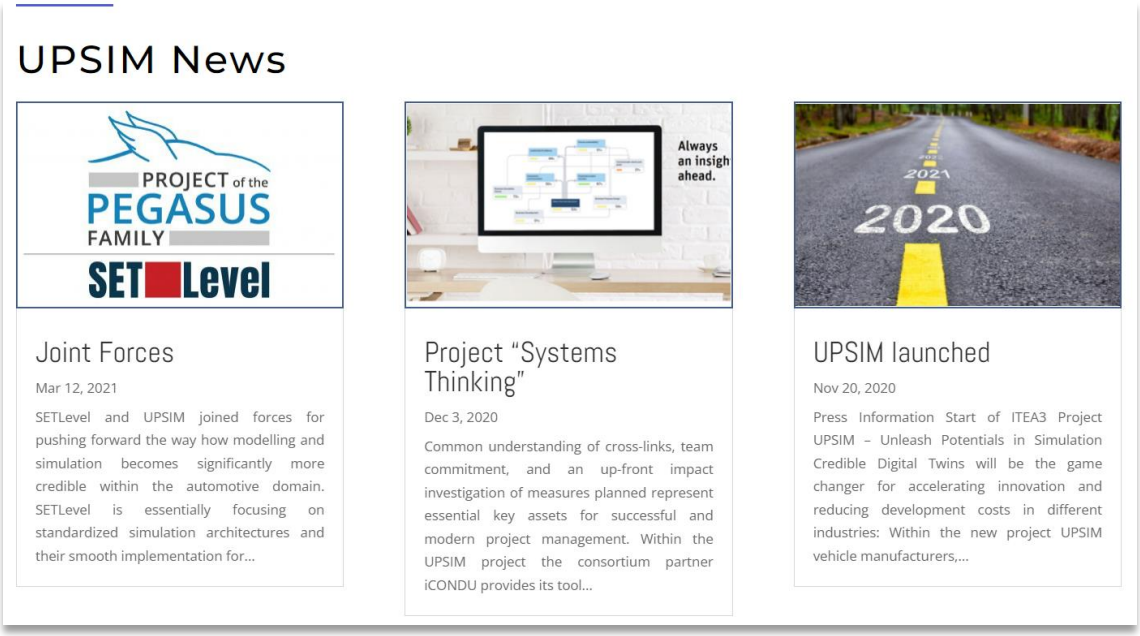


Figure 2-3: UPSIM News Section

A brief overview of the topics "digital twin" and "credibility" is also included.

Figure 2-4: Introduction to UPSIM Main Topics

At the bottom of the homepage the funding acknowledgement can be found.

Figure 2-5: Funding Acknowledgement

2.2 Category "Use Cases"

The Use Cases page provides information about the content of the project. More specifically, it gives an overview of the research topics addressed in UPSIM, the project structure, the main project events and the expected results. The text and the respective demo are shown below.

2.2.1 Automotive Use Case: Scenario-based Testing

"Testing Advanced Driver Assistance Systems (ADAS) is challenging, as the environmental conditions that appear in reality are manifold and complex. Testing on the road only is not feasible since it is expensive and difficult to reproduce results – additionally virtual tests based on environment simulations are therefore required. These simulations are based on scenarios representing real world situations that provide ground truth data to sensors or sensor models for the environmental perception. To integrate environment simulations with function simulations, lists of objects (i.e. sensed and abstracted traffic participants) and sensor raw data need to be exchanged and have to be processed by the ADAS function under test. Various simulators for automated driving exist that provide different, not uniquely defined interfaces. The challenge lies in the proper integration and configuration of complex tool-chains for scenario-based testing of (partly) automated vehicles."

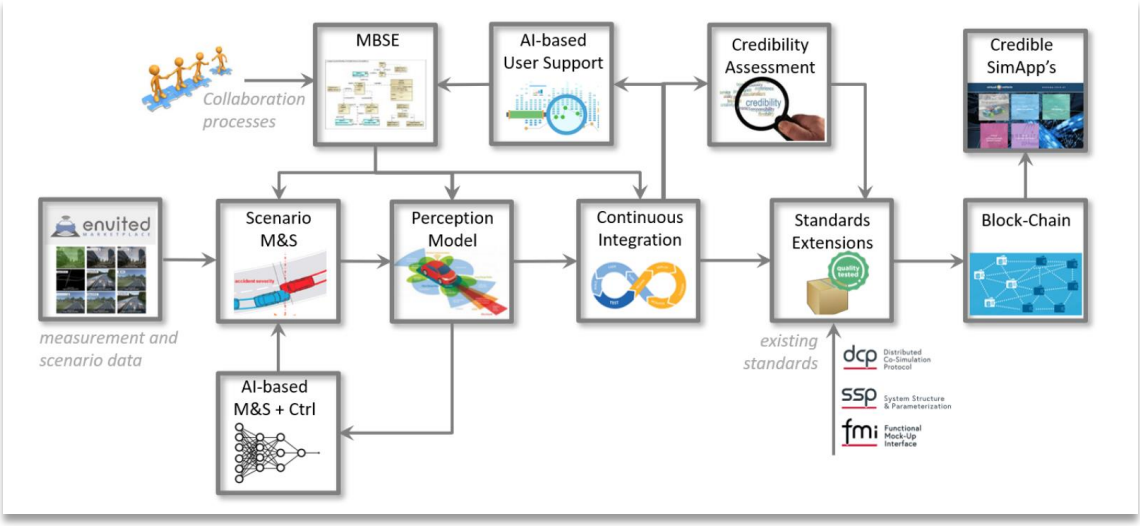


Figure 2-6: Automotive Use Case

2.2.2 Healthcare Use Case: Medical Imaging Catheter

"Virtual Design and Testing of medical imaging catheters by means of creating interacting device/human Digital Twins. To decrease the time to market for next generation medical devices, product development should be strongly supported by virtual design and testing by means of high-fidelity digital twins of these devices and human tissue (e.g., arteries). Our improved understanding of the device-human tissue interaction from these interacting digital models will lead to quantified loading conditions within the device, and consequently, to improved performance and reliability. In addition, we will be able to develop accelerated qualification tests and thus, reduce development cycles and materials usage. The use case will lead to quantification of credibility and accuracy of these interacting digital twins for virtual testing, as well as potential workflow and business value."

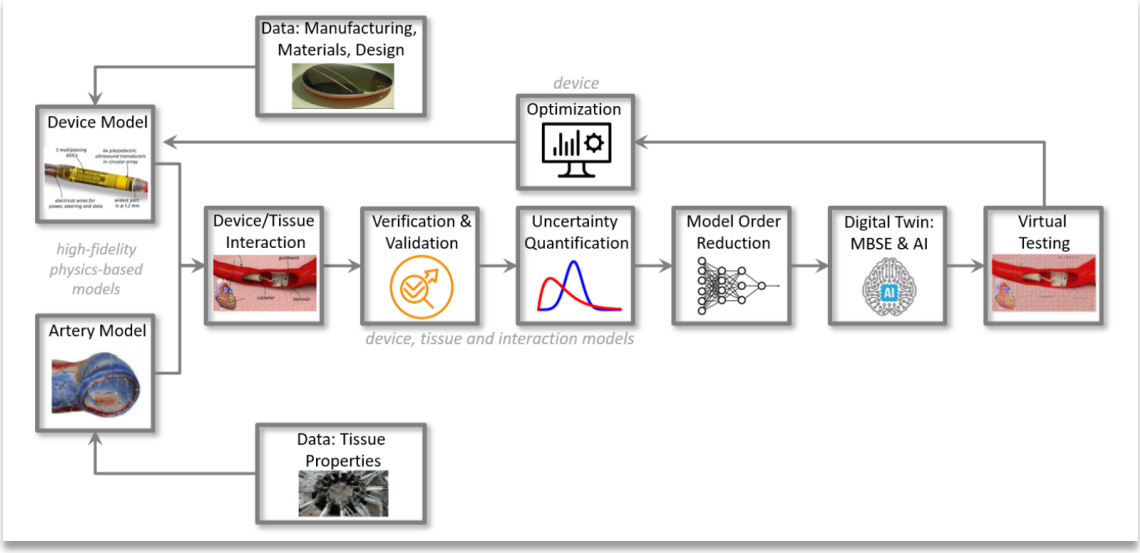


Figure 2-7: Healthcare Use Case

2.2.3 Agriculture Use Case: Agriculture Robot

"In the process of moving towards autonomous robotic agricultural operations, several tasks rise to ensure continuous product reliability and performance without human interaction during operation. A common challenge when developing agricultural machinery is the ability to comply with the varying physical conditions across Europe, e.g. soil type and texture, topography, etc. Furthermore, the robots need to be compatible with a wide range of equipment and tools to be an integrated part of future farming. The agricultural robots consist of multiple sensors, software, electronics and mechanics. Tests is a crucial but time-consuming. By obtaining a validated digital twin of the system, the time to market can be reduced by performing tests in a virtual setting rather than performing physical tests that are often constrained by the availability of a test field, weather conditions and fully functional subsystems. By increasing the physics-based modelling, simulation and digital twin capabilities will provide valuable insights about the overall machine performance in the design phase as well as during field operation."

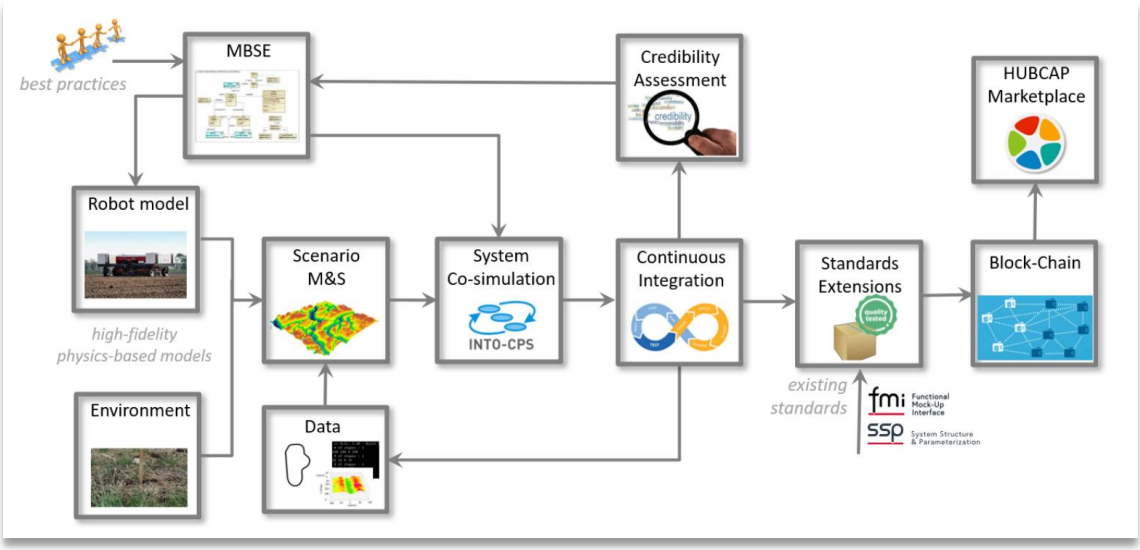
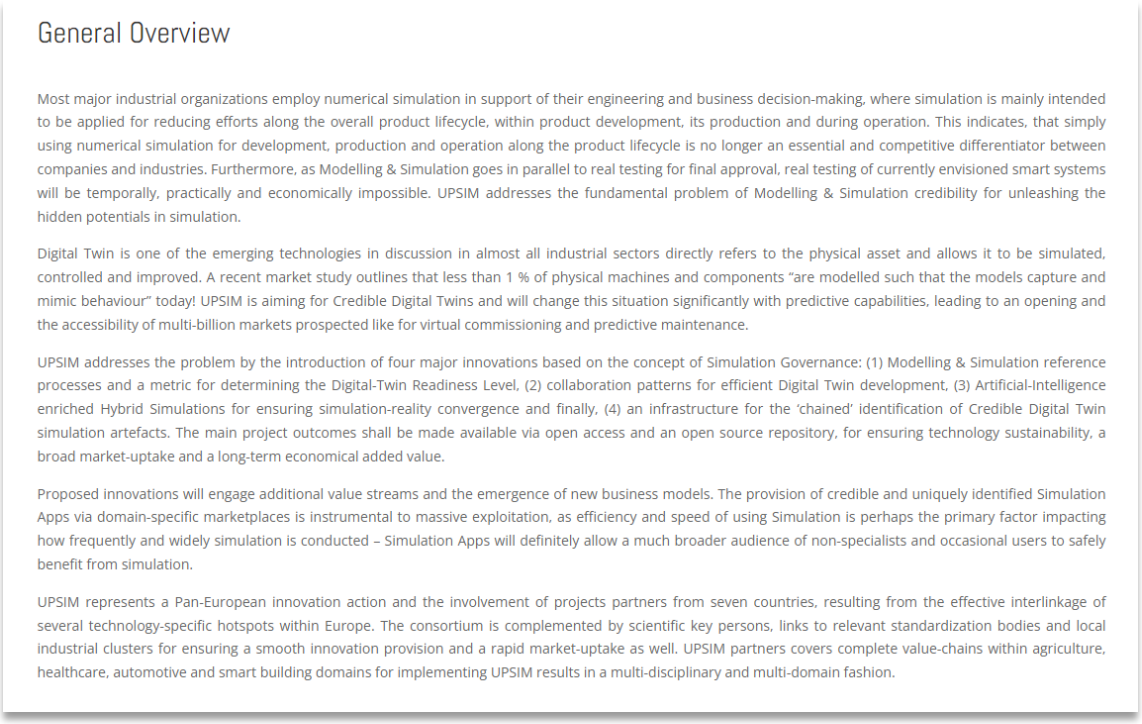


Figure 2-8: Agriculture Use Case

2.3 Category "Project"

2.3.1 General Overview

A detailed overview of UPSIM can be found on this subpage.



General Overview

Most major industrial organizations employ numerical simulation in support of their engineering and business decision-making, where simulation is mainly intended to be applied for reducing efforts along the overall product lifecycle, within product development, its production and during operation. This indicates, that simply using numerical simulation for development, production and operation along the product lifecycle is no longer an essential and competitive differentiator between companies and industries. Furthermore, as Modelling & Simulation goes in parallel to real testing for final approval, real testing of currently envisioned smart systems will be temporally, practically and economically impossible. UPSIM addresses the fundamental problem of Modelling & Simulation credibility for unleashing the hidden potentials in simulation.

Digital Twin is one of the emerging technologies in discussion in almost all industrial sectors directly refers to the physical asset and allows it to be simulated, controlled and improved. A recent market study outlines that less than 1 % of physical machines and components "are modelled such that the models capture and mimic behaviour" today! UPSIM is aiming for Credible Digital Twins and will change this situation significantly with predictive capabilities, leading to an opening and the accessibility of multi-billion markets prospected like for virtual commissioning and predictive maintenance.

UPSIM addresses the problem by the introduction of four major innovations based on the concept of Simulation Governance: (1) Modelling & Simulation reference processes and a metric for determining the Digital-Twin Readiness Level, (2) collaboration patterns for efficient Digital Twin development, (3) Artificial-Intelligence enriched Hybrid Simulations for ensuring simulation-reality convergence and finally, (4) an infrastructure for the 'chained' identification of Credible Digital Twin simulation artefacts. The main project outcomes shall be made available via open access and an open source repository, for ensuring technology sustainability, a broad market-uptake and a long-term economical added value.

Proposed innovations will engage additional value streams and the emergence of new business models. The provision of credible and uniquely identified Simulation Apps via domain-specific marketplaces is instrumental to massive exploitation, as efficiency and speed of using Simulation is perhaps the primary factor impacting how frequently and widely simulation is conducted – Simulation Apps will definitely allow a much broader audience of non-specialists and occasional users to safely benefit from simulation.

UPSIM represents a Pan-European innovation action and the involvement of projects partners from seven countries, resulting from the effective interlinkage of several technology-specific hotspots within Europe. The consortium is complemented by scientific key persons, links to relevant standardization bodies and local industrial clusters for ensuring a smooth innovation provision and a rapid market-uptake as well. UPSIM partners covers complete value-chains within agriculture, healthcare, automotive and smart building domains for implementing UPSIM results in a multi-disciplinary and multi-domain fashion.

Figure 2-9: UPSIM General Project Overview

2.3.2 Key Elements

The key elements of UPSIM are presented on this subpage.

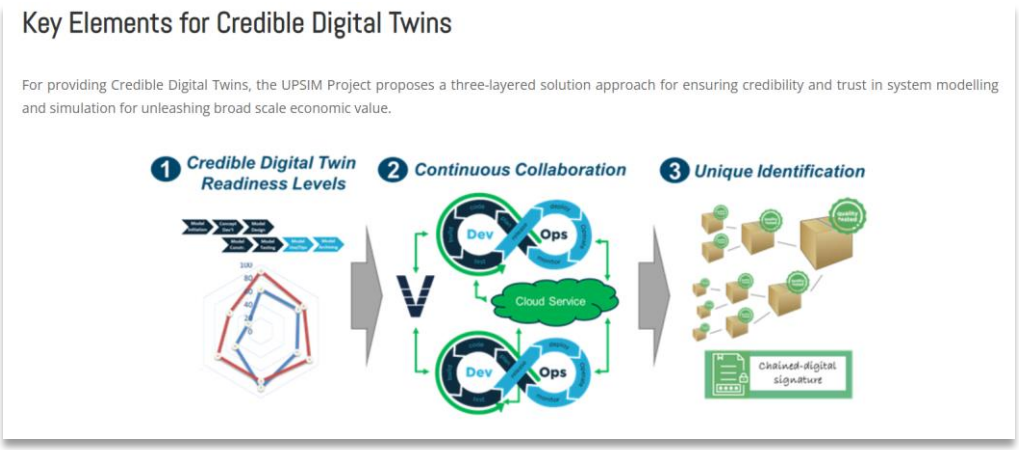


Figure 2-10: Overview of the Key Elements

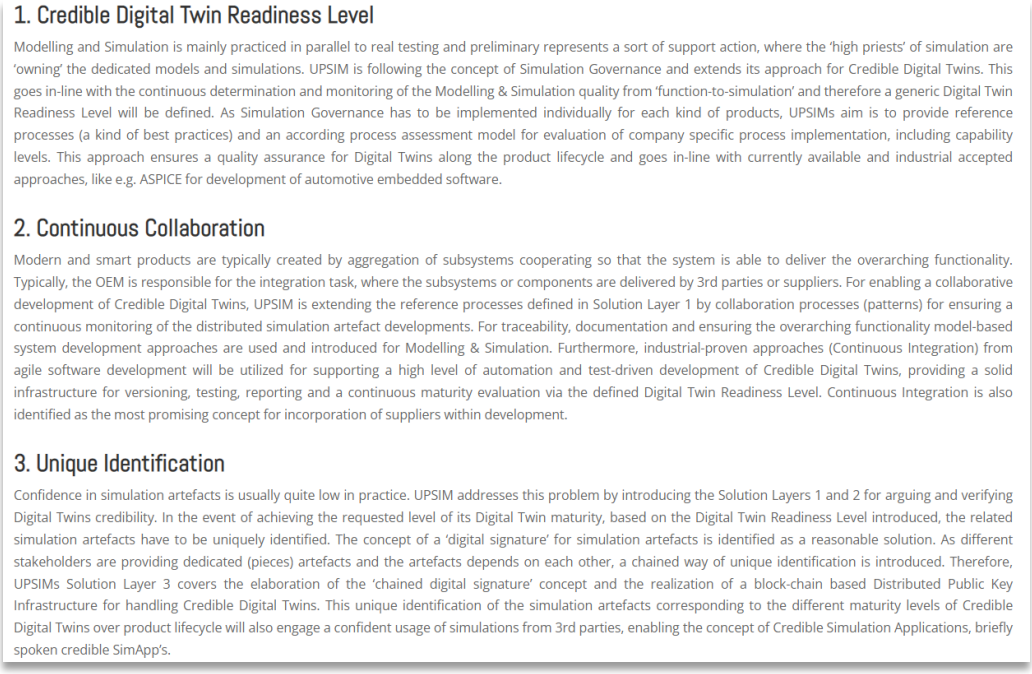


Figure 2-11: More Details on the Key Elements

2.4 Category "Partners"

All UPSIM partners are listed in the "Partners" section and provided with a link to the corresponding company homepages.

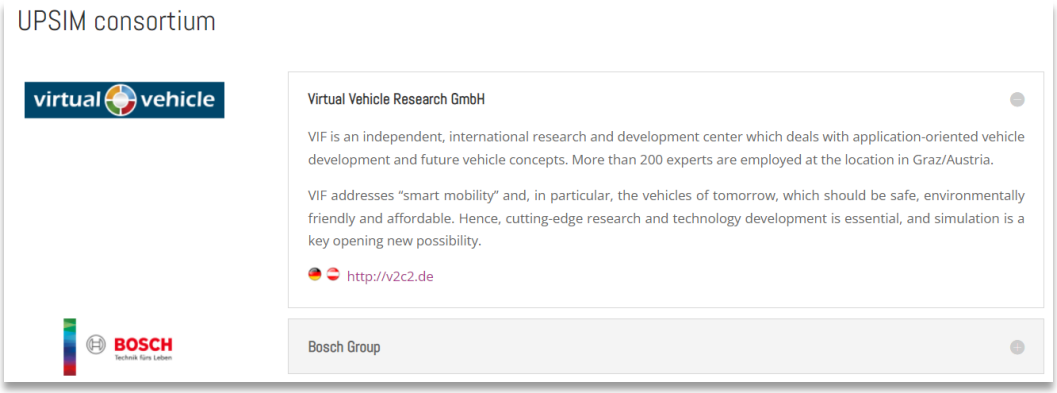


Figure 2-12: Overview UPSIM Partner Description

2.5 Category "Results & Media"

This section provides material that is made available to the public:

- **Deliverables:** Accepted and publicly available deliverables can be found here.
- **Publications:** Material such as flyers, leaflets or publications are available.
- **Presentations:** The project introduction and an overview of presentations are included in this section.
- **Press:** Articles and other relevant media articles are listed.
- **Logo:** The logo can be downloaded directly.
- **Relevant Links:** Links to websites such as the Modelica Association, the ASAM OpenX Standards or INTO-CPS are listed here.

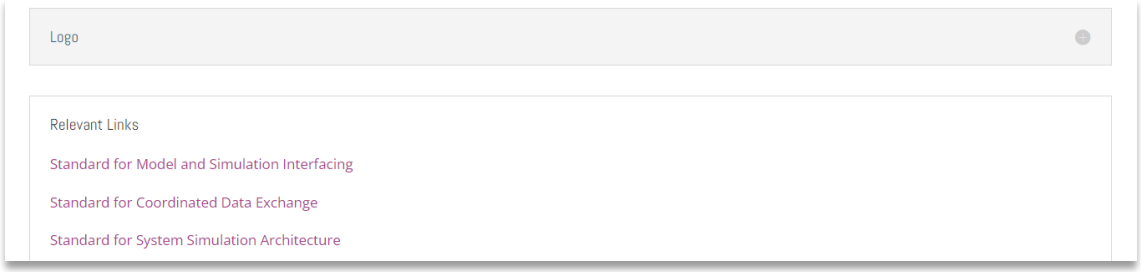


Figure 2-13: "Relevant Links" of the Results & Media Section

2.6 Category "Contact"

The contact details can be found on this subpage.

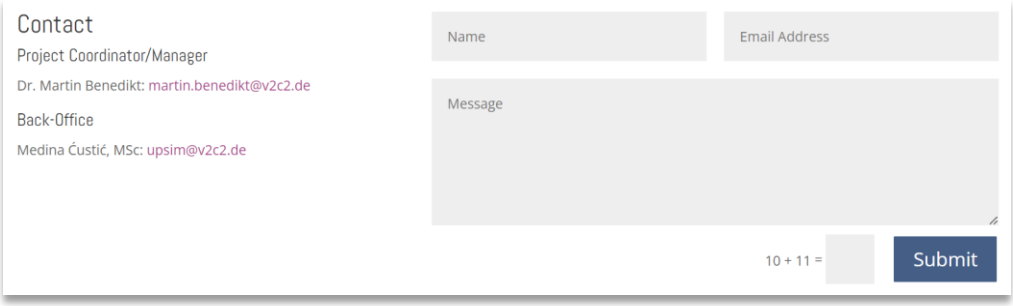


Figure 2-14: UPSIM Contact Details

3 Acknowledgment

Rijksdienst voor Ondernemend Nederland

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FFG Promoting Innovation.

ITEA 3

Project participants:
Virtual Vehicle Research GmbH (AT)
Virtual Vehicle Research GmbH (DE)

Aarhus University – DK
Agro Intelligence ApS – DK
3D Mapping Solutions GmbH – DE
Audi AG – DE
Automotive Solution Center for Simulation e.V. – DE
Infineon Technologies AG – DE
Deutsches Zentrum für Luft- und Raumfahrt (DLR) – DE
iCONDU GmbH – DE
LTX Simulation GmbH – DE
Robert Bosch GmbH – DE
Technische Universität Berlin – DE
University of Augsburg – DE
Virtual Vehicle Research GmbH – DE
Volkswagen A.G. – DE
softwarehelden GmbH & Co. KG - DE
Eindhoven University of Technology – NL
In Summa Innovation b.v. – NL
KE-works BV – NL
LifeTec Group BV – NL
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Philips Electronics Nederland BV – NL
Philips Consumer Lifestyle B.V. – NL
Reden BV – NL
Sioux LIME BV – NL
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DISCLAIMER

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