

Transport as a Service (TaaS) for Smart Business Parks

PROJECT SUMMARY

The aim of the TaaS for Smart Business Parks project was to develop a methodology for the development of a digital twin, in this case using a practical use case, offering the possibility of understanding and managing the implementation of intelligent transport systems and ecosystems in a business park.

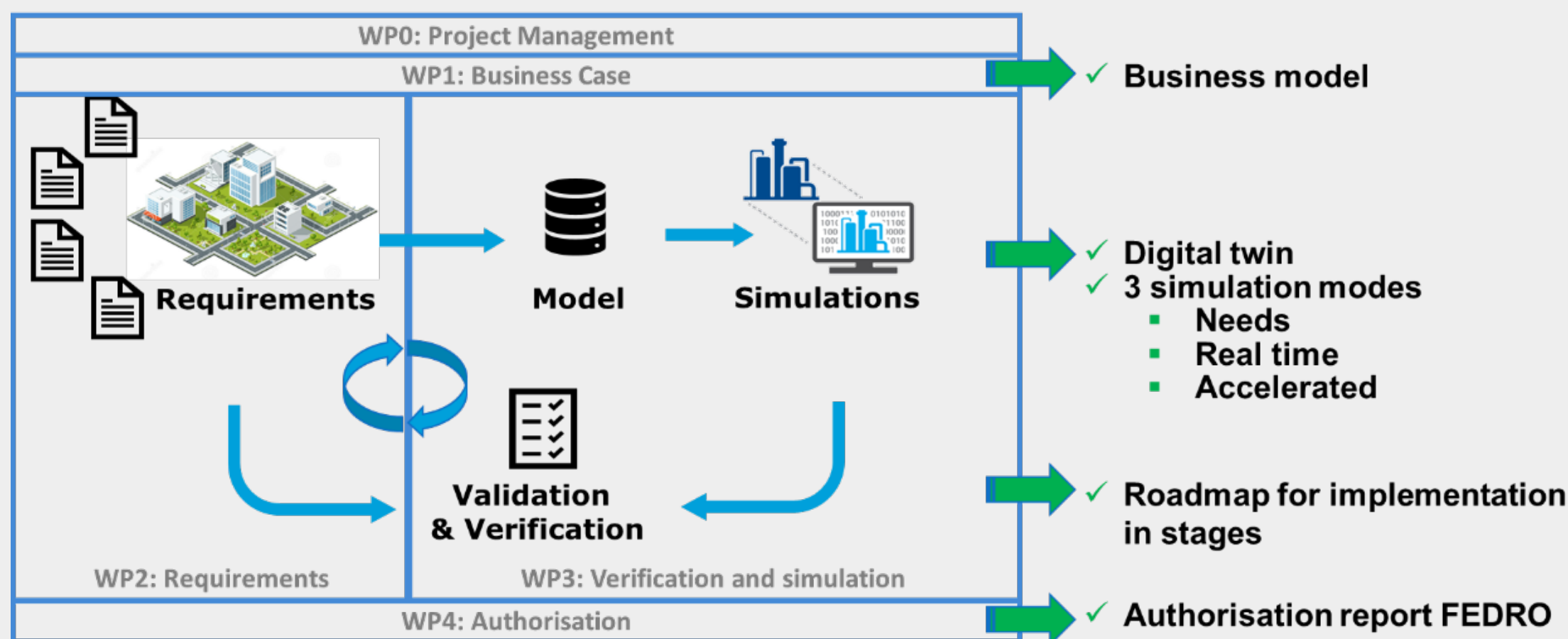
The project has made wide contributions in many fields. First, the project gathered more than 300 requirements for a TaaS system from all partners of the project, which represents a very large part of all regular actors normally present on a business park. This allowed the project to start with a very good knowledge of the actors' needs. Second, a dozen user stories related to mobility were drawn, which permitted to tailor the next 4 contributions, which, together, formed the digital twin of the business park: the simulations of mobility, supervision and remote control (teleoperate) of highly automated vehicles, energy, and business model:

- The simulator of mobility was used to reproduce the interactions between the kinds of transportation foreseen in the park: walking, bike sharing, highly automated shuttles, public transport, and private transport.
- The realistic world simulator allows the user to immerse itself in the digital twin and to supervise and remote control a highly automated vehicle.
- The simulator of energy studied some typical days of a year to present the foreseeable production and use of electricity.
- The simulator of business model calculated foreseen costs for the park based on inputs related to its configuration: buildings, transport options, energy production, and services. Based on partners' requirements, a set with over 70 cybersecurity requirements was created, covering a wide range of potential issues; from the infrastructure communication network to communication with highly automated vehicles and smart sensors placed in equipment.

Finally, a survey on the legal authorization of projects like TaaS describes the status of highly automated vehicles and provides future incoming improvements to the road law.

METHODOLOGY

To solve the problems associated with the new requirements of transport systems, the TaaS project is proposing a multi-stage solution.



First, an economic analysis has been carried out (WP1). More specifically, an economic model in which TaaS can be applied, leading to a business case, has been developed. Second, the requirements arising from the various surveys carried out and those recorded in the field have been collected (WP2). These will help to not only better understand the needs of the project's stakeholders, but also to study the market as well as the internal and external systems in which TaaS will operate. Once all the requirements have been established, they were integrated into a digital twin that simulates the interactions between the different data sets (WP3).

Simulation is a powerful, efficient and cost-effective way of developing and testing a concept without risking full-scale implementation. The simulation was then verified and validated.

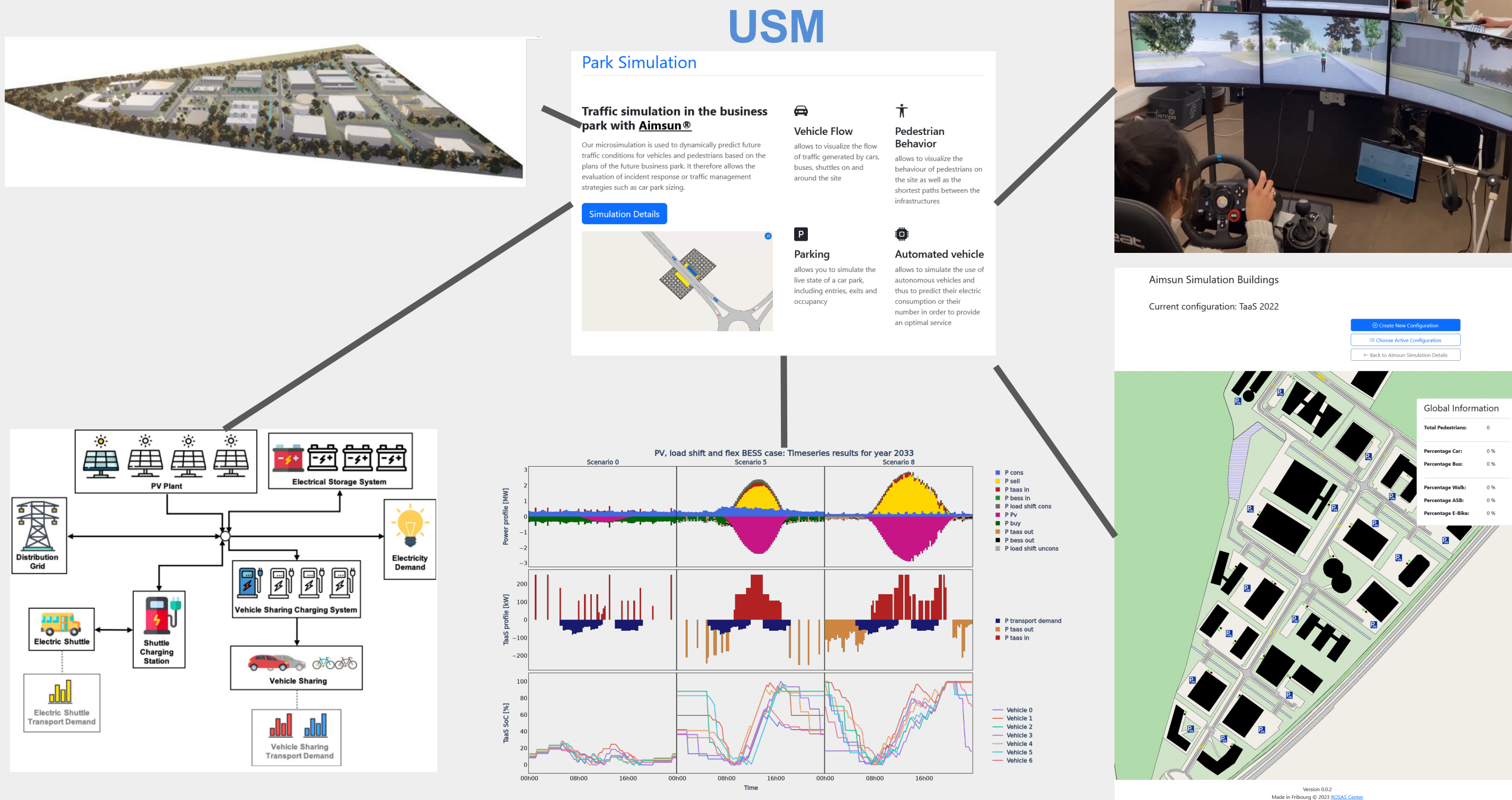
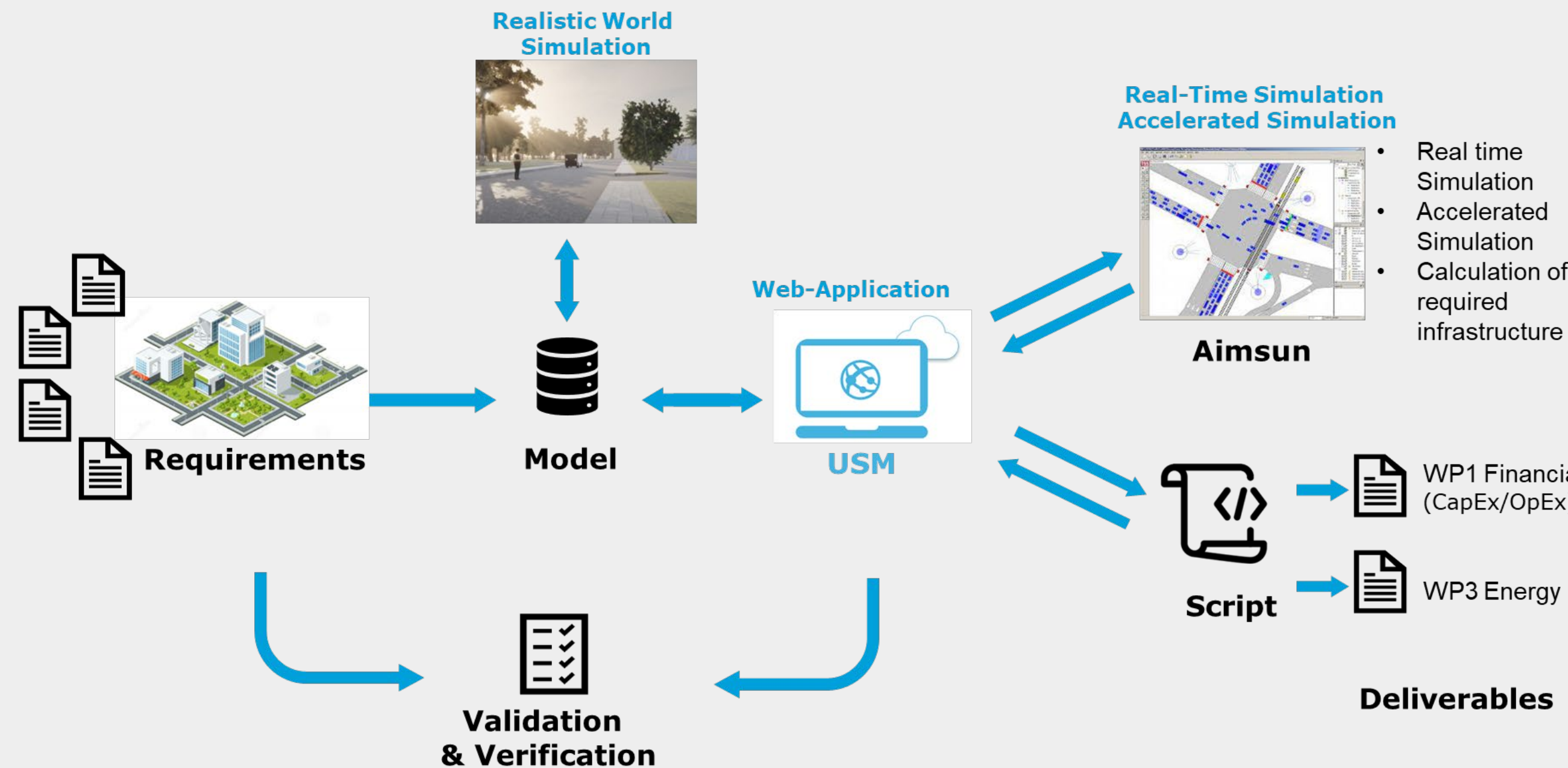
RESULTS

The project Transport as a Service for Smart Business Parks studied the creation of a business park and the collaboration between its different actors. It also successfully created a digital twin of the studied business park, which allows forecasting and planning mobility, energy production/use and costs.

Overall, the project is at an advanced stage where the developed components are successfully interacting with each other and the basis for the implementation of TaaS and smart ecosystems in business parks has been created. Moreover, results about the mobility inside the park could enable authorities associated to the business park to evaluate and adapt public transport for employees and visitors.

The expertise gained and achievements realized in this project have been applied to various other initiatives.

With the framework set in place in this project and the knowledge learned, the authors can contribute to the economic development of the region by reapplying their "know how" to other business parks or assimilated situations requiring highly automated mobility (indoor and outdoor), energy management, and/or economic forecast.



CONCLUSION

- This project enables the development of a sustainable business park integrating a high-performance mobility system with efficient energy management with the help of a digital twin.
- This system can be used for any existing or future business park.
- People's movements are considered and linked to the mobility plan of the town wishing to develop it.

INDUSTRIAL PARTNERS



Amin Amini, Laura Amaudruz, Cédric Bornand, Florian Buchter, Massimo Fiorin, Jens Henkner, Pascal Hulalka, Oliver Nahon, Martin Neubauer, Pierre Lambert, Eric Silva, Sylvain Telley, Jamie Townsend, Valerio Villa, Laurent Zwahlen

PROJECT LEADERS AND ADDITIONAL ACADEMIC PARTNERS



HES-SO Fribourg

Roland Scherwey (PL FR), Wolfgang Berns., Vincent Bourquin, Danielle Burkhard, Maurizio Caon, Claire Casteran, Philipp Eickelmann, Marc-Antoine Fénart, Tony Licata, Laurent Pichon, Thomas Probst, Gabriel Python, Vincent Robatel, Gabrielle Thurnherr

HES-SO Vaud

Romuald Mosqueron (PL VD), Mokhtar Bozorg, Yorick Brunet, Mauro Carpita, Yves Delacrétaz, Matthieu de Lapparent, Antoine Giralddi, Yann Lederrey, Sylvain Pasini, Luca Tomasini