DIGITAL TWIN

Position Statement

Through the Digital Twin concept, SWARCO is redefining the way traffic is monitored, analyzed, and optimized. By creating real-time, data-driven virtual counterparts of physical infrastructure, digital twins enable a deeper understanding of current traffic conditions and offer forecasting capabilities to anticipate near-future developments. This technology stack serves as a key enabler for comprehensive real-time overview of the entire traffic ecosystem and proactive management, providing cities with the insights needed to make informed, strategic decisions.

A Digital Twin of a mobility system relies on a continuous real-time data feed into the system. This data is extrapolated in space to create a complete digital replica of the road network that allows cities to monitor traffic without blind spots. Beyond operational benefits such as improving traffic flow or incident response, this technology empowers cities towards a truly holistic mobility management by maximizing the value of real-time data and intelligent infrastructure. By harnessing real-time data and intelligent traffic systems, this technology empowers urban planners to create more livable and sustainable environments by maximizing the value of real-time data and intelligent traffic management systems. With Digital Twins as a crucial building block for the future of mobility, SWARCO is shaping a smarter, more adaptive and proactive approach to traffic management - improving the optimization of infrastructure, enhancing sustainability, and ensuring seamless movement for people and goods.

Why are Digital Twins relevant?

For Road Users

- **Real-Time Traffic Optimization -** Reduced congestion and enhanced safety
- **Seamless Navigation & Parking** – Improved smart routing and parking guidance
- **Eco-Friendly Mobility** – Reduced traffic-related emissions through optimizing traffic flow and promoting sustainable transport modes

For Customers (Cities, Transport Authorities, Businesses)

- **Optimized Traffic Management** – Data-driven decisions based on comprehensive and real-time network monitoring
- **Increased Public Satisfaction –** Leveraging data to support effective policy implementation

For Us

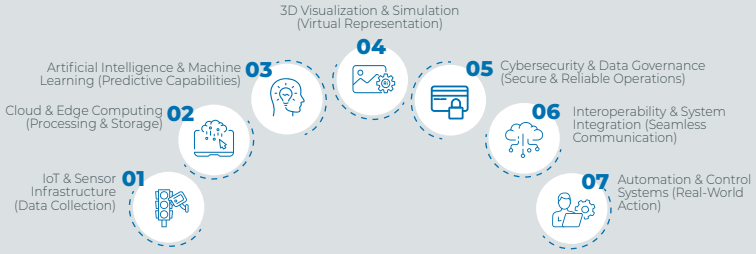
- **Enhancing Safety & Reliability** – Solutions that make roads, vehicles, and mobility systems more resilient and future-ready
- **Driving Innovation in Smart Mobility** – Future-proof systems that address to changing trends and needs
- **Building Sustainable Infrastructure** – Environmentally friendly and efficient mobility networks

Statement: What is a Digital Twin?

"A Digital Twin is more than a mirror - it's a living, real-time model of movement and infrastructure. It enables cities to simulate, predict, and instantly respond to changing conditions, optimize flows, reduce emissions, and design greener, smarter systems. By turning live data into foresight, it drives us toward a future where mobility is not just efficient, but truly sustainable."

Matti Korvenmaa, Fast Prototyping Lead

Technological Pillars



Megatrend: Digital Twins Enabling Eco-Intelligence amid Climate Change and Urban Growth

Real-Time Data Integration

Real-time data integration and IoT-connectivity to create a dynamic, up-to-date digital replica that reflects actual traffic conditions, allowing for responsive and adaptive traffic management.

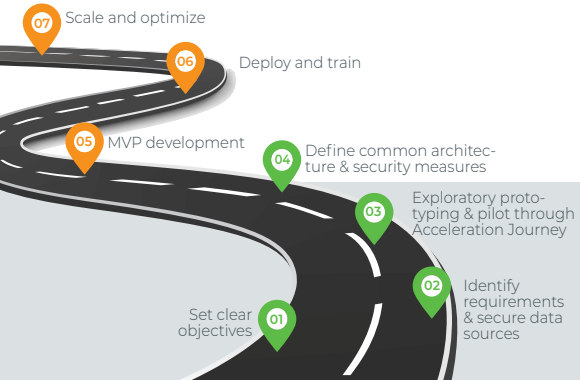
AI-Powered Predictive Analytics

AI-Powered Predictive Analytics to test scenarios before implementation, minimizing risk and optimizing outcomes

Human-Centric Urban Mobility Planning

Sustainable and Human-Centric Urban Mobility Planning modelling the environmental impact of traffic systems, evaluating multimodal transport options and helping planners design livable and eco-friendly cities

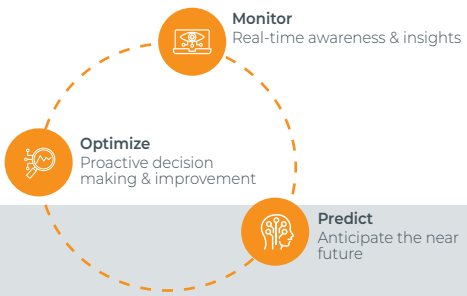
Roadmap



Why is the advancement of Digital Twins crucial?

- Integration with Autonomous Vehicles & V2X Communication
- Improved management of planned events and unplanned incidents
- Smart Infrastructure Planning

Adaptive Improvement Cycle



We are balancing Innovation with Responsibility, ensuring:

- Data Privacy & Protection
- Ethical & Fair AI Decision-Making
- Cybersecurity & System Resilience
- Governance, Regulation & Accountability