SmartRail Ecosystem

With Co-Innovations towards global markets.

- SmartRail intends to become the market's most attractive provider of services integrated into tram systems
- We are targeting at sustainable mobility, seamless travel chains and user-centric services
- The technological focus is to deliver the best tram in the world in terms of passenger and life-cycle services
- SmartRail provides solutions that improve tram safety and flexibility as we move towards autonomous traffic
- Increasing ecosystem promotes competitiveness and creates new business by means of systematic co-creation
- R&D&I is accelerated through agile experiments in the Lyyli Living Lab environment
- <u>https://smartrailecosystem.com/</u>
- <u>https://www.tampereenratikka.fi/en/a-unique-urban-mobility-environment-for-tampere/</u>



Picture: Tampere Tramway Ltd.

SmartRail Ecosystem & Lyyli Living Lab members



Why Ecosystem? Benefits of the model

- Cross-sectoral co-creation:
 - Customer engagement benefits also the customers themselves
 - Fast & effective way of work
 - Living Lab activities boosting co-innovation & co-development
 - Wider perspectives and varying innovations
 - Future insights (research)
- Risk and cost sharing through collaboration & partnerships:
 - Deepens the understanding of other actors' business
 - Joint offerings
 - Complementing and strengthening one's own skills and competence
- Resource efficiency & co-specialization:
 - Access to resources that are out of reach for individual organisations
 - Harnessing underutilized resources for the use by ecosystem actors
- New revenue and know-how
- New customer relations and markets















From innovation ecosystem to business ecosystem



What is joint offering of an ecosystem?

The Ecosystem joint offering to be pursued refers to

- 1) A product/solution jointly developed by the parties;
- 2) a joint solution that combines/integrates/utilizes products offered separately by the parties; and/or
- 3) a joint market entry plan for the offer in the previous sections.

An agreement has been reached on the division of responsibilities and costs, risks and benefits of customer relationships

SmartRail Ecosystem Technology roadmap

Phase1 201	Ph.	ase2 2020	Phase3 2023	Phase4 2026	Phase5 2028	
DAS		High Automation ir	n Depot Conditional Aut Traffic	omation in	Driverless Vehicle	
Test Lab		Living I	Lab Tram Feeder Conne	ctions Full Sca	le Testing/Validation	
Next Gen Diagnostics Simulators	Reactive Maintenance	Cloud Computing Environment Simulations	Predict Mainte Digital Twin Simulato	tive enance Artificia or tools	ally Intelligent Tram	
New Digital Services		Turnkey Rail Solution			Vehicle as a Service	
Legislation d	levelopment, I	Ethical issues, IPR, Co	ompetences, Education			
Smart Mobil	lity, Passenger	Services (inc. Last-m	nile solutions, Beyond M	aaS), C-ITS		
Virtual Reali	ty, Augmented	J Reality, Enhanced [Driver Experience, Enhar	nced Passenger Exp	erience	
SmartRail Ecosyster	M lic. It was created by and is	s in the property of the relevant comp	pany of the Skoda Group.			

SmartRail Ecosystem evolves in phases supported by Business Finland



3. Innovation phase and Living Lab as a boost for ecosystem activities

3. Innovation phase, Q1/2024 – Q4/2026, budget circa 6 M€

- New main theme: transport and mobility services that connect to the tram system and autonomous urban mobility - including supporting technology and data solutions
- Ecosystem-based business: focus on developing, commercializing and internationalizing the co-offering of the SmartRail Ecosystem
- SmartRail#3 Consortium: GIM, Nodeon, iQ Payments, Moovy, Nodeon, Solita, Tietoevry, Normivalaistus, Traficom, City of Tampere, University of Tampere and VTT
- Will complement the "Rail Solutions from Finland" offering <u>Rail</u> solutions from Finland offering available - Business Finland

Lyyli Living Lab development environment in Tampere tram

- Concrete Living Lab -operations started in spring 2022
- Boost for product development, market references and implementation of sustainable, user-focused and autonomous urban mobility
- Unique development environment, data platform and showcase <u>https://www.tampereenratikka.fi/en/lyyli-living-lab/</u>

Passengers Digital services









SmartRail#3 Use cases



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SmartRail Ecosystem Ongoing projects

Lyyli Living Lab (Pilot Tram)

Testing environment for different technologies and research activities in real TRAM. Offered by Tampere Raitiotie.

Maintenance operations

Maintenance activities based on data, predicitive and proactive operations.

- Mobility services & SmartRail 3rd innovation phase Main target is on urbanites mobility services and connections between public transport vehicles in order to enable development and testing area towards safe and autonomous transport operations.
- Anti-collision system

Object detection system as a part of Anti-Collision system

Monitoring the life-cycle of car body

Online measurement system that predicts the carbody fatigue life-cycle.

Ecosystem-based operations model

Continuous development of ecocsystemic business and strengthening ecosystem health



https://www.tampereenratikka.fi/en/a-unique-urban-mobilityenvironment-for-tampere/

SmartRail Ecosystem Ongoing projects

Multipurpose Simulator

Driver's training and simulator tools for testing and developing new solutions to Tram or it's surrounds.

Automated depot concept

Safety analysis and requirements of Autonomous Depot operation.

 Passenger counting/monitoring system based on neural network solution

Coming to Tampere Trams by using Tram's camera feeds and weight sensors located in bogies.

Urban Rail Cloud

Cloud based solution for distributing the data to different stakeholders.

Electric Map Assistance

Driver's assistance system for speed limits and doors control on stops. Statuses shown on driver's display helping driver to make right decisions.

Bogie and Track observation

Based on vibration and wheel measurement data, system predicts maintenance activities of the track and wheels as well as gives feedback to driver about effect of driving style (comfort level)

Door systems

Requirements of the door systems when moving towards autonomous Tram operations.

Composite materials

Use of composite materials for reducing weight of the structures.

HVAC system

Using of UV light and different filters for cleaning air inside the Tram.

Accurate positioning systems

Different methods for determinating Tram's location. Radar, GNNS, Following mapped points on track, LIDAR pointcloud.

Virtual Reality tool

Virtual Reality as a tool for designing accessible public transportation services

SmartRail Ecosystem

This item is classified as Public. It was created by and is in the property of the relevant company of the Skoda Group.

SmartRail Ecosystem boosting experiment-based development

Companies:

- Partnerships with other companies and cities
- Validated solutions & market references (use-cases)
- Research & Development & Innovation, business growth & exports

City actors

- Tampere Tramway Ltd., Kaupunkiliikenne Ltd.:
- EXAMIPLES TO ECOSYSTEN BENEFITS STEM ACTORS Solutions to develop tram functions & operation, travel/passenger experience, and maintenance
 - Tram driver training: training simulator
 - Safe pathway to tram automatization
- City of Tampere:
 - Sustainable, energy-efficient and safely automated urban mobility
 - Fluent & attractive user-focused mobility services to create sustainable modal shift
 - Execution of strategic goals (SUMP, Data-Driven City for Citizens program...)

Other public organisations

Traficom: Needs to develop regulation, safe pathway to automated urban mobility & knowledge and capabilities related to requirements of automation and urban rail transport

Research organisations (VTT, TUNI, KAMK, LUT ...) :

- Applied research to solve concrete challenges (e.g. use-cases planned together with cities and companies)
- Competence development, research alignment, utilization of EU funding

Key elements for successful ecosystem evolvement

Visions beyond the horizon

> ambitious goals

Tight cooperation with the customers and listening their intensions

> create products your customers want and need

Commitment of companies' strategy and top management for the common targets

resources for collaboration & product development

Strong support from states level, not only mental but also participation to RDI funding

bridging the gap from research to viable business

Vision and goals divided to short term targets based on the maturity level of the technology

> low-hanging fruits to enable funding with new products towards final target

Open atmosphere and well-formed shared benefit models

collaboration to create new business through joint offerings

Research activities to support companies' goals

> newest knowledge & know-how to create innovations & new business

Testing areas as near as possible same as real world

> physical & digital living labs & testbeds enabling rapid testing, productization & commercialization



We help our customers turn science into practical innovations



SmartRail Ecosystem & Lyyli Living Lab Day 11.6.2025 (Tampere + Online)

9:30-11:30 SmartRail Ecosystem Day (Live + Webinar)

- Status of SmartRail Ecosystem
- 3rd innovation phase of SmartRail Ecosystem
- Keynote by City of Tampere
- Building joint offerings in ecosystems
- SmartRail#3 usecases & company presentations

13:00-14:00 Lyyli Living Lab: Utilizing Lyyli tram in R&D (Live + Webinar)

- Examples of utilizing Lyyli Living Lab in research and development & product development
- How to utilize Lyyli Living Lab & how to get involved
- Discussion

https://www.tampereenratikka.fi/smartrail-ecosystem-lyyli-living-lab-day/

02/06/2025 VTT - beyond the obvious https://smartrailecosystem.com/



Thank you!

www.smartrailecosystem.com

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