

Korea-EU Horizon Europe Researchers Networking Forum on Energy & Advanced Mobility on Energy & Advanced Mobility

Boglárka Eisinger Balassa

Széchenyi István University, Vehicle Industry Research Center



Széchenyi István University & JKK Introduction

Széchenyi István University – Vehicle Industry Research Center (SZE-JKK)

- Located in **Győr, Hungary** – 14,000 students, strong engineering focus
- Established in 2012 (E-Mobility) and expanded in 2017 (Autonomous Systems)
- Four research groups:
 - **Social & Technological Acceptance of Innovation**
 - **Autonomous Transport Systems**
 - **Mobile Robotics & Industry 4.0**
 - **E-Mobility**
- Bridging **engineering and human sciences for holistic R&D**
- Access to **ZalaZONE** Proving Ground and advanced test infrastructure



Research Focus and Objectives

Understanding Human Responses to Autonomous Systems

Aim: Explore how users perceive, trust, and interact with automated mobility

Research questions:

- What factors influence user trust in automated systems?
- How can fear and uncertainty be reduced during automation transitions?
- How does familiarity shape technology acceptance?



Contributing to Horizon Cluster 5 objectives on safety, resilience, and social acceptance.

Proposed Research Design & Methodology

Quantitative

- Questionnaire-based analysis (TAM, UTAUT, Technology Trust Model)
- Eye-tracking, galvanic skin response – implicit trust & fear measures
- Process modelling with P-Graph and scenario-based analysis

Qualitative

- In-depth Interviews: Policy-makers, developers, and test drivers – expectations, ethical and regulatory concerns
- Focus Groups: Discussions with citizens on social acceptance and community-level impacts



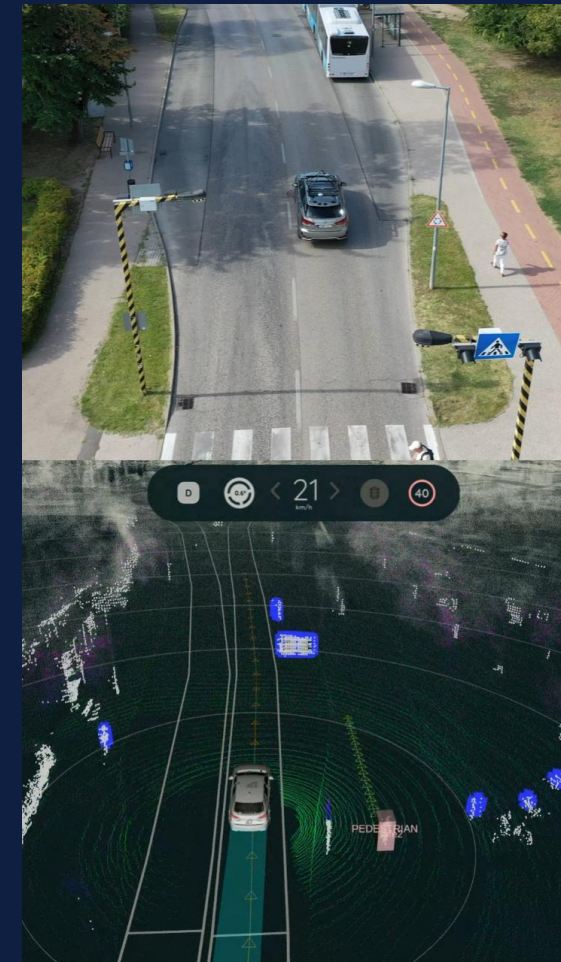
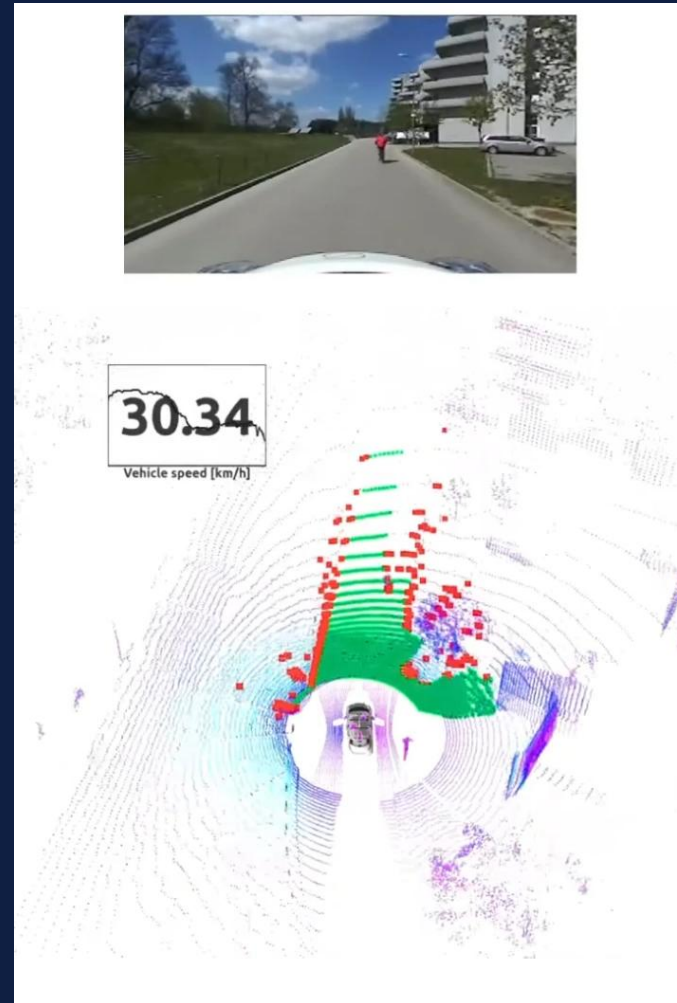
Integration

Combining behavioural, emotional, and contextual data to build comprehensive acceptance models for **CCAM systems**



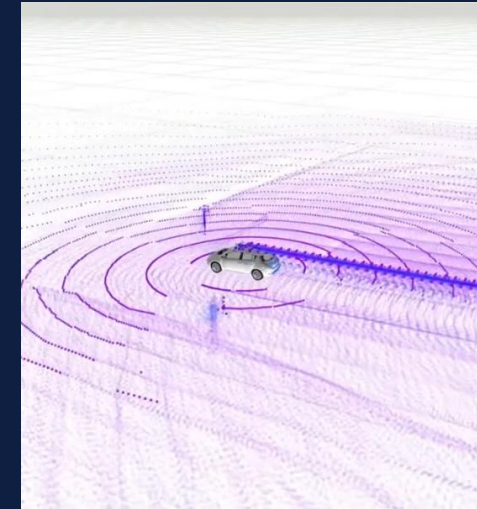
Core Technologies for Autonomous Vehicle Development and Testing

- **ROS 2 only / ROS 2 + Autoware**
- **Road detection**
- **Object detection**
- **Object tracking**
- **Obstacle avoidance**
- **Real world testing**
- **Simulation**
- **3D mapping and HD MAP**
- **V2X**
- **Energy efficient drive**



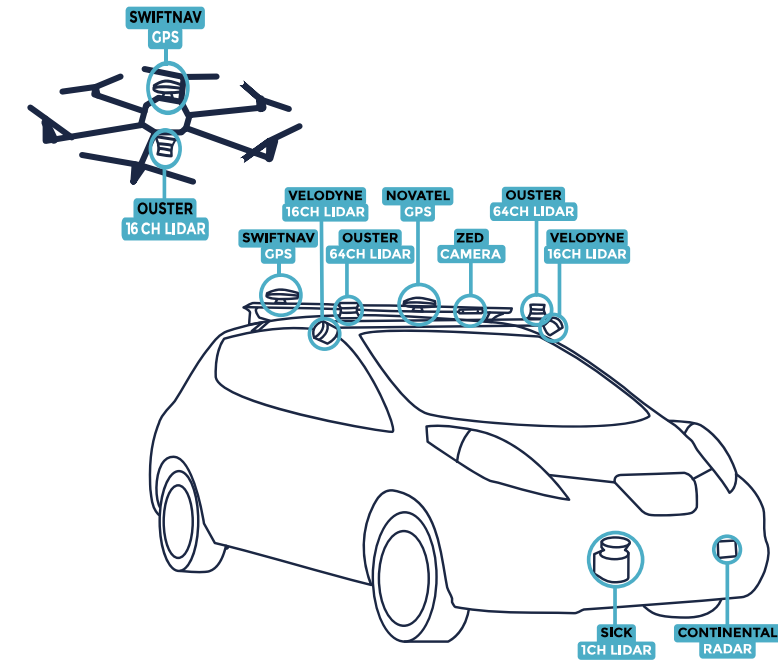
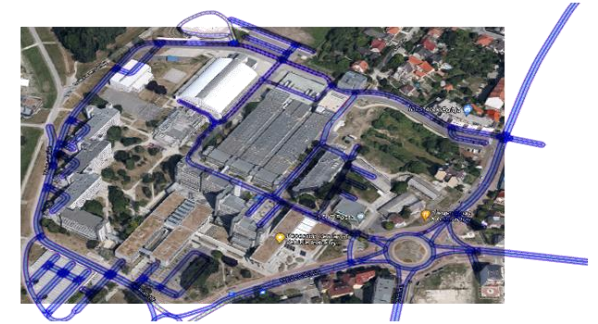
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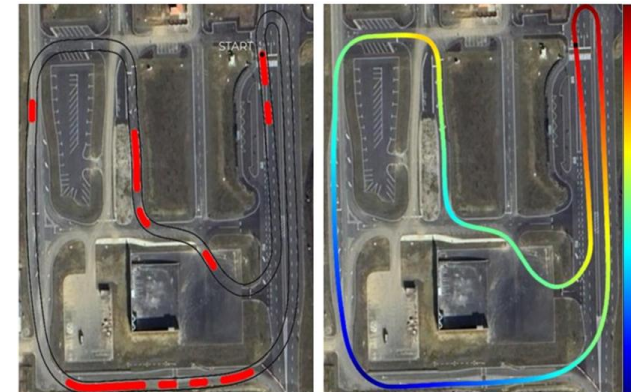
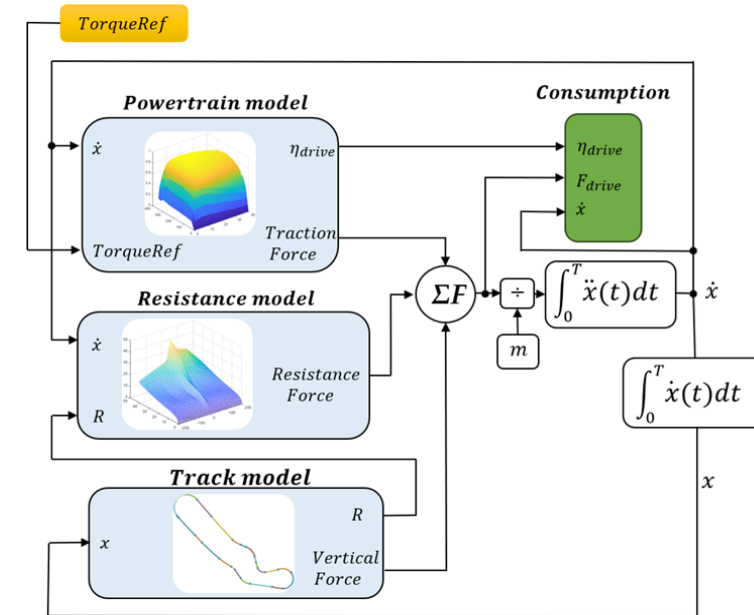
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Researchers



Dr. Boglárka Eisinger Balassa

Habilitated Associate Professor

- PhD in **Business & Organizational Sciences**, Széchenyi István University

Research Interest

Consumer trust, acceptance, and behavioural responses toward emerging technologies.

Integration of **social, psychological and technological models** in decision-making

Application sectors: mobility, transport, smart cities, public services

Achievements

147 publications

20+ projects (e.g. Erasmus+)



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Researchers



Dr. Ernő Horváth

Research Engineer

- PhD in **Perception & Trajectory Planning for Autonomous Robots and Road Vehicles**, Széchenyi István University

Research Interest

Computer Vision & LiDAR Perception in autonomous mobility
(road, sidewalk detection)

Trajectory Planning & Path Following Algorithms (multi-goal
pursuit, clothoid-based planners)

Real-time embedded systems, FPGA, real-time control for
autonomous platforms

Achievements

68 publications

20+ projects



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Researchers



Dr. Buics László

Associate Professor

- PhD in **Data Management in Supply Chain Management**, Széchenyi István University
- **Program Director** of the Széll Kálmán College of Economics and Data Science.

Research Interest

Data management, digital transformation, and logistics in mobility ecosystems

Business process modelling and optimization, KPI-based evaluation of service systems

Simulation models (discrete event), supply chain risk and resilience analysis

Integration of public service processes and mobility innovations

Achievements

114 publications

20+ projects



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Interested Calls for Proposals

HORIZON-CL5-2026-10-D6-01: Flagship-pilot: large-scale demonstrations of CCAM (CCAM Partnership)

- The Vehicle Industry Research Centre at Széchenyi István University combines **engineering excellence and social science expertise** to support Europe's CCAM flagship pilot.
- We can contribute through **demonstration-oriented engineering research, simulation-based development, and societal acceptance studies** addressing human–technology interaction, trust, and readiness for CCAM deployment.

Area	JKK Competence	Role in Consortium
CCAM Demonstration & Engineering	ZalaZONE, ROS2, Autoware, AI-based simulation	Demonstration & Engineering R&D Partner
User & Societal Research	Acceptance models (TAM, UTAUT, Trust), surveys, physiological data	SSH Work Package Leader
Simulation & Connectivity	Software-in-the-loop, digital twin, V2X integration	Technical Research Partner
Policy & Business Aspects	Industry collaboration, regulatory and business insight	Advisory & Dissemination Partner

Interested Calls for Proposals

HORIZON-CL5-2026-10-D6-02: Geopolitical competition and socioeconomic resilience in CCAM: an innovation and policy roadmap for EU leadership (CCAM Partnership)

- Our research integrates **economic modelling, social acceptance analysis, and AI-driven foresight** to understand how geopolitical, technological, and social factors influence CCAM adoption.
- We can provide **evidence-based insights** for policymaking, business strategies, and governance models to enhance Europe's **technological sovereignty and societal resilience** in automated mobility.

Area	JKK Competence	Role in Consortium
Socioeconomic & Policy Analysis	Market foresight, governance studies, economic modelling	Policy & Foresight Research Partner
Human-Centred Research	Technology acceptance, trust, behavioural insights	SSH Work Package Leader
Simulation & AI Tools	AI-based analytics, digital twin integration	Technical Research Partner
Dissemination & Impact	Cross-sectoral collaboration, stakeholder engagement	Communication & Dissemination Partner

Interested Calls for Proposals

HORIZON-CL5-2027-06-D6-04: Holistic solutions for CCAM integration in critical scenarios (CCAM Partnership)

- Our research focuses on **resilient CCAM solutions** that combine engineering, simulation, and behavioural studies to address **critical and high-risk traffic situations**, such as system failures, extreme weather, or emergency conditions.
- We contribute to developing **human-centred and data-driven frameworks for risk perception, trust, and decision support**, integrating technical testing at **ZalaZONE** with societal research to ensure safety, transparency, and public acceptance.

Area	JKK Competence	Role in Consortium
Engineering & Safety Testing	ZalaZONE, ROS2, simulation, AI-based perception	Technical R&D Partner
Human Factors & Behaviour	Trust, stress, decision-making, psychophysiological studies	SSH & Human-Factors Research Partner
Resilience & Decision Support	Data-driven analysis, emergency management frameworks	Technical & Modelling Partner
Communication & Training	User engagement, safety awareness, dissemination	Communication & Dissemination Partner

Interested Calls for Proposals

HORIZON-CL5-2026-10-D6-10: Enhanced resilience in multimodal passenger transport through digital technologies and generative and discriminative AI

- Our research aims to strengthen the **resilience of multimodal transport systems** by integrating AI-based prediction, digital twins, and real-time data analytics to anticipate, manage, and recover from disruptions effectively.
- We combine engineering innovation, decision-support modelling, and social science expertise to enhance public trust, safety, and adaptive response in critical transport scenarios — linking ZalaZONE testing with human-centred behavioural research.

Area	JKK Competence	Role in Consortium
AI & Digital Technologies	Generative AI, ROS2, digital twin modelling, real-time simulation at ZalaZONE	Technical & Data Modelling Partner
User & Behavioural Research	Trust and perceived safety analysis, behavioural response studies, physiological measurements (eye-tracking, stress)	SSH Work Package Leader – User Response & Trust
Decision Support & Policy Modelling	Scenario analysis, P-graph methodology, system control and resilience modelling	Policy & Decision Support Contributor
Training & Dissemination	Human–AI interaction training, emergency simulation workshops, communication strategies for public confidence	Training & Dissemination Partner

Why Collaborate with Us – Our Uniqueness

Cross-Disciplinary Thinking

We work at the intersection of **engineering, artificial intelligence, and social sciences**, creating solutions that are not only technically sound but also **socially accepted and sustainable**.

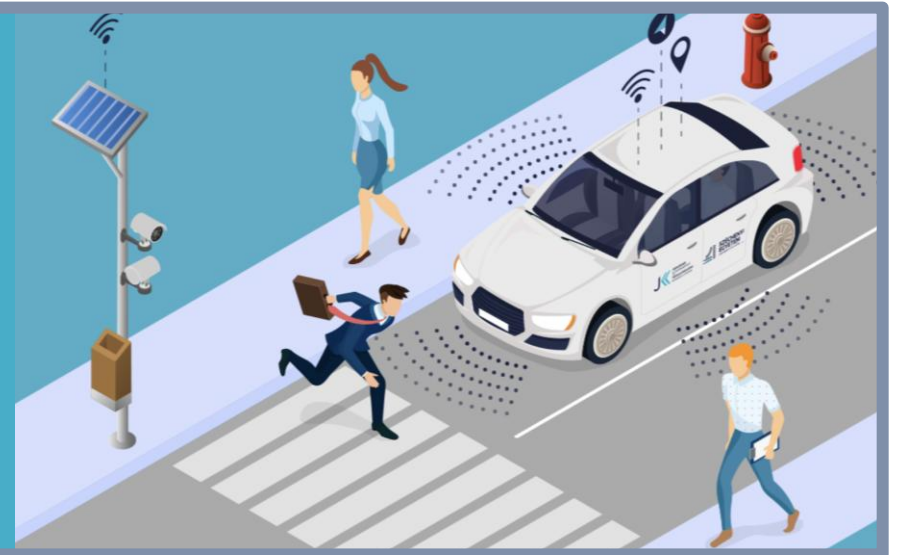


Key Facility

ZalaZONE Proving Ground & Simulation Labs (ROS2, digital twin, human-in-the-loop testing)

SZE–JKK's Research Competences include:

- **Interdisciplinary expertise** across engineering, AI, and behavioural sciences
- **Proven methods** in technology acceptance, simulation, process modelling (P-graph), and AI-based decision support
- **Advanced testing infrastructure** via ZalaZONE Proving Ground – ideal for validating autonomous and connected systems
- **Integration of human, social, and technical perspectives** to assess trust, resilience, and acceptance in automated mobility



Thank You for Your Attention!



Contact details

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<https://jkk-web.sze.hu/en/>