NATIONAL LABORATORY FOR AUTONOMOUS SYSTEMS

AUTONOMOUS SYSTEMS DO WATCH, DECIDE, PRODUCE, DRIVE, AND EVEN FLY

The National Laboratory for Autonomous Systems aims to coordinate mobility-related research, development and innovation solutions for road and air vehicles and robots, with a focus on complex systems, formations and applications requiring autonomous and cooperative operation.

MAIN RESEARCH AREAS

- Autonomous road and air vehicles
- Autonomous robotics and manufacturing systems
- Management planning strategies
- Vehicle dynamics and control
- Cooperative management
- Robotics modelling and control
- Mobile robotisation
- Applied research infrastructure
- Infocommunications
- Systems integration research
- Electromobility
- Digital twin, mathematical modeling, simulation

CONSORTIUM LEADER:
HUN-REN Institute for Computer Science and Control

CONSORTIUM PARTNER:
Budapest University of Technology and Economics
Széchenyi István University

PROJECT NUMBER: RRF-2.3.1-21-2022-00002

FUNDING PERIOD: 04.01.2022 - 12.31.2025

OVERALL BUDGET: 6.227.207.003 HUF

BENEFITS TO BE EXPECTED FROM LABORATORY RESEARCH

Address research and development challenges related to mobility provided by road and air vehicles and mobile robots; demonstrate the functional and cooperative operation of such systems; and coordinate the necessary research, development and innovation activities.

Address research challenges in an efficient and innovative way through coordinated cooperation between the national professional and research community on mobility.

Create an effective professional network, which will provide a platform for R&D activities in the field of autonomous systems, and will also provide an opportunity for knowledge transfer between ARNL participants and other universities, research institutes, industry, and SMEs.

Accelerate development work on general and dedicated cyber-physical manufacturing and logistics systems.

Increase the social acceptance of autonomous vehicles by better communicating the related R&D results in a more coordinated way, better reflecting the collaboration between industry and research, better highlighting the societal benefits of the results and in a way that is understandable to the general public.

Further purpose of the project is to strengthen the environmental exploitation of autonomous vehicles and mobile robotics.

Support research institutes and industrial actors, SMEs and educational institutions linked to the ARNL professional network in their efforts to become an integral part of the Hungarian innovation ecosystem in the field of autonomous systems research, development and related innovation, and thus to increase the competitiveness of the country.
Support the educational and technical institutions of higher education, both within and outside the Consortium, in their efforts to modernise and update their BSc, MSc and PhD programmes, their training courses and their trainee programmes for university students in the field of autonomous systems.

Thoughtfully disseminate knowledge needed to conduct research in the field and to effectively implement related developments, through innovative knowledge transfer mechanisms and traditional higher education channels.

THE PROFESSIONAL TEAM

Péter Gáspár, DSc, head of the National Laboratory (HUN-REN SZTAKI). His research interests include linear and nonlinear systems, robust control, system identification and identification for control purposes, and artificial intelligence methods. His industrially motivated interests include mechanical systems, vehicle structures, vehicle dynamics, and vehicle control.

Zsolt Szalay, PhD, Lead Researcher (BME). His main research interest is automated vehicle control beyond dynamic limits and uniquely combining automated mobility systems' virtual and physical testing methodologies. He has been engaged with automotive innovation for nearly 30 years and has headed the research and innovation activities of the ZalaZONE Automotive Proving Ground for eight years, leading research on the testing and validation methodologies of connected, cooperative and automated vehicles. He is the founder and leader of the BME Automated Drive Lab research group, offering beyond state-of-the-art solutions for highly automated and autonomous vehicle systems.

József Váncza, PhD, Lead Researcher of the Robotic modelling and control workpackage (HUN-REN SZTAKI). His research focuses on the interplay of artificial intelligence, manufacturing science, production engineering and operations management. He contributed to the development of cyber-physical production systems, advanced planning in production and energy management, autonomous robotics as well as to cooperative and sustainable production. He is co-inventor of ten registered international patents.

Bálint Vanek, PhD, Head of Autonomous Aircraft Research within the NL (HUN-REN SZTAKI). His research interests include the analysis and synthesis of fault-tolerant, robust control systems and estimation methods for control purposes, with particular interest in aeroelastic phenomena of passenger aircraft and the remote sensing challenges of unmanned aerial vehicles.

Ferenc Szauter, PhD, Lead Researcher, (SZE). His research interests include alternative transport systems, infrastructure management and operations research. The research project, "Dynamics and Control of Autonomous Vehicles in Synergy with the Requirements of Automated Transport Systems" was successfully completed by his leadership as a result of the establishment of a professional team for the research and development of autonomous vehicles at the Széchenyi István University in Győr.

POSSIBLE PARTNERSHIPS

- Domestic and international automotive industry partners: formulating common research and development goals
- International research institutes: participation in joint EU tenders

TARGET GROUP

- Students and young researchers in higher education: research careers
- Automotive industry: joint research, development, and testing
- Domestic and international research institutes and organizations: global embedding, cooperation

PLACES OF IMPLEMENTATION:

- Budapest
- Győr
- Kecskemét
- Zalaegerszeg
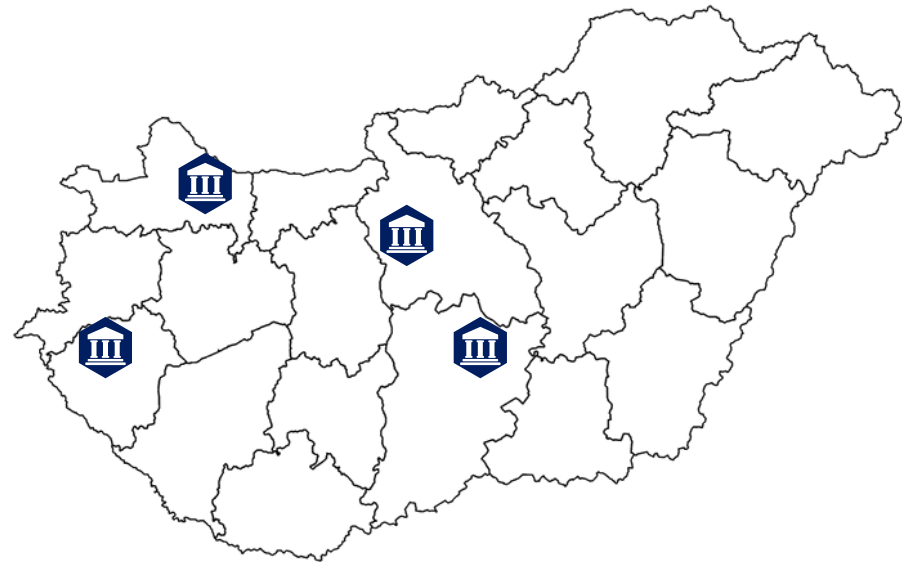
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