NATIONAL LABORATORY FOR COOPERATIVE TECHNOLOGIES

BUILDING UP AND DEVELOPMENT OF DUAL USE INNOVATION CAPACITIES AND COMPETENCIES

The National Laboratory for Cooperative Technologies builds and develops dual use innovation capacities and competencies. Its main goal is the physical and content realization of an “innovation space” that plays a key role in the digitization, research and development of industry and the relating dual use industry at both national and regional levels.

MAIN RESEARCH AREAS

- Off-road unmanned ground vehicles
- Drone technology
- Network centric cooperative automation
- Bionics, robotics
- Additive manufacturing and material technology

CONSORTIUM LEADER:

TECHTRA Technology Transfer Institute Pbc. Non-Profit Ltd.

CONSORTIUM PARTNERS:

Budapest University of Technology and Economics

CollMot Robotics Ltd.

Femtonics Ltd.

Hungarian University of Agriculture and Life Sciences

HM Electronics, Logistics and Asset Management Ltd.

MouldTech Systems Kft.

HUN-REN Institute for Computer Science and Control

Széchenyi István University

University of Szeged

National University of Public Service

University of Pécs

ZalaZONE InnoTech Nonprofit Ltd.

PROJECT NUMBER: 2022-2.1.1-NL-2022-00012

FUNDING PERIOD: 01.12.2022 - 31.10.2026

OVERALL BUDGET: 10.412.083.434 HUF

HUNGARIAN NATIONAL LABORATORY

NATIONAL RESEARCH, DEVELOPMENT AND INNOVATION OFFICE HUNGARY

PROGRAM FINANCED FROM THE NRDI FUND

BENEFITS TO BE EXPECTED FROM LABORATORY RESEARCH

Off-road, terrestrial autonomous vehicles

- Implementation of real-time automated operation of off-road vehicles using static maps and dynamic environment sensing, implementation of a working prototype
- Methodology for the semi-automatic generation of maps supporting static field autonomy

Network-centric, cooperative automation

- Common control system of ground and air autonomous platforms integrated into a cooperative network, with real-time communication, real-time detection and intervention, integration with the C2/C4 systems currently in use via standard interfaces
- Implementation of a security application system on a real site

Drone technology

- Development of a small drone conforming to military standards with the option of swarm control
- Development of a VTOL type drone with a payload of 25 kg, implementation of a working prototype
- Scalable battery management system and control electronics applicable to drones
- Laser drone defense prototype system

Robotics, bionics

- Implementation of a special body sensor product
- AR/VR remote manipulation SW
- Experimental implementation of exoskeleton models
- Smart clothing pilot implementation
- Smart clothing data integration SW

Additive manufacturing and material technology

- Development of comprehensive metal, polymer 3D printing and composite material technology competence
- Application of additive technology in relation to the devices developed in the project

THE PROFESSIONAL TEAM

Scientific director:

Dr. Viktor Tihanyi (TECHTRA) division leader, former university associate professor at the BME, previously professional leader of several domestic and international research project consortiums, in addition to research work, he has 14 years of industrial experience in development and management positions, he has a degree in electrical engineering and mechanical engineering, his main research area the autonomous systems.

Researchers leaders:

Dr. István Varga (BME) is a doctor of the Hungarian Academy of Sciences, deputy dean of the Faculty of Transportation and Vehicle Engineering. His main research area is the modeling and management of road traffic processes. The most important results of his research work are the measurement and estimation of traffic parameters, as well as the development of new, efficient control strategies and algorithms.

Prof. Dr. György Wersényi (SZE) is a lecturer and researcher at the Telecommunications Department of SZE. His area of expertise is wireless communication technologies, communication and security problems of autonomous control systems. Doctorate in Germany, habilitation in 2013, university professor from 2016, dean of the Faculty of Mechanical, Information Technology and Electrical Engineering from 2020

Dr. Kónya Zoltán (University of Szeged, SZTE) Professor, Head of the Doctoral School of Environmental Science, Vice-Rector for Scientific Affairs & Innovation at the University of Szeged. Internationally recognized researcher in the field of chemistry of nanostructured materials; in recent years, he has typically dealt with the synthesis, characterization and use of one-dimensional nanostructures (carbon and titanate nanotubes). His area of expertise is the environmental chemistry of nanostructures. The goal of his research is to produce and qualify new materials with his colleagues that can be used to achieve a breakthrough in the field of nanotechnology and environmental technology in the production of products with high intellectual added value. Co-author of more than 300 international publications (IF >900), number of independent references ~6200, Hirsch-index 44; Co-inventor in 13 patents. He is an editorial board member and co-editor of several journals, a reviewer and jury member of international research funds. He regularly teaches at all levels of higher education. Recognitions: MKE Bench Award (1994), MTA Polányi Mihály Award (2003), OTDT Master Teacher Gold Award (2015), MTA Ernő Pungor Award (2015), GDCh George Hevesy Award (2017), MTA Grant Bench Award (2018), Dénes Gábor Award (2018).

Dr. Bálint Vanek (SZTAKI) is the senior deputy of the System and Control Theory Research Laboratory, the head of the Flight Control and Navigation Research Group. Consortium leader of the FLEXOP and FLiPASED H2020 tenders, as well as consortium member of several tenders funded by FP7, H2020, ONR and ESA, member of the Autonomous Systems National Laboratory Project Steering Board.

Dr. József Betlehem (PTE): habilitated university professor, vice chancellor of the University of Pécs. His field of research is the examination of the physical and psychological performance of nursing and medical staff working in extreme conditions, with particular attention to paramedics and paramedics working in rescue. The investigations of his working group also cover the decision-making and stress-tolerant abilities of normal individuals.

Dr. Weltsch Zoltán (ZalaZONE InnoTech), (ZalaZONE InnoTech) Head of ZalaZONE's Research & Innovation Department, Associate Professor, Manager of the Innovation Park of Zalaegerszeg of Széchenyi István University. His research areas: Bonding technology of hybrid material pairings, Vibration-based stress relief procedures.

Dr. Péter Kiss (MATE) is a university professor, head of department at the Department of Vehicle Technology of the Technical Institute of the Hungarian University of Agricultural and Life Sciences. Mechanical engineer and technical development engineer. His education and research area: internal combustion engines, road and off-road vehicles, vehicle energetics and off-road driving theory. He is a member of the editorial board of the professional journals Journal of Terramechanics, Journal of Tekirdag Agricultural Faculty and Haditechnika. He is a senior board member and former president of the International Society for Terrain-Vehicle Systems (USA). He is the leader of several research projects.

Dr. Zoltán Krajnc (NKE) Broadcast engineer, engineer-teacher, officer with operational-combat qualification, aviation and air defense force major, PhD in military sciences, head of department, academic deputy dean, university professor, his research area is the specifics of air operations planning; Air Warfare Doctrines; Defense against ballistic missiles; Air component of the fight against terrorism; Development history of air defense missile technology. Project experience: TÁMOP project manager and scientific leader, KÖFOP prominent research leader, ÁROP research leader, OTKA research group leader.

Péter Weisz (HM EI), division director, computer science degree at the Budapest University of Technology, his strengths are project management and business analysis. He participated in project planning and management in many projects, among others; JUSTEUS, Dermahelp, Monsearch, Lexpert, MonSpeech.
Dr. Rózsa Balázs (Femtonics) (b. 1974) physician, physicist, doctor of neurosciences. He obtained his PhD degree in 2007 at the Hungarian Academy of Sciences' Experimental Medical Research Institute (MTA KOKI), but since 2005 he has been the head of the team developing 3-dimensional two-photon microscopes at the institute. Founding managing director and scientific director of Femtonics Kft., since 2010 group leader at MTA KOKI and Pázmány Péter Catholic University.

POSSIBLE PARTNERSHIPS

The consortium has many members, covering both the academic and the industrial sectors, in which we can make good use of the already existing extensive contact networks.

In addition to all this, we would like to expand the relations with the partners detailed in the target groups section, on the industrial, academic and user sides.

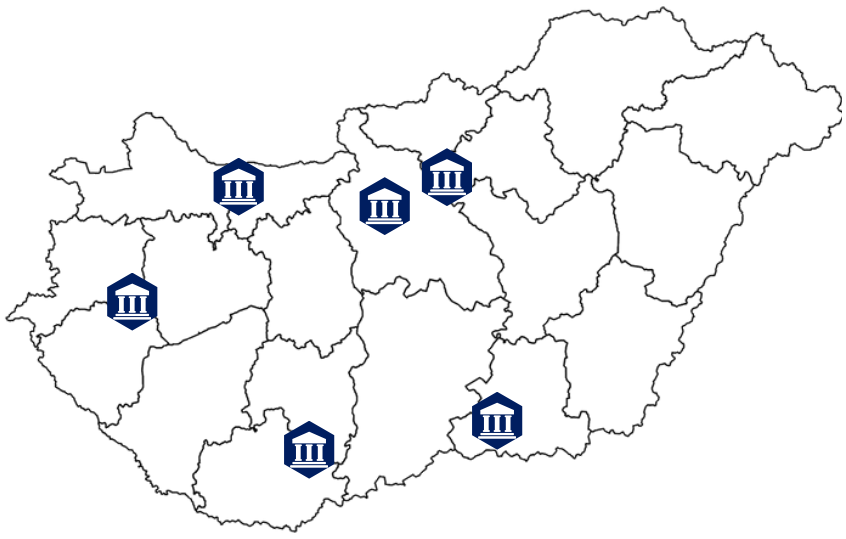
Foreign programs can also be considered, we are negotiating with, for example, the Swedish WASP program, which has set similar goals with significantly higher budget. It would be advantageous to involve participants in the NATO DINANA program and collaborators in the EDA and EDF tenders.

TARGET GROUP

- University students: topic promotion, academic work support
- PhD students: support for scientific work
- Development companies for civil applications: e.g. agriculture
- Civil deployment companies: Agricultural estates, users
- Military and other defense development companies
- Users for military and other defense purposes, such as Hungarian Defense Forces, disaster management, border protection, foreign customers

PLACES OF IMPLEMENTATION:

- Budapest
- Gödöllő
- Győr
- Pécs
- Szeged
- Zalaegerszeg



PROFESSIONAL CONTACT

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