

„PNRR: Fonduri pentru România modernă și reformată!”

National Competence Centre and solutions for the development of Climate Neutral and Smart Cities



Deliverables - Project 4

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Deliverables - Project 4

P4.D1.1. A partnership with public authorities from different levels of governance in order to identify research, development and innovation solutions related to EU missions within Horizon Europe

On 25 July 2023, a five-year collaboration protocol was signed between the NetZeRoCities Competence Center, Ștefan cel Mare University of Suceava, and the Municipality of Suceava. The partnership was established to support the objectives of the EU Mission “100 Climate-Neutral and Smart Cities by 2030” and to identify and develop research, development, and innovation solutions aligned with Horizon Europe missions. The collaboration leverages academic expertise, administrative capacity, and the resources of the NetZeRoCities Competence Center to accelerate the transition towards climate neutrality and smart urban development, while strengthening the regional innovation ecosystem and increasing Romania’s participation in European smart city initiatives.

P4.D1.2. A partnership with civil society in order to identify research, development and innovation solutions related to EU missions within Horizon Europe

Within this deliverable, a collaboration agreement was established between the NetZeRoCities Competence Center, Ștefan cel Mare University of Suceava, and the CYGNUS Scientific Society. The partnership aims to identify and promote research, development, and innovation solutions related to Horizon Europe missions, with a particular focus on smart and sustainable mobility. The collaboration supports the development of joint projects funded through national and European programs, promotes the activities of the NetZeRoCities Competence Center, and contributes to the creation of national and international cooperation networks for sustainable development and climate-neutral communities.

P4.D1.3. Architecture and technology for hybrid V2X communications

This deliverable presents the design and implementation of a hybrid V2X

communication architecture intended to support information exchange among vehicles, infrastructure, and other traffic participants in smart mobility scenarios. The architecture integrates complementary communication technologies, including 5G (provided by Orange Romania), DSRC, VLC, and LoRa, ensuring flexibility, extended coverage, and communication redundancy. The VLC component was developed by USV, while the LoRa component was implemented and tested within the university. The resulting solution provides support for V2X communications adapted to various operating conditions and the specific requirements of intelligent transportation ecosystems.

P4.D1.4. Report on communication infrastructure for autonomous vehicles

The deliverable provides a comprehensive report on the communication infrastructure required for autonomous vehicles, based on an extensive review of more than 250 scientific and technical references. The study identifies the key requirements and specifications of modern V2X communication infrastructures and evaluates the role of major enabling technologies, including DSRC, C-V2X, LoRa, and VLC. The analysis highlights the strengths and limitations of each technology and emphasizes the need for their integration within a hybrid communication architecture. The report concludes that achieving high levels of safety and reliability for autonomous vehicles requires the complementary use of multiple communication technologies.

P4.D1.5. Artificial intelligence algorithms for e-mobility

The deliverable presents a comprehensive analysis of artificial intelligence algorithms applicable to the field of e-mobility, covering both AI fundamentals and major application areas. The study evaluates the use of AI for predictive battery management, route optimization, mobility demand forecasting, and autonomous driving, as well as the methods used for data collection and processing. The report includes implementation examples, case studies, technological challenges, and future research directions, highlighting the essential role of artificial intelligence in improving the efficiency, sustainability, and safety of e-mobility systems integrated into smart city environments.

P4.D2.1. Requirements and Design Report for Intelligent Routing Solutions and Intelligent Urban Dispatch Platform

An analysis of the functional and technical requirements necessary for the development of intelligent routing solutions and the Intelligent Urban Dispatch Platform. This study defines the main system components, data flows, and overall architecture, with the objective of optimizing urban mobility and improving traffic management efficiency.

P4.D2.2. Requirements and Design Report for Human-Infrastructure Platform and Digital Twin Component for Smart Traffic

This report includes conclusions following our analysis on the requirements and design concepts for the Human-Infrastructure Platform and the Digital Twin component dedicated to smart traffic management. The document describes the main functionalities and the integration framework required for monitoring, simulation, and analysis of urban mobility processes.

P4.D2.3. Intelligent Routing Solutions Implemented and 1st version of experimental model for the Intelligent Urban Dispatch Platform

The deliverable presents the implementation details for the first intelligent routing solutions, together with the initial experimental version of the developed Intelligent Urban Dispatch Platform. The solution enables the testing and evaluation of route optimization mechanisms and traffic flow management strategies in various urban scenarios.

P4.D2.4. Human-Infrastructure Platform and Digital Twin Component for Smart Traffic - 1st version of experimental models

The deliverable documents the development of the first experimental version of the Human-Infrastructure Platform and the Digital Twin component. The developed models enable the simulation and analysis of traffic behavior, providing support for the evaluation and improvement of smart mobility services.

P4.D2.5. Implementation Report for Intelligent Routing Solutions and Intelligent Urban Dispatch Platform

This report presents the implementation activities carried out for the intelligent

routing solutions and the Intelligent Urban Dispatch Platform. It highlights the main functionalities developed, the integration of system components, and the results achieved during the validation stages.

P4.D2.6. Implementation Report for Human-Infrastructure Platform and Digital Twin Component for Smart Traffic

This deliverable describes the implementation process of the Human-Infrastructure Platform and the Digital Twin component for smart traffic. It presents the developed functionalities, the integration of data sources, and the system's capabilities to support traffic monitoring and analysis in urban environments.

P4.D2.7. Testing Report for the Intelligent Urban Dispatch Platform, Multimodal Transport Services monitoring platform, Human-Infrastructure Platform and Digital Twin Component for Smart Traffic

The Deliverable summarizes the testing activities and results obtained for the main platforms developed within the project. The evaluations confirmed the functionality, interoperability, and ability of the solutions to support intelligent urban mobility services and advanced traffic management applications.

P4.D2.8. A partnership with civil society in order to identify research, development and innovation solutions related to EU missions within Horizon Europe

The deliverable presents the collaboration agreement signed between the NetZeRoCities Competence Center, Ștefan cel Mare University of Suceava, and the Suceava Chamber of Commerce and Industry. The partnership aims to identify and promote research, development, and innovation solutions relevant to the European Union missions under Horizon Europe. The collaboration strengthens the connection between academia, industry, and civil society, supporting initiatives with an impact on smart mobility and sustainable development.

P4.D3.1. Digital architecture of intelligent infrastructure (and matching between smart city services and sensing layer) – draft technical report

The deliverable presents the conceptual and architectural framework of intelligent digital infrastructure, highlighting how smart city services can be correlated with the available sensor infrastructure. The presented report establishes the development and integration directions required to support digital urban services.

P4.D3.2. A partnership with public authorities from different levels of governance to identify research, development and innovation solutions related to EU missions within Horizon Europe

Within this deliverable, a partnership was developed with local, regional, and national public authorities to identify challenges and innovation opportunities relevant to the European missions under Horizon Europe. The collaboration contributed to defining common research and innovation directions with potential impact on communities and smart cities.

P4.D3.3. Testing report on integration of SHUBs in Smart Campus living lab

The Deliverable presents the testing and validation activities related to the integration of SHUBs within the Smart Campus ecosystem in NetZeRoCities. The results demonstrated their capability to support the collection and exchange of data required for the development and evaluation of smart services.

P4.D3.4. Catalogue of threats, selected infrastructure components and indicators – technical report

This report includes the identification of the main categories of threats relevant to intelligent infrastructures, as well as the definition of the components and indicators used for assessment and monitoring. The document provides a reference framework for risk analysis and for enhancing the resilience of urban systems.

P4.D3.5. Set of requirements for integration of urban infrastructure (focused on mobility infrastructure and sustainability)– technical report

This deliverable defines the requirements necessary for the integration of different urban infrastructure components, with a focus on mobility and sustainability. It presents the key aspects that facilitate interoperability and support the development of efficient, user-oriented urban services.

P4.D3.6. The set-up of testing activities, the results of implementing algorithms and the feedback from the users – technical report

The report summarizes the testing activities carried out in NetZeRoCities, the main results obtained following the implementation of the developed solutions, and the feedback collected from users. The conclusions highlight the functionality of the evaluated systems and identify opportunities for further improvements and future development.

P4.D4.1. Set of equipment acquired and upgraded infrastructure report

The report summarizes the status of equipment acquisitions and infrastructure upgrade activities carried out within the project. The planned purchases were intended to support research and development activities in the field of intelligent mobility, contributing to efficient, safe, and sustainable transport systems. Due to administrative, procedural, and contractual constraints during the implementation period, a significant portion of the planned acquisitions could not be completed. Nevertheless, all project activities were successfully implemented by leveraging the existing equipment and infrastructure available within the partner organizations.

P4.D4.2. Industry liaison office in the field of smart mobility report

The Deliverable presents the details behind the Industry Liaison Office for Smart Mobility, that was established at Ștefan cel Mare University of Suceava. Its role is to facilitate collaboration between academia and industry, while providing

consultancy and expertise in the field of smart and sustainable mobility. Currently, Bosch, Orange Romania, and the National University of Science and Technology POLITEHNICA Bucharest are in the process of joining this structure, with the necessary documents under evaluation and signature. The office contributes to knowledge transfer, the development of joint projects, and the acceleration of innovation in the field of smart mobility.

P4.D5.1. Awareness survey on smart mobility and climate-neutral and smart cities mission

The deliverable presents the results of an awareness survey on smart mobility, assessing public perceptions, usage patterns, and acceptance of solutions such as public transport, micromobility, electric mobility, intelligent parking, and multimodal travel planning. The findings reveal a continued reliance on private vehicles and limited adoption of sustainable mobility alternatives. At the same time, respondents expressed interest in cleaner, more integrated, and user-friendly mobility services. Such results provide valuable input for policy development, urban planning, and future awareness initiatives supporting climate-neutral cities.

P4.D5.2. Report on state of the art in technologies and practical examples of SMI with a special focus on climate neutrality

This deliverable provides an overview of state-of-the-art technologies and practical implementations in Smart Mobility and Infrastructure (SMI), with a focus on climate neutrality. It reviews key enabling technologies, including IoT, V2X communications, 5G, Digital Twins, smart sensing systems, and traffic optimization solutions. The report also analyzes relevant European and international case studies, highlighting how digitalization and connected mobility can reduce emissions and improve urban quality of life. The findings support future technology adoption and strategic planning activities.

P4.D5.3. An updated common strategic agenda in SMI

This deliverable defines strategic priorities for Smart Mobility and Infrastructure, addressing transport decarbonization, digital transformation, integrated mobility services, accessibility, innovation, and stakeholder engagement. The agenda aligns project objectives with major European initiatives, including the EU Green

Deal and the Sustainable and Smart Mobility Strategy. It proposes actions related to zero-emission transport, infrastructure development, professional training, entrepreneurship, and public awareness. The document provides a framework for future sustainable and inclusive mobility initiatives.

P4.D5.5. 10 scientific publications, including 5 in ISI Q1/Q2 ranked journals

The report documents the significant scientific dissemination results that were achieved through the publication of 15 scientific contributions. They include one book chapter published by Springer, six articles in ISI Web of Knowledge indexed journals ranked in the Q1/Q2 categories, and eight papers presented at international conferences indexed in IEEE Xplore and/or ISI Web of Knowledge. The publications address topics such as vehicular communications (V2X, VLC, C-V2X, and DSRC), the Internet of Things (IoT), distributed user interfaces, and assistive technologies. These outcomes have enhanced the scientific visibility of the project and contributed to strengthening expertise in the field of smart mobility.