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Twin-Safe: Advancing Road Safety Through Twinning

Summary of Deliverable 2.2

Laboratory setup plan

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Summary

The TWIN-SAFE project seeks to support the comprehensive growth of the Faculty of Transport and Traffic Sciences University of Zagreb (FTTS) by enhancing its research capacities and educational programs. The overarching ambition of the project is to establish FTTS as a centre of excellence in multidisciplinary road safety research, education, and innovation through strategic partnerships with Lund University (LU) and Hasselt University (HU). To achieve its ambitious goals, the TWIN-SAFE project will place a strong emphasis on enhancing the research facilities at FTTS, with a primary focus on defining roadmap for the FTTS laboratories. These improvements are crucial for establishing FTTS as a centre of excellence in multidisciplinary road safety research and innovation.

The second deliverable of Work Package 2, is entitled “Mapping Phase”, within the TWIN-SAFE project. It serves as a continuation of the first deliverable “Roadmap for Improvements” whose primary objective was to provide a strategic framework guiding enhancements to FTTS policies and practices related to research infrastructure and project management. Additionally, it includes a comprehensive description of existing laboratories at FTTS, with a particular focus on their research and educational activities over the past five years. The aforementioned analysis led to the formulation of specific recommendations for rationalizing and improving these laboratory facilities. Based on the mission and vision of FTTS and trends in the transportation and traffic sector, deliverable 2.1 “Roadmap for improvements” proposed establishing three new laboratories at FTTS: 1) Road Simulation Laboratory; 2) Traffic Behaviour Research Laboratory; and 3) Traffic Ecology Laboratory. Building upon this foundation, the primary objective of this deliverable was to provide a comprehensive blueprint for two laboratories which are linked to road safety - the Road Simulation Laboratory and the Traffic Behaviour Research Laboratory. These facilities are designed to address critical aspects of transportation safety and human behaviour in traffic environments.

The main part of this deliverable presents a comprehensive plan that outlines the required infrastructure, equipment, resources, and staffing requirements, considering factors such as space allocation, safety protocols, budget, and schedule for the Road Simulation Laboratory and the Traffic Behaviour Research Laboratory. The deliverable is primarily directed towards the FTTS and Centre of Excellence for Road Traffic Safety (CERTS) management boards, providing a strategic framework for advancing institutional goals and enhancing inter-organizational collaboration. This collaborative approach aims to create state-of-the-art research facilities that combine the strengths and specialized knowledge of all three institutions. Moreover, the deliverable aims to enhance the research capabilities of CERTS at FTTS, enabling advanced studies in road safety through high-fidelity simulations and in-depth behavioural analysis. These laboratories will enhance CERTS position in the European Research Area, attracting partnerships with industry and government agencies while producing highly skilled graduates in the field.

One of the proposed laboratories - Road simulation laboratory, is envisioned as a facility designed to research a diverse array of road traffic scenarios, situations and conditions. This controlled environment will enable researchers to test, refine, and validate innovative traffic management and safety technologies. The primary focus of this laboratory will be on road traffic dynamics and the enhancement of road safety features. The proposed plan for the laboratory features a variety of simulators, including a driving simulator, bicycle simulator, and e-scooter simulator, complemented by multiple purpose-specific rooms to support various aspects of the research process.

Second proposed laboratory - The Traffic Behaviour Research Laboratory, will concentrate on investigating the behaviours and interactions of individuals, as well as the various factors influencing traffic environments. It is important to highlight that the Traffic Behaviour Research Laboratory should closely cooperate with other laboratories at CERTS and FTTS, such as Laboratory for Traffic Accidents

Expertise, Laboratory for Georeferential Video System, Laboratory for Data Science in Transportation and Logistics and newly proposed Road Simulation Laboratory. The research activities within the laboratory will be focused around two main pillars: 1) human decision-making processes in traffic, and 2) behavioural impact on traffic safety. The overarching goal is to gain deeper insights into how individuals behave in traffic situations and, ultimately, to use these findings to develop research-driven strategies aimed at improving traffic safety.

As stated, research activities within the laboratory will be focused around two main pillars. Within these two pillars, research will be conducted on topics such as mode choices and preferences, sustainability factors contributing to our transport decisions, the interaction between users and the transport system, analyses of traffic patterns and congestion, and the psychological and social aspects that influence our behaviour in traffic. First pillar “Human Decision-Making in Traffic” explores the factors that influence how individuals make transportation choices. It investigates mode preferences (e.g., public transport vs. personal vehicles), the sustainability considerations that affect decisions, and how the transport system interacts with user behaviour. Second pillar “Behavioural Impact on Traffic Safety” emphasizes the psychological and social dimensions that contribute to traffic safety, aiming to identify behavioural patterns that increase risk and uncover solutions to reduce unwanted situations (crashes) and enhance overall safety.

While the plans for the establishment of the Road Simulation Laboratory and the Traffic Behaviour Research Laboratory are comprehensive, it is important to emphasize that they remain conceptual at this stage. Precise budgeting has not been included in these plans due to various constraints that could impact staffing and other resource allocations. Internally, FTTS faces certain administrative and operational limitations that could affect the timeline and scope of staffing the laboratories. Additionally, external factors at the national level, such as changes in funding policies, legal framework, economic conditions, and regulatory requirements, could also influence the availability of resources. These uncertainties necessitate a flexible approach in planning, allowing FTTS to adapt its strategy in response to specific circumstances. Consequently, while this deliverable outlines a vision for the laboratories, it acknowledges that further financial planning and analysis will be essential as these constraints become more defined.