

C2C_Country to City Bridge_BMV Joint Research Project

Problem Statement

Connecting urban and rural areas remains a challenge for passenger transport. While high-capacity, space-efficient public transit systems in densely populated urban areas enable fast, convenient, and affordable travel, in rural areas, private cars are often the only option. Traditional public transit generally cannot serve these areas economically or within reasonable time frames. Many people therefore continue to commute to the city by car. Since a car carries an average of only 1.1 people during rush hour, the demand for road space and energy, as well as the associated emissions per person, are very high, as is the space required for parking; new initiatives and solutions are needed.

Project Objective

C2CBridge aims to explore opportunities for attractive alternatives to private cars as a means of commuting through a customized public transportation offering, thereby also making urban and regional living environments more appealing to residents. One obvious component of the solution is autonomous vehicle concepts operating as on-demand transport, offering space for four people and luggage. They take users to their destination after a maximum of one transfer at mobility hubs or enable transfers to other modes of transport there. The modern mobility hubs, adapted to the respective context, are designed to facilitate transfers as comfortably as possible and be easily recognizable through their own signage. A consortium of several research teams is investigating how an optimal combination of the new transport services and traditional public transport, as well as their interchanges, can be designed to be future-proof, effective, and aesthetically pleasing.

Implementation

In C2CBridge, technical solutions are to be developed hand in hand with planning and urban design concepts. Based on a comprehensive analysis of mobility behavior, mobility needs, and the existing transportation system in various types of areas, vehicle prototypes and custom-designed mobility stations are conceived and built for a wide range of environments. Optimal and coordinated operational concepts are developed for the system. The solutions developed are evaluated economically and examined for their impact on urban development and their suitability. The transportation offerings and the utilization potential of the transfer hubs are developed with constant user feedback, which is made possible through studies and virtual experiences.

For this complex collaborative research project, the IEB is specifically developing modular, single-mode, circular-economy-friendly, and sensory-engaging transfer hubs where passengers can conveniently and comfortably switch from existing local public transit to a wide variety of mobility options. The distinctively designed transfer hubs, each featuring a unique corporate design tailored to the region, can also offer additional information and services. A selected prototype of a hub, complete with accompanying test vehicles, will be constructed on a 1:1 scale on Campus East and specially equipped for evaluation and testing purposes.

Funding Agency

Federal Ministry of Transport (BMV)

Project Partners

Institutes of the Karlsruhe Institute of Technology (KIT)
(IEB, AIFB, ECON, FAST, IESL, IFGG, IFL, IVP, IIP, IOR, IPEK, ITAS, ITI, ITIV, KASTEL, LTI)

Institutes of the Fraunhofer Society for Applied Research (IOSB, ICT, ISI)

Research Center for Information Technology (FZI)

Baden-Württemberg Institute for Sustainable Mobility (BWIM)

Karlsruhe University of Applied Sciences (HKA) (BWIM)

Albtal-Verkehrs-Gesellschaft Karlsruhe (AVG)

City of Karlsruhe

Karlsruhe Technology Region

Pforzheim University, Faculty of Design (HSPF)

IEB Research Team, Faculty of Architecture

Professor Emeritus Ludwig Wappner,

Dipl. Ing., Architect and Urban Planner, Chair of Structural Engineering

Dipl. Ing. Aristid Chang, Architect, Research Assistant and Project Manager

M.Sc. Lukas Großmann, Research Assistant

B.Sc. Johannes Döring, Research Assistant

In collaboration with Prof. Dennis Mueller, Dipl. Ing. Architect,

Chair of Structural Engineering

Project Period

2024–2027