



Karlsruhe Mobility Lab

powered by  TechnologieRegion
Karlsruhe
Hightech meets the Good Life

Hub for intelligent urban and regional mobility concepts



The partners of the Karlsruhe Mobility Lab



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MOBILITÄTSSYSTEME
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www.trk.de/mobilitaet

Future Mobility Award for start-ups



aen

driving visionary mobility forward.

The intention of the Future Mobility Award is to honour sustainable mobility solutions for the transport sector. The aim is to give start-ups the chance to present themselves and make their ideas and solutions for the transport sector visible as well as to strengthen the ecosystem of start-ups and investors.

The award is presented by aen – automotive. engineering. network e.V., Messe Karlsruhe, Stadt Karlsruhe Wirtschaftsförderung and Nahverkehrs-praxis / Fachverlag Dr. H. Arnold GmbH.

www.future-mobility-award.de

www.ae-network.de

Facts and Figures

- the mobility cluster of the Karlsruhe TechnologyRegion
- organizes the annual international competition for start-ups: “Future Mobility Award”
- the award is presented by the Economic Development Agency of the City of Karlsruhe
- finalists pitches will take place at IT-TRANS 2022

efeuCampus Bruchsal

Innovationszentrum autonome urbane Güterlogistik



efeuCampus Bruchsal

With the LastMileCityLab – experience space for urban logistics – as a lighthouse project of RegioWIN 2030, a unique real laboratory is being created as an experience space for logistics and transport in urban areas, on the roads and in the air. In Bruchsal, an experience area is being created on the topic of logistics and transport on the “last” and “penultimate” mile: with the “Mobile Postoffice”, the further development of the efeu robot vehicles and the use of the “Volo-drone” heavy load drone, “world innovations made in BW” are being shown there as solutions for municipalities.

www.efeu-campus-bruchsal.com

FZI Research Center for Information Technology



As an independent foundation, the FZI Research Center for Information Technology has stood for top-level applied research in the field of information technology and its application fields for over 35 years. One of the central research fields is mobility research: Together with partners from industry and science, software and hardware solutions for mobility and transportation concepts for vehicles and autonomous mobile systems of future generations are developed, researched and evaluated.

www.fzi.de

Facts and Figures

- Legal Form: Non-profit foundation under public law
- Foundation: 1985
- 251 Employees | 32 Visiting Researchers | 202 Research Assistants
- Overall Budget 2020: 25 Million €
- 178 Projects in 2020: 78 Industrial Projects
100 Public Projects
- Average duration of projects: 26.3 months
- 14 Dissertations | 16 Scientific Journal Contributions |
95 Conference Contributions | 59 Trainings and Workshops
(as of 2020)

Autonomous Low-Risk Vehicles

Future Mobility – made by FZI

The FZI Research Center for Information Technology is developing new solutions for the mobility of people and goods. One approach is to use autonomous micromobiles, so-called low-risk vehicles. An advantage is the limited application environment, the low speed and the resulting low risk potential. However, in addition to the autonomous driving function, high computational power must be developed in a small package space with low energy consumption and cost. These issues are addressed in the FLOW project, in which a micromobility system for factory traffic is developed. An extension of the approach to symbiotic mobility between humans and vehicles is being explored in the HeLios project.



FZI-Shuttles

Interconnected and automated shuttles for last-mile transport of cargo and passengers

In the project EVA-Shuttle, networked and autonomously driving mini-buses – based on the EasyMile EZ10 Gen2 shuttle – were used for the last mile from the bus stop to the front door. The aim of the research project was to develop a public transport mobility concept that could be evaluated under real conditions on the Test Area Autonomous Driving Baden-Württemberg (TAF BW). Building on these results, the FZI is presenting the next development stage of the shuttles within the EU project SHOW: Here, the concept +, the use case of platooning and a stronger networking with the TAF BW will be demonstrated.



Test Area Autonomous Driving Baden-Württemberg

Testing and development possibilities for sustainable mobility concepts of tomorrow

At the Test Area Autonomous Driving Baden-Württemberg (TAF BW) – developed by a broad consortium, led by the FZI Research Center for Information Technology –, future-oriented technologies and services related to connected and automated driving (cars, shuttles, commercial vehicles), can be tested in Karlsruhe and Heilbronn. For this purpose, traffic areas of various types have been equipped with sensors and communication devices that allow real-time recording of traffic events as well as communication between vehicles and infrastructure. In addition, more than 200 km of test routes have been mapped with high precision and by using georeferencing, so that many different scenarios are available.



Better on the way, together!

What is the Baden-Württemberg Institute for Sustainable Mobility?

The “Baden-Württemberg Institute for Sustainable Mobility” (BWIM) is an institution for the transfer of academic and technical knowledge as well as applied research in the field of sustainable mobility. Combining the competences of the universities within Baden-Württemberg, including advanced training, applied research, knowledge transfer, and political consulting, the institute has a decentralized and interdisciplinary position.

BWIM connects different stakeholders from economics, administration, and politics to create positive and diverse examples of sustainable mobility initiatives in urban and rural areas. The institute thus forms the knowledge, research, communication and transfer interface between applied science, business, society and politics for Baden-Württemberg – and beyond.



Hochschule Karlsruhe
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Applied Sciences

TIKA

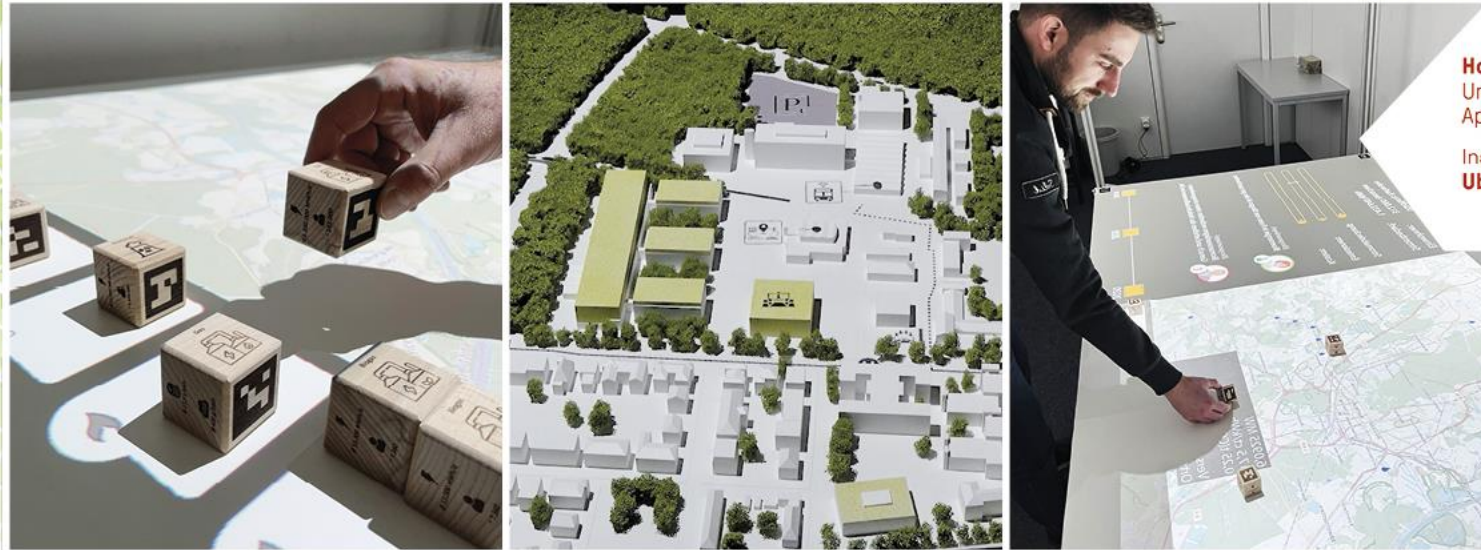
BWIM Baden-Württemberg Institut
Für Nachhaltige Mobilität.



www.bw-im.de

www.bw-im.de/en

Interactive AR Table



Hochschule Karlsruhe
University of
Applied Sciences

TKA

Institut für
Ubiquitäre Mobilitätssysteme

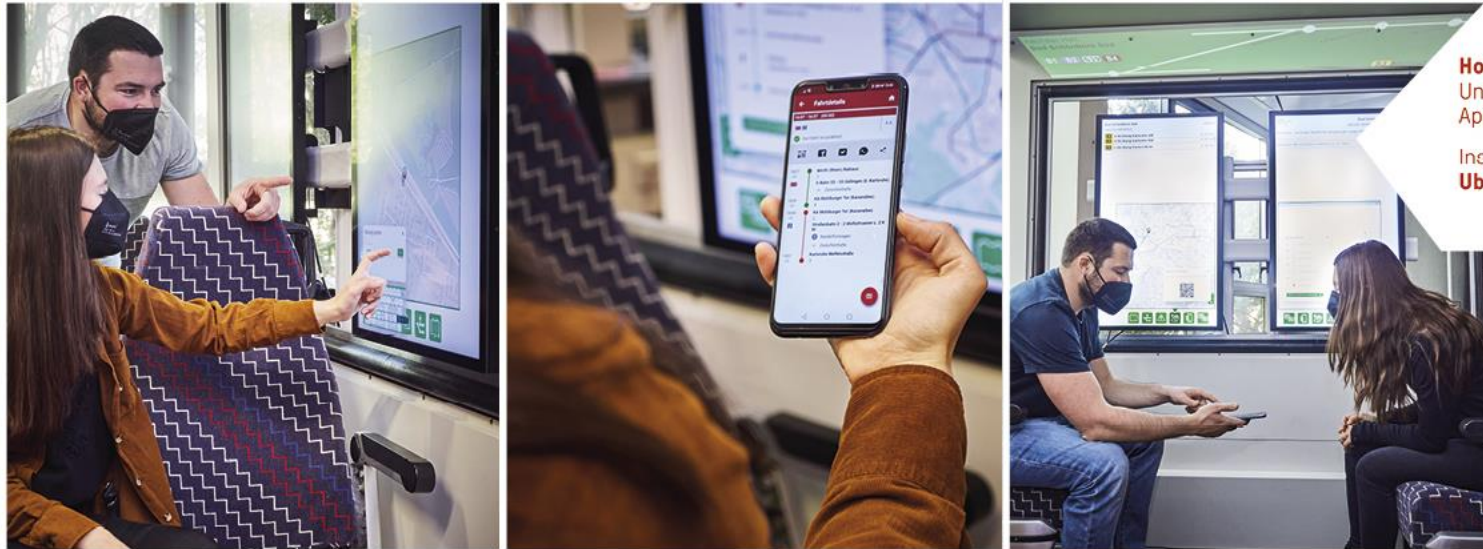
Our AR table enables a wide variety of data to be visualized vividly. The natural, playful and interactive operation with tangibles encourages experimentation and thus facilitates access to new information. The AR table is ideal for making information accessible to a broad mass of people within e.g. trade fairs, exhibitions and participatory citizen processes. Visualizations of a wide variety of information are conceivable, e.g. on traffic and environmental topics.

Facts and Figures

- 4K-UHD resolution
- 2.5m x 1.4m
- up to 252 different tangibles
- RealSense D435 for tangible detection
- Easy configuration via images and JSON

www.h-ka.de/en/iums/ar-surface

Smart Window



Hochschule Karlsruhe
University of
Applied Sciences



Institut für
Ubiquitäre Mobilitätssysteme

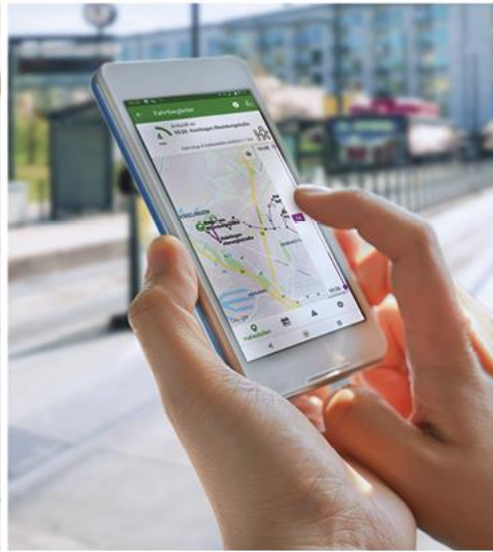
In order to develop public transport towards more mobility experience, an intelligent and transparent display window (SmartWindow) was designed. The research project SmartMMI aims to improve the information supply of passengers along their mobility chain. The project explored and evaluated the provision of mobility data on the SmartWindow, in conjunction with the mobile application on passengers' mobile devices. The project was funded by the research initiative mFund by the BMDV.

www.smartmmi.de/project/
www.h-ka.de/en/iums/passenger-cabin

Facts and Figures

- 2 displays 43" interactive
- 1 display 32" (1/3) cutted
- Resolution 1920 × 1080 pixel
- fieldtest Duration over 1 year

Barrier-free travel assistance



init

ASSISTIVetravel provides needs-based support at all stages of a trip for visually, hearing or mobility-impaired passengers. A unique approach incorporates the drivers as well as vehicle equipment. This allows for exterior announcements at the boarding stop, on-board announcements to be transmitted to hearing aids and notification of the bus drivers about a request to board. Therefore, they can confirm if the wheelchair space is available and assist with boarding or lighting.

www.initse.com

Facts and Figures

- More than 35 years of experience
- More than 1,000 employees
- More than 1,100 transport providers
- More than 160,000 vehicles
- More than 130 ITCS/RTPI systems
- More than 140 ticketing systems
- More than 100 planning systems
- More than 120 personnel assignment systems
- More than 300 passenger counting systems

Messe Karlsruhe – where mobility thrives

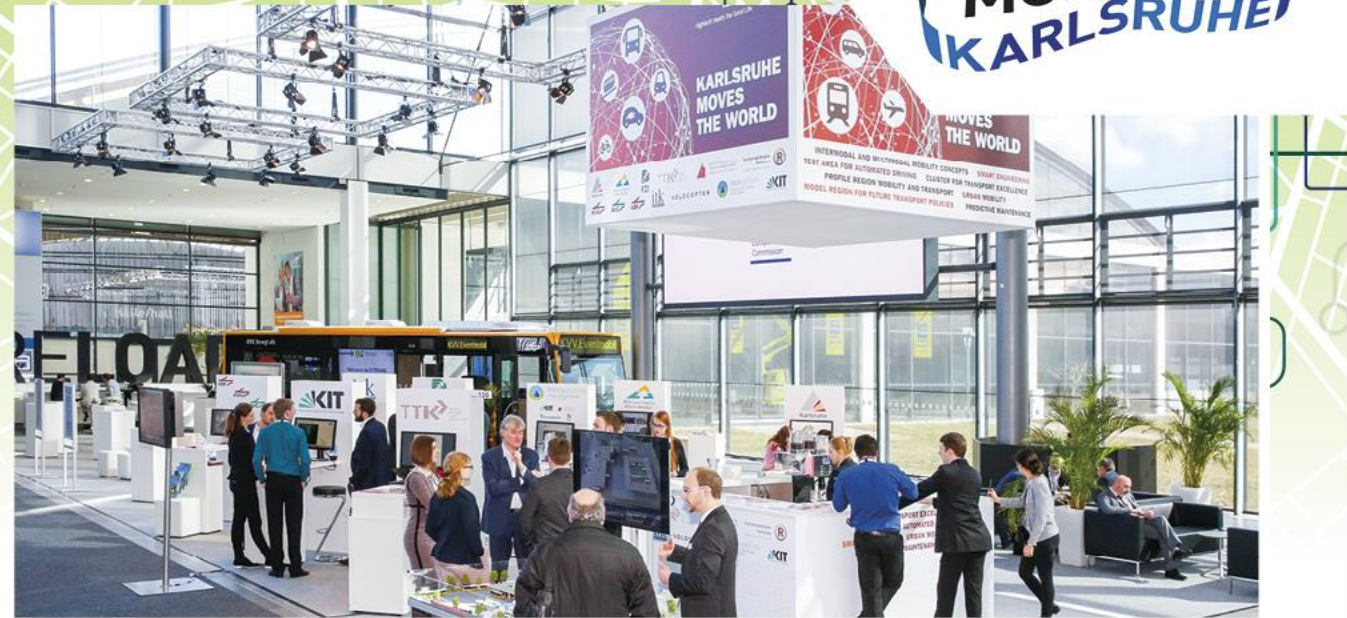
The threads of exciting mobility concepts
converge in Karlsruhe

Leading experts from industry, research
and the public sector work closely to
develop and test new ideas and present
them to the world of mobility.

Messe Karlsruhe is the perfect event
partner to showcase mobility innovations
at international exhibitions and conferences
held at its premises.

IT-TRANS 2022

180 Speakers
45+ Conference Sessions
500+ Conference Attendees
7.000+ International Visitors
60+ Countries
3 Networking Events
4 Technical Visits
270 Exhibitors
16 Market Updates
37 Start-up Sessions



— messe karlsruhe

www.messe-karlsruhe.de
www.it-trans.org

Traffic Information Portal



www.mobil.trk.de

The Traffic Information Portal run by the Karlsruhe TechnologyRegion and the City of Karlsruhe offers current information on mobility in the regions of Baden, Southern Palatinate and Northern Alsace. It serves as an essential component in the city's and the region's traffic information service and provides guidance on various questions regarding multimodal mobility, from car and cycle traffic to public transport.

The interested public can obtain information on the current traffic situation, on existing and scheduled construction sites, train and bus timetables and available parking spaces. Users benefit from free and mainly real time information services.

Facts and Figures

- 16 German cities, 4 German administrative districts and the French Collectivité européenne d'Alsace
- Bus and tram stops with timetables: 25,000
- Realtime traffic situation: 4,500 kilometres
- Cycle path network: 18,330 kilometres
- Rental bike stations: 970
- Car sharing stations: 330
- Charging stations for electric vehicles: 2,000

Evaluation of Mobility Solutions



With an interdisciplinary concept, the research of the KIT Institute for Transport Studies consists in making transport efficient and sustainable. We analyze and forecast the impact of new mobility solutions on the travel behavior with a holistic view of the transport sector.

The effects of, for example, the regiomove Ports or of the MOIA ride-pooling service are simulated with our agent-based travel demand model mobiTopp.

www.ifv.kit.edu
www.mobitopp.net

Facts and Figures about KIT

385 professors
9,783 employees
22,275 students
1,090.7 million € budget in 2021

Platooning of city buses

The next step towards automated driving in public transport

With platooning, vehicles are able to automatically follow the trajectory of a lead vehicle at a short distance. This is achieved on the one hand by data communication via an air interface (“over-the-air”) from the vehicle in front to the vehicle behind (“Vehicle-2-Vehicle”/V2V). On the other hand, the following vehicle is equipped with sensors to follow the rear of the lead vehicle. A appropriate algorithm calculates the trajectory of the following vehicle from these two redundant data sources. By developing the technology, operation can be adapted to fluctuating passenger numbers according to demand, automation can be advanced and economic efficiency can be created.

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www.itiv.kit.edu
www.kit.edu



Regional product light rail (Hofladentram)

Transport and sale of regional products by light rail

The concept is to convert the interior of a decommissioned light railway for the transport and sale of regional products. The focus is to be on agricultural products. In this way, customers can also be reached outside the previous distribution points of farm shops.

The concept is intended to underline the innovative power of a holistic mobility change in the region. This empowers commuters not only to reach their destination in a sustainable way, but also do their shopping in a sustainable way at the stops they already use every day.

Project group: Albtal-Verkehrs-Gesellschaft (AVG), Offenburg University of Applied Sciences (Business Administration/Logistics and Commerce and Direct Marketing/E-Commerce), big. bechtold-gruppe, Marlo Consultants



**HOFLADEN
TRAM**



Cargo Tram

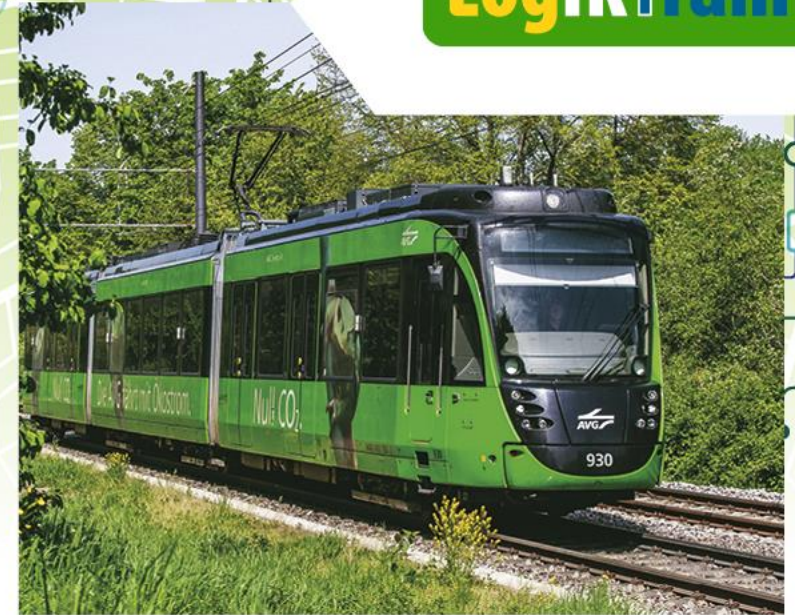
Innovative and environmentally friendly logistics concept to relieve road traffic.

The steadily growing delivery traffic for retail and private households puts a strain on both the road infrastructure and local residents. A fundamental change in cargo logistics is therefore necessary in order to use existing modes of transport in an environmentally friendly and efficient manner.

The joint project “LogIKTram” is developing a logistics concept and an information and communication technology (ICT) platform for future cargo transport in trams. In this way, cargo transport in the Karlsruhe region will be shifted more strongly from road to rail and an innovative, environmentally friendly transport system, a “cargo tram,” will be created for the urban and regional cargo logistics.



LogIKTram



www.logiktram.de

regioKArgoTramTrain

More goods on the railways

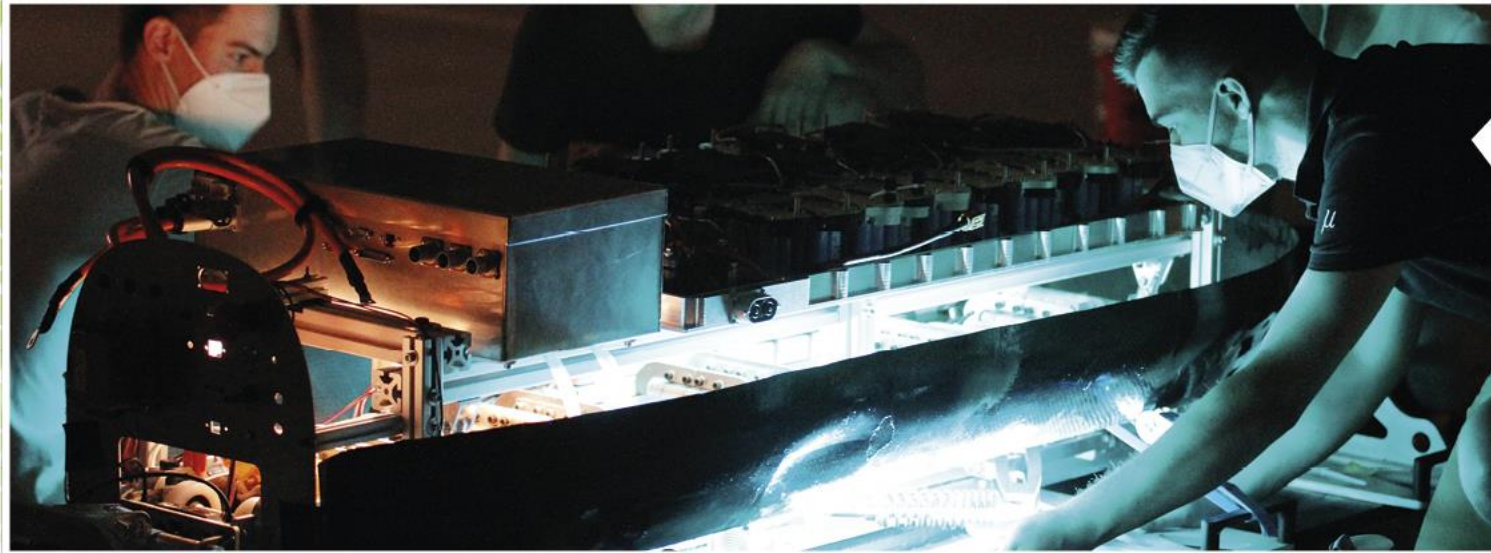
The centerpiece is the development of a new type of freight light rail system. In the future, it will transport passengers and parcels – from the region to the city and vice versa. Starting from transshipment areas in the region – the consolidation centers – parcels are to be transported by rail with the help of the new light rail vehicles to transshipment points within the city – the city hubs. From there, the goods will be distributed further on the “last mile” in a climate-friendly way. With all the positive effects: Less traffic, less noise, fewer emissions.



the golden way
regioKArgo
TramTrain

www.ae-network.de/regiokargo

mu-zero HYPERLOOP – the future of transport



μ zero
HYPERLOOP
SUPPORTED BY **SEW**
EURODRIVE

mu-zero HYPERLOOP is a non-profit association that unites 71 students from Karlsruhe and Stuttgart to work on innovative, sustainable mobility systems. The team is developing functioning transport capsules, so-called Hyperloop Pods, which will levitate through almost airless tubes at approximately the speed of sound. The exhibited Hyperloop Pod is distinguished by a novel propulsion concept with a linear induction motor (LIM) which enables contactless, low-noise acceleration and deceleration.

www.mu-zero.de

Facts and Figures

Association: Foundation of the non-profit association in June 2020 in Karlsruhe. / Development of the 2nd Hyperloop prototype since October 2021, official presentation on 29.06.2022 / Support from over 32 sponsors and 25 other cooperation partners / Awarded the „Kickstart Prize“ at EHW 2021 as the best new Hyperloop team 2021 worldwide.

Team 2021/2022: 71 motivated, student team members / Team members from 4 universities in Baden-Württemberg (KIT, HdM, HKA, University of Stuttgart) / Team members from 12 different fields of study / Team members with 16 different nationalities

ALBACOPTER®

An Experimental VTOL/Glider Platform for Urban Air Mobility

Relocating parts of urban traffic into the air is not a dream for the future any longer. Within the Fraunhofer ALBACOPTER® Lighthouse Project, an airborne experimental platform is being developed and approved for testing and demonstration flights that combines the VTOL capabilities of multicopters with the aerodynamic advantages of gliders. The ambitious project incorporates six Fraunhofer Institutes' expertise and technologies from the fields of mobility, materials science, energy and propulsion engineering, mechatronics, as well as sensor, communication and automation technology, AI and production engineering. Fraunhofer ICT presents elements of the developed ALBACOPTER® propulsion system.

Facts and Figures about Profilregion

Seven leading institutions for research and teaching
Network of > 25 industrial partners
Funded by the Ministry of Science, Research and the Arts and the Ministry of Economic Affairs, Labour and Housing in Baden-Württemberg and as a national High Performance Center by the Fraunhofer-Gesellschaft.



www.albacofter.fraunhofer.de
www.profilregion-ka.de



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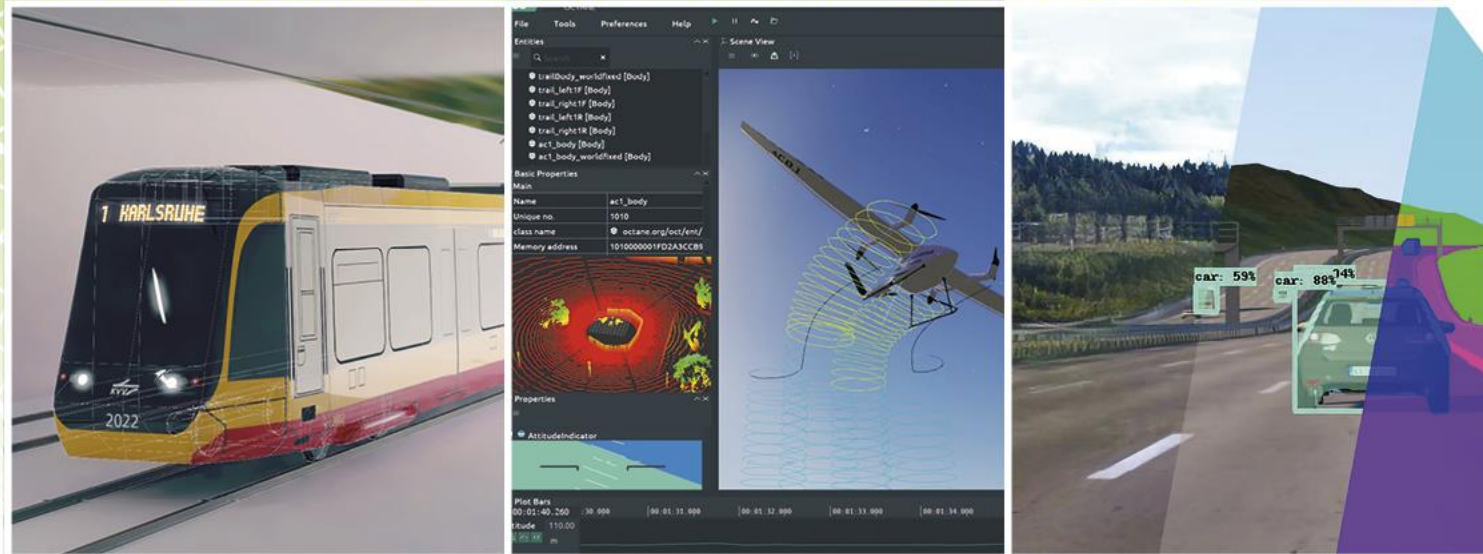


An Open Simulation Framework for ITS

The OCTANE Platform for Seamless Mobility and AI Simulations



PROFILREGION
MOBILITÄTSSYSTEME
KARLSRUHE



Simulations become increasingly relevant for the development of future intelligent transportation systems (ITS). They allow to evaluate goals like safety, reliability and efficiency in large-scale scenarios, and to quickly evaluate concepts even in early stages. To this end, the OCTANE simulation, developed by Fraunhofer IOSB with Profilregion partners, provides an open, expandable platform aiming at all areas of ITS development, from sensors and AI over electronics and dynamics, to human factors.

www.octane.org
www.profilregion-ka.de

MobileCityGame: 2050 Designing Transitions



PROFILREGION
MOBILITÄTSSYSTEME
KARLSRUHE

MobileCityGame is a serious computer game for experiencing options and pitfalls of the urban mobility transition towards 2050. The game is developed for the city of Karlsruhe. A serious transport model allows testing a large variety of measures in infrastructure development, mobility management, new technologies and urban design. Its core objective is meeting climate targets while maintaining citizens' satisfaction and financial viability.

MobileCityGame addresses professional users and non-expert players alike for scenario development, workshops, communication, education and fun.

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www.isi.fraunhofer.de/mobilecitygame
www.profilregion-ka.de

Robust Perception for Automated Vehicles

A Look at the Sensor and Processing Setup Developed in the Joint UNICARagil Project

Germany's leading universities in field of automated driving have joined forces with selected specialists from industry in the BMBF-funded UNICARagil project to rethink automated vehicles and their architecture. Based on the latest research on connected and automated driving, disruptive modular architectures in hardware and software for automated vehicle concepts are developed.

The Institute of Measurement and Control Systems (MRT) at the Karlsruhe Institute of Technology (KIT) presents elements of a sensor setup for the developed vehicles, with a focus on robust calibration and detection, which is critical for accurate localization and object detection, especially for sensor fusion.

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www.unicaragil.de
www.profilregion-ka.de

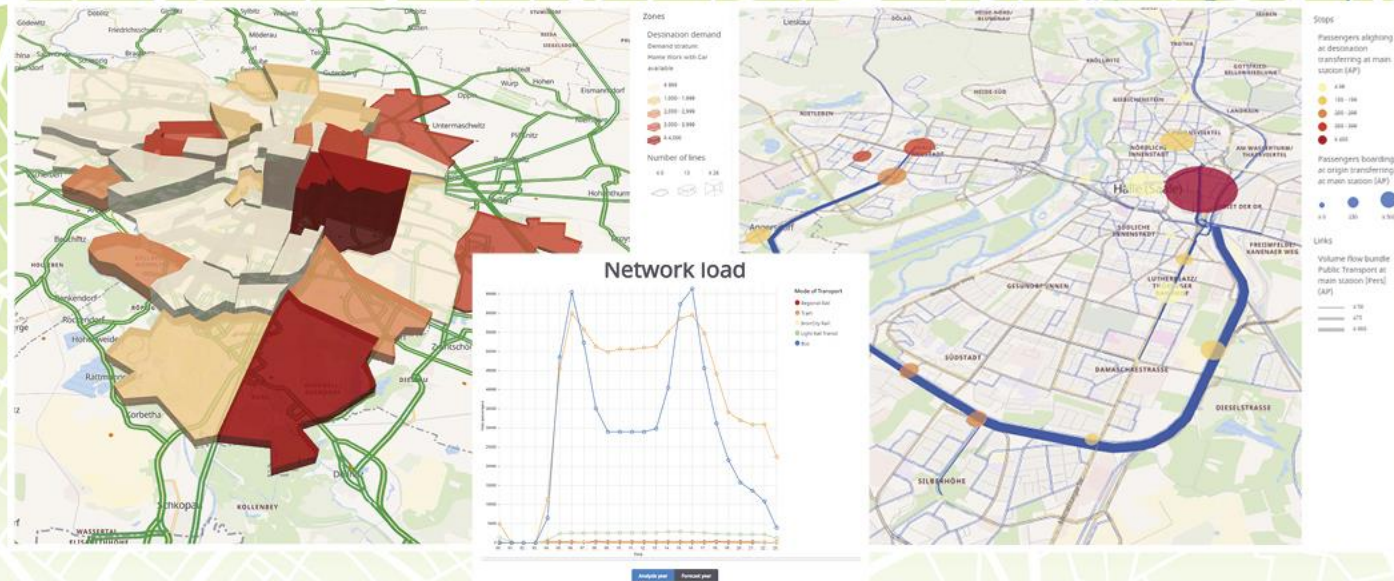


PROFILREGION
MOBILITÄTSSYSTEME
KARLSRUHE



PTV Visum Publisher

Share your model insights.



PTV GROUP

PTV Visum Publisher is a web-application to interactively present and share transport model data, demand, and results.

Connect with your decision makers – create convincing and interactive dashboards and 3D maps from your mobility data.

Boost your team's collaboration – invite all team members to comment on each map.

www.visum-publisher.myptv.com
www.ptvgroup.com

Features

- Display network, demand, assignment, analysis results, and other data from PTV Visum.
- Create animations from time-tables incl. assignment results.
- Use charts to analyze important KPIs and compare scenarios.

Facts and Figures

- Founded in 1979 as a KIT spin-off to develop software for transport modeling
- 900 employees worldwide
- Global presence with 28 locations
- Software and services for modeling and simulation of infrastructure design and planning
- Industry-leading optimization, modeling and simulation methods for transport and logistics
- +2,500 cities and public transport operators worldwide trust in PTV software
- € 117 M annual revenue 2021






Smart mobility map – the mobility platform






 **raumobil**

Our field solutions

Your benefits

-  Visibility – the entire mobility offering becomes accessible
-  Seamless integration – Easy integration into your website
-  Branding – Customization on your design

-  Sustainability and CO₂ emission reduction through smart connected mobility
-  Smart travel planner with multimodal and intermodal routes
-  Omnichannel – Usable on all devices



Scan the QR-Code to
learn more about us
www.raumobil.com

regiomove: Anything is possible



regio
move

regiomove is a pioneer project. Its goal: Connecting the existing public transportation network with new mobility services and the communities in the area. No matter if tram, train, bus, bike or car sharing. No matter if rural or urban.

The regional cross-linking is carried out using two fundamental components: The ports and the app. At regiomove ports people can easily connect their journey with tram, bus, shared bikes or cars. Such combined journeys are digitally connected via the regiomove App. With only one single account you can route, book and pay intermodal journeys. Furthermore, the ports may offer new service components, like digital information terminals, charging stations, locker boxes or bicycle service stations.

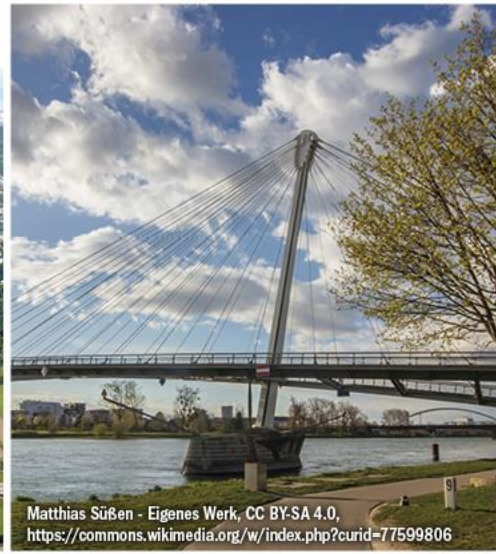


www.kvv.de/regiomove

Sustainable Mobility in the Upper Rhine Region



© MGS-Südschwarzwald GmbH



Matthias Süßen - Eigenes Werk, CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=77599806>



Maximilian Dörbecker (Chumwa) - Eigenes Werk, CC BY-SA 2.5, <https://commons.wikimedia.org/w/index.php?curid=3178513>



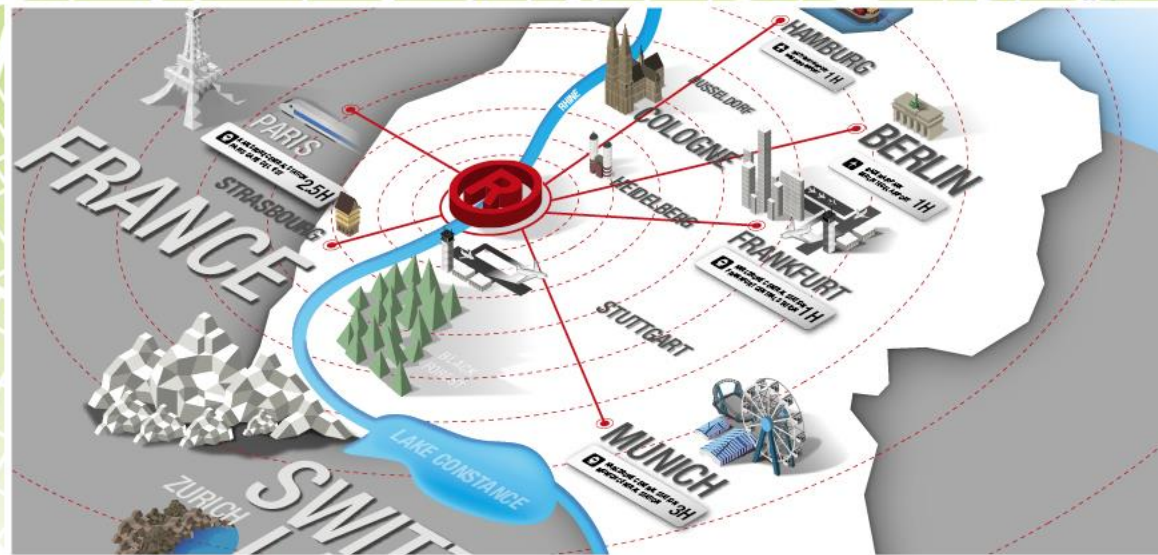
Multinational transport concepts leverage considerable synergies in reducing the environmental impact of cross-border transport. The Franco-German consortium therefore developed a decision support system to support municipalities in the Upper Rhine Region in setting up and expanding sustainable urban and cross-border mobility systems. In this way, SuMo-Rhine provides impetus for the transformation of the transport sector in the three-country region of the Upper Rhine Valley.

www.sumo-rhine.com
www.kinamo-3ec0e.firebaseio.com/home

Facts and Figures about KIT

385 professors
9,783 employees
22,275 students
1,090.7 million € budget in 2021

TechnologieRegion Karlsruhe GmbH



**TechnologieRegion
Karlsruhe**
Hightech meets the Good Life



www.trk.de

Public authorities have joined forces with businesses, chambers of commerce and scientific institutions to form the TechnologieRegion Karlsruhe GmbH.

Together we are shaping the development of the region with the aim of strengthening and promoting it as a hub for business, science and innovation. Our focus is very much on the themes of mobility, energy and IT. Projects are initiated on a real-lab scale through the strategic networking of partners from business, science and the public sector. The TechnologieRegion Karlsruhe GmbH acts as a platform, takes over the steering of the different actors and contributes to co-financing.

Facts and Figures

- Around 1.7-million people living within an area of 6,000 km²
- Working population of 675,000
- Around one-third of the labour force work in technology-intensive industries – more than in almost every other region in Europe over 100,000 companies
- Economic output above the German average for many years¹⁾ Regional GDP risen to more than € 60 billion in recent years
- Purchasing power: about €33 billion in total¹⁾

1) Includes only the figures for the German cities and districts of the Karlsruhe TechnologyRegion.

UITP Regional Training Centre Karlsruhe

UITP – Karlsruhe Mobility

Innovation Partnership

www.trk.de/mobilitaet
www.uitp.org/training

**UITP
Regional
Training
Centre
Karlsruhe**



The UITP-Karlsruhe Mobility Innovation Partnership between UITP and Karlsruhe TechnologyRegion, unique in this form, exists since 2019. The partnership is supported by the TRK-UITP Liaison Office in Karlsruhe and the associated UITP Regional Training Centre Karlsruhe. Three times a year, the UITP Regional Training Centre Karlsruhe offers training programmes for public transport employees. Those programmes are: Ticketing, Bus planning and Scheduling, Cybersecurity, Autonomous Driving and Mobility as a Service.

www.trk.de/mobility-innovation-partnership
www.uitp.org/trainings

Facts and Figures

- Founded 2019
- Hosts three trainings a year virtually or on site in Karlsruhe
- Internationally recognized trainings
- Qualified UITP Trainings
- Trainings delivered by public transport experts, for public transport experts
- Interactive session
- Best practice showcases and site visits



In collaboration with:

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Karlsruhe
Hightech meets the Good Life



Urbanloop: digitize to decarbonize mobility



UrbanLOOP
smart urban mobility

Travelling 1 kilometer in 1 minute for less than 1 cents of electricity, Urbanloop aims to be an alternative to cars. Using railroads, autonomous vehicles connect places across the city with disponibility and security. As in a horizontal elevator, the vehicle waits the passenger in station, starts as soon as she presses the button and reaches its destination without stopping time. With Artificial Intelligence and multiples innovations, Urbanloop wishes the decarbonization of urban mobility.

www.urbanloop.fr

Last Mile

Innovative and environmentally friendly logistics concept to relieve road traffic.

We take over the delivery of shipments on the “last mile” for freight forwarders, parcel service providers as well as food suppliers/fresh food transports. This means we bring your goods environmentally friendly and fast to the destination and thus directly to the customer’s door. veloCARRIER delivers with electrically powered e-cargo bikes and thus focuses on two goals: To reduce truck traffic as well as pollutant emissions. The development and operation of the city hubs in cities and metropolitan regions is done in cooperation with ecoCARRIER AG. We tailor this individually to your industry and the respective city.

Facts and Figures

10 micro Hubs in Germany
8,000 shipments per day
3,000 km per day CO₂ free delivery



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www.trk.de/mobilitaet