

MITHOS

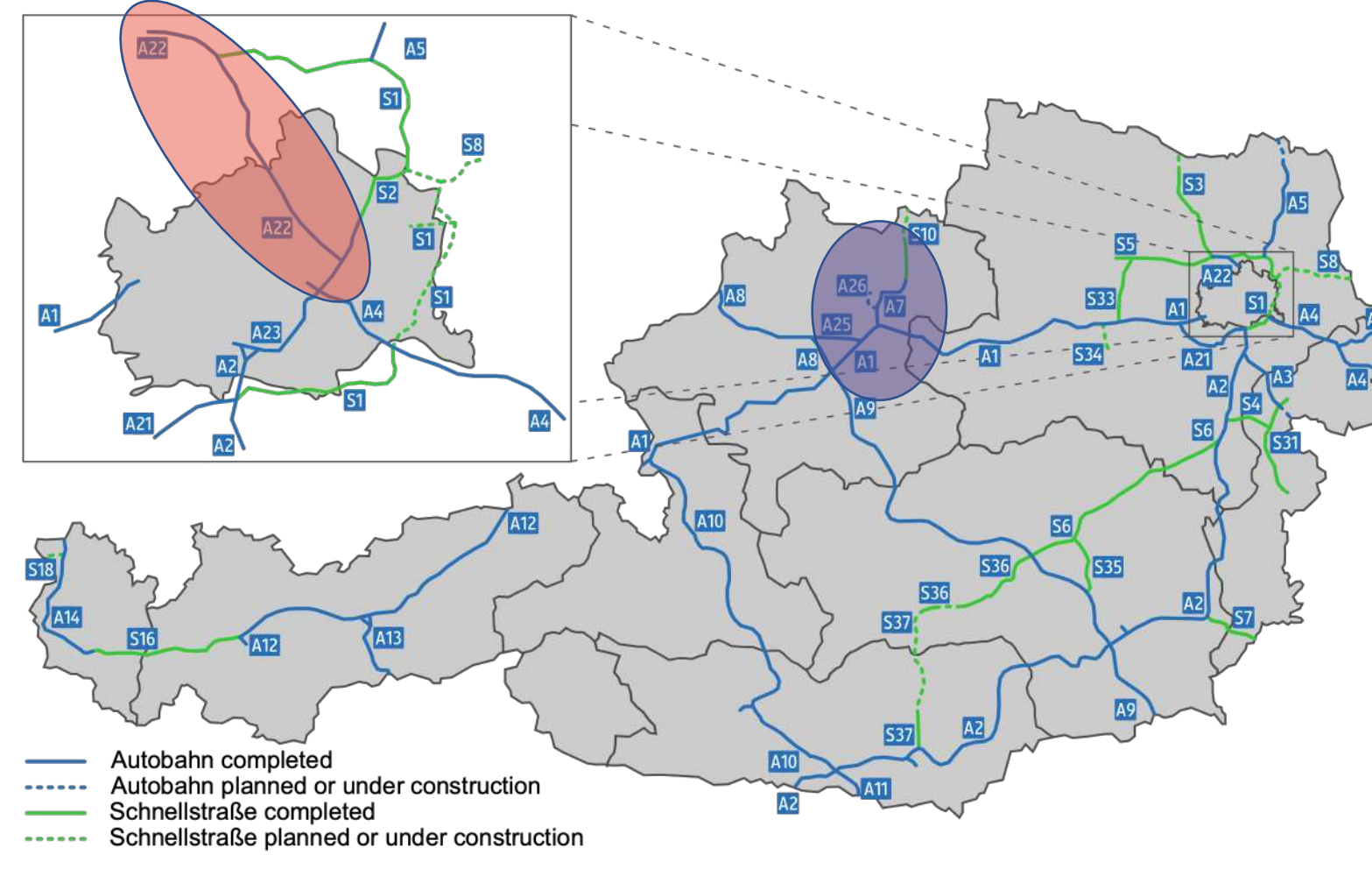
The Austrian Pilot: Quick Assessment of Road Conditions

MITHOS: INNOVATIVE DECISION-MAKING TOOL FOR THE FEDERATED MONITORING, RE-DESIGN AND CONSERVATION OF MULTIMODAL TRANSPORT INFRASTRUCTURES

*Novel Certad, Amirhesam Aghanouri, Joseba Gorospe, Cristina Olaverri-Monreal
Department Intelligent Transport Systems, Johannes Kepler University Linz, Austria, Linz
Paul Rosenkranz, Peter Saleh, Isabela Erdelean, Angel Losada-Arias, Andreas Hula
AIT Austrian Institute of Technology GMBH, Austria, Vienna*

Introduction

The Austrian pilot is implemented on the national motorway network managed by the Austrian road operator ASFINAG, which spans over approximately 2,265 kilometres and includes 5,862 bridges and 168 tunnels across the country. The pilot focuses on two specific locations: an 8.5-kilometre section of the A22 motorway near Vienna and a bridge near Linz. The pilot aims to optimize infrastructure maintenance by collecting KPIs, analyzing infrastructure status, and adjusting maintenance schedules based on data. Unlike the traditional approach of four-year cycles or reactive interventions, it pursues a proactive, data-driven strategy to improve efficiency, reduce costs, and enhance road safety.

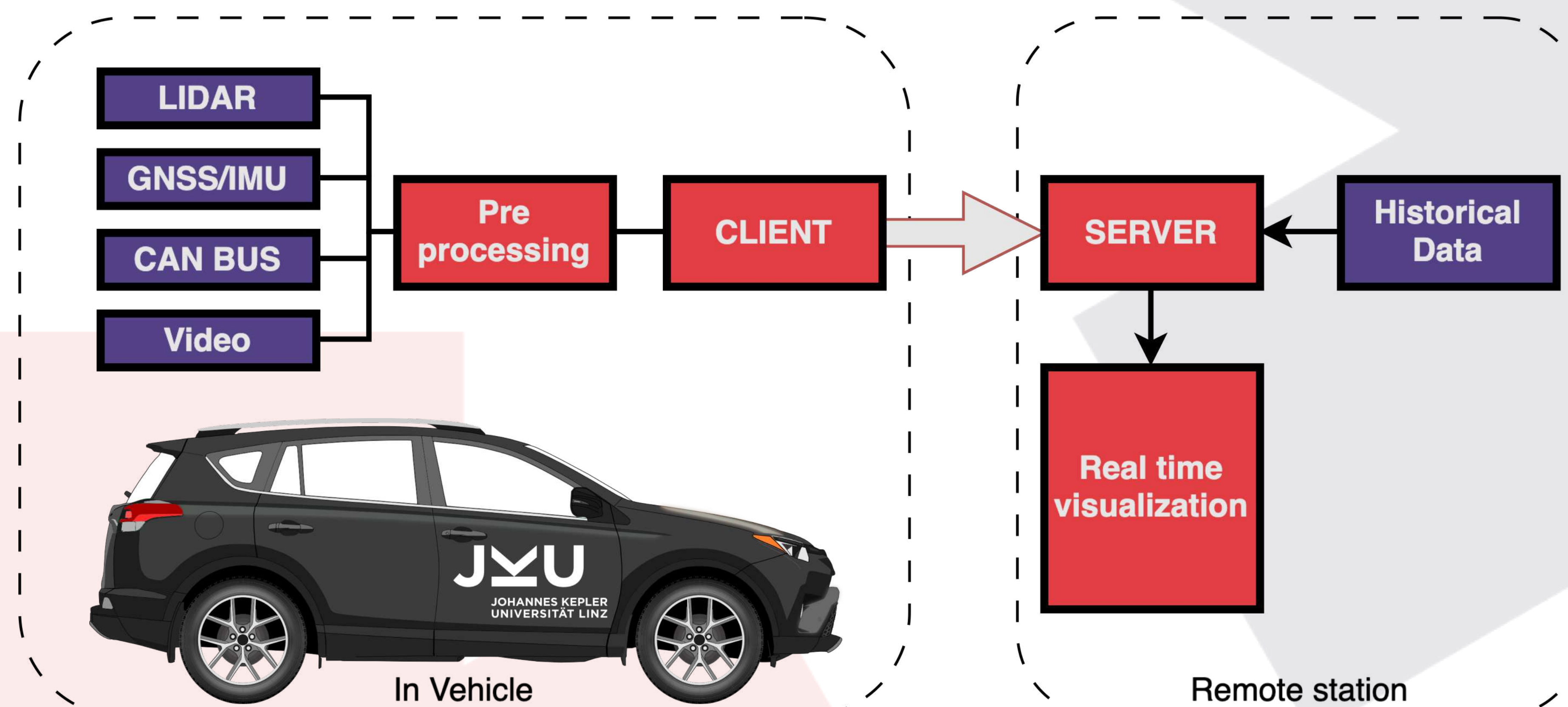


Geographical location

- Vienna (Capital of Austria):** 2.1 Mio. Inhabitants - 800k commuters/workday. **Selected Section:** The A22 motorway connects to north-western areas of the city (red) affecting large population with 40-60k commuters per workday. In addition is the calibration site of data collection method
- Linz (3rd largest city in Austria, capital of Upper Austria):** ~214k Inhabitants - 110k commuters/workday. **Selected Section:** The A7 motorway cuts through Linz with various bridges (violet) connecting to north and south areas (large pop.) as well as Czechia and Germany with 40-60k vehicles per workday. Focus on bridges.

Key Features

- Historical Road Condition measurements with AIT's RoadSTAR vehicle system on the motorway network.
- Historical data of the whole Austrian motorway network to train/test machine learning models.
- Road condition estimation with research vehicle using CAN bus, LiDAR sensors, cameras, IMU, and GJKU-ITSNSS.
- Quick assessment of road conditions supported by autoencoders, deep inverse models and other AI techniques.
- Map-style real-time visualization of the road conditions and current incidents.
- Up-Scaling with BikeSTAR measurements/control runs for method-transfer to other pilot sites (Hamburg, Bilbao, Thessaloniki)



Motivation

Currently, maintenance is scheduled periodically, at fixed multiyear intervals, and is largely informed by conventional inspection campaigns. These inspections occur with low frequency and cannot fully capture the continuous degradation processes caused by fluctuating traffic loads, climatic influences, and the increasing share of heavy vehicles. As a result, maintenance planning often relies on generalized assumptions rather than on condition-based evidence. These lead either to premature interventions, resulting in unnecessary costs, or to delayed maintenance, which can accelerate deterioration. Our solution analyses acceleration and speed fluctuations, vibrations, or other sensor-derived parameters from vehicles, to estimate the actual degradation state of the pavement. Such real-time indicators would enable a shift toward predictive, demand-driven maintenance planning, offering the potential to optimize resource allocation, prolong infrastructure life, and enhance traffic safety and serviceability.

Partners Roles

JKU

- Methodological design of quick assessment method.
- Involvement of in-vehicle measurement with the JKU-ITS research vehicle.
- Model generation for decision support system (DSS)

AIT

- Road infrastructure Condition Monitoring RoadSTAR and BikeSTAR
- Trajectory based Road Safety Impact Assessment with Mobility Observation Box (MOB).
- Pilot management.

ASFINAG (LOI partner)

- Definition of parameters and interfaces for their asset management intentions
- Evaluation of methodological soundness
- Results approval and connection to internal systems

About MITHOS

The MITHOS consortium brings together 14 partner organisations from seven European countries and is working to develop an innovative, AI-supported decision support system for monitoring, redesigning and maintaining multimodal transport infrastructures. The aim is to manage roads, railways, cycle paths and ports more efficiently, safely and sustainably.

 <https://mithosproject.eu/>

 cristina.olaverri-monreal@jku.at
joseba.gorospe@jku.at

 www.jku.at/its

 paul.rosenkranz@ait.ac.at
peter.saleh@ait.ac.at

 www.ait.ac.at



**Funded by
the European Union**