Development, Implementation (Pilot) and Evaluation of a Demand Responsive Transport System

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Development of a Demand Responsive Transport System

• Innovative public transport bus system without fixed routes, timetables and stations
• Scientific approach: “real-world laboratory”
• Development of an operation concept and routing algorithm
• Operation via smart phone application and telephone order system
• Implementation and operation in the municipality of Schorndorf for one year
• Development of task-specific vehicle concepts

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Specification of Bus Operation System Requirements

Participatory, inter- and transdisciplinary requirements derivation:
• Social sciences, technical and computer sciences
• Local stakeholders (e.g. municipality, local citizenship, etc.)

Definition of Operation Area

Analysis of as-in-state conditions:
• Points of interest
• Road traffic situation
• Commuter flows
• Existing public transport (e.g. isochrones of accessibility of main station, see figure)

Pick-up Areas / Stopping Points

Discrete stopping points instead of continuous pick-up areas:
• Due to legislation, route planning and usability (stopping point identification)
• Walking distance to stopping points max. 150 m (200 m)
• Digital maps and on-site visits

Routing – Disposition Algorithm

Optimization of route by a specifically designed algorithm. Ride requests collected via:
• Smartphone app
• Web interface
• Telephone service

Vehicle Concept and Constructive Implementation

• Pilot phase with existing Mercedes-Benz Sprinter models, one of them modified with hybrid propulsion (ELENA Bus)
• Development of virtual vehicle concepts tailored to the system by scientists of Hochschule Esslingen and DLR together with social scientists and later users
• Automated driving, electric propulsion

Interieur / Exterieur

• Centrifugal development strategy: focus on ergonomic aspects, evaluation with the digital man model RAMSISTM™
• Multifunctional space
• Consideration of different scenarios, e.g. commuting, transportation of luggage, etc.

Car Body - Structure

• Systematic lightweight design for optimization of safety, comfort, accessibility, emissions and energy consumption
• Topology optimization
• Evaluation of different types of body architecture with FEM models

Power Unit / Chassis

• Tracking of inner city bus lines of Schorndorf with a GPS data logger
• Derivation of electric drivetrain requirements
• Battery pack will enable 3 hours driving time in urban surrounding, hilly topology

Knowledge Management

Project Coordination

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