Future Travelling

Description of projects

Hydrogen Modular Range Extender for Electric Vehicles (MoREZero)

Catalonia, Flanders, Turkey, Sweden

Zero emissions cities, increasing taxes on polluting vehicles and rapidly growing consumer vehicle demand are factors pushing the need for alternative fuel vehicle technologies. Many strategies have been conducted in the past years to promote the market introduction of electric vehicles. However, it seems that the main fear that final users have is a range anxiety, which is the fear that the vehicle does not have sufficient range to reach its destination.

The MoRE Zero project aims to contribute to increasing consumer awareness and acceptance of Electric Vehicles by increasing the range of these vehicles through the installation of a zero emissions range extender based on fuel cell technology. The main outcome of the project will be the development of a hydrogen modular range extender system.

To achieve this key objective, the MoRE Zero project has analysed and optimised each of the key components of the system in order to find the most suitable solution for two vehicle categories, 3,5T and 18T. As such, the result of the project will be two demonstration vehicles with the hydrogen range extender system fully integrated. Currently, components belong to new Range Extender system (FCM-Fuel cell module & DC/DC converter) have been validated independently. After that functional validation, these components will be calibrated together and finally, once they are fitted on the vehicle, performance vehicle validation will take place.

Main objectives of MoRE Zero project
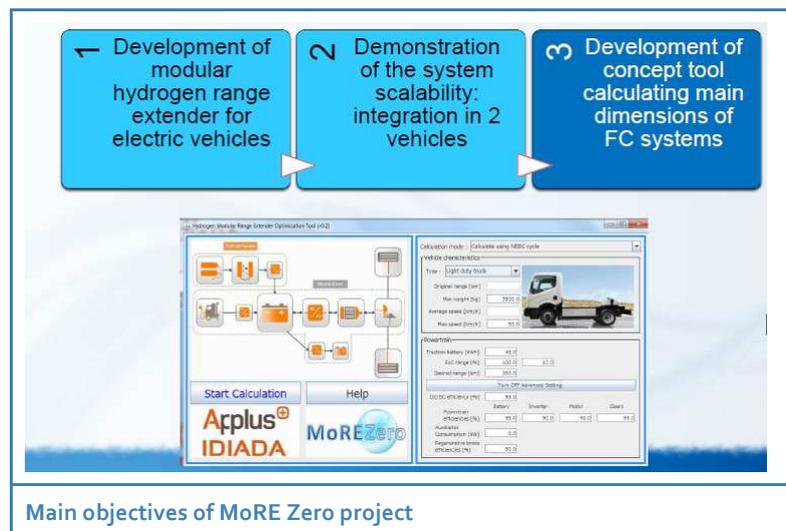
In order to ensure the system modularity and scalability, the project is also developing an automated tool to assist the selection of different alternatives for specifying a hydrogen range extender system. The application customizes the integration and size of the relevant components (such as battery, fuel cell or number and capacity of H2 tanks) to the consumer needs of any existing electric vehicle.

MoRE Zero will achieve a substantial impact with regards to a greener road transport system and the acceptance of citizens and policy makers to introducing alternative fuel vehicles. This will be accomplished by demonstrating that zero emission vehicles can meet the challenge of range anxiety in all kinds of vehicles.

For more information about the project visit www.morezero.eu or contact Natalia Artal: Natalia.Artal@idiada.com

Renewable Energy Powered Hybrid Innovative Sailing Yacht (REP-SAIL)

Turkey, Poland

Sailing boats are nature friendly vessels as they are using wind as their primary propulsion resource. In certain cases, where the wind may not be enough and for household energy usage, they use liquid-fuel auxiliary systems and diesel engines as extra energy resources. Using liquid-fuel systems for manoeuvring while entering ports, in opposite wind conditions and when the thrust is low, are main factors that raise carbon footprint of sailing boats.

Platform that is being researched and developed in this project, will use energy stored in the batteries that is generated by renewable energy resources instead of any liquid fuel generated energy for propulsion or household energy usage while cruising, on port or anchored.

REP-SAIL is developing a new renewable energy powered sailing yacht
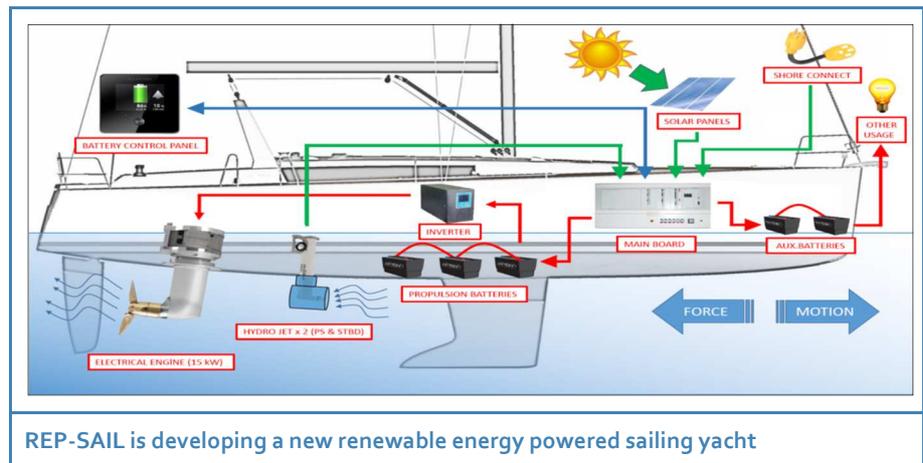
Two water turbines integrated under the hull, venturi wind turbines located on port and starboard sides of the stern deck and solar panels that will be laid down on upper deck and main deck will be the main energy input for the boat.

Batteries and energy management system will be designed for lowest energy loss. This will provide enough energy to move the boat while sailing is not possible, and energy for accommodation.

Maritime University in Szczecin, Warsaw University of Technology and Autocomp Management under management of Milper, are researching sub-components of the boat, including energy converters, energy storage systems, energy management systems and high-efficiency electric propulsion systems.

Those components will be suitable for offshore conditions and will conform enough efficiency.

For more information about the project contact Gürhan Ertas gurhan.ertas@milper.com.tr

Accessible and inclusive mobility for all with individual travel assistance-aim4it
### Germany, Austria and Poland

The project aim4it focuses on a public transport system which is inclusive and fair to all groups of society contributing to reduce the existing barriers. The project pursues a holistic approach which reflects both the user point of view as well as the service provider perspective by the development of a broad spectrum of assistance functions.

Especially passengers with special mobility needs have to be informed in due time about their departure times and their changeover times at interchange stations. This information not only need to be up to date but also represented in an understandable manner.

The project aim4it tackles this challenge and combines competences of a multidisciplinary project team to develop a novel intermodal pre-/on- and post-trip transport information system (ITIS).

The system architecture consists of three main elements: services in the background, in-vehicle components and smartphone client application. The smartphone application connects with background services and in-vehicle components in order to deliver the end-user the functionality consisting of six main functions.

1. **Barriere-free re-routing function in case of incidents**
2. **Connection protection of passengers with reduced mobility**
3. **Request for staff assistance**
4. **In-vehicle passenger information** -based on wireless communication between the app and the in-vehicle infrastructure
5. **Incidents information in sign language** provided by the avatar -
6. **Feedback function** for actively involve passengers in continuous improvement of the barrier-free public transport system

The picture shows the system architecture of aim4it project
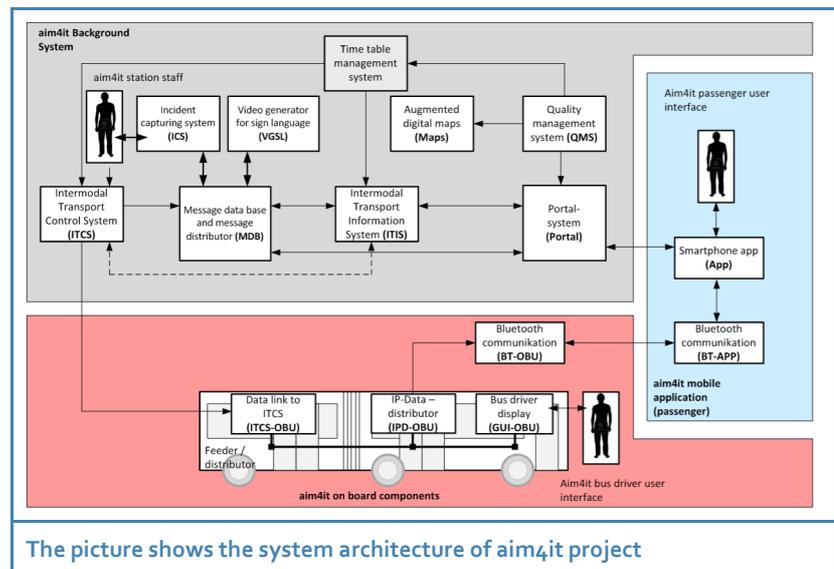
The solution has already been presented to the target group of end users and received a positive reception. Next steps envisaged are the in integration of project results into productive system and the updating of industry standards (VDV) according to project outcomes in order to make the solution transferable to other regions.

See how aim4it works in this video.

For more information about the project contact Anna-Maria Ademeit: Anna-Maria.Ademeit@dlr.de

A platform to analyse and foster the use of Green Travelling (GreenTravelling)

Basque Country, Poland, Turkey

This project aims at developing a set of tools for the assessment of inter-modal travelling options, fostering green transport means based on two very innovative points. First, from a micro perspective, the development of a multi-modal routing algorithm that includes the electric vehicles (EVs) as an alternative transport mean. Second, from a macro perspective, the deployment of a decision support tool to allow infrastructure managers and public administrations to evaluate different parametrisable scenarios according to several kind of costs, as well as social and environmental impact.

The result of this project will derive in two products which are now under development:

(1) The Green Travelling Application

It includes the developing of the GTAlg and GTInt. The first is the algorithm representing a key element of the project. It takes into account heterogeneus information coming from different, public and internal, databases. I.e transport network parameters (OpenStreetMap), public transport information: schedules, stops, lines, costs... (GTFS, General Transit Feed Specification), traffic conditions, elevation...

The Green Travelling application and the Green Travelling Platform will be the two products derived from the project.

The second is the interface for computers, mobile devices and car consoles.

(2) The Green Travelling Platform.

A platform for decision support addressed to infrastructure managers and local authorities, able to simulate the transport needs of the society. It allows to build what-if scenarios considering (1) citizens Preferences, (2) modal Split of the Population, (3) Public Transport Routes and Schedules and (4) Environmental impact of vehicles. It also considers the inclusion of electric vehicles and the effects that incentives can have on citizen's behaviors.

The project usability will be tested in three case studies featuring Basque Country, Poland and Turkey realities. They will include real data about the GIS system, the different transport means schedules and costs, local incentive alternatives, etc.

The Green Travelling Project offers new possibilities for changing transport users' behavior by expanding functionalities of trip planners and drawing special attention to environmentally friendly travelling and multimodality.

For more information about the project contact Luis Rodríguez: luisrodriguez@saitec.es
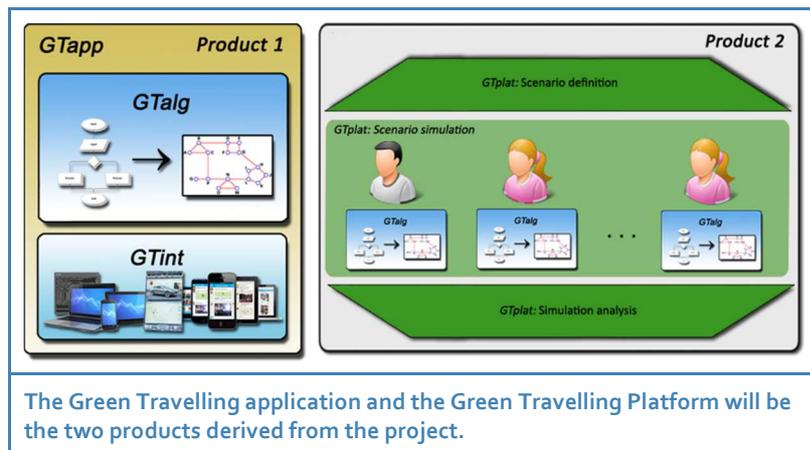
Enhanced Pedestrian Routing and navigation as well as Quality Management of Pedestrian Ways (PERRON)

Austria, Belarus Germany

Although walking is part of almost every journey, no matter which mode of transport is used, wayfinding for pedestrians has only been performed based on standard car-centric street maps.

The main objective of the PERRON project is to improve pedestrian navigation by bringing it to a more detailed and realistic level. Nowadays, pedestrians are mostly routed and navigated based on road networks. However, to ensure efficient, attractive, and safer navigation solutions for pedestrians, they should be routed and navigated on pavements wherever possible. Therefore, the PERRON project applies and validates a scientific model for route search depending on the quality of the footways, based on measurable way attributes.

Moreover, PERRON identifies patterns for road crossing where there are not dedicated crosswalks and develops pedestrian-centered routing algorithms using information of OpenStreetMap (OSM) database, which consider

PERRON identifies patterns for road crossing and extracts landmark information from OSM to be integrated in navigation instructions

sidewalks and way quality criteria (distance, safety, comfort, attractiveness).

PERRON further aims to extend and adapt existing methods of generating and presenting pedestrian navigation that consider pedestrians needs. The main achievement in this field has been the extraction of landmark information from OSM to be integrated in the navigation instructions. In the pedestrian-centered interface design the provision of navigation instructions will be provided via text to speech as well as through the use of wearable technologies.

These developed methods and algorithms will be brought together in a mobile demonstrator and will be evaluated in two selected test sites in Austria and Germany.

For more information about the project visit perron-project.eu or contact Manfred Tscheligi*:*
*manfred.tscheligi@ait.ac.at*

Analysis and development of attractive public transport through information technology (ADAPT-IT)

Israel, Sweden

One of the most effective strategies to achieve an efficient and sustainable transport system is to develop and operate high level of service public transport. The public transport system needs to be efficient under varying traffic flow conditions, passenger demand, incidents and events, service disruptions and other interruption and irregularities. To realize its potential in these circumstances, real-time operations control of the transit services is required. Despite the importance of transit operation control to the service quality and cost, much less attention has been given to real-time operations control when compared to service planning and design.

The overall objective of the proposed research is to develop strategies and methods for real-time operations control and information provision. The project will design a decision support system that will facilitate proactive and predictive public transport operations control to maximize the benefits to travellers, operators and the transport system as a whole, in real-time in response to real-time conditions.

At this stage of the project a detailed traffic transit simulation model under development. This model implements various transit control algorithms and thus support evaluation of impact on the system. simulation model will be embedded within the decision-support tool to recommend specific control actions in various situations. The project also include case studies

Conceptual framework of the ADAPT-IT project

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using real-world data and the effect of sensors to reduce prediction uncertainty.
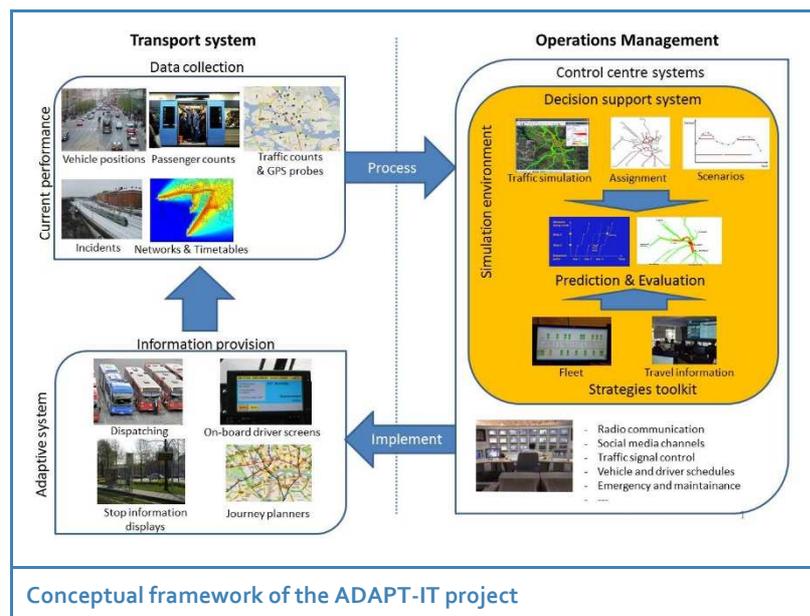
ADAPT-IT's final results will demonstrate the benefits of the developed tool to passengers and operators.

For more information about the project contact Tomer Toledo: toledo@technion.ac.il

Public transport services with wearable devices for different mobility types (Guide2Wear)

Austria, Basque Country, Flanders, Germany, Sweden

Guide2Wear aims at evaluating the potential of wearable devices for future travel services and providing a prototype for public transport navigation services with additional functions using a wearable device. The main objective is to improve co-modality and the use of environmental friendly transport modes for passengers by taking a major step forward in information providence, payment support and passenger guidance by using wearable devices and the related new possibilities.

The project has deeply analysed the technical side as well as the human side of this task. On one hand wearable devices and expected progress in this field have been studied and on the other hand the different user needs based on different mobility behaviour and human factors have been considered as well as legal and economic aspects.

Through literature reviews, interviews and surveys, discussion with stakeholders, focus groups, and expert workshops the consortium has identified the state of the art in transport supporting services for mobile devices. Different user groups and their special requirements, mobility types and mobility behaviour, future mobility trends, wearable devices relevant for transport, and the current situation concerning related

Guide2Wear is developing a prototype for public transport navigation services with additional functions using a wearable device

legal aspects in Europe have been thoroughly analysed. By means of a field study, the impact of new technology on mobility behaviour is evaluated.

Based on user need assessment and technological maturity the smart watch has been chosen as the preferred wearable for developing the prototype. A prototype application is now under development and will be used to show the potential of wearable devices for public transport and intermodality.

This will lead to a major improvement of seamless intermodal trips by providing the appropriate information and functionality in a comfortable way.

For more information about the project visit www.guide2wear.eu or contact Ingrid Nagel: Ingrid.Nagel@ivi.fraunhofer.de

Smart Adaptive Public Transport (SMART-PT)

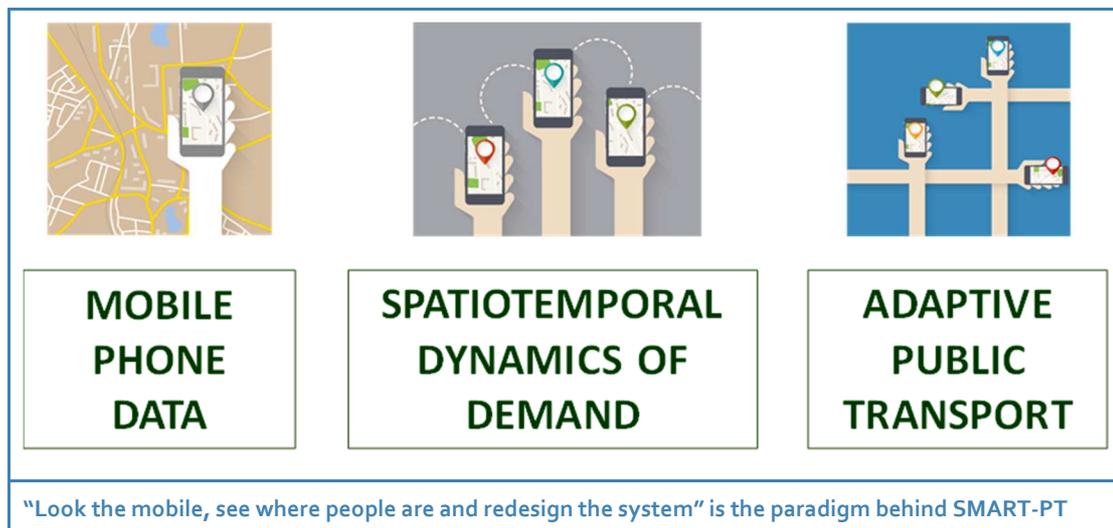*Israel, Flanders, Poland, Sweden*

Public transport networks remain stable for many years, with mostly static routing governed by the assumption that residents have fixed and habitual activity and travel patterns. The starting point is that public transport services accommodate mainly the demand of the past with static routes and timetables.

SMART-PT aims to modify Public Transport into a smart system that adapts itself to the evolving activities and derived demand of the travellers of the future.

Based on the information available for several case studies the project is working to:

- Systemically analysing the discrepancy between travel demand and existing public transport supply from mobile telephony sources
- Develop algorithms for adapting the inflexible public transport supply to the current activity patterns of the population and further evolution following the expected changes in the future urban population
- Evaluate public transport supply changes with a spatially explicit high resolution agent-based simulation model using both synthetic and real data of urban dynamics
- Develop the pathways and policies for implementing SMART-PT approach in case studies of the project teams
- Investigate the potential impacts of this approach on end-users, service providers and regulators.

| MOBILE PHONE DATA | SPATIOTEMPORAL DYNAMICS OF DEMAND | ADAPTIVE PUBLIC TRANSPORT |

"Look the mobile, see where people are and redesign the system" is the paradigm behind SMART-PT

This research framework will be employed for developing a proof-of-concept and investigate its effectiveness in case studies in Tel-Aviv, Stockholm and Leuven.

For more information about the project visit smart-pt.tau.ac.il or www.facebook.com/smartpt.ent3 or contact the coordinator Itzhak Benenson bennya@post.tau.ac.il or project manager Eran Ben-Elia benelia@bgu.ac.il