

## Impact Objective

- Foster research potential and promote excellence at the University of Žilina, Slovak Republic, in the field of intelligent transport systems (ITS) while also positively impacting ITS in Europe

# Driving change in transport systems

*Drs Karl Ernst Ambrosch, Dietrich Leihs and Giuseppe Lugano discuss their work on ERAdiate, an innovative intelligent transport systems project run through the University of Žilina, Slovak Republic, which seeks to address the major challenges associated with transportation*



From left to right: Dr Karl Ernst Ambrosch, Dr Dietrich Leihs and Dr Giuseppe Lugano

### Can you begin by introducing yourselves and your respective research interests?

**KEA:** I am the European Research Area (ERA) Chair Holder for Intelligent Transport Systems (ITS) at the University of Žilina. I have worked for several universities, as well as in industry and SMEs. Over the last few decades my main research interest has been in converting knowledge into commercially used systems and products.

**DL:** I am an expert in ITS and have played several roles in industrial technology, academia, education and research, as well as public administration and the institutional environment. My activities focus on urban transport, the mitigation of air pollutants and greenhouse gases, and the creation and distribution of traffic information.

**GL:** I joined the ERAdiate (Enhancing Research and innovAtion dimension of the University of Žilina in intelligent transport systems) team in September 2016 after having worked for the five years as a Science Officer at COST (European Cooperation in Science and Technology) where I supported the activities of transdisciplinary Science and Technology Networks across Europe. Networks have been also at the core of my research work,

in which I investigated the potential of digital communities – emerging from converged social and technological networks – in various application areas.

### Can you explain what ITS are in more detail?

**DL:** ITS provide tools and methods in order to make transportation effective and efficient, ranging from infrastructure management, management of vehicles and passengers, to decision support. ITS are very often attempts to improve mobility using information and communications technology, whereby the informed traveller travels faster, more conveniently, using less energy or modal shift from individual to shared/public transport, thus saving energy and reducing congestion which leads to shorter travel times. Pricing and/or special rules – like access control to historic city centres – lead to behavioural changes. ITS cover systems that interconnect traffic management centres as well as payment systems or advanced driver assistance systems in modern cars.

### Collaboration obviously plays a significant role in the success of the project. Could you briefly explain what each collaborator brings to the project?

**GL:** Given the broad scope of the ERAdiate project, which looks at enhancing the research and innovation dimensions of the University of Žilina in ITS, the team was gradually formed by bringing in researchers with complementary knowledge and competences. With five

full-time members, the core team is rather small, but additional part-time colleagues are involved in the activities based on emerging needs. Collaboration also refers to the identification and involvement of relevant actors in the ERAdiate activities, for instance participation in EU-funded projects. In this respect, the different backgrounds and perspectives of the team members allow forming interdisciplinary consortia with representation of all relevant actors needed to implement the best solution for the identified problem.

### What methods are you using throughout the course of your research and what do you hope each will achieve?

**DL:** The main research methods that ERAdiate facilitates are surveys with statistical support and modelling. The expected outcome is to create methods that generate data and information to help assess the effectiveness and efficiency of the transportation system as a basis for a vivid research and innovation agenda.

### Finally, can you talk about some of the results you have achieved so far?

**KEA:** We have already won several projects and are on a good track with our research partners and other stakeholders. We have created awareness and are attracting promising ideas for new activities from both universities and companies. Our visibility is growing and we are perceived as an interesting partner.



# Addressing future mobility issues today

The *ERAdiate* (Enhancing Research and innovAtion dimension of the University of Žilina in intelligent transport systems) project is a unique and innovative research hub focused on addressing the global societal and environmental challenges associated with mobility issues and transportation

The damaging effects the use of fossil fuels has on the environment are now well documented, to the point where finding alternative modes of transport – ones that do not rely on the burning of fuels that create greenhouse gases – is an urgent requirement for the societies of tomorrow. In light of this, the concept of intelligent transport systems (ITS) has been gaining ground in recent years. Indeed, ITS are seen as a vital means of increasing safety and tackling the growing congestion and emission problems around the world.

In addition to making transport safer, more efficient and more sustainable, ITS has the potential to integrate existing technologies to form new services that address the challenges associated with transport, at the same time as creating new jobs and growth in the sector. Ultimately, ITS uses advanced applications to provide innovative services for the general public that benefit traffic management, facilitate safer modes of transports, and make smarter use of existing transport networks.

## PUTTING THE SLOVAK REPUBLIC ON THE MAP

In recognition of the potential of ITS, the European Commission has funded a project to move it forward into new areas. The ERAdiate initiative has been established to contribute to scientific excellence in ITS and support regional innovation strategies that foster economic and social development. Dr Karl Ernst Ambrosch is the European Research Area (ERA) Chair Holder for ITS at the University of Žilina, Slovak Republic, and is enthusiastic about the potential

impacts that ERAdiate could have in the future: 'ERAdiate will have impact both for the University of Žilina and the region,' he explains. 'The university will have greater inclusion in the scientific community and more internationalisation, while in the region the expertise shall enable projects and deployment to improve the mobility of citizens.'

Another important consideration for Ambrosch and his team is establishing an ITS community made up of industry representatives and SMEs. ERA Chair Team Member Dr Dietrich Leihls extols the virtues of this highly interdisciplinary research project: 'As is typical for ITS, it is interdisciplinary so the related university research is typically spread among various faculties and departments to encourage collaboration. The major impact of ERAdiate will be that ITS-related university research will proceed in a similar way to that of research and technology organisations (RTO) but with a streamlined strategy and hence provide basic research capabilities, which are rare with RTOs.'

The project has not been without its challenges, but it is envisaged that these will eventually be overcome. For instance, given the geographical remoteness of the location of the research, the physical exchange of people is limited. However, by actively looking for collaboration with partners in selected research fields from specific locations, this highly collaborative endeavour will benefit all those involved and their respective countries.

## INTERLINKED THEMES

One of the main research focus areas of the project is on the complex field of mobility. No less than 70 per cent of all Europeans live in cities and thus urban mobility is a decisive factor for the quality of life and prosperity of individuals across Europe. In response to this, ERAdiate is tackling urban mobility and covers all modes of transportation, including active forms of mobility. Whereas before solutions might have been offered that failed to consider the impact on individuals, ITS are increasingly focused on new aspects such as customer care and user needs. In addition, given the importance of reducing the carbon footprint, decarbonisation is considered at every step of the journey. 'The field of mobility is complex and has to be treated in parallel with people, their aspirations and needs,' adds Ambrosch. 'Though we deal with research, our activities are linked to the real world and real people. So socioeconomic effects are very important and at the end of the day systems shall earn money rather than creating comfort using public funding.'

The team have therefore defined a list of interlinked themes that will help them realise the ambitions of the project whilst still keeping these considerations in mind. The main themes are cooperative and complex systems, smart solutions, smart and liveable cities, access, pricing, decarbonisation of mobility, business models for ITS, inclusive mobility and the societal effects of ITS deployment. With these points in mind, the outputs from the project will not only be feasible, they will

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resist the possibility of undermining one another; each individual theme feeds into the others to create an overall picture of success that works in conjunction with all the others.

## REAL-WORLD IMPACT

Another key consideration is making the knowledge gathered throughout the course of the project accessible. Importantly, while the people involved in the project are attempting to develop understanding of the complexities associated with ITS, they also want to drive real-world impact. As such, the findings must feed into the structure and infrastructure of society. Dr Giuseppe Lugano, who is the leader of the Work Package concerned with dissemination and publicity, is aware of the approach the project must take in communicating its findings: 'Although the project deals with research and development activities, our work cannot be regarded just as research projects, because in addition to research and innovation, they are also expected to contribute to institutional and structural

changes as well as to regional development. Accordingly, the ERAdiate dissemination efforts follow different channels adapted to the target audiences.'

With that in mind, dissemination activities such as seminars, workshops and conferences – as well as the use of social media to complement website information – are key to the sharing of knowledge, raising awareness and engaging additional participants in ERAdiate activities. This enables broader impact of the findings and translation from research to real-world applications.

Ultimately, the findings from the project will do much to alleviate the societal burdens transport places on people and the environment. In addition to the decarbonisation of mobility across Europe and beyond, urban mobility will be advanced to the point where we all engage with sustainable urban mobility and, not too far in the future, autonomous driving.

## Project Insights

### FUNDING

European Union Framework Programme (FP7) ERA Chair, project number 621386

### FOSTERING EXCELLENCE IN RESEARCH AND INNOVATION IN THE FOLLOWING FIELDS:

Cooperative ITS • Decarbonisation of mobility • Urban mobility/smart cities • Intermodal ITS

### CONTACT

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### PROJECT LEADER BIO

**Dr Karl Ernst Ambrosch** has worked for several universities as well as within industry and SMEs. During the last decades his main interest has been converting knowledge into commercially used systems and products. Ambrosch led the largest non-university research company for energy and mobility in Austria (arsenal research) from 2008 to 2012. He restructured the company, organised national and international research projects, and finally merged it into the mother company the Austrian Institute of Technology. In addition, he has a long history working as an entrepreneur and consultant.

