

This document is a translation of the honorary speech ("Laudatio") prepared by Ministerialrat Stefan Karnop from the Ministry of Regional Development and Transport (MLV) in Saxony-Anhalt on the occasion of the Manfred-Fuchs-Award ceremony on Oct 27th, 2015. No guarantees are given about the correctness and adequateness of the translation.

Laudatio on the project team, Dr. Thomas Strang and Dr. Andreas Lehner

Dear ladies and gentlemen! (...)

The aim to get a better understanding of the world by use of a theoretic model, trial and error, in short the technological-scientific progress, has led to prosperity, quality of life and an expectation of a long human life. However one has to challenge the value of any innovation for the human kind, as the drive for something new has to be guided by moral borders.

I am thus very happy to be here today to give the Laudatio to the awardees of this year's Manfred-Fuchs Innovation Award of the Association of Friends of the German Aerospace Center in Bonn for the project "Railway Collision Avoidance System (RCAS)", which aims to protect the safety of humans.

They are, as you all know, the founder and CEO of Intelligence on Wheels, Prof. Dr. Thomas Strang, as well as the CTO of Intelligence on Wheels, Dr. Andreas Lehner.

But let's start differently. You all remember January 2011. The accident in Hordorf with 10 fatalities, 23 injured people and a material damage of around 7 mio Euros? How could this happen, everyone wondered once the horror calmed down. Very simple: What happens every day, to every one of us – human failure – but this time with the worst consequences. The driver of the freight train passed a red signal and crashed head-on into a passenger train coming from the opposite direction. There was no technology in place acting as a safety net, which steps in once a human makes a mistake. Immediately there was a call for installation of well-known train protection technology – area-wide in the entire infrastructure. But for not so few railway operators traditional protection technology is much too expensive, and maybe also over-dimensioned. This holds also for the Harzer Schmalspurbahnen (HSB). Although being "the biggest under the small ones" as well as the most beautiful – just come to the Harz region and enjoy a ride – financially they have to fight very tough.

Now Saxony-Anhalt explored for further safety options which are more cost efficient and found a publication from the German Aerospace Center (DLR) describing a system used in aeronautics to prevent collisions and its transfer to the railway domain through a research project. We established a contact to HSB. I remember very well the first meeting in our ministry: HSB was very sceptical, and my railway specialists in the ministry even more. Eventually we plucked up courage and decided to give it a try and engage with the experiment. That was the starting shot for an entirely new way in technical safety of railway transport. And we were able to accordingly fund the project.

So the way was cleared for an installation at the Harzer Schmalspurbahnen. Innovation in historic trains, a very impressive story, which has been enabled primarily through the enthusiasm of Prof. Dr. Thomas Strang and Dr. Andreas Lehner. I wish to explicitly thank you ... also from my Minister, Thomas Webel, all the very best. (...)

What belongs to a good Laudatio, I would like to introduce both awardees briefly.

[Official English CV, no verbal translation] Dr. rer. nat. Thomas Strang studied computer science at the University of Technology (RWTH) in Aachen and received his Diploma degree (Dipl.-Inform.) in 1998. At this time he worked on communications and distributed & multi agent systems, high speed

networks and telecommunications, local area networks, multimedia communications, computer graphics and security. Parallel to university he worked in industry from 1988 to 2000, where he gained experiences in design, development and management of several projects in the area of large scale security systems. Since July 2000 he has been working as a researcher in the Institute of Communications and Navigation at the German Aerospace Center (DLR) in Oberpfaffenhofen, Germany. Here his research focus has been on ubiquitous and pervasive computing, location- and context-awareness, service discovery and execution frameworks, Semantic Web and smart mobile devices. Since 2004 he has been responsible for the Institute's programme in transportation research, which includes adaptive services for intelligent transportation systems (ITS) and ad-hoc vehicle-to-vehicle communications (V2X). In 2003 he was awarded a Doctor's degree in natural sciences (Dr. rer. nat.) at the University of Munich, Germany, with a dissertation on service interoperability in ubiquitous computing environments. Since October 2004 he has been a professor for computer science at the University of Innsbruck, Austria, and has also given lectures at the University of Munich (LMU) and at the Technical University of Munich (TUM). Between 2005 and 2006, he has been an Executive Director as well as acting Head of Institute at the Digital Enterprise Research Institute (DERI) in Innsbruck, Austria, where he also led a research group on ubiquitous services. Thomas Strang has led the DLR research project RCAS (RCAS I from 2007-2009, RCAS II from 2010-2012) and is the CEO of Intelligence on Wheels.

[Official English CV, no verbal translation] Dr.-Ing. Dipl.-Ing. Andreas Lehner was born in Gmunden, Austria in 1973. Between 1999 and 2001 he was a RF-CMOS designer for GSM and UMTS mobiles for Infineon Technologies in Munich, at the California Institute of Technology (Caltech) in Pasadena, and at the Institute of Communications and Information Engineering, University of Linz. In 2001 he received a diploma degree in Mechatronics from the Johannes Kepler University in Linz, Austria. Since 2001 he is scientific staff, technical project leader and senior research fellow at the Institute of Communications and Navigation of the German Aerospace Center DLR. In 2007 he received a PhD in EE from the Friedrich-Alexander University in Erlangen-Nuremberg for his work on "Satellite navigation channel measurement and modelling". He got a "Best Presentation Award" at the Institute of Navigation GPS/GNSS Conference 2003 in Portland, was winner of the IEEE COM innovation prize 2007 in Berlin, and received the DLR idea award "Safety-first" in 2011. He is participating in ETSI standardisation processes and contributed to the ITU standards ITU-R P.681 and P.682 "Propagation data required for the design of Earth-space land mobile and aeronautical mobile telecommunication systems". He holds 5 patents and has published more than 60 papers and articles in international conference proceedings and journals. His research foci are on measurement and modelling of multipath propagation and interference in satellite-to-earth navigation and vehicle-to-vehicle communication systems, real-time implementation and simulation of high detailed error models, studies and performance analysis on land mobile, indoor and aeronautical GNSS applications, development and simulation of media access protocols in mobile ad-hoc networks, and on design and implementation of infrastructure-less vehicle collision avoidance and Vehicle-to-Vehicle communication systems. Andreas Lehner was responsible in the RCAS research project for the overall technical system including the setup of the demonstrator prototype. He is the CTO of Intelligence on Wheels.

Dear ladies and gentlemen, DLR developed a prototype for a sound and reasonable overall system for train collision avoidance in the framework of the project "Railway Collision Avoidance System (RCAS)", which has been demonstrated. All relevant information, for instance about the position, speed, the planned routing or the out-of-gauge-class are transmitted directly from train-to-train. The RCAS system does not only record all this information – and here comes the new part – it also informs the train driver about an immanent collision, who in turn can react in good time.

In a future stage of the development the system may even control the braking system of the train. If a train is about to collide, it will come to a complete standstill sufficiently early. A sensation. Because it works – differently than in the safety technology used in railways so far – independently from the infrastructure. RCAS works completely decentralized through the communications between the trains and their onboard computers.

The scientists of the Institute of Communications and Navigation developed the robust train-to-train communications and localization technology taking care of the railway specific constraints. Together with them, the engineers of the Institute of Transportation Systems took particularly care of the operational aspects of RCAS [..]. Researchers of the Institute of Robotics and Mechatronics complemented the RCAS approach with optical subsystems [..].

We in Saxony-Anhalt are very proud that you deployed your research spirit to this project. With good grace we thus also have been together at InnoTrans about one year ago and have commonly presented your project to the International public audience. And we share your happiness about your work being honoured with the innovation award.

In this spirit I may conclude with a citation of the German-American physicist Albert Einstein: “A human may only find a sense in his short and dangerous life if he contributes to the society”. This – dear gentlemen – you have achieved in the best sense for all railway travellers.

Thank you!

Ministerialrat Stefan Karnop

Ministry of Regional Development and Transport (MLV) in Saxony-Anhalt, Germany