

AIT Lecture Series

Title: “Motorway traffic flow modelling, estimation and control with VACS (Vehicle Automation and Communications Systems)”

Prof. Markos Papageorgiou

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AIT Austrian Institute of Technology GmbH
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Room: GG2_F4_M1
Giefinggasse 2, 1210 Vienna

Abstract

Motorway traffic congestion has a strong economic and social impact in and around densely inhabited areas. The development and implementation of proper motorway traffic control measures may lead to a sensible reduction of traffic congestion and to an increase of the overall capacity of motorway traffic networks. On the other hand, a significant and growing interdisciplinary effort by the automotive industry, as well as by numerous research institutions, has been devoted in the last decade to planning, development, testing and deployment of a variety of Vehicle Automation and Communication Systems (VACS) that are expected to revolutionise the features and capabilities of individual vehicles within the next decades. The presentation starts with a brief introduction to the rationale and impact of motorway traffic management, along with an overview of expected changes in the years and decades to come. This is followed by a selection of summarised results from the ERC Advanced Grant TRAMAN21 (www.traman21.tuc.gr) related to motorway traffic flow modelling, estimation and control with VACS, including aspects of system architecture.

Professional Bio



Markos Papageorgiou received the Diplom-Ingenieur and Doktor-Ingenieur (honors) degrees in Electrical Engineering from the Technical University of Munich, Germany, in 1976 and 1981, respectively. He was a Free Associate with Dorsch Consult, Munich (1982-1988), and with Institute National de Recherche sur les Transports et leur Sécurité (INRETS), Paris, France (1986-1997). From 1988 to 1994 he was a Professor of Automation at the Technical University of Munich. Since 1994 he has been a Professor at the Technical University of Crete, Chania, Greece. He was a Visiting Professor at the Politecnico di Milano, Italy (1982), at the Ecole Nationale des Ponts et Chaussées, Paris (1985-1987), at MIT, Boston (1997, 2000); at University of

Rome La Sapienza, Italy (2018); Distinguished Visiting Professor at Tsinghua University, China (2018-2021); and a Visiting Scholar at the University of California, Berkeley (1993, 1997, 2001, 2011) and other universities.

Dr. Papageorgiou is author or editor of 7 books and of over 500 technical papers. His research interests include automatic control and optimisation theory and applications to traffic and transportation systems, water systems and further areas. He was the Editor-in-Chief of *Transportation Research – Part C* (2005-2012). He also served as an Associate Editor of *IEEE Control Systems Society – Conference Editorial Board*, of *IEEE Transactions on Intelligent Transportation Systems* and other journals. He is a Life Fellow of IEEE and a Fellow of IFAC. He received a DAAD scholarship (1971-1976), the 1983 Eugen-Hartmann award from the Union of German Engineers (VDI), and a Fulbright Lecturing/Research Award (1997). He was a recipient of the IEEE Intelligent Transportation Systems Society *Outstanding Research Award* (2007) and *Outstanding Application Award* (2018); and recipient of the IEEE Control Systems Society *Transition to Practice Award* (2010). He is the recipient of the 2020 *IEEE Transportation Technologies Award*. He was presented the title of Visiting Professor by the University of Belgrade, Serbia (2010). The Dynamic Systems and Simulation Laboratory he has been heading since 1994, received the IEEE Intelligent Transportation Systems Society *Institutional Lead Award* (2011). He was awarded two ERC Advanced Investigator Grants (2013-2018 and 2019-2024).