Scientific Workshops

Thomas Dallmann

Matthias A. Hein

SW02 Towards Virtual-Drive Testing: Test and Measurement for Automotive Applications

Room: A1 – Gdynia

Date: 5 April 2019

Time: 8:40-12:30

Thomas Dallmann

pursued his Ph.D. in electrical engineering at the Institute of High Frequency Technology IHF, RWTH Aachen University. There he worked on polarimetric methods for radar cross-section imaging. Since 2016 he leads the Research Group Aachen of the Fraunhofer-Institute for High Frequency Physics and Radar Techniques FHR, Germany. His research is concerned with technologies and test systems for automotive radar.

Matthias A. Hein

started his academic career at the University of Wuppertal, Germany, before he joined the TU Ilmenau in 2002. He has authored around 520 publications and 30 invited talks, and supervised nearly 40 doctoral, 80 Master and 20 Bachelor projects. He chaired renowned international conferences and is board member in IEEE and European Societies. As spokesman of the Thuringian Center of Innovation in Mobility, his research focus is on automotive wireless sensor and communication systems and virtual test drives. His research has been attracting significant public and private funding since more than 10 years.

Abstract

In the upcoming years, autonomous driving will become reality and, besides increasing driving comfort, should advance the safety of road users. This however comes with high requirements to the reliability of automotive radars and communication systems. Their proper operation can only be ensured by using suitable RF measurement equipment. The equipment should not be able to test specific functions only, but to check complete cause-effect relationships within and around the vehicle instead. Due to the current efforts of governments, research institutions and industry to turn the autonomous driving vision into reality, research on such test systems for automotive applications has become highly relevant. The goal of this workshop is to make the currently conducted research in this field available to an interested audience.

Workshop Outline

Dr.-Ing. Adrian Zlocki, fka mbH, Germany: “Challenges in safety assurance of perception for automated vehicles“

Christopher Walkowiak, ITK Engineering, Germany: “Validation and verification with raytracing and radar target simulators in closed loop test environments“

Prof. Dr. Michael Ernst Gadringer, TU Graz, Austria: “OTA Radar Stimulation for Vehicle Tests“

Matt Spexarth, National Instruments, United States: “Error budget estimation for RCS accuracy calibration in automotive radar OTA test environments“

Dr. Lars Foged, MVG, Italy: "Direct Emulation of Virtual Drive Scenarios by Post Processing of Automotive Measurements"

Devin Crawford, Ansys, United States: "Application of asymptotic methods for large-scale V2X and automotive radar simulation"

Prof. Dr. rer. nat. Matthias Hein, TU Ilmenau, Germany: "Antenna and virtual-drive testing in the multi-purpose test facility VISTA"

Dr.-Ing. Thomas Dallmann, Fraunhofer FHR, Germany: "ATRIUM - Handling traffic scenario complexity in radar target simulation"

Vikass Monebhurrun

Lars Foged

Dr. Vince Rodriguez

SW03 Stand on the Antennas and Propagation Standards

Room: A1 – Gdynia

Date: 4 April 2019

Time: 10:50-12:30

Vikass Monebhurrun

(SM'07) received the PhD degree in electronics in 1994 and the Habilitation à Diriger des Recherches (HDR) in physics in 2010 from Université Pierre et Marie Curie (Paris VI) and Université Paris-Sud (Paris XI), respectively. He was engaged in research on electromagnetic non-destructive testing for nuclear power and aeronautical applications until 1998, following which he joined the Department of Electromagnetics at Supélec (CentraleSupélec since 2015). His research interests encompass time domain numerical modeling as well as radio frequency measurements. He actively participated in French National Research Programs on electromagnetic dosimetry since 1998, namely COMOBIO (1999-2002 on 2G systems), ADONIS (2003-2005 on 3G systems) and MULTIPASS (2007-2010 on 4G systems). His research contributed to international standardization committees of CENELEC, IEC, and IEEE.

He is author or co-author of more than 100 peer-reviewed international conference and journal papers and five book chapters. He also holds three international patents on antennas for mobile communications. He is an active contributor to international standardization committees of IEC 62209, IEC 62232, IEC/IEEE 62704 and IEEE1528. He was a member of the European COST Action BM1309 (2014-2018).

Dr. Monebhurrun serves as member of the Editorial Board of the IEEE COMPUMAG and IEEE CEFC conferences, and IEEE Transactions on Magnetics special issues since 1998. He serves as Associate-Editor for the IEEE Antennas and Propagation Magazine since 2015 and Transactions since 2016, and Editor of the IoP Conference Series: Materials Science and Engineering since 2013 He is the founder of the IEEE Radio and Antenna Days of the Indian Ocean (RADIO) international conference and he served as General Chair for all six editions since 2012. In 2013, he initiated the Radio Society (Mauritius) for which he serves as President. He is the Chair of the international committees of IEC/IEEE 62704-3 since 2010 and IEEE Antennas and Propagation Standards (APS/SC) since 2015. He was the recipient of the Union Radio-Scientifique Internationale (URSI)

Young Scientist Award in 1996. Following the publication of the dual/logo IEC/IEEE 62704-3 international standard on computational dosimetry in 2017, he received the IEEE Standards Association International Working Group Chair Award. As Chair of IEEE SIGHT Indian Ocean, he received the IEEE Ulrich L. Rohde Humanitarian Technical Field Project Award in 2018. He was recipient of the IEC 1906 Award in 2018.

Lars Foged

(M'91–SM'00) received his B.S. from Aarhus Teknikum, Denmark in 1988 and M.S. in Electrical Engineering from California Institute of Technology, USA in 1990. He was a "graduate trainee" of the European Space Agency, ESTEC and in the following ten years, designed communication and navigation antennas in the satellite industry. He led the antenna design effort on the recently launched GALILEO space segment and performed the multi-physics design of shaped reflectors for the EUTELSAT W satellites, still serving European users. Following his passion to rationalize the multi-disciplinary antenna design process, including measurements and simulations, he joined MVG (formerly SATIMO) in 2001 and founded the Italian branch office. In MVG, he initiated close collaborations with universities and research institutions on measurements with focus on antennas and techniques for analysis/post-processing. He has held different technical leadership positions in MVG and is currently the Scientific Director of the Microwave Vision Group, and Associate Director of Microwave Vision Italy.

He contributed to the European network of excellence "ACE" as an Activity Leader on "Antenna Measurements and Facility sharing" from 2004 to 2008. He was member of the EURAAP Delegate Assembly and responsible for the Working Group on Antenna Measurements from 2009 to 2012. He was Vice-Chair of the EUCAP conference in 2011, Industrial Chair of EUCAP conferences in 2012, 2014, 2017, and Technical Program Chair of EUCAP in 2016. Since 2004, he is secretary of the IEEE Antenna Standards Committee and has contributed to the development of different standards on antennas and measurements. He is board member of the European School of Antennas (ESOA), and technical responsible and teacher in Antenna Measurement courses in Europe and Asia since 2006. He is involved in the evolution of IEC standards on Human Exposure to Electromagnetic Fields since 2010. In 2016 and 2017, he led the Industry Initiatives Committee (IIC), a standing committee of IEEE AP-S. He is an Edmond S. Gillespie Fellow of AMTA and received the Distinguished Achievement Award from AMTA in 2017. In 2015, he contributed to the foundation of the AMTA Italian node. He has authored or co-authored more than 200 journal and conference papers on antenna design and measurement topics and received the "Best Technical Paper Award" from AMTA in 2013. He has contributed to five books and standards, and holds four patents.

Dr. Vince Rodriguez

(SM 2006) attended The University of Mississippi (Ole Miss), in Oxford, Mississippi, where he obtained his B.S.E.E. in 1994. Following graduation Dr. Rodriguez joined the department of Electrical Engineering at Ole Miss as a research assistant. During that period he earned his M.S. and Ph.D. (both degrees on Engineering Science with emphasis in Electromagnetics) in 1996 and 1999 respectively. After a short period as visiting professor at the Department of Electrical Engineering and Computer Science at Texas A&M University-Kingsville, Dr. Rodriguez joined EMC Test Systems (now ETS-Lindgren) as an RF and Electromagnetics engineer in June 2000. During that time he was involved in E-field generator design and the RF design of several anechoic chambers, including rectangular and taper antenna pattern measurement chambers some of them operating from 100MHz to 40GHz. He was also the principal RF engineer for the anechoic chamber at the Brazilian Institute for Space Research (INPE) the largest chamber in Latin America, a fully automotive, EMC and Satellite testing chamber. In September 2004 Dr. Rodriguez took over the position of Senior Principal Antenna Design Engineer, placing him in charge of the development of new antennas for different applications and on improving the existing antenna line. In the fall of 2010 he has served and Antenna Product Manager. In this position Dr. Rodriguez was in charge of all technical and marketing aspects of the antenna products at ETS-Lindgren. Among the antennas developed by Dr. Rodriguez are: broadband double and quad-ridged guide horns; high field generator horns; stacked LPDAs for automotive and military testing; and printed antennas for wireless testing. While mainly dedicated to antenna design Dr. Rodriguez continued being involved in anechoic chamber design. In November 2014 Dr. Rodriguez Joined MI Technologies (now NSI-MI Technologies) as a Senior Applications Engineer. In this position Dr. Rodriguez works on the design of antenna, RCS, and radome measurement systems. During his tenure at NSI-MI Dr. Rodriguez was involved in designing several Antenna and RCS anechoic ranges for near to far field, Compact Range and far field measurements. In 2017 Dr. Rodriguez was promoted to staff engineer positioning him as the resident expert at NSI-MI of RF

absorber and indoor antenna ranges. He continues to be involved in the design of antennas and special RF absorbers to meet the necessary specifications of large antenna, RCS, and HWiL systems.

Dr. Rodriguez is the author of more than fifty publications including journal and conference papers as well as book chapters. Dr. Rodriguez holds patents for hybrid absorber and for a dual ridge horn antenna. Dr. Rodriguez is a Senior Member of the IEEE and several of its technical societies. Among the IEEE technical societies he is a member of the EMC Society, where he is served as Distinguished Lecturer of the society from 2013 to 2015 and also served in the board of directors of the IEEE-EMC. Dr. Rodriguez also serves in the standard's committee of the IEEE AP-S and as secretary of the working group for IEEE STD 149 and IEEE STD 1128. He is also a member of the Antenna Measurement Techniques Association (AMTA). He has served in the board of directors of AMTA as meeting coordinator (2010-2011) and as vice president for the year 2012. In 2014 Dr. Rodriguez was named a E. S. Gillepie Fellow of the AMTA. Dr. Rodriguez is also a member of the Applied Computational Electromagnetic Society (ACES), where he served in the board of directors from 2014 to 2017. In 2019 he was elevated to Fellow of ACES. He has served as a reviewer for the ACES Journal, the IEEE Transactions on Antennas and Propagation and for the Journal of Electromagnetic Waves and Applications (JEWA). He has also served as reviewer for several IEEE, AMTA, ACES and EuCAP conferences. He has served as chair of sessions at several conferences of the IEEE, AMTA, CPEM (conference on precision electromagnetic measurements) and ATMS (Antenna Test and Measurement Society). Dr. Rodriguez is a Full member of the Sigma Xi Scientific Research Society and of the Eta Kappa Nu Honor Society.

Abstract

The IEEE Antennas and Propagation Standards Committee (APS/SC), sponsored by IEEE AP-S, develops and maintains standards that are within the fields of antennas and propagation. Many researchers within the AP-S community are not familiar with standards. These documents are important for both academia and industry. For example, misuse of technical terms is still frequently observed, especially in conference papers and presentations. The most common misuse is probably the term "return loss" often taken to be the synonym of "reflection coefficient". Engineers and researchers also perform antenna measurements but many are not aware about the existence of available antenna measurement recommendations. The workshop will address standards on terms and definitions, and antenna measurements. The speakers are: Vikass Monebhurrun, Lars Foged and Vince Rodriguez.

Workshop Outline

Introduction to AP-S Standards.

Std. 145: IEEE Standard for Definitions of Terms for Antennas.

Std. 211: IEEE Standard Definitions of Terms for Radio Waves Propagation.

Std. 149: IEEE Standard Test Procedures for Antennas.

Std. 1720: IEEE Recommended Practice for Near-Field Antenna Measurements.

Industrial Workshops

Xiang Xu

ISW01 Progresses and Challenges in Test and Measurement for mmWave Transmission Systems

Room: A1 – Gdynia

Date: 2 April 2019

Time: 10:50-12:30

Xiang Xu

received his Ph.D. in electrical engineering at the Institute for Theoretic Information Technology, RWTH-Aachen University. In 2014, he joined the German Research Center of Huawei Technologies as senior test expert. He is currently leading a team developing end-to-end test and measurement solutions for 5G and V2X communication products.

Xiang Xu also holds an MBA from IE Business School. He constantly promotes collaboration with industrial and academic partners through workshops, conferences and joint projects.

Abstract

The adoption of mmWave in 5G communications imposes many new challenges on test and measurement systems. For example, high level of integration makes over-the-air testing no longer optional but mandatory. Far-field measurements on mmWave need larger anechoic chambers, which ultimately leads to significant increase of cost in testing. The propagation of mmWave in the context of cellular communications is yet to be characterized.

While the emerging challenges offer exciting opportunities for both industry and academia. This industrial workshop is targeting to enable an effective dialog between industry and academia by providing latest insights in mmWave test and measurement area from both industrial and academic perspective.

Workshop Outline

"Challenges for Next Generation Measurement Systems" by Dr. Ren Jingpu, Huawei Technologies, China

"Radiated Over-The-Air Testing of Next Generation Antenna Systems in Realistic Propagation Scenarios" by Prof. Dr. Wei Fan, Aalborg University, Denmark

"Methods, Procedures and Examples for mmWave Near-field Power Density Compliance and Radiated Performance Testing", by Dr. Sven Kühn, SPEAG, Switzerland

"Simulation of OTA System Performance Parameters in a mm-Wave CATR for 5G Testing", by Prof. Dr. Stuart Gregson, Queen Mary University of London, UK

Panel discussion.

Dr. Martin Vogel

ISW02 Efficient Simulation of High-Speed Wireless Communication and Sensing, incl. 5G, in Large and Complicated Scenarios

Room: Zakopane

Date: 2 April 2019

Time: 15:00-16:20

Dr. Martin Vogel

is Principal Application Engineer and WinProp Program Manager at Altair Engineering, Inc. He obtained his MSc in Physics and his PhD in Electromagnetics in the Netherlands. He has worked on RCS, antenna and propagation applications for TNO Defense, Safety and Security in the Netherlands, and had a one-year assignment at the US Air Force Research Laboratory at Kirtland Air Force Base in the USA. He has worked at ANSYS on high-frequency and signal-integrity applications in various roles. After a sabbatical abroad, he joined Altair Engineering in 2013.

Workshop Outline

The future is wireless on many fronts: Mobile communication, video streaming, internet access, autonomous cars, as well as device-to-device communication in the Internet of Things. Simulation in the design- and network-planning stages is crucial for successful deployment. Problem is that the geometries involved (office buildings, city blocks, terrain) are extremely large in terms of wavelengths and at the same time have high complexity. If one doesn't take enough detail into account, or if one uses methods that ignore important effects, then uncertainties of many tens of dB occur easily. This workshop will discuss and contrast several numerical methods for propagation analysis: empirical models, Shooting and Bouncing Rays, Uniform Theory of Diffraction, and the Dominant Path Model. Several practical applications will be discussed in more detail:

- 5G radio network planning: why the higher frequencies and the higher density of base stations lead to the selection of a particular simulation method, and what the remaining challenges are;
- V2X (vehicle to anything) communication: under what circumstances to include the moving vehicle in a time-variant simulation, and why;
- RADAR design for automotive applications: at millimeter waves, the inclusion of a car bumber turns this into a multi-scale problem; we will show ways how to handle this properly;
- simulation of automotive RADAR in traffic: optionally one can make use of previously-determined Radar Cross Section information; we will show how this is done and discuss trade-offs.

There will be opportunity to discuss your applications.

Industrial Workshops

David Prestaux

ISW03 Analysis of phased array antenna for 5G

Room: Zakopane

Date: 3 April 2019

Time: 15:00-16:20

David Prestaux

t Lead application Engineer

David Prestaux hold a master degree in electrical engineering. After working at Framatome Connector USA, he was at the origin of ANSOFT France in 1998 then part of ANSYS in 2008.

David Prestaux has been supporting researchers and engineers in various electronic departments involved in the design of advanced connectors, filters, antennas or PCB. David provides expertise in Electromagnetic simulation and guidelines for best practices and better design flow.

Workshop Outline

5G is as much an opportunity as a design challenge for equipment provider. Ansys State of the art simulation software includes the best techniques for accuracy and speed within a seamless design flow.

This presentation describes a pervasive modeling and design approach, including full-wave electromagnetics simulations to help design the backbone of the 5G networks. This will include modeling massive MIMO antenna arrays (for the base station), user equipment (UE) hardware, characterization of channel state information (CSI), and environment effect on the 5G system performance. The presentation also discuss integration challenge, thermal modeling and robust design analysis.