Scientific Workshop

Title: Active Array Antennas: Design concepts, technologies and over-the-air testing

Abstract: The Workshop is being organised as part of the EurAAP Working Group on Active Array Antennas. Emerging millimeter-wave applications such as 6G wireless communications require beamsteering antenna concepts. Many design and technology challenges are associated with these complex antenna systems, including the optimization of the scan range, maximizing the overall efficiency and co-design strategies of the electronics and antenna elements. This workshop will provide a state-of-the-art overview of design concepts, active and passive technologies and over-the-air (OTA) testing. The contributions in the workshop are a balanced mix of industrial and academic experts. The workshop includes an interactive panel discussion to discuss future challenges.

Workshop outlines:

Date: Tuesday 19th March			
Time	**Title**	**Presenter(s)**	**Institute**
08:30	Welcome and introduction	Bart Smolders	Eindhoven University of Technology, The Netherlands
8:40-9.10	Integration of Doherty Power Amplifiers with Antennas: Direct Impedance Matching, Active Load Modulation	Oleg Iupikov/Marianna Ivashina	Chalmers University
9:10-9.40	Packaging of mm-wave active array antennas for car radar: concepts and technologies	Ralph van Schelven	NXP Semiconductors
9.40:10.10	RF-heterointegration for mm-wave radar and communication antenna-arrays	Fransesco Filice	IMEC
Break from to 10:10 to 10:30			
10.30:11.00	Active array antennas for non-terrestrial communications	Maria Carolina Vigano	Viasat
11.00-11.30	Over-the-air measurements of integrated antennas using a reverberation chamber	Anouk Hubrechsen	ANTENNEX
11.30-12.00	Front-end topologies and calibration strategies of active phased arrays	Yanki Aslan	Delft University of Technology
12.00-12.10	Panel discussion: Discuss on future research challenges	All	

Short CV of Speakers:

Oleg A. Iupikov received the M.Sc. degree (cum laude) in electrical engineering from Sevastopol National Technical University, Sevastopol, Ukraine, in 2006, and the Ph.D. degree from the Chalmers University of Technology, Gothenburg, Sweden, in 2017. After graduating, he was working at the Radio Engineering Bureau, Sevastopol. During this period, he was also a Visiting Researcher with The Netherlands Institute for Radio Astronomy (ASTRON), Dwingeloo, The Netherlands, where he was involved in the development of the focal plane array simulation software for the APERture Tile In Focus (APERTIF) radio telescope. He is currently working as a Researcher with the Chalmers University of Technology. He has authored/coauthored over 40 journal and conference papers. His research interests include receiving array antenna systems, in particular focal plane arrays for radio astronomy and microwave remote sensing applications, numerical methods for their analysis and optimization, signal processing algorithms for antenna systems, integration of antennas with active components, and over-the-air (OTA) characterization of active and passive devices.

Marianna Ivashina received a Ph.D. in Electrical Engineering from the Sevastopol National Technical University (SNTU), Ukraine, in 2001. From 2001 to 2010 she was with The Netherlands Institute for Radio Astronomy (ASTRON), where she carried out research on innovative phased array feed (PAF) technologies for future radio telescopes, such as the Square Kilometer Array (SKA), and APERTIF PAF system for the Westerbork Synthesis Radio Telescope. Marianna Ivashina is since 2017 Full Professor at Chalmers University of Technology, where she is head of the antenna systems research group at the Department of Electrical Engineering. Her research interests are electromagnetic design of antennas for future wireless communication and sensor systems, e.g., 5G base-stations, satellites, radars, radio telescopes, automated/cooperative systems. This includes various antenna types and technologies, such as active beamforming array antennas, MIMO antennas, high-gain reflector antennas and focal plane arrays, unconventional array architectures such as irregular, thinned and sparse arrays. An important part of her current research is integration and packaging of antennas with ICs as well as Over-The-Air (OTA) characterization of antenna systems, including system effects of signal processing and propagation. She is an Associate Editor of the IEEE Transactions on Antennas and Propagation, and a European School of Antennas Board member She is the Vice-Director of the VINNOVA Antenna Excellence Research Centre ChaseON. She is a Lead Scientist of the European Horizon2020 Innovative Training Network SILIKA 'Silicon-based Ka-band massive MIMO antenna systems for new telecommunication services' that is a collaboration between Chalmers University of Technology and Eindhoven University of Technology (The Netherlands), Katholieke Universiteit Leuven (Belgium), Ericsson (Sweden), NXP (The Netherlands).

Ralph M. Van Schelven received the B.Sc. and M.Sc. degrees (cum laude) in electrical engineering and the Ph.D. degree in electromagnetics from the Delft University of Technology (TU Delft), Delft, The Netherlands, in 2015, 2017, and 2022, respectively. He is currently an Antenna Engineer with NXP Semiconductors, Eindhoven, The Netherlands. His research interests include antenna-in-package and the design of integrated mm-

wave solutions. Dr. van Schelven was a recipient of an Honorable Mention at the IEEE Antennas and Propagation Society International Symposium in 2019.

Francesco Filice received the B.Sc. and M.Sc. degrees (cum laude) in telecommunication engineering from Universitá della Calabria (UNICAL), Italy, in 2013 and 2016, respectively. From 2017, he joined ST Microelectronics Crolles, France, and University of Nice, France, for a project concerning the development of low-cost wide-band antenna solutions for mobile satellite communication user's terminal at Ku- and Ka- band and he obtained the PhD degree in 2020. From 2020 to 2022, he joined ST Microelectronics Grenoble, working as antenna engineer for the development of RF millimeter-wave transceiver products operating in the 60 GHz V-Band. He is currently a research engineer at IMEC Leuven, Belgium, being part of the advanced RF program. His current research activities are focused on the development of D-band antenna modules, either for telecommunication and radar applications, and mm-wave RF interposers, aiming at the heterogeneous integration of III-V and CMOS devices.

Maria Carolina Viganò received the Laurea (summa cum laude) degree in telecommunication engineering from the University of Florence, Florence, Italy, in 2006, and the Ph.D. degree cosponsored by the Delft University of Technology, Thales Alenia Space Toulouse, and ESAESTEC, in January 2011. She was then an Intern, a YGT, and a Contractor at the European Space Agency, Noordwijk, The Netherlands. After years as a Research and Development Antenna Engineer and Product Manager at ViaSat Antennas System SA, Lausanne, Switzerland, she is now leading the Terminal Development Group. Her research interests include phased arrays, satellite communication antennas, and synthesis techniques for nonregular arrays.,Dr. Viganò was a co-recipient of the 2010 Young Antenna Engineer Prize at the 32th European Space Agency Antenna Workshop. She is currently on the industry board for SATNEX V and part of the MTT-TC29.

Anouk Hubrechsen received the B.Sc. and M.Sc. degrees in electrical engineering from the Eindhoven University of Technology, Eindhoven, The Netherlands, in 2017 and 2019, respectively, and her PhD degree (Cum Laude) in 2023. She was a Guest Researcher with the National Institute of Standards and Technology at Boulder, Boulder, CO, USA, in 2018 and 2019, where she was involved in reverberation-chamber metrology for the Internet-of-Things applications. She is currently involved in a Project on reverberation-chamber metrology for 5G-and-beyond mm-wave applications. She is also the Chief Executive Officer (CEO) of AntenneX B. V., Eindhoven. Ms. Hubrechsen has received the Regional and District Zonta Women in Technology Awards in 2019. From 2020 to 2021, she was the Vice-Chair of IEEE Benelux Women in Engineering.

Yanki Aslan received the B.Sc. degree (ranked first) from the Department of Electrical and Electronic Engineering, Middle East Technical University, Ankara, Turkey, in 2014, and the M.Sc. (Cum Laude) and Ph.D. degrees (Cum Laude) in Electrical Engineering from TU Delft, The Netherlands, in 2016 and 2020, respectively. He worked with NXP Semiconductors N.V. during his Ph.D. (2016-2020). He was a joint Postdoctoral Fellow at TU Delft and The European Space Agency (ESA) until mid-2021. He is currently an Assistant Professor at TU Delft in the Microwave Sensing, Signals, and Systems (MS3) Section. Dr. Aslan was one of the recipients of the IEEE AP-S Doctoral Research Grant in

2018 and the EuMA Internship Award in 2019. His research interests include phased arrays for next-generation communication and sensing systems, antenna array optimization, front-end architectures, and beamforming algorithms.