2023 20th European Radar Conference (EuRAD 2023)

Berlin, Germany
20-22 September 2023

IEEE Catalog Number: CFP23590-POD
ISBN: 979-8-3503-2246-0

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IEEE Catalog Number: CFP23590-POD
ISBN (Print-On-Demand): 979-8-3503-2246-0
ISBN (Online): 978-2-87487-074-3

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EuRAD01 : EuRAD Opening

Chair: Marlene Harter, Hochschule Offenburg, Germany
Co-Chair: Christian Waldschmidt, Universität Ulm, Germany
09:00–10:40, Wednesday 20th September 2023, Alpha6

(NA) **Opening of the European Radar Conference 2023**
Christian Waldschmidt [1], Marlene Harter [2]
[1] EuRAD 2023 Chair; [2] EuRAD 2023 TPC Chair

(NA) **Phased Array Radar for an Era of Autonomy: Progress, Challenges and Outlook**
Tom Driscoll, Echodyne, USA

(NA) **Secure – Fast – Convenient: UWB-Based Real-Time Walkthrough Passenger Screening**
Matthias Gareis, Andreas Schiessl, Rohde & Schwarz, Germany

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Chair: Hasan Iqbal, Continental, Germany
Co-Chair: Jerzy Kowalewski, HUBER+SUHNER, Switzerland
11:20–13:00, Wednesday 20th September 2023, Alpha5

(NA) **3D Metallized Polymer Waveguide Antennas for Radar Systems — From mmW to Sub-THz** *(Industrial Keynote)*
Jerzy Kowalewski, Alejandro Garcia Tejero, Marco Rossi, Francesco Merli, HUBER+SUHNER, Switzerland

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Thi Huyen Le [1], Michael Kaiser [1], Ivan Ndip [1], Julia-Marie Koeszegi [1], Tina Thomas [1], Oliver Nallaweg [1], Marc Dreissigacker [2], Christian Tschoban [1], Martin Schneider-Ramelow [1]
[1] Fraunhofer IZM, Germany; [2] Technische Universität Berlin, Germany

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Yunsu Kang, HL Klemove, Korea

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Göksenin Bozdağ, Mustafa Kuloğlu, Burak Eser, Aselsan, Türkiye

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Co-Chair: Yoke Leen Sit, Valeo Schalter und Sensoren, Germany
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[1]IETR (UMR 6164), France; [2]Ministère des Armées AID, France; [3]ESYCOM (UMR 9007), France

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[1]Mercedes-Benz, Germany; [2]Technische Universität Ilmenau, Germany

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Sören Kohnert [1], Michael Vogt [2], Reinhard Stolle [1]
[1]Hochschule Augsburg, Germany; [2]Ruhr-Universität Bochum, Germany

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Co-Chair: Christian Waldschmidt, Universität Ulm, Germany
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[1]KIT, Germany; [2]AVL, Germany; [3]HHVISION, Germany; [4]TH Köln, Germany; [5]Ruhr-Universität Bochum, Germany

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Co-Chair: Jacco J.M. de Wit, TNO, The Netherlands
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[1] Rohde & Schwarz, Germany; [2] Technische Universität München, Germany

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Mark Eberspächer, Balluff, Germany

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[1] HELLA, Germany; [2] Brandenburgische Technische Universität, Germany

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[1] Robert Bosch, Germany; [2] Universität Ulm, Germany

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[1] Uhnder, USA; [2] University of Victoria, Canada; [3] University of Texas at Austin, USA

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Chair: Felix Yanovsky, National Aviation University, Ukraine
Co-Chair: Fabian Friederich, Fraunhofer ITWM, Germany
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[1] Ruhr-Universität Bochum, Germany; [2] KROHNE Messtechnik, Germany

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[1] CAU, Germany; [2] aerosense GbR, Germany; [3] Ruhr-Universität Bochum, Germany

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Daan Rosenmuller [1], Bas van de Ven [1], Kostas Doris [1], Georgi Radulov [1], Marion Matters [1], Erwin Janssen [2]
[1] Technische Universiteit Eindhoven, The Netherlands; [2] NXP Semiconductors, The Netherlands

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[1] Shahid Beheshti University, Iran; [2] Université du Luxembourg, Luxembourg; [3] University of East London, UK

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Adham Sakhnini [1], Marc Bauduin [2], André Bourdoux [2], Sofie Pollin [1]
[1] KU Leuven, Belgium; [2] imec, Belgium

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[1] University of Illinois Chicago, USA; [2] KMB Telematics, USA

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Ronghao Lin [1], Yutao Chen [1], Jian Li [2]
[1] USTC, China; [2] University of Florida, USA

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Chair: Francesco Fioranelli, Technische Universiteit Delft, The Netherlands
Co-Chair: Jacco J.M. de Wit, TNO, The Netherlands
11:20–13:00, Thursday 21st September 2023, Beta6

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[1]Valeo Schalter und Sensoren, Germany; [2]ANSYS, Germany; [3]Valeo Autoklimatizace, Czechia

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[1]Technische Universität Graz, Austria; [2]Infineon Technologies, Austria

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Chair: Claudia Vasanelli, Texas Instruments, Germany
Co-Chair: Stéphane Kemkemian, Thales, France
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[1]Johannes Kepler Universität Linz, Austria; [2]ZF Friedrichshafen, Germany

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[1]KRISS, Korea; [2]Chungnam National University, Korea

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[1]IETR (UMR 6164), France; [2]CNES, France

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[1] Chalmers University of Technology, Sweden; [2] KTH, Sweden

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[1] DLR, Germany; [2] Universität Ulm, Germany; [3] FAU Erlangen-Nürnberg, Germany

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Co-Chair: Ronny Harmanny, Thales, The Netherlands
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[1] *Infineon Technologies, Germany;* [2] *Technische Universität Braunschweig, Germany*

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[1] *IETR (UMR 6164), France;* [2] *Université de Toulouse, France*

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Chair: Stéphane Méric, IETR (UMR 6164), France
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[1]INRS-EMT, Canada; [2]Concordia University, Canada

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[1]IES (UMR 5214), France; [2]Thales, France

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[1]Technische Universiteit Delft, The Netherlands; [2]NXP Semiconductors, Romania

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[1]BTU, Germany; [2]Technische Universität Hamburg, Germany; [3]Universitätsklinikum Erlangen, Germany

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[1]Ruhr-Universität Bochum, Germany; [2]BIT Technology Solutions, Germany

EuRAD18 : Imaging by Automotive Radars

Chair: Alexander Yarovoy, Technische Universiteit Delft, The Netherlands
Co-Chair: Marc Bauduin, imec, Belgium
11:20–13:00, Friday 22nd September 2023, Beta8/9

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319 **Distributed Automotive Radar Multi-Modal Sensing**
Anum Pirkani, Dillon Kumar, Mikhail Cherniakov, Marina Gashinova, University of Birmingham, UK

323 **1+1 is Greater Than 2: Collaborative Automotive Radar Imaging Exploiting Spatial Diversity**
Shunqiao Sun [1], Changzhi Li [2]
[1] University of Alabama, USA; [2] Texas Tech University, USA

327 **Implementation of Real-Time Automotive SAR Imaging**
Marcel Hoffmann [1], Theresa Noegel [1], Christian Schüßler [1], Lars Schwenger [1], Peter Gulden [2], Dietmar Fey [1], Martin Vossiek [1]
[1] FAU Erlangen-Nürnberg, Germany; [2] indie Semiconductor, Germany

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EuRAD19 : EuRAD Closing

Chair: Christian Waldschmidt, Universität Ulm, Germany
Co-Chair: Marlene Harter, Hochschule Offenburg, Germany
14:00–15:40, Friday 22nd September 2023, Alpha5/6

(NA) **Session Welcome**
Christian Waldschmidt, EuRAD 2023 Chair

(NA) **Improving Radar Based Space Situational Awareness: Recent Technical Concepts for the TIRA and GESTRA Systems**
Christoph Reising, Fraunhofer FHR, Germany

(NA) **Awards Ceremony**
Michael Gadringer, EuMW 2023 Awards Chair

(NA) **Closing Remarks**
Christian Waldschmidt [1], Marlene Harter [2]
[1] EuRAD 2023 Chair; [2] EuRAD 2023 TPC Chair

(NA) **Invitation to EuRAD 2024**
Guido Valerio, EuRAD 2024 Chair

EuMC/EuRAD01 : Waveforms for Distributed Networks and Integrated Communications and Sensing

Chair: Thomas Dallmann, Technische Universität Ilmenau, Germany
Co-Chair: Maria Sabrina Greco, Università di Pisa, Italy
11:20–13:00, Wednesday 20th September 2023, Beta3/4

331 **A Dual-Carrier Linear-Frequency Modulated Waveform for High-Accuracy Localization in Distributed Antenna Arrays**
Ahona Bhattacharyya, Jason M. Merlo, Jeffrey A. Nanzer, Michigan State University, USA

335 **Optimized Window Function for Improved Estimation Capabilities in 5G Joint Communication and Sensing**
Michael Hofstadler, Maximilian Larcher, Reinhard Feger, Andreas Springer, Andreas Stelzer, Johannes Kepler Universität Linz, Austria

339 **Design of Long-Sequence Unimodular Waveforms Using an Original Autoencoder for MIMO Radar Systems**
Ryota Sekiya, Hiroki Mori, Hiromi Hashimoto, Junichiro Suzuki, Toshiba, Japan

343 **Distributed Sensor Network for 3D Tag Localization Using Harmonic Radar at 61/122GHz ISM Band**
Steffen Hansen, Sandra Nowok, Alex Shoykhetbrod, Stefan Wickmann, Jan Wessel, Nils Pohl, Fraunhofer FHR, Germany

347 **CP-DSSS for Radar-Centric Integrated Sensing and Communication**
Linda Gehre, Lucas Giroto de Oliveira, Axel Diewald, Thomas Zwick, Benjamin Nuss, KIT, Germany

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EuMC/EuRAD02 : Focused Session Joint Communication and Radar Sensing — A Step Towards 6G Part 1

Chair: Reiner Thomä, Technische Universität Ilmenau, Germany
Co-Chair: Thomas Dallmann, Technische Universität Ilmenau, Germany
14:20–16:00, Wednesday 20th September 2023, Beta3/4

351 **Distributed ISAC Systems — Multisensor Radio Access and Coordination**
Reiner Thomä, Thomas Dallmann, Technische Universität Ilmenau, Germany

355 **6G Integrated Sensing and Communication: From Vision to Realization**
Thorsten Wild, Artjom Grudnitsky, Silvio Mandelli, Marcus Henninger, Junqing Guan, Frank Schaich, Nokia Bell Labs, Germany

359 **Bistatic OFDM-Based Joint Radar-Communication: Synchronization, Data Communication and Sensing**
Lucas Giroto de Oliveira, David Brunner, Axel Diewald, Charlotte Muth, Laurent Schmalen, Thomas Zwick, Benjamin Nuss, KIT, Germany

363 **Mutual Over-The-Air Frequency Synchronization of Continuous Wave Signals**
Thomas Dallmann, Reiner Thomä, Technische Universität Ilmenau, Germany

367 **A Compact Reconfigurable Power Splitter Enabling a Full-Duplex Integrated Transceiver Employed for Joint Communication and Radar Sensing**
Farhad Bozorgi, Padmanava Sen, Barkhausen Institut, Germany

EuMC/EuRAD03 : Antenna Techniques for Radar

Chair: Pierfrancesco Lombardo, Università di Roma "La Sapienza", Italy
Co-Chair: Alexander Yarovoy, Technische Universiteit Delft, The Netherlands
14:20–16:00, Wednesday 20th September 2023, Beta6

371 **Sparse 2D MIMO Antenna Designs Using Simulated Annealing**
Muge Bekar, Christopher John Baker, Marina Gashinova, University of Birmingham, UK

375 **Reconstructed 2D MIMO Using Burg Algorithm**
Muge Bekar, Christopher John Baker, Marina Gashinova, University of Birmingham, UK

379 **Monopulse Channels Beamforming with Overlapped Subarrays for Low-Cost Multi-Mission Radars**
Giulio Giovannetti, ELDES, Italy

383 **Avoidance of Near-Field Influences in Calibration Measurements of Radars by Means of Active Calibration Targets**
Matthias Linder, Benedikt Meinecke, Dominik Schwarz, Christian Waldschmidt, Universität Ulm, Germany

387 **Beam Space MIMO Radar at 24GHz Using Butler Matrices for Transmit and Receive Beamforming**
Reinhard Feger, Christoph Dutzler, Andreas Stelzer, Johannes Kepler Universität Linz, Austria

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EuMC/EuRAD04 : Focused Session Joint Communication and Radar Sensing — A Step Towards 6G Part 2

Chair: Aydin Sezgin, Ruhr-Universität Bochum, Germany
Co-Chair: Reiner Thomä, Technische Universität Ilmenau, Germany
16:40–18:20, Wednesday 20th September 2023, Beta3/4

391 **Map Fusion and Heterogeneous Objects Tracking in Joint Sensing and Communication Networks**
Elia Favarelli [1], Elisabetta Matricardi [1], Lorenzo Pucci [1], Enrico Paolini [1], Wen Xu [2], Andrea Giorgetti [1]
[1] Università di Bologna, Italy; [2] Huawei Technologies, Germany

395 **Reinforcement Learning for Cognitive Integrated Communication and Sensing Systems**
Aya Mostafa Ahmed [1], Leila Gharsalli [2], Stefano Fortunati [2], Aydin Sezgin [1]
[1] Ruhr-Universität Bochum, Germany; [2] IPSA, France

399 **Impact of Blockage on the Sensing Performance Using Distributed MIMO Architecture**
Adham Sakhnini [1], Mamoun Guenach [2], André Bourdoux [2], Sofie Pollin [1]
[1] KU Leuven, Belgium; [2] imec, Belgium

403 **Radar-Sensing Based on Non-Contiguous OFDM Signals Using Compressed Sensing**
Andreas Bathelt, Ruben Thill, Fraunhofer FHR, Germany

407 **Radar Waveform Design for Sensing and Communications Coexistence**
Robin Amar [1], Ehsan Raei [2], Mohammad Alaee-Kerahroodi [1], Bhavani Shankar M.R. [1]
[1] Université du Luxembourg, Luxembourg; [2] Amphinicy Technologies, Luxembourg

EuMC/EuRAD05 : AESA & MIMO Antenna Technology

Chair: Stephen Harman, Thales, UK
Co-Chair: Matthias Weiss, Fraunhofer FHR, Germany
16:40–18:20, Wednesday 20th September 2023, Beta6

411 **A Configurable All Digital Antenna Array with a Feed-Forward Efficiency Enhancement Scheme**
Bulent Sen [1], Filiz Ece Filci [2]
[1]NSPA, Luxembourg; [2]Aselsan, Türkiye

415 **Evaluation of a Novel Commercial Beamforming Integrated Circuit for a Ka-Band AESA Radar Application**
Sören Harms, Gabriel El-Arnauti, Olaf Saalmann, Andreas Fröhlich, Fraunhofer FHR, Germany

419 **Analysis and Simulation of a Coherent FMCW Lidar-Photonic Radar Combined Sensor System for Large Aperture Phased Array MIMO**
Stephan Kruse [1], Marc-Michael Meinecke [2], Pascal Kneuper [1], Tobias Schwabe [1], Heiko Gustav Kurz [2], J. Christoph Scheytt [1]
[1]Universität Paderborn, Germany; [2]Volkswagen, Germany

423 **Analysis of 2D CA-CFAR for DDMA FMCW MIMO Radar**
Minh Q. Nguyen, Reinhard Feger, Thomas Wagner, Andreas Stelzer, Johannes Kepler Universität Linz, Austria

427 **A Scalable X-Band Overlapped Subarray Beamformer for Linear Phased Array Antennas**
Yasin Özer [1], Selçuk Paker [2]
[1]Aselsan, Türkiye; [2]Istanbul Technical University, Türkiye

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EuMC/EuRAD06 : Innovative Designs for Radar, Satcom and mm-Wave Antennas

Chair: Frédéric Gianesello, STMicroelectronics, France
Co-Chair: Diego Caratelli, Technische Universiteit Eindhoven, The Netherlands
09:00–10:40, Thursday 21st September 2023, Beta3/4

(NA) **Active Phased Arrays for 5G and 6G Mobile Communication at Millimeterwaves** *(Industrial Keynote)*
Matthias Geissler, IMST, Germany

(NA) **Frequency Scanning X-Band Antenna for 3D Radar Systems**
S. Sekretarov, D. Vavriv, V. Vinogradov, A. Kravtsov, Y. Bulakh, V. Zolotarev, NASU, Ukraine

(NA) **Low-Profile and High-Gain Dual-Linearly Polarized Offset Reflector Antenna at W-Band**
Thi-Kim-Ngan Nguyen, David González-Ovejero, Ronan Sauleau, IETR (UMR 6164), France

(NA) **A Novel Automotive Palmtree Antenna for 5G Inside Scarabeus Ring Antennas for Satellite Reception**
Emanuel Panholzer, Stefan Lindenmeier, Universität der Bundeswehr München, Germany

(NA) **Circular Polarized Compact Dual Antenna Set for L-Band Space Applications**
Azat Meredov, Stefan Lindenmeier, Universität der Bundeswehr München, Germany

EuMC/EuRAD07 : EuMC/EuRAD Poster

Chair: Marlene Harter, Hochschule Offenburg, Germany
Co-Chair: Amelie Hagelauer, Fraunhofer EMFT, Germany
10:40–13:00, Thursday 21st September 2023, Exhibition

(NA) **IEEE 802.15.4z UWB Angle of Departure Tag Design for Indoor Positioning**
Sumin Han [1], Howon Yoo [1], Hosung Choo [2], Byung-Jun Jang [1]
[1] Kookmin University, Korea; [2] Hongik University, Korea

452 **A Non-Linear Transmission Line with Secondary Soliton Decimation**
Tyler Kelley, Stephen Pancrazio, Pouya Emani, Nhat Tran, Anh-Vu Pham, University of California at Davis, USA

456 **Monopulse Angle Measurement with Orbital Angular Momentum Charge Distribution**
Shikang Li, Meng Zhang, Xianzhe Xu, Rentuo Tao, Yawei Chen, NRIET, China

460 **Portable Low-Cost Millimeter-Wave Radar Node for Short-Range Applications**
Ignacio Sardinero-Meirás [1], Elías Antolinos [1], Ignacio E. López-Delgado [1], Marcos Gómez-Bracamonte [1], Jaime Fernández-Martínez [1], Lorena Perez-Eijo [2], Marcos Arias [2], Borja Gonzalez-Valdes [2], Jesús Grajal [1]
[1] Universidad Politécnica de Madrid, Spain; [2] Universidade de Vigo, Spain

464 **Time-Frequency Synchronization for CaCS-Based Radar Systems in Interference Scenarios**
Mohamad Basim Alabd, Joel Dittmer, Benjamin Nuss, Yueheng Li, Lucas Giroto de Oliveira, Axel Diewald, Thomas Zwick, KIT, Germany

468 **Design and Evaluation of a Joint Communication and Sensing System Using FMCW-Radar and FSK in V-Band**
Samira Faghih-Naini, Sebastian Peters, Thomas Kurin, Torsten Reissland, Robert Weigel, FAU Erlangen-Nürnberg, Germany

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472 **Modeling, Analysis and Optimization of Low-Altitude Air Traffic Control in Joint Radar and Communication Networks**
Xianzhe Xu, Shikang Li, Rentuo Tao, Yawei Chen, Linghao Xia, Yuhao Yang, NRIET, China

476 **An Initialization Method for Ultra-Precise Holographic Wireless Local Positioning**
Stefan Brückner, Erik Sippel, Patrick Gröschel, Markus Hehn, Martin Vossiek, FAU Erlangen-Nürnberg, Germany

480 **Experimental Investigation of Millimeter-Wave 3D Image Projection Using Dielectric Lens for Security Application**
Arie Setiawan [1], Naruto Yonemoto [2], Hitoshi Nohmi [3], Hiroshi Murata [1]
[1] Mie University, Japan; [2] MPAT, Japan; [3] Alouette Technology, Japan

484 **Design of a Contactless Vital-Signal Sensor Based on Six-Port Technology and Experiment of WiFi Interference**
Chun-Yu Fan [1], Adham Karakish [2], Muh-Dey Wei [1], Renato Negra [1]
[1] RWTH Aachen University, Germany; [2] Fraunhofer FHR, Germany

EuMC/EuRAD08 : Microwave Sensing Systems and Components

Chair: Thomas Musch, Ruhr-Universität Bochum, Germany
Co-Chair: Kamran Ghorbani, RMIT University, Australia
14:20–16:00, Thursday 21st September 2023, Alpha6

(NA) **Developments in Ray Tracing & the 6th Generation Radar Sensor Model**
Hasan Iqbal, Sreehari Buddappagari, Sandro Reith, Thomas Breitenberger, Continental, Germany

(NA) **Model-Based Sensor Fusion Approach for FMCW Radar Sensors in Non-Destructive Testing**
Jochen Altholz, Francesca Schenkel, Nils Pohl, Ilona Rolfes, Jan Barowski, Ruhr-Universität Bochum, Germany

(NA) **Experimental Verification of a Digital Delay Transponder Used as an In-Ice Synthetic Aperture Radar Reference Target**
Michael Stelzig [1], Andreas Benedikter [2], Ralf Horn [2], Marc Jäger [2], Martin Keller [2], Rolf Scheiber [2], Niklas Haberberger [1], Lena Krabbe [1], Gerhard Krieger [2], Martin Vossiek [1]
[1] FAU Erlangen-Nürnberg, Germany; [2] DLR, Germany

(NA) **A 30kW Peak – 350W CW Mechanically Controlled Low-Loss X-Band Variable-Ratio 2-Way Power Divider Using VESPEL Dielectric Material**
Maurizio R. Cirillo [1], Danio Salimbeni [1], Antonio Morini [2]
[1] Rheinmetall, Italy; [2] NotOnlyWaves, Italy

(NA) **A Picosecond Pulse Transmission and Reception System for Next Generation Wireless Sensing and Imaging Applications**
MuhibUr Rahman, Ke Wu, Polytechnique Montréal, Canada

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EuMC/EuRAD09 : Advancement in Radar Systems and Concepts

Chair: Mayazzurra Ruggiano, Thales, The Netherlands
Co-Chair: Hasan Sharifi, HRL Laboratories, USA
14:20–16:00, Thursday 21st September 2023, Beta7

(NA) **Supporting Space Domain Awareness with the SMART-L MM Radar** *(Industrial Keynote)*
Erwin P. van der Poel, Thales, The Netherlands

506 **TanDEM-X Mission Status**
Christo Grigorov, Markus Bachmann, Johannes Böer, Thomas Kraus, Marie Lachaise, Manfred Zink, DLR, Germany

510 **Dynamic Multi-Target Detection and Focus in Maritime Conditions**
Anum Pirkani, Dillon Kumar, Liam Daniel, Edward Hoare, Mikhail Cherniakov, Marina Gashinova, University of Birmingham, UK

514 **Robustness of Photonics-Based Coherent Multi-Band MIMO Radar to Fiber-Based Signal Distribution**
A. Malacarne [1], S. Maresca [2], G. Pandey [3], M.M.H. Amir [3], A. Bogoni [3], M. Scaffardi [1]
[1] CNIT, Italy; [2] CNR-IEIIT, Italy; [3] Scuola Superiore Sant'Anna, Italy

518 **Cramer-Rao Lower Bound of Localization of a Moving Target by a Dynamic Multistatic Radar**
Detmer A. Bosma [1], Philipp Markiton [2]
[1] TNO, The Netherlands; [2] Fraunhofer FHR, Germany