

# **2012 9th European Radar Conference**

**(EuRAD 2012)**

**Amsterdam, Netherlands  
31 October – 2 November 2012**








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## EuRAD02 : Focused Session: Advances in Automotive Radar

Chair: Holger Meinel, Daimler AG — Co-Chair: Thomas Zwick, Universität Karlsruhe

Venue G103, Time 08:30 – 10:10, Thursday 1 November 2012

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- 1  **C** **The EU Project MOSARIM: A General Overview of Project Objectives and Conducted Work**  
*Martin Kunert, Robert Bosch GmbH, Germany*
- 6  **C** **The Norm-Interferer — An Universal Tool to Validate 24 and 77GHz Band Automotive Radars**  
*Felipe Torres<sup>1</sup>, Christian Frank<sup>1</sup>, Wolfgang Weidmann<sup>1</sup>, Tobias Mahler<sup>2</sup>, Tom Schipper<sup>2</sup>, Thomas Zwick<sup>2</sup>*  
*<sup>1</sup>InnoSenT GmbH, Germany; <sup>2</sup>KIT, Germany*
- 10  **C** **Polarimetric Monitoring of Road Surface Status for Safety Driving of Vehicles**  
*Nam-Woon Moon<sup>1</sup>, Jun-Ho Choi<sup>2</sup>, Yong-Hoon Kim<sup>1</sup>*  
*<sup>1</sup>GIST, Korea; <sup>2</sup>ADD, Korea*
- 14  **C** **Benefit of Mixed Technologies for Automotive Radar Components**  
*D. Domnesque, Ph. Auxemery, J.P. Viaud, United Monolithic Semiconductors, France*
- 18  **C** **Automotive Radar — “quo vadis?”**  
*Juergen Dickmann, Jens Klappstein, Hans-Ludwig Bloecher, Marc Muntzinger, Holger Meinel, Daimler AG, Germany*

## EuRAD03 : Imaging Radar

Chair: Alexander G. Yarovoy, TU Delft — Co-Chair: Svein-Erik Hamran, FFI

Venue G105, Time 08:30 – 10:10, Thursday 1 November 2012

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- 22  **C** **2D Frequency Domain Imaging Algorithms for Forward Looking Array Radar**  
*Dmitry Purik<sup>1</sup>, Seung Hoon Han<sup>2</sup>, Sun-Gu Sun<sup>3</sup>*  
*<sup>1</sup>Samsung Thales Co. Ltd., Russia; <sup>2</sup>Samsung Thales Co. Ltd., Korea; <sup>3</sup>Agency for Defense Development, Korea*
- 26  **C** **Fast Imaging by 3-D Deconvolution in Short-Range UWB Radar for Concealed Weapon Detection**  
*T.G. Savelyev, Alexander G. Yarovoy, Technische Universiteit Delft, The Netherlands*
- 30  **C** **Radar Imaging of Building Interiors Using Sparse Reconstruction**  
*W.L. van Rossum, J.J.M. de Wit, R.G. Tan, TNO, The Netherlands*
- 34  **C** **Improved Minimum Variance Processing for UWB Medical Imaging Applications**  
*Malyhe Jalilvand, Xuyang Li, Thomas Zwick, KIT, Germany*
- 38  **C** **FPGA Based SPECAN Algorithm Implementation for ScanSAR Imaging**  
*Long Pang<sup>1</sup>, Zongbo Wang<sup>2</sup>, Bocheng Zhu<sup>1</sup>*  
*<sup>1</sup>Peking University, China; <sup>2</sup>Dalian University of Technology, China*

## EuRAD04 : Focused Session: Advanced Multidimensional Processing

Chair: Frederic Barbaresco, Thales France — Co-Chair: Alfonso Farina, SELEX Sistemi Integrati

Venue G103, Time 10:40 - 12:20, Thursday 1 November 2012

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- 42  **C** **RRP 3.0: 3<sup>rd</sup> Generation Robust Radar Processing Based on Matrix Information Geometry (MIG)**  
*Frederic Barbaresco, Thales Air Systems, France*
- 46  **C** **Information Geometry and Its Applications**  
*Felix Opitz, Cassidian, Germany*
- 50  **C** **Application of Riemannian Mean of Covariance Matrices to Space-Time Adaptive Processing**  
*Bhashyam Balaji<sup>1</sup>, Frederic Barbaresco<sup>2</sup>*  
*<sup>1</sup>Defence Research & Development Canada, Canada; <sup>2</sup>Thales Air Systems, France*
- 54  **C** **Clutter Rank for Slow-Time MIMO STAP**  
*Chin Yuan Chong<sup>1</sup>, Frédéric Brigui<sup>2</sup>, Frédéric Pascal<sup>3</sup>, Yee Kian Quek<sup>1</sup>*  
*<sup>1</sup>DSO National Laboratories, Singapore; <sup>2</sup>Temasek Laboratories at NTU, Singapore; <sup>3</sup>Supélec, France*
- 57  **C** **Radar Covariance Matrix Estimation Through Geometric Barycenters**  
*A. Aubry<sup>1</sup>, A. De Maio<sup>1</sup>, L. Pallotta<sup>1</sup>, A. Farina<sup>2</sup>*  
*<sup>1</sup>Università di Napoli "Federico II", Italy; <sup>2</sup>SELEX Sistemi Integrati S.p.A., Italy*

## EuRAD05 : Precise Ranging — Medical, Sub-Surface and Industrial Applications

Chair: Alexander Yarovoy, TU Delft — Co-Chair: Andreas Stelzer, University of Linz

Venue G105, Time 10:40 - 12:20, Thursday 1 November 2012

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- 63  **C** **FMCW Radar in Oil-Filled Waveguides for Range Detection in Hydraulic Cylinders**  
*Serdal Ayhan, Steffen Scherr, Mario Pauli, Thomas Zwick, KIT, Germany*
- 67  **C** **Vital Signs Detection Radar Using Low Intermediate-Frequency Architecture and Single-Sideband Transmission**  
*Brian Sveistrup Jensen<sup>1</sup>, Sævar Þór Jónasson<sup>1</sup>, Tom Keinicke Johansen<sup>1</sup>, T. Jensen<sup>2</sup>*  
*<sup>1</sup>Technical University of Denmark, Denmark; <sup>2</sup>FBH, Germany*
- 71  **C** **Position Estimation of Lap Joints for Seam Tracking Applications at mm-Wave Frequencies**  
*Jochen Schrattenecker<sup>1</sup>, Andreas Haderer<sup>1</sup>, Günther Reinthaler<sup>2</sup>, Andreas Stelzer<sup>1</sup>*  
*<sup>1</sup>Johannes Kepler Universität Linz, Austria; <sup>2</sup>Fronius International GmbH, Austria*
- 75  **C** **24GHz Six-Port Medical Radar for Contactless Respiration Detection and Heartbeat Monitoring**  
*G. Vinci, S. Lindner, F. Barbon, M. Hofmann, G. Fischer, D. Kissinger, A. Koelpin,*  
*Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*
- 79  **C** **Theoretical and Experimental Investigations on the Performance of Ground Penetrating Radars in Challenging Operational Conditions**  
*A. Galli<sup>1</sup>, D. Comite<sup>1</sup>, Guido Valerio<sup>2</sup>, P.M. Barone<sup>3</sup>, S.E. Lauro<sup>3</sup>, E. Mattei<sup>3</sup>, E. Pettinelli<sup>3</sup>,*  
*G. Vannaroni<sup>3</sup>*  
*<sup>1</sup>Università di Roma "La Sapienza", Italy; <sup>2</sup>IETR, France; <sup>3</sup>Università di Roma Tre, Italy*

## EuRAD06 : MISO/MIMO Radars

Chair: Arne Jacob, TU Hamburg-Harburg — Co-Chair: Jacek Misiurewicz, Warsaw University of Technology

Venue Europe Foyer 2, Time 13:50 - 15:30, Thursday 1 November 2012

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- 83  **C** **A Novel Receiver Architecture for Spread Spectrum MIMO-Radar Systems**  
*Jochen Moll, Viktor Krozer, Goethe-Universität Frankfurt, Germany*
- 87  **C** **Thinned MIMO Arrays with Constrained Element Spacing for Imaging Radar**  
*Kamil Rezer, Arne F. Jacob, Technische Universität Hamburg-Harburg, Germany*
- 91  **C** **Switching Scheme for a FMCW-MIMO Radar on a Moving Platform**  
*Johanna Guetlein, Sebastian Bertl, Andreas Kirschner, Juergen Detlefsen, Technische Universität München, Germany*
- 95  **C** **Moving Target Detection in Clutter by Multisite Radar Systems Consisting of MIMO Radars**  
*Victor Chernyak, Moscow Aviation Institute, Russia*
- 99  **C** **MISO Radar for Detection and Tracking of Fast-Flying Objects**  
*Vojtech Jenik, Filip Kozak, Premysl Hudec, Czech Technical University in Prague, Czech Republic*

## EuRAD07 : Compressive Sensing

Chair: Radmila Pribic, Thales NL — Co-Chair: Joachim Ender, Fraunhofer FHR

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- 103  **C** **A Configurable Compressive Acquisition Matrix for Radar Tracking Using Particle Filtering**  
*Ioannis Kyriakides, University of Nicosia, Cyprus*
- 107  **C** **Compressive Sensing for High Resolution Profiles with Enhanced Doppler Performance**  
*L. Anitori<sup>1</sup>, Peter Hoogeboom<sup>1</sup>, François Le Chevalier<sup>2</sup>, M. Otten<sup>1</sup>*  
*<sup>1</sup>TNO, The Netherlands; <sup>2</sup>Thales, France*
- 111  **C** **Grid Matching for Sparse Signal Recovery in Compressive Sensing**  
*Rakshith Jagannath<sup>1</sup>, Geert Leus<sup>1</sup>, Radmila Pribic<sup>2</sup>*  
*<sup>1</sup>Technische Universiteit Delft, The Netherlands; <sup>2</sup>Thales Nederland B.V., The Netherlands*
- 115  **C** **Finite Rate of Innovation Method for DOA Estimation of Multiple Sinusoidal Signals with Unknown Frequency Components**  
*Pertami J. Hayuningtyas<sup>1</sup>, Pina Marziliano<sup>2</sup>*  
*<sup>1</sup>Universitas Indonesia, Indonesia; <sup>2</sup>Nanyang Technological University, Singapore*

## EuRAD08: Remote Sensing 1

Chair: Oleg Krasnov, TU Delft — Co-Chair: Piotr Samczynski, Warsaw University

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- 119  **C** **A Radar Demonstrator for Ground-Based L-Band Ground Reflectivity Measurements**  
*Lukasz Maslikowski<sup>1</sup>, Piotr Krysik<sup>1</sup>, Krzysztof Kulpa<sup>1</sup>, Katarzyna Dabrowska-Zielinska<sup>2</sup>, Maciej Bartold<sup>2</sup>*  
<sup>1</sup>Warsaw University of Technology, Poland; <sup>2</sup>Institute of Geodesy and Cartography, Poland
- 123  **C** **Sentinel-1: Implementation of a Radar Observatory**  
*Paul Snoeij<sup>1</sup>, Dave Bibby<sup>1</sup>, Ramon Torres<sup>1</sup>, Roberta Bertoni<sup>1</sup>, Allan Østergaard<sup>1</sup>, Ignacio Navas-Traver<sup>1</sup>, Claudio Bruno<sup>2</sup>, Renato Croci<sup>2</sup>, Michelangelo L'Abbate<sup>2</sup>, Andrea Pietropaolo<sup>2</sup>, Friedhelm Rostan<sup>3</sup>, Markus Huchler<sup>3</sup>*  
<sup>1</sup>ESA, The Netherlands; <sup>2</sup>Thales Alenia Space, Italy; <sup>3</sup>Astrium GmbH, Germany
- 126  **C** **Performance Assessment of RF-MEMS-Based Passive ESA for Fully-Polarimetric K<sub>a</sub>-Band SAR**  
*Amer Nezirović, Robert Malmqvist, Tomas Boman, Andreas Gustafsson, Mikael Karlsson, FOI, Sweden*
- 130  **C** **PoSAR: A VHR Tomographic GB-SAR System Application to Snow Cover 3-D Imaging at X and Ku Bands**  
*Laurent Ferro-Famil<sup>1</sup>, Cécile Leconte<sup>1</sup>, Frédéric Boutet<sup>1</sup>, Xuan-Vu Phan<sup>2</sup>, Michel Gay<sup>2</sup>, Yves Durand<sup>3</sup>*  
<sup>1</sup>IETR, France; <sup>2</sup>GIPSA-Lab, France; <sup>3</sup>Météo France, France
- 134  **C** **Advanced Algorithm of Velocity Measurement for Modern Meteorological Radar**  
*Felix J. Yanovsky<sup>1</sup>, David I. Lekhovytskiy<sup>2</sup>, Dmytro V. Atamanskiy<sup>3</sup>*  
<sup>1</sup>National Aviation University, Ukraine; <sup>2</sup>Kharkiv National University of Radio Electronics, Ukraine; <sup>3</sup>Kharkiv Air Force University, Ukraine






## EuRAD09: PCL and Radar Design Tools

Chair: Krzysztof Kulpa, Warsaw University of Technology

Co-Chair: Pierfrancesco Lombardo, University of Rome 'La Sapienza'

Venue Europe Foyer 2, Time 16:00 – 17:40, Thursday 1 November 2012

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- 138  **C** **Helicopter Detection Capability of Passive Coherent Location (PCL) Radar**  
*Jani Tikkinen<sup>1</sup>, Kai Hiltunen<sup>1</sup>, Kalle Martikainen<sup>1</sup>, Matti Isohookana<sup>2</sup>*  
<sup>1</sup>Patria, Finland; <sup>2</sup>University of Oulu, Finland
- 142  **C** **The Use of a GSM-Based Passive Radar for Sea Target Detection**  
*Piotr Krysik, Krzysztof Kulpa, Warsaw University of Technology, Poland*
- 146  **C** **MIMO Radar Copula Ambiguity Function**  
*Rustem B. Sinitsyn, Felix J. Yanovsky, National Aviation University, Ukraine*
- 150  **C** **MIMO Antenna Design with Genetic Algorithm for TTW Radar Imaging**  
*B. Boudamouz<sup>1</sup>, P. Millot<sup>1</sup>, C. Pichot<sup>2</sup>*  
<sup>1</sup>ONERA, France; <sup>2</sup>LEAT, France
- 154  **C** **Oceanographic Model Based Azimuth Estimator for HF Surface Wave Radar**  
*A. Gupta, Th. Fickenschner, Helmut-Schmidt-Universität, Germany*

## EuRAD10: Remote Sensing 2

Chair: Andreas Danklmayer, Fraunhofer-FHR — Co-Chair: Stephane Kemkemian, Thales Airborne Systems

Venue G102, Time 16:00 – 17:40, Thursday 1 November 2012

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- 158  **C** **External Calibration of the PARSAX Dual-Channel FMCW Polarimetric Agile Radar System**  
*Zhijian Li<sup>1</sup>, L.P. Ligthart<sup>2</sup>, Peikang Huang<sup>3</sup>, Weining Lu<sup>4</sup>, W.F. van der Zwan<sup>2</sup>, Oleg A. Krasnov<sup>2</sup>, Alexander G. Yarovoy<sup>2</sup>, Weiqiang Zhu<sup>1</sup>*  
<sup>1</sup>Nanjing Electronic Equipment Institute, China; <sup>2</sup>Technische Universiteit Delft, The Netherlands; <sup>3</sup>Second Academy of CASIC, China; <sup>4</sup>First Academy of CASIC, China
- 162  **C** **Using Polarization-Spectral Features of the Signals for Detection of Small Moving Objects on Background of Sea and Land Surfaces**  
*V.I. Lutsenko, I.V. Lutsenko, I.V. Popov, National Academy of Sciences of Ukraine, Ukraine*
- 166  **C** **Analysis of Influence of the Raindrop Canting Angle on Radar Polarimetric Measurements**  
*Alexander Myagkov<sup>1</sup>, Tatiana Nomokonova<sup>1</sup>, Galina Babur<sup>2</sup>*  
<sup>1</sup>TUSUR, Russia; <sup>2</sup>Technische Universiteit Delft, The Netherlands
- 170  **C** **Analysis of Meteorological Radar Signals Using LSS-Decomposition**  
*O.S. Semenova, Felix J. Yanovsky, National Aviation University, Ukraine*
- 174  **C** **Advances in Polarimetric X-Band Weather Radar**  
*Tobias Otto<sup>1</sup>, Herman W.J. Russchenberg<sup>1</sup>, Hidde Leijnse<sup>2</sup>*  
<sup>1</sup>Technische Universiteit Delft, The Netherlands; <sup>2</sup>KNMI, The Netherlands

## EuRAD11: Automotive and Helicopter Radar

Chair: Thomas Zwick, KIT Karlsruhe — Co-Chair: Wolfgang Menzel, University of Ulm

Venue G103, Time 16:00 – 17:40, Thursday 1 November 2012

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- 178  **C** **Small Transmitting Power and High Sensitivity 76GHz Millimeter-Wave Radar for Obstacle Detection and Collision Avoidance of Civil Helicopters**  
*Shunichi Futatsumori<sup>1</sup>, Akiko Kohmura<sup>1</sup>, Naruto Yonemoto<sup>1</sup>, Keiji Kobayashi<sup>2</sup>, Yoshinori Okuno<sup>2</sup>*  
<sup>1</sup>Electronic Navigation Research Institute, Japan; <sup>2</sup>Japan Aerospace Exploration Agency, Japan
- 182  **C** **Monopulse Transversal Traffic Monitoring for Automotive Radar**  
*Stein Arne Askeland, NTNU, Norway*
- 186  **C** **Real-Time Implementation of an Imaging Algorithm for FMCW MIMO Radar Systems**  
*Andreas Haderer, Philipp Scherz, Clemens Pfeffer, Andreas Stelzer, Johannes Kepler Universität Linz, Austria*
- 190  **C** **Systematic Approach to Investigate and Counteract Interference-Effects in Automotive Radars**  
*Tom Schipper, Marlene Harter, Lukasz Zwirello, Tobias Mahler, Thomas Zwick, KIT, Germany*
- 194  **C** **Performance of UWB Short Range Radar in Weibull Clutter Environment**  
*Purushothaman Surendran<sup>1</sup>, Seok Jun Ko<sup>1</sup>, Chul Ung Kang<sup>1</sup>, Jong Hun Lee<sup>2</sup>*  
<sup>1</sup>Jeju National University, Korea; <sup>2</sup>DGIST, Korea

## EuRAD12: Target Classification and Micro-Doppler Analysis

Chair: William Miceli, UCL — Co-Chair: Jacco de Wit, TNO

Venue Emerald, Time 08:30 - 10:10, Friday 2 November 2012

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- 198  **C** **Model-Based Classification of Human Motion: Particle Filtering Applied to the Micro-Doppler Spectrum**  
*S.R. Groot<sup>1</sup>, Alexander G. Yarovoy<sup>1</sup>, R.I.A. Harmanny<sup>2</sup>, J.N. Driessen<sup>2</sup>*  
<sup>1</sup>Technische Universiteit Delft, The Netherlands; <sup>2</sup>Thales Nederland B.V., The Netherlands
- 202  **C** **Automatic In-Door Fall Detection Based on Microwave Radar Measurements**  
*Peter Karsmakers, Tom Croonenborghs, Marco Mercuri, Dominique Schreurs, Paul Leroux, Katholieke Universiteit Leuven, Belgium*
- 206  **C** **A Reduced Physical Optics Model for 2D Target Identification by a Bistatic Monochromatic Wave Radar**  
*M. Amirisazi, F. Daout, F. Schmitt, SATIE, France*
- 210  **C** **Micro-Doppler Analysis of Small UAVs**  
*J.J.M. de Wit<sup>1</sup>, R.I.A. Harmanny<sup>2</sup>, G. Prémel-Cabic<sup>2</sup>*  
<sup>1</sup>TNO, The Netherlands; <sup>2</sup>Thales Nederland B.V., The Netherlands
- 214  **C** **Aerial Target Classification by Micro-Doppler Signatures and Bicoherence-Based Features**  
*Pavlo Molchanov<sup>1</sup>, Alexander Totsky<sup>2</sup>, Jaakko Astola<sup>1</sup>, Karen Egiazarian<sup>1</sup>, Sergey Leshchenko<sup>3</sup>, Manuel Rosa-Zurera<sup>4</sup>*  
<sup>1</sup>Tampere University of Technology, Finland; <sup>2</sup>National Aerospace University, Ukraine; <sup>3</sup>Kozhedub Air Force University, Ukraine; <sup>4</sup>Universidad de Alcalá, Spain

## EuRAD13: Short Range Radar

Chair: Reinhard Knöchel, University of Kiel — Co-Chair: Alexander Kölpin, University Erlangen-Nürnberg

Venue G102, Time 08:30 - 10:10, Friday 2 November 2012

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- 218  **C** **Association of Range-Doppler Video Sequences in Multistatic UWB Radar for Human Tracking**  
*Yuan He, François Le Chevalier, Alexander G. Yarovoy, Technische Universiteit Delft, The Netherlands*
- 222  **C** **Description of the Complete Processing Pipeline of a Multistatic Through-Wall Pulse Radar**  
*Omar Benahmed Daho, Jamal Khamlichi, Michel Menard, Alain Gaugue, L3I, France*
- 226  **C** **Through-Wall Tracking of Moving Persons by UWB Sensor Network**  
*Dušan Kocur, Jana Rovňáková, Technical University of Košice, Slovak Republic*
- 230  **C** **Fast Range Point Migration Method for Weapon Detection Using Ultra-Wideband Radar**  
*Takuya Sakamoto, T.G. Savelyev, Pascal Aubry, Alexander G. Yarovoy, Technische Universiteit Delft, The Netherlands*
- 234  **C** **Ultra-Wideband Sensor System for Remote Monitoring of Vitality at Home**  
*R. Herrmann<sup>1</sup>, J. Sachs<sup>1</sup>, M. Kmec<sup>1</sup>, M. Grimm<sup>1</sup>, P. Rauschenbach<sup>2</sup>*  
<sup>1</sup>Technische Universität Ilmenau, Germany; <sup>2</sup>MEODAT GmbH, Germany

## EuRAD14: High Resolution Techniques

Chair: Felix Yanovsky, National Aviation University (Ukraine) — Co-Chair: Joachim Ender, Fraunhofer FHR

Venue Emerald, Time 10:40 – 12:20, Friday 2 November 2012

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- 238  **C** **Improved Beamspace ESPRIT-Based DOA Estimation via Pseudo-Noise Resampling**  
*Volodymyr Vasylyshyn, Kharkiv Air Force University, Ukraine*
- 242  **C** **Application of 2D MUSIC Algorithm to Range-Azimuth FMCW Radar Data**  
*Francesco Belfiori<sup>1</sup>, W.L. van Rossum<sup>2</sup>, Peter Hoogeboom<sup>1</sup>*  
*<sup>1</sup>Technische Universiteit Delft, The Netherlands; <sup>2</sup>TNO, The Netherlands*
- 246  **C** **Accuracy Limits of a K-Band FMCW Radar with Phase Evaluation**  
*Steffen Scherr, Serdal Ayhan, Mario Pauli, Thomas Zwick, KIT, Germany*
- 250  **C** **Adaptive Super-Resolution with a Synthetic Aperture Antenna**  
*Christoph Fischer<sup>1</sup>, Markus Andres<sup>2</sup>, Hans-Ludwig Bloecher<sup>1</sup>, Juergen Dickmann<sup>1</sup>, Wolfgang Menzel<sup>2</sup>*  
*<sup>1</sup>Daimler AG, Germany; <sup>2</sup>Universität Ulm, Germany*

## EuRAD15: Multiple and Coupled Radar Systems

Chair: William Miceli, University College London — Co-Chair: Andy Stove, Thales UK

Venue G102, Time 10:40 – 12:20, Friday 2 November 2012

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- 254  **C** **Scalable Multi-Channel Digital Platform for Waveform-Agile Radar**  
*Giacomo Calabrese<sup>1</sup>, Lorenzo Pagli<sup>1</sup>, Oleg A. Krasnov<sup>2</sup>, Alexander G. Yarovoy<sup>2</sup>*  
*<sup>1</sup>Università di Firenze, Italy; <sup>2</sup>Technische Universiteit Delft, The Netherlands*
- 258  **C** **The Effect of Phase Noise on Ranging Uncertainty in FMCW Secondary Radar-Based Local Positioning Systems**  
*Randolf Ebel, Denys Shmakov, Martin Vossiek, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*
- 262  **C** **A High Accuracy Post-Synchronization Method for Secondary Radar Systems**  
*Markus Kaiser<sup>1</sup>, Jörg Hüttner<sup>1</sup>, Andreas Ziroll<sup>1</sup>, Robert Weigel<sup>2</sup>*  
*<sup>1</sup>Siemens AG, Germany; <sup>2</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*
- 266  **C** **V-Band Two-Tone Continuous Wave Radar Operating in Monostatic/Bistatic Mode**  
*Kamel Haddadi, Tuami Lasri, IEMN, France*
- 270  **C** **Wind Turbine Compatibility Kit for ATC Radars: Compatibility of Wind Turbines and Air Traffic Control Radars**  
*C. Neumann, M. Weber, A. Müller, EADS Deutschland GmbH, Germany*









## EuRAD Poster01 : EuRAD Poster Session







Chair: François Le Chevalier, TU Delft — Co-Chair: Oleg Krasnov, TU Delft

Venue Topaz Lounge, Time 10:10 - 17:40, Thursday 1 November 2012




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- 274  **C** **Structured  $\ell_2$ - $\ell_1$  Experiment Design Regularization Approach for Near Real Time Enhancement of Low Resolution Fractional SAR Imagery**  
*Yuriy V. Shkvarko, José Tuxpan, Israel Yañez, Instituto Politécnico Nacional, Mexico*
- 278  **C** **Optimization of OFDM SAR Signals for Range Ambiguity Suppression**  
*Vishal Riché, Stéphane Méric, Jean-Yves Baudais, Eric Pottier, IETR, France*
- 282  **C** **Multichannel InSAR Phase Unwrapping Using Nonlinear Kalman Smoother**  
*Davide Chirico, Gilda Schirinzi, Università di Napoli "Parthenope", Italy*
- 286  **C** **Application of Spline Basis for Some Imaging Tasks**  
*K.I. Semenova, I.V. Shelevytsky, Felix J. Yanovsky, National Aviation University, Ukraine*
- 290  **C** **Mitigating the Multipath Effects of Low Angle Monopulse Tracking by Even Difference Pattern**  
*Altunkan Hizal<sup>1</sup>, Sencer Koç<sup>2</sup>*  
*<sup>1</sup>Aselsan Inc., Turkey; <sup>2</sup>Middle East Technical University, Turkey*
- 294  **C** **Module Spatially Variant Apodization Algorithm for Enhancing Radar Images**  
*Qi Wang, Weiqiang Zhu, Zhijian Li, Zhenhai Ji, Yongzhi Sun, Nanjing Electronic Equipment Institute, China*
- 298  **C** **Neural Network Based Direction of Arrival Estimation for a MIMO OFDM Radar**  
*Yoke Leen Sit, Marija Agatonovic, Thomas Zwick, KIT, Germany*
- 302  **C** **Automatic Target Classifier for a Ground Surveillance Radar Using Linear Discriminant Analysis and Logistic Regression**  
*A. Javed, A. Ejaz, S. Liaqat, A. Ashraf, M.B. Ihsan, NUST, Pakistan*

*EuRAD Poster Session continued ...*

- 306  **C** **Pulsed FMCW Waveform Design for LPI Radars Based on Stretch Processing**  
*Altunkan Hizal, Şimşek Demir, Aselsan Inc., Turkey*
- 310  **C** **Orthogonal Waveforms for Multistatic and Multifunction Radar**  
*Gaspere Galati, Gabriele Pavan, Annalisa De Franco, Università di Roma "Tor Vergata", Italy*
- 314  **C** **Random Phase/Frequency Modulated Waveforms for Noise Radar Systems Considering Phase Shift**  
*Leandro Pralon<sup>1</sup>, Bruno Pompeo<sup>1</sup>, Gabriel Beltrao<sup>2</sup>, Higor Cioqueta<sup>2</sup>, Bruno Cosenza<sup>1</sup>, José Mauro Fortes<sup>3</sup>*  
*<sup>1</sup>Brazilian Army Technological Center, Brazil; <sup>2</sup>Orbisat da Amazônia, Brazil; <sup>3</sup>Pontifical Catholic University, Brazil*
- 318  **C** **Choosing the Position of the Receiver in a MISO Passive Radar System**  
*Mohammad Mahdi Chitgarha, Mohammad Nazari Majd, Mojtaba Radmard, Mohammad Mahdi Nayebi, Sharif University of Technology, Iran*
- 322  **C** **Identification of Buried Objects in GPR Using Phase Information Extracted from Transient Response**  
*V. Mikhnev, M.-K. Olkkonen, E. Huuskonen, Aalto University, Finland*
- 326  **C** **Simulator for Studying Resource Allocation in Reconfigurable Multi-Sensor Networks**  
*T.H. de Groot, Oleg A. Krasnov, Alexander G. Yarovoy, Technische Universiteit Delft, The Netherlands*
- 330  **C** **Adaptive Optimization Algorithms for Utility-Driven Resource Allocation in Reconfigurable Multi-Sensor Networks**  
*T.H. de Groot, Oleg A. Krasnov, Alexander G. Yarovoy, Technische Universiteit Delft, The Netherlands*

*EuRAD Poster Session continued...*






- 334  **C Sentinel-1 In-Orbit Calibration Plan**  
*Paul Snoeij<sup>1</sup>, Dirk Geudtner<sup>1</sup>, Allan Østergaard<sup>1</sup>, Ignacio Navas-Traver<sup>1</sup>, Michael Brown<sup>1</sup>, Bjorn Rommen<sup>1</sup>, Dave Bibby<sup>1</sup>, Ramon Torres<sup>1</sup>, Marco Schwerdt<sup>2</sup>, Björn Döring<sup>2</sup>, Manfred Zink<sup>2</sup>, Dirk Schrank<sup>2</sup>*  
<sup>1</sup>ESA, The Netherlands; <sup>2</sup>DLR, Germany
- 337  **C Experimental Verification of Novel Method to Reduce Quantization Lobes for Phased Array Radar**  
*Hirokazu Kamoda, Jun Tsumochi, Fumiyasu Suginoshita, NHK, Japan*
- 341  **C Performance of the Wet Radomes for Phased-Array Weather Radars: Evaluation and Applications**  
*Jorge L. Salazar, Paul Siquiera, Jorge Trabal, Eric J. Knapp, David J. McLaughlin, University of Massachusetts at Amherst, USA*
- 345  **C Experimental Study of Small-Scale Fluctuations of Refraction Index in Surface Air**  
*Ye. Belov, G. Khlopov, S. Khomenko, A. Linkova, G. Rudnev, O. Voitovych, National Academy of Sciences of Ukraine, Ukraine*
- 349  **C Model for the Calculation of the Radar Cross Section of Wake Vortices of Take-Off and Landing Airplanes**  
*Danielle Vanhoenacker-Janvier<sup>1</sup>, Kahina Djafri<sup>1</sup>, Frederic Barbaresco<sup>2</sup>*  
<sup>1</sup>Université Catholique de Louvain, Belgium; <sup>2</sup>Thales Air Systems, France
- 353  **C Detection of Dangerous Meteorological Phenomena with Usage of GPS Signals**  
*V.I. Lutsenko<sup>1</sup>, I.V. Lutsenko<sup>1</sup>, I.V. Popov<sup>1</sup>, E.V. Krivenko<sup>1</sup>, V.N. Gudkov<sup>2</sup>, N.V. Lukianenko<sup>2</sup>, N.X. Anh<sup>3</sup>*  
<sup>1</sup>National Academy of Sciences of Ukraine, Ukraine; <sup>2</sup>Navis-Ukraine, Ukraine; <sup>3</sup>Vietnamese Academy of Science and Technology, Vietnam

## EuRAD/EuMC01 : Space Based Systems

*Chair: Antoine Roederer, TU Delft — Co-Chair: Luca Perregrini, University of Pavia*

*Venue Emerald, Time 08:30 – 10:10, Thursday 1 November 2012*

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- 357  **C Beam Squint Compensation Technique for the Sardinia Radio Telescope**  
*A. Giannini<sup>1</sup>, S. Moscato<sup>1</sup>, M. Pasian<sup>1</sup>, L. Perregrini<sup>1</sup>, Maurizio Bozzi<sup>1</sup>, P. Besso<sup>2</sup>*  
<sup>1</sup>Università di Pavia, Italy; <sup>2</sup>ESOC, Germany
- 361  **C A 100GHz Millimeter Wave Radar System with 32 Transmitters and 32 Receivers for Space Applications**  
*Jochen Moll, Mikko Kotiranta, Bernd Hils, Viktor Krozer, Goethe-Universität Frankfurt, Germany*
- 365  **C Suitability of GaN and LDMOS for 70–82% Efficiency 120–200W HPA Addressing Spaceborne P-Band Radar Applications**  
*N. Le Gallou<sup>1</sup>, Jens Vidkjaer<sup>2</sup>, C. Poivey<sup>1</sup>*  
<sup>1</sup>ESA, The Netherlands; <sup>2</sup>Technical University of Denmark, Denmark
- 369  **C Compact, Flexible, Wideband and Efficient Power Combining Technique for Spatial Applications**  
*J.-P. Frayssé<sup>1</sup>, L. Raynaud<sup>1</sup>, D. Lopez<sup>1</sup>, M. Maignan<sup>1</sup>, G. Soubercaze-Pun<sup>2</sup>, L. Lapierre<sup>2</sup>, N. Picard<sup>3</sup>, A. Peden<sup>3</sup>*  
<sup>1</sup>Thales Alenia Space, France; <sup>2</sup>CNES, France; <sup>3</sup>Lab-STICC, France
- 373  **C Critical Technology Breadboarding for the PARIS In-Orbit Demonstration Mission**  
*M. Martín-Neira, ESA, The Netherlands*

## EuRAD/EuMC02: Tunable Circuits and Beamforming Antenna Systems

Chair: Stepan Lucyszyn, Imperial College London — Co-Chair: Alexander Koelpin, University of Erlangen-Nuremberg

Venue Europe Foyer 2, Time 08:30 - 10:10, Thursday 1 November 2012

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- 377  **Discrete Tunable RF-Power GaN-BST Transistors**  
*Olof Bengtsson<sup>1</sup>, Holger Maune<sup>2</sup>, Felix Gölden<sup>3</sup>, Serguei Chevtchenko<sup>1</sup>,  
Mohsen Sazegar<sup>2</sup>, Paul Kurpas<sup>1</sup>, Alex Wiens<sup>2</sup>, Rolf Jakoby<sup>2</sup>, Wolfgang Heinrich<sup>1</sup>*  
<sup>1</sup>FBH, Germany; <sup>2</sup>Technische Universität Darmstadt, Germany; <sup>3</sup>SHF Communication  
Technologies AG, Germany
- 381  **A Novel Tunable Matching Network for Dynamic Load Modulation of High Power Amplifiers**  
*Li Yue, Takashi Maehata, Kazuyuki Totani, Hideki Tango, Tatsuya Hashinaga,  
Takumi Asaina, Sumitomo Electric Industries Ltd., Japan*
- 385  **3-Mode Reconfigurable Beam-Forming Array Antenna for Mobile WLAN Application**  
*Hyun-Sung Tae, Hyeong-Seok Jang, Soo-Ji Lee, Wang-Sang Lee, Jong-Won Yu, KAIST,  
Korea*
- 389  **Fourier Transform Using a Rotman Lens**  
*Yunhua Zhang, Vincent Fusco, Queen's University Belfast, UK*
- 393  **Liquid-Based Tunable Loaded-Line Phase Shifter**  
*Pierre Meineri, David Dubuc, Katia Grenier, LAAS, France*

## EuRAD/EuMC03: Innovative Antenna Concepts

Chair: Peter Knott, Fraunhofer FHR — Co-Chair: Marco Pasian, University of Pavia

Venue Emerald, Time 10:40 - 12:20, Thursday 1 November 2012

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- 397  **New Broadband Button-Shaped Antenna on Innovative Magneto-Dielectric Material for Wearable Applications**  
*Martino Aldrigo<sup>1</sup>, Davide Bianchini<sup>1</sup>, Alessandra Costanzo<sup>1</sup>, Diego Masotti<sup>1</sup>,  
Carmen Galassi<sup>2</sup>, Liliana Mitoseriu<sup>3</sup>*  
<sup>1</sup>Università di Bologna, Italy; <sup>2</sup>CNR-ISTEC, Italy; <sup>3</sup>Universitatea Alexandru Ioan Cuza,  
Romania
- 401  **A Novel Log Periodic Implementation of a 700MHz-6GHz Slant Polarised Fixed-Beam Antenna Array for Direction Finding Applications**  
*Roscoe W.S. Harrison, Michael Jessup, Roke Manor Research Ltd., UK*
- 405  **A Dielectric Lens-Based Antenna Concept for High-Precision Industrial Radar Measurements at 24GHz**  
*Nils Pohl<sup>1</sup>, Michael Gerding<sup>2</sup>*  
<sup>1</sup>Ruhr-Universität Bochum, Germany; <sup>2</sup>KROHNE Messtechnik GmbH, Germany
- 409  **Reconfigurable and Dual-Polarization Folded Reflectarray Antenna**  
*Simone Montori<sup>1</sup>, Roberto Vincenti Gatti<sup>1</sup>, Roberto Sorrentino<sup>1</sup>, Sabine Dieter<sup>2</sup>,  
Wolfgang Menzel<sup>2</sup>*  
<sup>1</sup>Università di Perugia, Italy; <sup>2</sup>Universität Ulm, Germany
- 413  **Design and Application of a Liquid Crystal Varactor Based Tunable Coupled Line for Polarization Agile Antennas**  
*Onur Hamza Karabey, Sara Bausch, Saygin Bildik, Sebastian Strunck, Alexander Gaebler,  
Rolf Jakoby, Technische Universität Darmstadt, Germany*

## EuRAD/EuMC04 : Phased Array Related Antennas

Chair: Winfried Mayer, Endress+Hauser — Co-Chair: Giampiero Gerini, TNO

Venue Europe Foyer 2, Time 10:40 - 12:20, Thursday 1 November 2012

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- 417  **C** **Integrated Filtering in a Planar Array of Connected Dipoles Including a Common-Mode Rejection Module**  
*Lorenzo Cifola<sup>1</sup>, Daniele Cavallo<sup>1</sup>, Giampiero Gerini<sup>1</sup>, Antonio Morini<sup>2</sup>*  
<sup>1</sup>TNO, The Netherlands; <sup>2</sup>Università Politecnica delle Marche, Italy
- 421  **C** **A Compact Two-Dimensional Phased Array Using Grounded Coplanar-Waveguides Butler Matrices**  
*Wei-Yang Chen, Ya-Ru Hsieh, Chi-Cheng Tsai, Yi-Ming Chen, Chia-Chan Chang, Sheng-Fuh Chang, National Chung Cheng University, Taiwan*
- 425  **C** **Low Cost X-Band Dual Polarization Phased Array Antenna: Scanning Performance**  
*Jorge L. Salazar, Rafael H. Medina, Eric J. Knapp, David J. McLaughlin, University of Massachusetts at Amherst, USA*
- 429  **C** **Composite Right/Left-Handed (CRLH) Phased-Array Feed Network for Frequency Scanning Antenna**  
*Jun Choi, Yuandan Dong, Tatsuo Itoh, University of California at Los Angeles, USA*
- 433  **C** **A Patch-Slot Combination Approach for Large Band Reflectarrays**  
*T. Makdissy<sup>1</sup>, R. Gillard<sup>1</sup>, E. Fourn<sup>1</sup>, E. Girard<sup>2</sup>, H. Legay<sup>2</sup>*  
<sup>1</sup>IETR, France; <sup>2</sup>Thales Alenia Space, France

## EuRAD/EuMC Poster01 : Joint EuMC/EuRAD Poster Session








Chair: Massimiliano Simeoni, Delft University of Technology — Co-Chair: Oleg Krasnov, Delft University of Technology

Venue Exhibition Hall, Time 10:40 - 17:40, Wednesday 31 October 2012








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- 437  **C** **Laser Ablated 48GHz ZOR CRLH Antenna on Alumina Substrate**  
*Gheorghe Sajin, Florea Craciunoiu, Adrian Dinescu, Iulia Andreea Mocanu, Alexandra Stefanescu, IMT Bucharest, Romania*
- 441  **C** **Electrodynamic Model and Calculation of the Effective Permeability Tensor for 3D Magnetic Opal-Based Nanocomposites at Microwaves**  
*G.S. Makeeva<sup>1</sup>, O.A. Golovanov<sup>1</sup>, A.B. Rinkevich<sup>2</sup>*  
<sup>1</sup>Penza State University, Russia; <sup>2</sup>Russian Academy of Sciences, Russia
- 445  **C** **Analytical Calculation of Cutoff Wavenumbers of Dielectric Waveguides with Elliptical Cross Section**  
*Grigorios P. Zouros, John A. Roumeliotis, National Technical University of Athens, Greece*
- 449  **C** **Parallel Plate Mode Suppression in LTCC-Integrated Stripline Circuits Using Periodic Bandgap Structures**  
*Andreas Ziroff, Florian Poprawa, Jörg Hüttner, Siemens AG, Germany*
- 453  **C** **Modeling of Shielding Effectiveness of Reinforced Concrete Walls for Electromagnetic Pulse**  
*Se-Young Hyun, Kyung-Won Lee, Jong-Gwan Yook, Yonsei University, Korea*
- 457  **C** **Dispersion of Spin-Electromagnetic Waves in Ferrite-Ferroelectric Multilayered Structure**  
*A.A. Nikitin<sup>1</sup>, V.V. Vitko<sup>1</sup>, A.B. Ustinov<sup>1</sup>, A.A. Semenov<sup>1</sup>, E. Lahderanta<sup>2</sup>*  
<sup>1</sup>St. Petersburg Electrotechnical University, Russia; <sup>2</sup>Lappeenranta University of Technology, Finland

*Joint EuMC/EuRAD Poster Session continued ...*

- 461  **C** **Accurate Models for Spiral Resonators**  
*David Ellstein, Bingnan Wang, Koon Hoo Teo, Mitsubishi Electric Research Laboratories, USA*
- 465  **C** **Ab initio Adaptive Meshing for Planar Passive Component Modeling**  
*Javier Sieiro, José M. López-Villegas, María N. Vidal, Joan A. Osorio, Tomás Carrasco, Saiyd Ahyoune, Universitat de Barcelona, Spain*
- 469  **C** **An Alternative Domain Decomposition Technique for CUDA-Based 3D FDTD Methods**  
*Matthew Livesey<sup>1</sup>, James F. Stack Jr.<sup>2</sup>, Fumie Costen<sup>3</sup>, Takeshi Nanri<sup>4</sup>, Seiji Fujino<sup>4</sup>, Norimasa Nakashima<sup>4</sup>*  
*<sup>1</sup>Accenture, UK; <sup>2</sup>Remcom Inc., USA; <sup>3</sup>University of Manchester, UK; <sup>4</sup>Kyushu University, Japan*
- 473  **C** **Broadband Microstrip to Coplanar Strip Line/Slot Line Transitions on Perpendicular Substrates**  
*Faïcel Ouasli, Jean-Philippe Coupez, Patrice Pajusco, Christian Person, Lab-STICC, France*
- 477  **C** **Development of Microwave System for Tumor Ablation and Imaging**  
*Ashraf Mohra, Abdel-Fattah Sheta, Zeeshan Siddiqui, Ibrahim Elshafiey, King Saud University, Saudi Arabia*
- 481  **C** **Near-Field Measurements of a Millimeter-Wave Reflectarray at 120GHz**  
*S. Mäkelä<sup>1</sup>, A. Tamminen<sup>1</sup>, J. Ala-Laurinaho<sup>1</sup>, Antti V. Räisänen<sup>1</sup>, P. Koivisto<sup>2</sup>, J. Säily<sup>2</sup>, J. Häkli<sup>2</sup>, P. Rantakari<sup>2</sup>, R. Tuovinen<sup>2</sup>, A. Luukanen<sup>2</sup>*  
*<sup>1</sup>Aalto University, Finland; <sup>2</sup>VTT Technical Research Centre of Finland, Finland*
- 485  **C** **Electrically Small Antenna with Defected Ground Structure**  
*Hocine Kimouche, Sofiane Oukil, Ecole Militaire Polytechnique, Algeria*


*Joint EuMC/EuRAD Poster Session continued ...*

- 489  **C** **Two-Layer Embedded Half-Split Cylindrical Dielectric Resonator Antenna for Wideband Applications**  
*Raghvendra Kumar Chaudhary, Kumar Vaibhav Srivastava, Animesh Biswas, IIT Kanpur, India*
- 492  **C** **A Novel Method of Optical True Time Delay in Phased Array Antenna**  
*Zhenhai Ji, Weiqiang Zhu, Zhijian Li, Yongzhi Sun, Qi Wang, Nanjing Electronic Equipment Institute, China*
- 496  **C** **Analysis of the FAST ICRH Antenna with Salted Water Load Using HFSS Code**  
*Gian Luca Ravera<sup>1</sup>, Silvio Ceccuzzi<sup>1</sup>, Francesco Mirizzi<sup>1</sup>, Angelo A. Tuccillo<sup>1</sup>, Riccardo Maggiora<sup>2</sup>*  
*<sup>1</sup>ENEA, Italy; <sup>2</sup>Politecnico di Torino, Italy*
- 500  **C** **Multiple Feed Transmit-Array Antennas with Reduced Focal Distance**  
*Antonio Clemente<sup>1</sup>, Laurent Dussopt<sup>1</sup>, Ronan Sauleau<sup>2</sup>, Patrick Potier<sup>3</sup>, Philippe Pouliguen<sup>4</sup>*  
*<sup>1</sup>CEA-LETI, France; <sup>2</sup>IETR, France; <sup>3</sup>DGA/Maîtrise de l'Information, France; <sup>4</sup>DGA/Direction de la Stratégie, France*
- 504  **C** **Wideband Circularly Polarized Slot Antenna**  
*Nasimuddin, Zhi Ning Chen, Xianming Qing, A\*STAR, Singapore*
- 508  **C** **Dual-Band Circularly Polarized Hexagonal-Slot Antenna**  
*Nijee Jeevanandham<sup>1</sup>, Nasimuddin<sup>2</sup>, Kush Agarwal<sup>1</sup>, Arokiaswami Alphones<sup>1</sup>*  
*<sup>1</sup>Nanyang Technological University, Singapore; <sup>2</sup>A\*STAR, Singapore*
- 512  **C** **Two Dimensional Microstrip Array with High Aperture Efficiency on FR4 Substrate**  
*Zhongkun Ma, Guy A.E. Vandenbosch, Katholieke Universiteit Leuven, Belgium*

*Joint EuMC/EuRAD Poster Session continued ...*








- 516  **C** **Comparison of Weighted Sum Approaches for PSO Fitness Functions in Antenna Design**  
*Zhongkun Ma, Guy A.E. Vandenbosch, Katholieke Universiteit Leuven, Belgium*
- 520  **C** **Cabin Ceiling-Integrated Broadband Antenna for Wireless Services in Passenger Aircraft**  
*B. Schoenlinner<sup>1</sup>, M. Steinmayer<sup>2</sup>, B. Schulte<sup>3</sup>*  
*<sup>1</sup>EADS Innovation Works, Germany; <sup>2</sup>Diehl Aircraft GmbH, Germany; <sup>3</sup>Astyx GmbH, Germany*
- 524  **C** **Compact VHF Quadrifilar Helix Antenna**  
*Alexandru Takacs<sup>1</sup>, Tonio Idda<sup>1</sup>, Herve Aubert<sup>1</sup>, Hubert Diez<sup>2</sup>*  
*<sup>1</sup>LAAS, France; <sup>2</sup>CNES, France*
- 528  **C** **Analysis of Coupling Between Parallel Thick Dipoles Within Antenna Arrays**  
*Irina Paraschiv<sup>1</sup>, Hubregt J. Visser<sup>2</sup>*  
*<sup>1</sup>Technische Universiteit Eindhoven, The Netherlands; <sup>2</sup>IMEC, The Netherlands*
- 532  **C** **A Ka-Band CMOS Low-Phase-Variation Variable Gain Amplifier with Good Matching Capacity**  
*Pei-Hua Lo, Chien-Chih Lin, Hsin-Chih Kuo, Huey-Ru Chuang, National Cheng Kung University, Taiwan*
- 536  **C** **A Solution for the Transient Field Diffracted by an Obtuse-Angled Dielectric Wedge**  
*Gianluca Gennarelli<sup>1</sup>, Giovanni Riccio<sup>2</sup>*  
*<sup>1</sup>CNR-IREA, Italy; <sup>2</sup>Università di Salerno, Italy*
- 540  **C** **Correlation Analysis of MIMO Channel Measurement Parameters Under 781MHz Environment**  
*Won Ho Jeong<sup>1</sup>, Joo Seock Kim<sup>1</sup>, Kyung-Seok Kim<sup>1</sup>, Myoung-won Jung<sup>2</sup>, Jong Ho Kim<sup>2</sup>, Young Keun Yoon<sup>2</sup>*  
*<sup>1</sup>Chungbuk National University, Korea; <sup>2</sup>ETRI, Korea*

*Joint EuMC/EuRAD Poster Session continued ...*

- 545  **C** **The Path Loss Characteristics for New Wireless Mobile Communication Systems in Outdoor Environments**  
*Myoung-won Jung<sup>1</sup>, Jong Ho Kim<sup>1</sup>, Joo Seock Kim<sup>2</sup>, Won Ho Jeong<sup>2</sup>, Kyung-Seok Kim<sup>2</sup>, Jeong Ki Pack<sup>3</sup>*  
*<sup>1</sup>ETRI, Korea; <sup>2</sup>Chungbuk National University, Korea; <sup>3</sup>Chungnam National University, Korea*
- 551  **C** **Modeling Small Scale Fading for Cognitive Programme Making and Special Event Applications**  
*Sven Dortmund, Sebastian Sczyslo, Ilona Rolfes, Ruhr-Universität Bochum, Germany*
- 554  **C** **Spectral Characteristics of Coupled Plasmonic Modes in Aggregates of Plasma Columns**  
*Nadiia Stognii, Nataliya Sakhnenko, Kharkiv National University of Radio Electronics, Ukraine*
- 558  **C** **3D Patch Antenna Using a Cardboard Substrate for RFID Reader Applications**  
*Giuseppina Monti, Luca Catarinucci, Claudia Vasanelli, Luciano Tarricone, Università del Salento, Italy*
- 562  **C** **A 13.56MHz Rectifier with Efficiency-Improving Harmonic-Termination Circuit for Wireless Power Transmission Systems**  
*S. Yoshida<sup>1</sup>, M. Tanomura<sup>1</sup>, R.A. Chinga<sup>2</sup>, Jenshan Lin<sup>2</sup>, Wei-ting Chen<sup>3</sup>*  
*<sup>1</sup>NEC Corporation, Japan; <sup>2</sup>University of Florida, USA; <sup>3</sup>ITRI, Taiwan*
- 566  **C** **X-Band Semi-Passive RFID Tag on Flexible Laminate**  
*Stevan Preradovic<sup>1</sup>, Aleksandar Menicanin<sup>2</sup>*  
*<sup>1</sup>Nitero, Australia; <sup>2</sup>University of Belgrade, Serbia*









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*Joint EuMC/EuRAD Poster Session continued ...*

- 570  **C Initial Calibration Procedure of a Six-Port Receiver System for Complex Data Reception**  
*S. Lindner, F. Barbon, G. Vinci, Robert Weigel, A. Koelpin, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*
- 574  **C Design and Performance of Fiber-Optic Relay Node for Mobile Communication Systems**  
*Hiroyuki Otsuka, Hiroki Masuda, Akiyuki Nakajima, Kogakuin University, Japan*
- 578  **C CMOS RF T/R Router Switch ICs for LTE Carrier Aggregation Transceivers**  
*Chang-Ming Lai, Je-Kuan Jau, Ping-Hsun Wu, Chun-Hsiang Chi, Chia-Hao Tu, Jian-Yu Li, ITRI, Taiwan*
- 582  **C Evaluation of Nonlinear Distortion in MIMO Transmitters**  
*M. Bozic<sup>1</sup>, M. Cabarkapa<sup>1</sup>, D. Budimir<sup>1</sup>, N. Neskovic<sup>2</sup>, A. Neskovic<sup>2</sup>*  
*<sup>1</sup>University of Westminster, UK; <sup>2</sup>University of Belgrade, Serbia*
- 586  **C Compact Printable Chipless RFID Tags Using Polarization Diversity**  
*Md. Aminul Islam, Nemai Karmakar, Monash University, Australia*
- 590  **C Design of High Efficiency Wireless Charging Pad Based on Magnetic Resonance Coupling**  
*Jinsung Choi<sup>1</sup>, Young-Ho Ryu<sup>2</sup>, Dong-Zo Kim<sup>2</sup>, Nam Yoon Kim<sup>2</sup>, Changwook Yoon<sup>2</sup>, Yun-Kwon Park<sup>2</sup>, Sangwook Kwon<sup>2</sup>, Youngoo Yang<sup>3</sup>*  
*<sup>1</sup>RF Micro Devices, USA; <sup>2</sup>SAIT, Korea; <sup>3</sup>Sungkyunkwan University, Korea*
- 594  **C Prediction of Multipactor Thresholds in Passive Microwave Components Using an Improved Simulation Method**  
*Yun Li, Wanzhao Cui, China Academy of Space Technology at Xi'an, China*

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*Joint EuMC/EuRAD Poster Session continued ...*

- 598  **C Coupler Based Deterministic Indoor Radio Channel**  
*Hans W. Pflug, Jac Romme, Georgios Selimis, Johan van den Heuvel, Kathleen Philips, Harmke de Groot, IMEC, Belgium*
- 602  **C Wireless Sensor Network for Electrical Secondary Substations**  
*Ricardo André Pinto Faria, Universidade Técnica de Lisboa, Portugal*
- 606  **C UWB Antenna for Body Implanted Applications**  
*Kamya Yekeh Yazdandoost, NICT, Japan*
- 610  **C New Steerable Antenna with Controllable Metamaterial**  
*Yongzhi Sun, Zhijian Li, Weiqiang Zhu, Zhenhai Ji, Qi Wang, Nanjing Electronic Equipment Institute, China*
- 614  **C Calibration and Validation of the CASA Phased Array Antenna**  
*Rafael H. Medina, Jorge L. Salazar, Eric J. Knapp, David J. McLaughlin, University of Massachusetts at Amherst, USA*
- 618  **C Planar Square Quadrifilar Spiral Antenna for Mobile RFID Reader**  
*Soo-Ji Lee, Dong-Jin Lee, Hyeong-Seok Jang, Hyun-Sung Tae, Jong-Won Yu, KAIST, Korea*
- 622  **C Impact of Truncation on Finite-Sized Dual-Band Linear Phased Arrays**  
*A.S.E. Valavan, Massimiliano Simeoni, Alexander G. Yarovoy, Technische Universiteit Delft, The Netherlands*
- 626  **C Beamforming with Efficient Node Selection Techniques for Green Cognitive Radio Networks**  
*N.M Tessema, X. Lian, H. Nikoogar, Technische Universiteit Delft, The Netherlands*