

2007 European Radar Conference

**Munich, Germany
10-12 October 2007**

IEEE Catalog Number:	CFP07590-PRT
ISBN 10:	2-87487-004-8
ISBN 13:	978-2-87487-004-0

Table of Contents

Ultra-Wideband Radars for High-Resolution Imaging and Target Classification	1
<i>Alexander G. Yarovoy</i>	
Development of an Airborne Ice Sounding Radar Front-End.....	5
<i>Viktor Krozer, Carlos Cilla Hernandez, Jose Luis Vazquez Roy, Jens Vidkjaer, Jorgen Dall</i>	
TerraSAR-X In-Orbit Antenna Model Verification Results.....	9
<i>Markus Bachmann, Marco Schwerdt, B. Brautigam</i>	
Modeling of Nonidealities in Receiver Front-End for a Simulation of Multistatic SAR System	13
<i>Alicja Ossowska, Jung-Hyo Kim, Werner Wiesbeck</i>	
Set of X-Band distributed absorptive limiter GaAs MMICs	17
<i>A.P.M. Maas, J.P.B. Janssen, F.E. van Vliet</i>	
Shorted Ring Aperture Frequency Selective Surface Operating at a Doubled Frequency	21
<i>Lyudmila Mospan</i>	
Optimization of a Fast Scanning Millimetre-Wave Short Range SAR Imaging System	24
<i>Frank Gumbmann, Hue Phat Tran, Jochen Weinzierl, Lorenz-Peter Schmidt</i>	
Coherent Millimeter-Wave Imaging for Security Applications.....	28
<i>Alexander Dallinger, Sebastian Bertl, Jurgen Dellefsen</i>	
EuRAD: Passive Microwave Remote Sensing for Security Applications.....	32
<i>Markus Peichl, Stephan Dill, Matthias Jirousek, Helmut Suess</i>	
System Modelling for Millimeter-Wave Imaging Systems Using a 2.5D Calculation Method.....	36
<i>V. Tavakol, Q. Feng, I. Ocket, B. Nauwelaers, Dominique Schreurs</i>	
Ultra-Wideband Imaging for Detection of Early- Stage Breast Cancer	39
<i>X. Zhuge, M. Hajian, Alexander G. Yarovoy, L.P. Ligthart</i>	
Digital Beamforming And Multidimensional Waveform Encoding for Spaceborne Radar Remote Sensing	43
<i>Gerhard Krieger, Nicolas Gebert, Alberto Moreira</i>	
Digital beam forming on transmit and receive with an AESA FMCW radar.....	47
<i>C.M. Lievers, W.L. van Rossum, A.P.M. Maas, A.G. Huizing</i>	
Investigation of MIMO SAR for Interferometry	51
<i>Jung-Hyo Kim, Alicja Ossowska, Werner Wiesbeck</i>	
Concept for Measuring and Compensating Array Deformation.....	55
<i>J.J.M. de Wit, W.L. van Rossum, M.P.G. Otten, A.G.P. Koekenberg</i>	
Various Cross-Range Resolution Techniques Applied to an Eight-Channel 77GHz Sensor	59
<i>Peter Feil, Winfried Mayer, Wolfgang Menzel</i>	
Application of STAP Technique to FMCW Systems.....	63
<i>Tomasz Gorski, Adam Kawalec, Witold Czarnecki, Jean-Marc Le Caillec, Laurent Lecornu</i>	
Knowledge-Aided Array Calibration for Registration-Based Range-Dependence Compensation in Airborne STAP Radar with Conformal Antenna Arrays	67
<i>Philippe Ries, Marc Lesturgie, Fabian D. Lapierre, Jacques G. Verly</i>	
Real-Time Space-Time Adaptive Processing on the STI CELL Multiprocessor	71
<i>Di Wu, Yi-Hsien Li, Johan Eilert, Dake Liu</i>	
Single-Antenna Projection Algorithm to Discriminate Super-Imposed Secondary Surveillance Radar Mode S Signals	75
<i>E.G. Piracci, N. Petrochilos, G. Galati</i>	
Four-Dimensional Discretization for Detection of Moving Objects in Wide Band SAR.....	79
<i>M.I. Pettersson</i>	

Table of Contents

The TanDEM-X Mission: A Satellite Formation for High-Resolution SAR Interferometry.....	83
<i>Gerhard Krieger, H. Fiedler, M. Zink, I. Hajnsek, M. Younis, S. Huber, Markus Bachmann, J. Hueso Gonzalez, M. Werner, Alberto Moreira</i>	
Results from Geometric and Radiometric Calibration of TerraSAR-X.....	87
<i>B. Brautigam, Marco Schwerdt, Markus Bachmann, B. Doring</i>	
Advances in Airborne SAR Interferometry Using the Experimental SAR System of DLR.....	91
<i>Rolf Scheiber, Pau Prats, Matteo Nannini, Karlus A.C. de Macedo, Christian Andres, Jens Fischer, Ralf Horn</i>	
An Adaptive Technique for Estimating Ship Motion in SAR Data.....	95
<i>Marina V. Dragosevic, Michael D. Henschel, Charles E. Livingstone</i>	
An experimental comparison of Interferometric radar vs. Accelerometers for monitoring of large structures.....	99
<i>Matteo Fratini, Massimiliano Pieraccini, Devis Dei, Filippo Parrini, Gianni Bartoli, Carlo Atzeni</i>	
UWB FSR for air targets detection: preliminary analysis.....	103
<i>M. Cheniakov, Cheng Hu, M. Gashinova</i>	
Adaptive Antenna Configuration for Unambiguous Signal Reconstruction in Dual-Channel SAR Systems	107
<i>Diego Cristallini, Julien Marini, Pierfrancesco Lombardo</i>	
Leaky Lens Antenna for Multi-beam Imaging Systems.....	111
<i>Simona Bruni, Andrea Neto, Giampiero Gerini, Dave Bekers</i>	
3D Tower-Turntable ISAR Imaging	114
<i>Timo Kempf, Markus Peichl, Stephan Dill, Helmut Suess</i>	
Localization, from the observed far-field, of radiating centers in a 2D-scene.....	118
<i>Gildas Kubicke, Nicolas Chevaux, Christophe Bourlier, Philippe Pouliguen, Joseph Saillard</i>	
Determination of Resonance Poles of Radar Targets in Narrow Frequency Bands.....	122
<i>Janic Chauveau, Nicole de Beauhoudrey, Joseph Saillard</i>	
Analysis of the Signal Model for Forward Scattering Radar in Case of a Small Target.....	126
<i>V.I. Kostylev, M. Cherniakov</i>	
FMCW Radar with Broadband Communication Capability	130
<i>Peli Barrenechea, Frans Elferink, Johan Janssen</i>	
Two-dimensional Radar Imaging with Scattered PSK-modulated Communication Signals.....	134
<i>Christian Sturm, Stephan Schulteis, Werner Wiesbeck</i>	
Automotive 24 GHz Pulse Radar extended by a DQPSK Communication Channel.....	138
<i>Volker Winkler, Jürgen Detlefsen</i>	
Wideband ambiguity function and optimized coded radar signals.....	142
<i>Mayazzurra Ruggiano, Piet van Genderen</i>	
A Golay Code Based Approach to Reduction of the PAPR and its Consequence for the Data Throughput.....	146
<i>R. Firat Tigrek, P. van Genderen</i>	
Technology for Ultra Broadband Reconfigurable Beamformer and Front-End.....	150
<i>Aziz Ouacha, Roland Erickson, Robert Malmqvist</i>	
Trends in Wideband Phased-Array Front-Ends.....	154
<i>F.E. van Vliet</i>	
Calibration and Integration Testing of Wideband Multifunctional Radar Sensors.....	157
<i>Martin Kirscht, Thomas Schwämmlein, Kosmas Weidmann, Joachim Boukamp</i>	

Table of Contents

A Low-Cost 24GHz Doppler Radar Sensor for Traffic Monitoring Implemented in Standard Discrete-Component Technology.....	161
<i>F. Alimenti, F. Placentino, A. Battistini, G. Tasselli, W. Bernardini, P. Mezzanotte, D. Rascio, V. Palazzari, S. Leone, A. Scarponi, N. Porzi, M. Comez, L. Roselli</i>	
Range Doppler Detection for automotive FMCW Radars.....	165
<i>Volker Winkler</i>	
Performance Analysis of RADARSAT-2 Multi-Channel MODEX Modes.....	169
<i>Shen Chiu</i>	
W-Band Substrate Integrated Waveguide Radar Sensor based on Multi-Port Technology.....	173
<i>Emilia Moldovan, Serioja O. Tatu, Sofène Affes, Renato G. Bosisio, Ke Wu</i>	
A 19GHz VCO Downconverter MMIC for 77GHz Automotive Radar Frontends in a SiGe Bipolar Production Technology.....	177
<i>H. P. Forstner, H. Knapp, C. Gamsjäger, H. M. Rein, J. Böck, T. Meister, K. Aufinger</i>	
Novel Secondary Radar for Precise Distance and Velocity Measurement in Multipath Environments.....	181
<i>Sven Roehr, Peter Gulden, Martin Vossiek</i>	
A Ka-band, Magnetron Based, Scanning Radar for Airborne Applications.....	185
<i>V.A. Volkov, D.M. Vavriv, R.V. Kozhin, L.V. Shevtsova, Yong-Hoon Kim, Hoon Lee</i>	
Multi-Range and Multi-Pulse Radar Detection in Correlated Non-Gaussian Clutter	189
<i>Ulku Cilek Doyuran, Yalcin Tanik</i>	
Feasibility Study of a Multi-Carrier Dual-Use Imaging Radar and Communication System	193
<i>Dmitriy Garmatyuk, Jonathan Schuerger, Y. T. Morton, Kyle Binns, Michael Durbin, John Kimani</i>	
A New Approach for Evaluating the Phase Noise Requirements of STALO in a Doppler Radar	197
<i>Sung-Chan Song, Yun-Seok Hong</i>	
A radar frontend with time steered array antenna for PAMIR.....	201
<i>H. Wilden, O. Saalmann, B. Poppelreuter, O. Peters, A. Brenner</i>	
Broadband Active Sensor for the SOSTAR Airborne SAR/MTI Radar	205
<i>Eirik Grorud, Catherine Mehl, Michael Moll, Christian Renard, Eva Semmler, Kosmas Weidmann</i>	
TCAR: The Trans-Atlantic Cooperation for a state-of-the-art AGS Radar	209
<i>Peter Hoogeboom, Stéphane Buvry, Andreas Löhner</i>	
New Practical Application of Ultra-Wideband Radars.....	215
<i>Igor Y. Immoreev</i>	
Experimental Evaluation of an Array GPR for Landmine Detection.....	219
<i>Timofey Savelyev, Alexander Yarovoy, Leo Ligthart</i>	
C-Band Low-Loss Phase Shifter >360° for WLAN Applications	223
<i>Mohammed A. El-Tanani, Gabriel M. Rebeiz</i>	
High Isolation Substrate Integrated Coaxial Feed for Ka-Band Antenna Arrays.....	227
<i>Holger Pawlak, Max S. Reuther, Arne F. Jacob</i>	
A Novel Design Method for Blass Matrix Beam-Forming Networks.....	231
<i>Federico Casini, Roberto Vincenti Gatti, Luca Marcaccioli, Roberto Sorrentino</i>	
A Novel Rotman Lens in SIW Technology	235
<i>Elisa Sbarra, Luca Marcaccioli, Roberto Vincenti Gatti, Roberto Sorrentino</i>	
Design of a Travelling-Wave Aperture-Coupled Circularly-Polarized Concentric Ring Array	239
<i>Chunwei Min and Charles E. Free</i>	
The impact of SARA for further advances in Automotive Microwave Sensing.....	243
<i>Gerhard Rollmann, Hans-Ludwig Bloecher</i>	

Table of Contents

KOKON - Automotive High Frequency Technology at 77/79 GHz	246
<i>Robert Schneider, Hans-Ludwig Blöcher, Karl M. Strohm</i>	
Short Range Radar - Status of UWB Sensors and their Applications	250
<i>Hans Dominik</i>	
Short Range Radar - Being on the Market.....	254
<i>Josef Wenger</i>	
Functional Requirements of Future Automotive Radar Systems.....	258
<i>Ralph H. Rasshofer</i>	
Bistatic radar cross section of two-dimensional random rough layers in the high-frequency limit	262
<i>Nicolas Pinel, Christophe Bourlier, Joseph Saillard</i>	
Spectrum of rough sea surfaces covered in oil: Consequences on the radar cross section	266
<i>Nicolas Pinel, Christophe Bourlier, Nicolas Dechamps</i>	
Polarimetric Approach to Detection of Probable Aircraft Icing Zones. Icing Detection Algorithms	270
<i>A.A. Pitertsev, F.J. Yanovsky</i>	
A Simple Robust Detection of Weak Target in Noise Radars.....	274
<i>Krzysztof Kulpa, Jacek Misiurewicz, Zbigniew Gajo, Mateusz Malanowski</i>	
Field Polarization Transformation by Bodies with Negative Refractive Index.....	278
<i>Sergey Knayzev, Boris Panchenko, Sergey Shabunin</i>	
Investigating the Influence of the Antennas on UWB System Impulse Response in Indoor Environments.....	282
<i>Jens Timmermann, Malgorzata Porebska, Christian Sturm, Werner Wiesbeck</i>	
GaAs Monocycle Pulse Generator for UWB Applications.....	286
<i>S. Mazer, C. Rumelhard, C. Algani, M. Terré, F. Deshours</i>	
Noise Characterization of Ultra Low Noise Differential Amplifiers for Next Generation Radiotelescopes	290
<i>J. Morawietz, R.H. Witvers, J.G. Bij de Vaate, E.E.M. Woestenburg</i>	
Comparison of UWB Technologies for Human Being Detection with Radar	294
<i>A.G. Yarovoy, X. Zhuge, T.G. Savelyev, L.P. Ligthart</i>	
Chaotic UWB transceiver with tunable chaotic signal generation in CMOS 0.18um technology	298
<i>Sang-Min Han, Oleg Popov, Yun Seong Eo</i>	
Coplanar Line Based Low Loss Microwave Phase Shifters with Electromechanical Control.....	302
<i>Yuriy Prokopenko, Irina Golubeva, Victor Kazmirenko, Yuriy Poplavko</i>	
Compact Front-end Filter Banks for Wideband Multi-role AESA Systems	306
<i>Niklas Billström, Johan Sandwall</i>	
UTSi® CMOS Tunable RF Front-End Filters and LNAs for Wide-Band Phased Array Antennas.....	310
<i>Robert Malmqvist, Jonas Hedman, Carl Samuelsson, Niklas Billström, Andreas Gustafsson</i>	
A Low-Noise Front-End with Beamsteering Capability at 35 GHz	314
<i>Hannes Grubinger, Helmut Barth, Ruediger Vahldieck</i>	
Ultra Wideband Microstrip Antenna for Phased Array Applications.....	318
<i>Abdelnasser A. Eldek</i>	
Resonant-Tunneling Diode on the Basis of Silicon Multilayer Cathode	322
<i>Nina M. Goncharuk</i>	
Influence of hardware parameters on the performance of future indoor THz communication systems under realistic propagation conditions	326
<i>Radoslaw Piesiewicz, Martin Jacob, Joerg Schoebel, Thomas Kürner</i>	
A Dual Radiometer System for Traffic Monitoring.....	330
<i>Mario Leib, Muhammad Fahad Khan, Winfried Mayer, Wolfgang Menzel</i>	

Table of Contents

Towards a Frequency-Selective Microwave Power Limiter for Defense and Aerospace Applications.....	334
<i>Alain Phommahaxay, Gaëlle Lissorgues, Lionel Rousseau, Tarik Bourouina, Pierre Nicole</i>	
Hybrid Distributed Amplifier using MCM-D based on Selectively Anodized Aluminium Substrate.....	338
<i>Bo-In Sohn, Seong-Ho Shin, Young-Se Kwon</i>	
A High Linearity Chireix Outphasing Power Amplifier Using Composite Right/Left-Handed Transmission Lines.....	342
<i>Sang-Ki Eun, Seung Hun Ji, Choon Sik Cho, Jae W. Lee, Jaeheung Kim</i>	
Pattern Scanning in Low Sidelobe Phased Array Antennas Using Pattern Search Algorithms.....	346
<i>Siamak Ebadi, Keyvan Forooraghi</i>	
A 2-D Electronic Beam Steering Phased Array for Point-Multipoint Communication Applications.....	349
<i>Matteo Albani, Tindaro Cadili, Francesco Di Maggio, Renato Gardelli, Antonino Incorvaia, Carmelo Mollura, Ignazio Pomona, Massimo Russo, Elisa Sbarra, Roberto Sorrentino, Roberto Vincenti Gatti</i>	
Multislot transmission line phase shifter combined with the planar irradiator for scanning antenna	353
<i>A.A. Semenov, I.G.Mironenko, A.A. Ivanov, Chong-Yun Kang, P.J. Beljavski, S.F. Karmanenko</i>	
Four-Square Phased Array for Multi-Beam Applications using Novel Matrix Feed	357
<i>Klaus Solbach, Stefanie Angenendt</i>	
Microwave Propagation over the South Ocean.....	361
<i>Vyacheslav N. Shalyapin, Victor K. Ivanov</i>	
Dispersion Analysis of a Planar Negative Group Velocity-Transmission Line	364
<i>Giuseppina Monti, Luciano Tarricone</i>	
A Fully Integrated CMOS RF Transmitter for UHF Mobile RFID Reader Applications	368
<i>Kyudon Choi, Yunseong Eo, Sungjae Jung, Ickjin Kwon, Heung-Bae Lee, Young-jin Kim</i>	
Electromagnetic environment of RFID systems.....	372
<i>Delia Arnaud-Cormos, Thierry Letertre, Antoine Diet, Alain Azoulay</i>	
The use of Intermodulation Distortion for the Design of Passive RFID	376
<i>Hugo Cravo Gomes, Nuno Borges Carvalho</i>	
ASK Modulator for RFID System using A Novel Variable DGS Resonator.....	380
<i>Yoon-Deock Lee, Kwan-Kyu Nae, Eun-Jin Lee, Hyoung-Hwan Roh, Jin-Wook Jung, Young-Kou Han, Jin-Woo Jung, Seok-Cheon Baek, Myeong-Sub Jung, Hong-Goo Cho, Ha-Ryoung Oh, Yeong-Rak Seong, Jun-Seok Park</i>	
Analysis of Phase Noise Requirements on Local Oscillator for RFID System Considering Range Correlation	384
<i>Jae-Hyun Bae, Jong-Cheol Kim, Bu-Won Jeon, Jin-Woo Jung, Jun-Seok Park, Byung-Jun Jang, Ha-Ryoung Oh, Young-Joo Moon, Yeung-Rak Seong</i>	
Jitter Analysis of Electrical Samplers Based on a Propagation Line	388
<i>Benoît Gorisse, Hassan El Aabbaoui, Nathalie Rolland, Paul-Alain Rolland</i>	
UWB Communication Using Fractal Signals	392
<i>V. N. Bolotov, Yu. V. Tkach</i>	
X Band Receiver Noise Temperature Improvement in ESA Deep Space Antennas.....	396
<i>Stéphane Halté</i>	
Attenuation of Multipath Components Using Directional Antennas and Circular Polarization for Indoor Wireless Positioning Systems	400
<i>R. Szumny, K. Kurek, J. Modelski</i>	
Planar Limiters and Receiver Protectors	404
<i>Brian M. Coaker, D. Mark Dowthwaite</i>	
A Narrow Beam Low Sidelobe Level Planar Monopulse Antenna Design Using Pattern Search Algorithm	408
<i>Z. Vahidpoor, Z. Atlasbaf</i>	

Table of Contents

Image Formation Algorithm for Space-Surface BSAR.....	412
<i>Michail Antoniou, Rajesh Saini, Rui Zuo, Mikhail Cherniakov</i>	
Millimetre Wave Radar Visualisation in Mines.....	416
<i>G. Brooker, E. Widzyk-Capehart, S. Scheduling, R. Hennessy, C. Lobsey</i>	
Forward Scatter RCS Estimation for Ground Targets	420
<i>V. I. Sizov, M. Cherniakov, M. Antoniou</i>	
Comparison of bistatic signatures of octahedral and icosahedral reflectors in high-frequency domain	424
<i>Gildas Kubicke, Christophe Bourlier, Joseph Saillard</i>	
Joint Influence of Rain Rate and Turbulence on Radar Signal Spectrum Width	428
<i>Yahya S. H. Khraisat, Felix J. Yanovsky</i>	
Statistical Distribution for Scattering Mechanism of Targets Based on eigenvector Decomposition in Polarimetric Radars	432
<i>B.Zakeri, A.Ghorbani, Michele Galletti</i>	
Performance Evaluations of Frequency Diversity Radar System	435
<i>Valentina Ravenni</i>	
Modification of Resonance Poles of a Conducting Target by a Dielectric Coating.....	439
<i>Janic Chauveau, Nicole de Beaucondrey, Joseph Saillard</i>	
Joint Estimation of Target Doppler Frequency and Azimuth Angle of Scanning System Radar	443
<i>Hui Chen, Benxiong Huang, Liu Bin, Bin Deng</i>	
Adaptive AR Model Based Detection in Nonhomogeneous Environment	447
<i>Hamid Azad, Abbas Sheikhi</i>	
Adaptive Algorithm for Moving Target Detection and Velocity Estimation.....	451
<i>Igor G. Prokopenko, Felix J. Yanovsky, Kostantin I. Prokopenko</i>	
Data Fusion of Secondary and Primary Surveillance Radars for Increased Robustness in Air-Traffic Monitoring.....	455
<i>Maria Andersson, Michael Ilestrand</i>	
Accurate distance measurement with a wideband high resolution pseudo noise coded radar	459
<i>C. Meier, A. Terzis, S. Lindenmeier</i>	
Development of TanDEM-X DEM Calibration Concept	463
<i>J. Hueso González, M. Bachmann, H. Fiedler, S. Huber, G. Krieger, B. Wessel, M. Zink</i>	
Use of the Ground Penetrating Radar Methods for Paleontology on Example of the Mammoth Fauna Investigation	467
<i>S.P. Lukjanov, R.A. Stepanov, I.A. Chernyi, O.V. Stukach</i>	