

2006 European Radar Conference

**Manchester, United Kingdom
13-15 September 2006**

**IEEE Catalog Number:
ISBN:**

**06EX1408
2-9600551-7-9**

**Copyright © 2006 by The European Microwave Association
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republications permission, write to IEEE Copyrights Manager, IEEE Operations Center, 445 Hoes Lane, Piscataway, New Jersey USA 08854. All rights reserved.

IEEE Catalog Number: 06EX1408

ISBN: 2-9600551-7-9

Additional Copies of This Publication Are Available from:

IEEE Service Center
445 Hoes Lane
Piscataway, NJ 08854
IEEE Service Center
445 Hoes Lane
Piscataway, NJ 08854

Phone: (800) 678-IEEE
(732) 981-1393

Fax: (732) 981-9667

E-mail: customer-service@ieee.org

Table of Contents

RANSAC-Based Flight Parameter Estimation for Registration-Based Range-Dependence Compensation in Airborne Bistatic STAP Radar with Conformal Antenna Arrays	1
<i>Philippe Ries, Fabian D. Lapierre, Jacques G. Verly</i>	
Characterisation of a Multistatic Radar System	5
<i>Shaun Doughty, Karl Woodbridge, Chris J. Baker</i>	
Non-Linear Frequency Scaling Algorithm for FMCW SAR Data	9
<i>Adriano Meta, Peter Hoogeboom, L.P. Ligthart</i>	
Eigenstructure-Based Estimation of Directions of Arrival of Signals with Rectangular Sparse Array	13
<i>Volodymyr I. Vasylyshyn</i>	
The Intelligent Identification of Air and Sea Targets in Coastal Radars	17
<i>Mehdi Malboubi, Javad Akhlaghi, M.-R. Akhavan Saraf, H. Mir Mohammad Sadeghi</i>	
High Precision Self-Adaptive Radar Gauging Under Clutter Environments	21
<i>B. Sai</i>	
Rain Clutter Filtering from Radar Data with Slope Based Filter	25
<i>Ilkka Ellonen, Arto Kaarna</i>	
Spatio-Temporal Processing with Ground-Based Rotating Radar Systems	29
<i>M. Oudin, J.-P. Delmas, C. Germond, C. Adnet, F. Barbaresco</i>	
Fast and Accurate Method for PCL Radar Detection in Noisy Environment	33
<i>Mohammad Reza Mousavi, Amir Jafargholi, Mohammad Mahdi Nayebi</i>	
Combining MIMO Radar with OFDM Communications	37
<i>B.J. Donnet, I.D. Longstaff</i>	
Feature Based Plot Classification Using a Bayes Algorithm	41
<i>Piet van Genderen</i>	
Segmentation of GPR Images	45
<i>N.V. Verdenskaya, V.V. Sazonov, I.A. Ivanova, Alexander G. Yarovoy, L.P. Ligthart</i>	
Chaotic Signals in Radar?	49
<i>S.A. Harman, A.J. Fenwick, C. Williams</i>	
A Multiple-Beam Sector Antenna with a Dual Planar Reflectarray Arrangement	53
<i>Michael Thiel, Wolfgang Menzel</i>	
Design, Analysis and Measurements of Reflected Phased Array Microstrip Antennas at Ka-Band, Using Hollow Phasing	57
<i>C. Trampuz, M. Hajian, L.P. Ligthart</i>	

A Fully Integrated Scanning Receiver Array	61
<i>Wolfgang Menzel, Ziqiang Tong</i>	
Bidirectional Field Compensated Active Antenna	65
<i>Robert Wanner, Mohamed I. Sobhy, Peter Russer</i>	
Miniature Antenna as Optimal Load for High Efficiency Integrated Active UHF Microsystems	68
<i>R. Serrano, I. Cairo, S. Capdevila, S. Blanch, A. Aguiasca, J. Romeu, L. Jofre</i>	
Design Considerations in Sparse Array Antennas	72
<i>Cristian I. Coman, Ioan E. Lager, L.P. Ligthart</i>	
Sparse Antenna Array Configurations in Large Aperture Synthesis Radio Telescopes	76
<i>W.A. van Cappellen, S.J. Wijnholds, J.D. Bregman</i>	
3D Field Simulation of Sparse Arrays Using Various Solver Techniques within CST MICROWAVE STUDIO	80
<i>Frank Demming-Janssen, Wigand Koch</i>	
Pattern Synthesis of Linear, Sparse Array Antennas	84
<i>Joachim H. Dickhof, Cristian I. Coman, Ioan E. Lager, Massimiliano Simeoni</i>	
Advances in Phased Array Technology	88
<i>L. Baggen, S. Holzwarth, M. Boettcher, M. Eube</i>	
Ground-Based SAR for Short and Long Term Monitoring of Unstable Slopes	92
<i>Massimiliano Pieraccini, Guido Luzi, Daniele Mecatti, Linhsia Noferini, Carlo Atzeni</i>	
Monostatic Radar Signatures of Significant Classes of Ground Targets, in the Time and Frequency-Domain	96
<i>Stavros Papadopoulos, Amit Kumar Mishra, Bernard Mulgrew</i>	
Performance Study of Quantized Linear Frequency Modulated Signals and its Application to CW Radars	100
<i>Fernando Martin Porqueras, Albert Aguiasca Sole, Antoni Broquetas Ibars</i>	
Comparison of UWB Target Identification Algorithms for Through-Wall Imaging Applications	104
<i>Sebastian Hantscher, Bernhard Praher, Alexander Reisenzahn, Christian G. Diskus</i>	
Doppler Tolerance of OFDM-Coded Radar Signals	108
<i>G.E.A. Franken, Homayoun Nikookar, Piet van Genderen</i>	
MIMO Radar, Techniques and Opportunities	112
<i>B.J. Donnet, I.D. Longstaff</i>	
New Approaches to Multilateration Processing: Analysis and Field Evaluation	116
<i>G. Galati, M. Gasbarra, P. Magaro, P. De Marco, L. Mene, M. Pici</i>	

Multilateration Applied to Airport Vehicles Management Systems: The Agile Transponder	120
<i>G. Galati, P. Magaro, E.G. Piracci, L. Ciccotti</i>	
A Low-Cost Shaped-Beam Hybrid-Feed Microstrip Planar Array Antenna for X-Band Polarimetric Radar Systems	124
<i>Andrea Vallecchi, Guido Biffi Gentili</i>	
Advanced Airborne SAR Imaging	128
<i>Andreas R. Brenner</i>	
High Electromagnetic Field Measurement by Using a Reflection on a Target	131
<i>S. Vauchamp, J.-C. Diot, M. Lalande, J. Andrieu, B. Beillard, B. Jecko, J.-L. Lasserre</i>	
An Interferometric CW-SF Radar for Remote Testing and Monitoring Large Structures	135
<i>Matteo Fratini, Massimiliano Pieraccini, Filippo Parrini, Giulia Bernardini, Carlo Atzeni</i>	
Low-Power Radar for Wireless Sensor Networks	139
<i>Maarten Ditzel, Frans H. Elferink</i>	
Amplitude-Phase Method Allowing the Determination of the Complex Dielectric Permittivity of Underlying Surfaces Using Polarimetric Radar Remote Sensing	142
<i>D.V. Kolyadov, L.P. Lighthart, A.I. Kozlov</i>	
A Fast Scanning W-Band System for Advanced Millimetre-Wave Short Range Imaging Applications	146
<i>Hue Phat Tran, Frank Gumbmann, Jochen Weinzierl, Lorenz-Peter Schmidt</i>	
Technologies for Sub-ns Pulse Coherent mm-Wave Radar	150
<i>Duncan A. Robertson, David R. Bolton, Paul A.S. Cruickshank, Robert I. Hunter, Graham M. Smith</i>	
A 94GHz Real Aperture 3D Imaging Radar	154
<i>David G. Macfarlane, Duncan A. Robertson</i>	
Template Based Micro-Doppler Signature Classification	158
<i>Graeme E. Smith, Karl Woodbridge, Chris J. Baker</i>	
Airborne Weather Radar as Instrument for Remote Sensing of the Atmosphere	162
<i>F.J. Yanovsky</i>	
Computational Model of Radar Signal Spectrum Reflected from Rain	166
<i>Yahya S.H. Khraisat</i>	
Meteorological Object Characteristic Calculation Using Doppler Spectrum Analysis with Neural Network	170
<i>Vitaliy Marchuk, Yaroslav Ostrovsky, F.J. Yanovsky</i>	
IDRA: IRCTR Drizzle Radar	174
<i>J. Figueras i Ventura, H.W.J. Russchenberg</i>	

Projection Approach for Estimating Radar Signal Multivariate Probability Density	178
<i>R.B. Sinitsyn</i>	
ULTRA: Wideband Ground Penetrating Radar	182
<i>Filippo Parrini, Matteo Fratini, Massimiliano Pieraccini, Carlo Atzeni, Gaetano De Pasquale, Piernicola Ruggiero, Francesco Soldovieri, Adriana Brancaccio</i>	
UWB Array-Based Radar for Landmine Detection.....	186
<i>Alexander G. Yarovoy, Pascal Aubry, Pidio Lys, L.P. Ligthart</i>	
Signal Processing in Multisite UWB Radar Devices for Searching Survivors in Rubble.....	190
<i>Victor Chernyak</i>	
A Lightweight, Ultra Wideband Polarimetric W-Band Radar with High Resolution for Environmental Applications.....	194
<i>Richard Holliday, Matt Rhys-Roberts, Duncan A. Wynn</i>	
Enhanced Tunable Ultra-Wideband Pulse Generation Based on Variable Edge-Rate Compression	198
<i>E. Maxwell, T. Weller, J. Harrow</i>	
2-Dimensional Measuring Method Using a Wide-Area Surveillance Sensor with Leaky Coaxial Cables	202
<i>Kenji Inomata, Takashi Hirai, Hiroyoshi Yamada, Yoshio Yamaguchi</i>	
Antenna Systems for the Meteorological Radar Design	206
<i>Sergey Knyazev, Sergey Shabunin</i>	
Distributed Pre-Processed CA-CFAR Detection Structure for Non Gaussian Clutter Reduction	209
<i>Z. Messali, F. Soltani, M. Sahmoudi</i>	
Stealth Consideration for Passive Millimetre-Wave Detection and Guidance	213
<i>Xiang Shi, Guowei Lou, Xingguo Li</i>	
Radar Remote Sensing Images Segmentation Using Fractal Dimension Field.....	217
<i>V.K. Ivanov, R.E. Paschenko, O.M. Stadnyk, S.Ye. Yatsevich</i>	
Frequency Diversity Radar System: Design, Analysis and Performances	221
<i>Valentina Ravenni, Giorgio Pizziol</i>	
Limited Multi-Static Calibration Technique Without a Phantom for the Detection of Breast Cancer	225
<i>B. Cheeseman, Y. Huang</i>	
Imaging Simulation of Spacecraft by Ground Based High-Resolution ISAR.....	229
<i>Yunhua Zhang, Bitao Jiang, Xiangkun Zhang, Jingshan Jiang</i>	
A Lighter Transponder for Harmonic Radar.....	233
<i>Francois Meloche, Philippe M. Albert</i>	

Detection of the Markov Signals in a Mixture with the Markov Correlated Clutters Using Autoregressive Models	237
<i>I.G. Prokopenko</i>	
Numerical Simulations of Environmental Distortions by Scattering of Objects for the Radar --- SSR and Flat Roofs, RCS and Windturbines	241
<i>Gerhard Greving</i>	
Fast Signal Processing Algorithms for Noise Radars.....	245
<i>R.B. Sinitsyn, A.J. Beletsky</i>	
5.8 GHz Vital Signal Sensing Doppler Radar Using Isolation-Improved Branch-Line Coupler	249
<i>Sang-Gyu Kim, Hyun Kim, Yongshik Lee, Il-Suek Kho, Jong-Gwan Yook</i>	
High-Power Multi-Function Radar Receiver Protection	253
<i>B.M. Coaker, D.M. Dowthwaite, N.E. Priestley</i>	
Normalization of Feature Distributions for Linear-Quadratic Fusion in Landmine Detection Using GPR.....	257
<i>V. Kovalenko, Alexander G. Yarovoy, L.P. Ligthart</i>	
Analysis of a 10kW-2.45GHz Ferrite Phase Shifter.....	261
<i>A.M.T. Abuelma'atti, A.A.P. Gibson, B.M. Dillon</i>	
The Development of a Motion-Compensated, Vehicle Mounted, Ultra-Wideband Radar for Buried Landmine Detection	265
<i>Andrew J. Hill, Graeme Crisp, Justin Ratcliffe</i>	
Semiconductor Technology Trends for Phased Array Antenna Power Amplifiers	269
<i>Terry Edwards</i>	
Comparison of the 2D and 3D Netted Radar Ambiguity Function	273
<i>Yu Teng, Karl Woodbridge, Chris J. Baker</i>	
SAR Raw Data Simulation in the Frequency Domain.....	277
<i>A.S. Khwaja, L. Ferro-Famil, E. Pottier</i>	
Patch Array Antenna for UWB Radar Applications	281
<i>Paolo Gaboardi, L. Rosa, Annamaria Cucinotta, Stefano Selleri</i>	
Short Range Detector of Static or Mobile Targets in the ISM Band 2.45 GHz.....	285
<i>I. Masri, Bernard Huyart, J.-C. Cousin, T. Boudet, A. Guillot</i>	
Retrieving 3D Relief by Using a Single-Antenna, Squint-Mode Airborne SAR	288
<i>O.O. Bezvesilniy, Y.V. Dukhopelnykova, V.V. Vynogradov, D.M. Vavriv</i>	
Range Finding by Using NRD Guide Pulse Radar Front-End at 60 GHz	292
<i>Futoshi Kuroki, Koichi Yamaoka, Yu-suke Murata, Sho-hei Ishikawa, Ken-ichi Masaki, Tsukasa Yoneyama</i>	
Signal and Interference Analysis: Proposed Analogue Signal Suppression Techniques for PCL Radar.....	296
<i>D.W. O'Hagan, Chris J. Baker, H.D. Griffiths</i>	

Radar as a Tool for Antiterrorism	299
<i>Anna A. Zamyatina, Alexander J. Zamyatin, Vladimir J. Zamyatin, Viktor K. Zavrjukha, Irina A. Baygutlina</i>	
Innovative Dual Band Reconfigurable Beam Forming Network for Conformal Arrays	303
<i>R. Vincenti Gatti, A. Ocera, L. Marcaccioli, Roberto Sorrentino</i>	
Phase Mode Excitation in Beamforming Arrays	307
<i>J.G. Davis, A.A.P. Gibson</i>	
Cost-Effective Array Antennas for Narrow-Beam, Wide-Angle Scanning Applications	311
<i>Massimiliano Simeoni, Cristian I. Coman, Ioan E. Lager</i>	
Multifunction Antennas --- The Interleaved Sparse Sub-Arrays Approach	315
<i>Cristian I. Coman, Ioan E. Lager, L.P. Ligthart</i>	
RF MEMS and GaAs Based Reconfigurable RF Front-End Components for Wide-Band Multi-Functional Phased Arrays	319
<i>R. Malmqvist, A. Gustafsson, T. Nilsson, C. Samuelsson, B. Carlegrim, I. Ferrer, Tauno Vaha-Heikkila, A. Ouacha, R. Erickson</i>	
Pulse-to-Pulse Stability Characteristics of Robust Design Centered High Performances/Low Cost T/R Module	323
<i>M. Cicolani, A. Gentile, S. Maccaroni, L. Marescialli</i>	
A Detailed Study and Implementation of an RPC for LFM-CW Radar	327
<i>M. Angeles Gonzalez, Jesus Grajal, Alberto Asensio, Diego Madueno, Laureano Requejo</i>	
The Influence of Transmitter Phase Noise on FMCW Radar Performance	331
<i>Patrick D.L. Beasley</i>	
A 77-GHz Radar Transmitter with Parallelised Noise Shaping DDS	335
<i>Christoph Wagner, Andreas Stelzer, Herbert Jager</i>	
A Compact, Ka-Band Magnetron Based T/R Module	339
<i>V.A. Volkov, D.M. Vavriv, R.V. Kozhin, D.I. Zaikin, Yong-Hoon Kim, Hoon Lee</i>	
Sub-10 ps Pulse Generator with Biphasic Modulation Function in 0.13-(μ)m InP HEMT	342
<i>Yoichi Kawano, Yasuhiro Nakasha, Toshihide Suzuki, Toshihiro Ohki, Tsuyoshi Takahashi, Kozo Makiyama, Tatsuya Hirose, Kazukiyo Joshin</i>	
Microwave (De)Multiplexer for Ultra-Wideband (UWB) Non-Coherent High Data Rates Transceiver	346
<i>Stephane Mallegol, Jean-Philippe Coupeuz, Christian Person, Thomas Lespagnol, Stephane Paquelet, Alexis Bisiaux</i>	
A CMOS Receiver Front-End for 3.1-10.6 GHz Ultra-Wideband Radio	350
<i>Bo Shi, Michael Yan Wah Chia</i>	

Ultra-Fast Pulse Transmitter for UWB Microwave Radar 354
Amnoiy Ruengwaree, Abhijit Ghose, Jurgen Weide, Gunter Kompa

Low-Rate Chaotic UWB Transceiver System Based on IEEE 802.15.4a 358
Sang-Min Han, Mi-Hyun Son, Yong-Hwan Kim, Seong-Soo Lee