

# **2018 22nd International Microwave and Radar Conference (MIKON 2018)**

**Poznan, Poland  
14-17 May 2018**



IEEE Catalog Number: CFP18784-POD  
ISBN: 978-1-5386-3723-4

**Copyright © 2018, Warsaw University of Technology  
All Rights Reserved**

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP18784-POD
ISBN (Print-On-Demand):	978-1-5386-3723-4
ISBN (Online):	978-83-949421-1-3

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## TABLE OF CONTENTS

<b>On Low-Fidelity Models for Variable-Fidelity Simulation-Driven Design Optimization of Compact Wideband Antennas .....</b>	1
<i>S. Koziel, S. Unnsteinsson, A. Bekasiewicz</i>	
<b>Modeling and Analysis of the Impact of Reference Planes of Quasi Half Loop Bond Wire Antennas .....</b>	5
<i>I. Ndip, T. Le, K.-D. Lang</i>	
<b>Implementation of the Theory of Characteristic Modes into Antenna Modeling Tools AToM and Visual Antenna.....</b>	7
<i>M. Masek, J. Rymus, P. Hazdra, M. Capek</i>	
<b>Topological Modifications for Performance Improvement and Size Reduction of Wideband Antenna Structures .....</b>	11
<i>A. Bekasiewicz, S. Koziel</i>	
<b>A Novel Microstrip Dual-Layer Rat-Race Coupler with Compact Size and Enhanced Bandwidth.....</b>	15
<i>A. Bekasiewicz, S. Koziel</i>	
<b>Coupled-Line Sensor Setup with Liquids and Solids Permittivity Sensing Capability Developed with the Use of 3D Printing Technology .....</b>	19
<i>I. Piekarz, J. Sorocki, K. Wincza, S. Gruszczynski</i>	
<b>3D Printed Circular and Rectangular Waveguide Mode Converters .....</b>	24
<i>J. Strycharz, P. Piasecki</i>	
<b>Design of Immittance Inverters and Phase Inverters with Non-Foster Elements .....</b>	29
<i>B. Buyantuev, D. Kholidnyak</i>	
<b>Design and Implementation of a RF Energy Harvesting Module with DC Power Control.....</b>	33
<i>H. Partal, S. Partal, M. Belen</i>	
<b>Traveling-Wave Microstrip Array Antenna Using Substrate Integrated Waveguide.....</b>	37
<i>M. Belen</i>	
<b>Design of Multiband Sierpinski Fractal Carpet Antenna Array for C-Band .....</b>	41
<i>T. Cao, W. Krzysztofik</i>	
<b>A Novel Yin-Yang Fractal Antenna for Multiband Applications in Communication .....</b>	45
<i>E. Serria, M. Hussein</i>	
<b>X Band Patch Array Antenna Design for Marine Radar Application .....</b>	50
<i>M. Pehlivan, Y. Asci, K. Yegin, C. Ozdemir</i>	
<b>The Investigation of Mutual Coupling Effects on a Large Array Antenna Radiation Pattern .....</b>	52
<i>A. Raniszewski, P. Piasecki</i>	
<b>TDOA Estimation Using a Pair of Synchronized DW1000 Based Anchor Nodes .....</b>	57
<i>V. Djaja-Josko, J. Kolakowski, J. Modelska</i>	
<b>APPR DoA Estimation Algorithm for Smart Antenna.....</b>	61
<i>H. Paaso, M. Somersalo, M. Hoppuri, J. Korpi, M. Hiivala, A. Mammela</i>	
<b>A Novel Calibration Method for RSS-Based DoA Estimation Using ESPAR Antennas .....</b>	65
<i>M. Plotka, M. Tarkowski, K. Nyka, L. Kulas</i>	
<b>Influence of ESPAR Antenna Radiation Patterns Shape on PPCC-Based DoA Estimation Accuracy .....</b>	69
<i>M. Rzymowski, L. Kulas</i>	
<b>GaN Pushing the Limits of High-Speed Switching .....</b>	73
<i>W. Heinrich, N. Wolff, O. Bengtsson, T. Hoffmann, F. Huhn, A. Liero, A. Wentzel</i>	
<b>A Review of the Six-Port Technique for Metrology Applications.....</b>	77
<i>K. Haddadi, C. Loyez, S. Lallemand</i>	
<b>A Review on Six-Port Radar and Its Calibration Techniques .....</b>	80
<i>S. Linz, F. Lurz, R. Weigel, A. Koelpin</i>	
<b>Monolithically Integrated Dual Polarization Six-Port Receiver for Fiber Optics Coherent Communications .....</b>	84
<i>I. Molina-Fernandez, P. Reyes-Iglesias, A. Ortega-Monux, R. Halir, C. Alonso-Ramos</i>	
<b>Compact PCB Delay Line for Six-Port Based Instantaneous Frequency Measurement .....</b>	87
<i>F. Lurz, B. Scheiner, S. Linz, R. Weigel, A. Koelpin</i>	
<b>Application of 3 x 3 Butler Matrix in Wideband Measurements of Scattering Parameters.....</b>	91
<i>K. Staszek, K. Wincza, S. Gruszczynski</i>	
<b>A Single Module Compact Efficient Harmonic Tuned 160W Power Amplifier for GPS Application.....</b>	97
<i>A. Ali, E. Cipriani, P. Colantonio</i>	
<b>Pulsed Measurements of Transmittance Deviations of Power Amplifiers for T/R Modules .....</b>	100
<i>D. Kuchta, D. Gryglewski, W. Wojtasik</i>	

<b>A Hybrid Two Stage 20-W GaN HEMT Ku-Band Power Amplifier for Very Small Aperture Terminals.....</b>	104
<i>F. Rautschke, D. Maassen, S. Vehring, G. Boeck</i>	
<b>Highly Efficient Harmonic-Tuned GaN HEMT Power Amplifier for a 2.45 GHz ISM Band .....</b>	108
<i>M. Goralczyk</i>	
<b>Radar micro-Doppler of Wind Turbines: Low-Frequency Polarimetric Extension of Simplified Analytical Model.....</b>	112
<i>K. Wangkheimayum, O. Krasnov, A. Yarovoy</i>	
<b>VOR Times Series for an Aircraft Trajectory in the Presence of Wind Turbines .....</b>	116
<i>S. Ben-Hassine, A. Chabory, C. Morlaas, R. Douvenot</i>	
<b>Radar Demonstrator for Bird Monitoring in Wind Farms.....</b>	119
<i>C. Wassierz, T. Badawy, J. Klimek, M. Caris, H. Kuschel, T. Bertuch, C. Locker, F. Kloppel, J. Wilcke, A. Saalmann</i>	
<b>Reducing the Effect of Offshore Wind Farms on the REWS CFAR Detection Threshold.....</b>	123
<i>L. Danoon, A. Brown</i>	
<b>Classification of Ground Moving Radar Targets Using Convolutional Neural Network .....</b>	127
<i>E. Al Hadhrami, M. Al Mufiti, B. Taha, N. Werghi</i>	
<b>Probability of Detection for Swerling Model Fluctuating Targets with a Square-Law Detector and Different Signal to Noise Ratios.....</b>	131
<i>R. Kassab, T. Boutin, C. Adnet</i>	
<b>Helicopter Identification Using Blade Flash Sequence Matching.....</b>	133
<i>K. Stawiarski, M. Meller</i>	
<b>A New Memory Based Ordered Statistic-CFAR Processing for Coherent Detection .....</b>	135
<i>V. Corretja, S. Kemkemian, J. Petitjean</i>	
<b>Recognition of Signals with Time-Varying Spectrum Using Time-Frequency Transformation with Non-Uniform Sampling .....</b>	140
<i>E. Swiercz</i>	
<b>An Iterative Technique to Retrieve the Planar Wide-Mesh Scanning Near-Field Data from Those Affected by an Inaccurate Positioning .....</b>	145
<i>F. D'Agostino, F. Ferrara, C. Gennarelli, R. Guerriero, M. Migliozzi</i>	
<b>Dual Band GNSS Antenna for Missile Applications.....</b>	149
<i>O. Yigit, Y. Asci, K. Yegin</i>	
<b>3D Co-Site Interference Modeling Between Aircraft Antennas for the Purpose of Their Best Placement .....</b>	151
<i>A. Vishnevsky, V. Ivanov</i>	
<b>Investigation of Electrical Properties of Fully Wearable Antenna for ISM Applications .....</b>	155
<i>M. Ahmed, M. Ahmed, A. Shaalan</i>	
<b>Broadband Quasi-optical sub-THz Detector Based on GaAs HEMT .....</b>	159
<i>P. Kopyt, B. Salski, J. Cuper, P. Zagrajek, J. Bar, D. Obrebski</i>	
<b>A Novel Dual-Band Rectifier Circuit with Enhanced Bandwidth for RF Energy Harvesting Applications.....</b>	161
<i>T. Karataev, A. Bekasiewicz, S. Koziel</i>	
<b>Simulation Optimization of H-Plane Waveguide Filters - A New Approach.....</b>	165
<i>P. Miazga</i>	
<b>An Analysis of Cylindrical Posts of Arbitrary Convex Cross Sections Located in Waveguide Junctions with the Use of Field Matching Method.....</b>	169
<i>M. Jasinski, S. Dziedziewicz, P. Kruczynski, R. Lech, P. Kowalczyk</i>	
<b>Multipoint Excitation in the FDTD Eigenmode Port Template Generation.....</b>	173
<i>M. Sypniewski</i>	
<b>EM-Driven Topology Evolution for Bandwidth Enhancement of Hybrid Quadrature Patch Couplers.....</b>	175
<i>A. Bekasiewicz, S. Koziel</i>	
<b>Face Re-Identification in Thermal Infrared Spectrum Based on ThermalFaceNet Neural Network .....</b>	179
<i>A. Grudzien, M. Kowalski, N. Palka</i>	
<b>Infrared-radio Wireless Communication System .....</b>	181
<i>J. Mikolajczyk, B. Rutecka, D. Szabra, J. Wojtas, Z. Zawadzki, Z. Bielecki</i>	
<b>Optics for Free Space THz Transmission .....</b>	184
<i>M. Walczakowski, P. Zagrajek, M. Piszczelek, N. Palka, M. Sypek, J. Suszek</i>	
<b>Carrier Trapping in the Terahertz Bow-Tie Diode Based on AlGaN/GaN-heterostructures .....</b>	186
<i>S. Pralgauskaite, K. Ikamas, J. Matukas, A. Lisauskas, V. Jakstas, V. Janonis, I. Kasalynas, P. Prystawko, M. Leszczynski</i>	
<b>Impact of Beacon Interval on the Performance of WiFi-based Passive Radar Against Human Targets .....</b>	190
<i>I. Milani, F. Colone, C. Bongioanni, P. Lombardo</i>	

<b>Separation of GPS Signals in FSR System.....</b>	194
<i>H. Kabakchiev, V. Behar, I. Garvanov, D. Kabakchieva, K. Kabakchiev, H. Rohling, K. Kulpa, A. Yarovoy</i>	
<b>Advantages of Non-Uniform Linear Arrays Based on COTS Elements in Passive Radar Applications.....</b>	199
<i>J. Rosado-Sanz, N. Rey-Maestre, D. Mata-Moya, M. Jarabo-Amores, M. Rosa-Zurera, J. Barcena-Humanes</i>	
<b>DVB-T2 Passive Radar Developed at Saint Petersburg Electrotechnical University .....</b>	204
<i>E. Vorobev, A. Barkhatov, V. Veremyev, V. Kutuzov</i>	
<b>Antenna Array for the Passive Radar Monitoring System .....</b>	208
<i>P. Terentyeva, G. Golovkov, S. Borovikov</i>	
<b>Experience in Developing, Manufacturing and Measurements of LTCC Leaky-Wave Antennas Operated in Millimeter Waves Range.....</b>	212
<i>P. Piasecki</i>	
<b>Double-wired Bond Wire Antennas .....</b>	216
<i>I. Ndip, M. Huhn, T. Le, K.-D. Lang</i>	
<b>Design of LTCC Patch Antenna for Increased Bandwidth and Reduced Susceptibility to Fabrication Process Inaccuracies.....</b>	218
<i>J. Sobolewski, P. Bajurko</i>	
<b>A Comparative Analysis of 5G mmWave Antenna Arrays on Different Substrate Technologies .....</b>	222
<i>I. Ndip, T. Le, O. Schwanitz, K.-D. Lang</i>	
<b>Design of Broadband High-Efficiency GaN Power Amplifiers .....</b>	226
<i>P. Chen, T. Brazil</i>	
<b>Multifunction MMICs for High Datarate Wireless and Optical Communication Based on State-Of-The-Art InP DHBT and SiGe BiCMOS Processes' .....</b>	230
<i>H. Zirath, S. Carpenter, Z. He, V. Vassilev, M. Bao</i>	
<b>InAlGaN/GaN HEMT Technology for Ka Band Applications .....</b>	234
<i>S. Delage, S. Piotrowicz, O. Patard, J.-C. Jacquet, P. Gamarra, C. Dua, P. Altuntas, N. Michel, E. Charier, C. Potier, M. Oualli, C. Lacam, C. Chang, H. Blanck, P. Fellon, D. Floriot</i>	
<b>mm-Wave Operation of AlN/GaN-Devices and MMICs at V- &amp; W-band .....</b>	238
<i>D. Schwantuschke, B.-J. Godejohann, P. Bruckner, A. Tessmann, R. Quay</i>	
<b>Investigation of Continuous Wave Jamming in an IEEE 802.15.4 Network .....</b>	242
<i>J. Rewienski, M. Groth, L. Kulas, K. Nyka</i>	
<b>Detection of Direct Path Component Absence in NLOS UWB Channel.....</b>	247
<i>M. Kolakowski, J. Modelska</i>	
<b>Reflected Signal Variations Simulation and Estimation When Multi Polarization Measurements .....</b>	251
<i>Y. Averyanova, I. Braun, A. Rudiakova, F. Yanovsky</i>	
<b>Self-Jamming and Interference Cancellation Techniques for Continuous Wave Bi-static Radar Systems .....</b>	255
<i>M. Pehlivan, K. Yegin</i>	
<b>The Concept Review of the EMF RATEL Monitoring System.....</b>	258
<i>N. Djuric, N. Kavecan, M. Mitic, N. Radosavljevic, A. Boric</i>	
<b>Capability Demonstration of Ocean Target Detection by Tiangong-2 Interferometric Imaging Radar Altimeter.....</b>	261
<i>Y. Zhang, X. Dong, X. Shi, W. Zhai, Q. Yang, D. Li, X. Kang, J. Jiang</i>	
<b>Generalized SL0 Algorithm for 3D Circular SAR Imaging .....</b>	265
<i>J. Drozdowicz, M. Wielgo, M. Baczyk</i>	
<b>Interferometric Radar Compressive Sensing Imaging with Direct Downsampling .....</b>	267
<i>Y. Zhang, X. Dong, W. Zhai, X. Shi, Q. Yang, D. Li, X. Kang</i>	
<b>Bias Dependence of the Access Resistance in GaN HEMTs .....</b>	271
<i>C. Nasser, D. Ritter, M. Rudolph</i>	
<b>Miniature High Directivity Couplers .....</b>	274
<i>A. Golaszewski, A. Abramowicz</i>	
<b>Analysis of Continuous-to-Discrete Transformation Effect on a Synthesis Filter Bank Project .....</b>	276
<i>B. Szlachetko, Z. Swietach</i>	
<b>Prototype Variable Resistors and Capacitors for RF and Microwave Phase Lock Loops .....</b>	280
<i>S. Hanasz, B. Gasowski, K. Czuba, H. Schlarb</i>	
<b>Quadrature Hybrid Coupler with Two Broadside Coupled Microstrip-Slot Lines .....</b>	282
<i>B. Stee, M. Czyziewski</i>	
<b>Comparison of Angular Spread for 6 and 60 GHz Based on 3GPP Standard.....</b>	286
<i>J. Kelner, C. Ziolkowski, B. Uljasz</i>	
<b>Broadband Low-Loss Impedance Transforming Rat-Race Coupler in Suspended Microstrip Technique .....</b>	291
<i>R. Smolarz, K. Wincza, S. Gruszczynski</i>	

<b>A Broadband Test Setup for Differential Mode Measurement of Infrared Photodiodes in TO-8 Package</b>	294
<i>M. Abramowicz, W. Wiatr</i>	
<b>Compact 2-Way H-Plane Power Dividers for a Rectangular Waveguide in Ku Band</b>	298
<i>O. Wossugieniri, H. Faezi, M. Fallah</i>	
<b>Accurate Analysis of Whispering Gallery Modes in Dielectric Resonators with BoR FDTD Method</b>	302
<i>M. Celuch, W. Gwarek</i>	
<b>Double-ridged Horn Antenna Operating in 18-40 GHz Range</b>	304
<i>J. Cuper, A. Pacewicz, B. Salski, A. Raniszewski, P. Kopyt</i>	
<b>Parametric SAR Study for 4G Cellular Phone Applications</b>	308
<i>S. Okuyucu, K. Yegin, B. Ozbakis, M. Secmen</i>	
<b>Advanced Polarimetric Radar Waveforms for Enhancing Detection Probability of Small Airborne Targets and Tiny Objects on Sea Waters</b>	312
<i>P. Kabacik, D. Sysak</i>	
<b>Anti-Tank Projectile Detection by Means of CW Microwave Sensors and Portable Pulsed Radar</b>	315
<i>A. Rutkowski, C. Recko, A. Kawalec</i>	
<b>Upgrading the Italian BIRALES System to a Pulse Compression Radar for Space Debris Range Measurements</b>	317
<i>T. Pisani, L. Schirru, E. Urru, F. Gaudiomonte, P. Ortu, G. Muntoni, G. Montisci, G. Bianchi, C. Bortolotti, M. Roma, F. Protopapa, A. Podda, A. Sulis</i>	
<b>Limits of Integration Using Polar Format Algorithm in Coherent Multistatic ISAR Processing</b>	321
<i>M. Baczyk, K. Kulpa</i>	
<b>Jamming Efficiency of Land-Based Radars by the Airborne Jammers</b>	324
<i>J. Matuszewski</i>	
<b>A Skewed-Beam Compensation Algorithm for a Full Digital Phased Array Antenna</b>	328
<i>S. Hong, J. Shin, C. Kim, H. Ko, K. Yoon, J. Kim, J. Kim, S. Park, M. Chung</i>	
<b>Advances in Compact Integrated Multichannel Millimeter Wave Radar Systems Using SiGe BiCMOS Technology</b>	330
<i>S. Kueppers, R. Herschel, N. Pohl</i>	
<b>A Comparison of Two Frequency Synthesizer Architectures in SiGe BiCMOS for FMCW Radar</b>	334
<i>A. Ergintav, F. Herzl, A. Mushtaq, W. Debski, H. Ng, D. Kissinger</i>	
<b>Pseudo-Random Noise Radar for Short-Range Applications in SiGe Technologies</b>	338
<i>H. Ng, M. Kucharski, D. Kissinger</i>	
<b>Scalable 79- And 158-GHz Integrated Radar Transceivers in SiGe BiCMOS Technology</b>	342
<i>M. Kucharski, D. Kissinger, H. Ng</i>	
<b>A Compact Ultra-Wideband mmWave Radar Sensor at 80 GHz Based on a SiGe Transceiver Chip</b>	345
<i>N. Pohl, T. Jaeschke, S. Kupperts, C. Bredendiek, D. Nußler</i>	
<b>Three-Objective Antenna Optimization by Means of Kriging Surrogates and Domain Segmentation</b>	348
<i>S. Koziel, A. Bekasiewicz</i>	
<b>Microstrip Antennas Based on Fractal Geometries for UWB Application</b>	352
<i>R. Kubacki, M. Czyzowski, D. Laskowski</i>	
<b>Extending Axial Ratio Bandwidth of Antenna Array by Parasitic Patches</b>	357
<i>J. Spurek, Z. Raida</i>	
<b>The Use of Shunt-Stubs in Corporate-Feeding Network for S-band Planar Antenna Array</b>	360
<i>A. Slowik, M. Czyzowski, B. Slesicki</i>	
<b>Investigation on Adaptive Satellite Communication System Performance Using SDR Technique</b>	363
<i>S. Kozlowski, K. Kurek, J. Skarzynski, K. Szczygielska, M. Darmetko</i>	
<b>The Concept of Mechanical and Radechon-Based Gammavision Cameras for the Use Onboard Martian Rovers</b>	367
<i>T. Mis</i>	
<b>Satellites Detection, Tracking and Cataloguing System</b>	370
<i>J. Kopycinski, P. Kuklinski, W. Rzesz, B. Majerski, A. Borucka, K. Choromanski</i>	
<b>The Investigation on the Creation and Potential Usefulness of the Atmospheric Cavity Resonance in the VLF Range in the Current and Former Radio Communication Systems</b>	374
<i>T. Mis</i>	
<b>Numerical Analysis of the Influence of a Gyrotron's Cavity Walls Curvature</b>	378
<i>B. Szlachetko, T. Wieckowski, E. Plinski</i>	
<b>Concept of the Phase Reference Line for the European Spallation Source</b>	382
<i>K. Czuba, J. Berlinski, L. Czuba, E. Fiste, M. Kalisiak, T. Lesniak, M. Mielnik, K. Oliwa, R. Papis, D. Sikora, W. Wierba, M. Zukocinski, A. Sunesson, R. Zeng</i>	

<b>The Concept of the RF Phase Reference Distribution System for SINBAD Accelerator Research Facility</b>	385
<i>M. Urbanski, K. Czuba, F. Ludwig, N. Ngada, U. Dorda, H. Prysckelski, H. Schlarb</i>	
<b>RF Front-end for Cavity Simulator for the European Spallation Source</b>	388
<i>M. Grzezorzak, K. Czuba, I. Rutkowski</i>	
<b>Efficient Multiple Hypotheses Tracking Scheme Using Adaptive Number of 'K' Best Hypotheses for Target Tracking in Clutter</b>	390
<i>S. Vudumu, P. Viji, L. Ramakrishnan</i>	
<b>Ensemble Kalman Filter for Track-Before-Detect Algorithm of pulse-Doppler Radar</b>	395
<i>J. Kwon, N. Kwak, E. Yang, K. Kim</i>	
<b>Long Range Radio Location System Employing Autonomous Tracking for Sounding Rocket</b>	400
<i>T. Chelstowski, K. Dobrzyniewicz, P. Kant, J. Michalski</i>	
<b>Tracking and Data Fusion with the HENSOLDT Passive Radar System</b>	404
<i>D. Franken, O. Zeeb</i>	
<b>Comprehensive Dimension Scaling of Multi-Band Antennas for Operating Frequencies and Substrate Parameters</b>	408
<i>S. Koziel, A. Bekasiewicz</i>	
<b>Investigation of Effects of Grooves on Antenna Performance for Ku Band Antenna</b>	412
<i>Y. Asci, O. Yigit, M. Pehlivan, K. Yegin</i>	
<b>A Non-resonant Slotted Corrugated Waveguide Array Antenna with Extended Frequency Scanning</b>	416
<i>A. Raniszewski</i>	
<b>Feasibility of Standard Instrumentation for Radiation Pattern Measurement of Time Modulated Antenna Array</b>	420
<i>G. Bogdan, K. Godziszewski, Y. Yashchyshyn</i>	
<b>Statistical Analysis and Robust Design of Circularly Polarized Antennas Using Sequential Approximate Optimization</b>	424
<i>S. Koziel, A. Bekasiewicz</i>	
<b>Power and Temperature Dependence of Passive Intermodulation Distortion</b>	428
<i>M. Steer, T. Williamson, J. Wetherington, J. Wilkerson, P. Aaen, A. Schuchinsky</i>	
<b>Influence of Step Recovery Diode DC Bias on AM/PM Conversion in Sampling Phase Detectors</b>	432
<i>B. Gasowski, S. Hanasz, K. Czuba, L. Zembala</i>	
<b>Phase Locked Loop Ku Band Frequency Synthesizer Based on a Tuned YIG Oscillator</b>	434
<i>M. Rytel, P. Kopyt, B. Salski</i>	
<b>A Measurement Setup for Digital Predistortion Using Direct RF Undersampling</b>	438
<i>T. Kowalski, B. Dabek, G. Gibiino, S. Habib, P. Barmuta</i>	
<b>Technology and Performance of E/D-mode InAlN/GaN HEMTs for Mixed-Signal Electronics</b>	440
<i>M. Blaho, D. Gregusova, S. Hascik, J. Kuzmik, A. Chvala, J. Marek, A. Satka</i>	
<b>An Analysis of Periodic Arrangements of Cylindrical Objects of Arbitrary Convex Cross Sections with the Use of Field Matching Method</b>	442
<i>M. Warecka, R. Lech, P. Kowalczyk</i>	
<b>Efficient Implementation of Greedy Multipoint Model-Order Reduction Technique for Fast Wide-band Frequency Analysis of Microwave Structures</b>	446
<i>D. Szypulski, M. Czarniewska, G. Fotyga</i>	
<b>An Analysis of Scattering from Ferrite Post of Arbitrary Convex Cross Section with the Use of Field Matching Method</b>	450
<i>M. Pastwa, T. Olszewski, R. Lech, P. Kowalczyk, J. Mazur</i>	
<b>Large Deformations of Unstructured Meshes with Linear Elasticity for Applications in Computational Electromagnetics</b>	454
<i>A. Lamecki</i>	
<b>FPGA Implementation of Relay-Type Correlator for Noise Radar Applications</b>	457
<i>S. Lukin, V. Pascazio, K. Lukin, D. Tatyanko, O. Zemlyanyi</i>	
<b>Buried Objects Detection Using Noise Radar</b>	461
<i>W. Susek, M. Kniola, B. Stec</i>	
<b>Advanced Range-Doppler Processing in Noise Radar</b>	464
<i>C. Wasserzier, G. Galati</i>	
<b>Noise Radar Imaging Using Phase-only Data in Frequency Domain</b>	468
<i>X. Dong, Y. Zhang</i>	
<b>Detection Range Limitation in MIMO and SISO Noise Radar</b>	471
<i>K. Kulpa, L. Maslikowski</i>	
<b>A Multilayer Dual-Band Filter Using Dual-Mode Resonators with Second Harmonic Suppression</b>	473
<i>N. Hansen, W. Gitzel, S. Radzijewski, J.-P. Mohncke, A. Jacob</i>	

<b>A 5.8 - 10.6 GHz UWB Filter Using Novel SIR Structure .....</b>	477
<i>M. Zukocinski</i>	
<b>DR Narrowband Filters for XFEL Accelerator .....</b>	481
<i>A. Abramowicz</i>	
<b>Low-Loss Pseudo-Highpass Filters Using Distributed-Element Unit Cells .....</b>	483
<i>J. Sorocki, I. Piekarz, S. Gruszcynski, K. Wincka</i>	
<b>Electrically Controlled Variable Inductors for Applications in Tunable Filters.....</b>	487
<i>B. Buyantuev, E. Vorobev, V. Turgaliev, D. Kholodnyak, A. Baskakova</i>	
<b>Impact of Transistor DC Operating Condition on Effectiveness of PA Digital Predistortion.....</b>	492
<i>K. Jedrzejewski, D. Rosolowski, W. Wojtasik</i>	
<b>Digital Trimmable 24 GHz Low-Noise Amplifier in 65 nm CMOS.....</b>	496
<i>S. Vehring, Y. Ding, G. Boeck</i>	
<b>18-31 GHz GaN MMIC LNA Using a 0.1 Um T-Gate HEMT Process .....</b>	500
<i>X. Tong, S. Zhang, P. Zheng, J. Xu, X. Shi</i>	
<b>A GaN Single Chip Front-End for C-Band Synthetic Aperture Radars.....</b>	504
<i>A. Salvucci, G. Polli, M. Vittori, R. Giofre, S. Colangeli, W. Cicognani, E. Limiti, D. Carosi, M. Feudale, C. Lanzieri, A. Suriani</i>	
<b>Micro-Doppler Feature Extraction for Interferometric Radar Based on Viterbi Algorithm and Intrinsic Chirp Component Decomposition.....</b>	508
<i>W. Kang, Y. Zhang, X. Dong</i>	
<b>Detection of Sport Ball in C-Band Using Continuous-Wave Radars.....</b>	512
<i>K. Stasiak, M. Zywek, G. Krawczyk, M. Malanowski, J. Drozdowicz, D. Gromek, K. Klincewicz, P. Samczynski</i>	
<b>Millimeter-wave Imaging Radar System Design Based on Detailed System Radar Simulation Tool.....</b>	517
<i>M. Mbeutcha, G. Ulisse, V. Krozer</i>	
<b>A Study on Using Different Kinds of Continuous-Wave Radars Operating in C-Band for Drone Detection.....</b>	521
<i>K. Stasiak, M. Ciesielski, A. Kurowska, W. Przybysz</i>	
<b>A Low Cost Dual-Band Transmit-Receive Module for a Commercial Maritime Radar with Digital Beamforming.....</b>	527
<i>N. Hansen, S. Radziejewski, J.-P. Mohncke, A. Jacob</i>	
<b>Low-cost Target Simulator for End-of-Line Tests of 24 GHz Radar Sensors .....</b>	531
<i>W. Scheiblhofer, R. Feger, A. Haderer, A. Stelzer</i>	
<b>Ferromagnetic Linewidth Measurements of CFMS Heusler Alloy Films.....</b>	535
<i>A. Pacewicz, B. Salski, P. Kopyt, O. Chumak, A. Nabialek, J. Krupka</i>	
<b>Deconvolution-based Spatial Resolution Improvement Technique for Resistivity Scans Acquired with Split-Post Dielectric Resonator .....</b>	541
<i>P. Korpas</i>	
<b>Microwave Determination of Liquid Mixing Ratio for Microfluidics .....</b>	544
<i>P. Barmuta, J. Bao, T. Markovic, B. Nauwelaers, D. Schreurs, I. Ocket</i>	
<b>Broadband Permittivity Measurement of Liquids in a Semi-Open Coaxial Test Cell with Meniscus-Effect Removal.....</b>	546
<i>M. Kalisiak, W. Wiatr</i>	
<b>Method for Dielectric Measurement in Liquids Using an Estimation Equation Without Short Termination.....</b>	550
<i>K. Shibata</i>	
<b>Optimal Processing of Low Power Signal in the System of Internet of Things .....</b>	554
<i>P. Yu, P. Yu</i>	
<b>Interference Mitigation in LTE-CA FDD Based on Mixed-Signal Widely Linear Cancellation .....</b>	558
<i>S. Sadjina, K. Dufrene, R. Kanumalli, M. Hueer, H. Pretl</i>	
<b>Modelling the Radiowave Propagation with a Split-Step Wavelet Method for Radio Occultation .....</b>	562
<i>R. Doubenot, A. Chabory, S. Rougerie</i>	
<b>Towards Analog Filter-Free All-Digital Transmitters Through Hybrid Estimation and Cancellation of <math>\Delta\Sigma M</math>'s Quantization Noise .....</b>	565
<i>D. Dinis, R. Ma, K. Teo, P. Orlik, A. Oliveira, J. Vieira</i>	
<b>Time Interval Measurement Technique Based on the Transformation of the Reference Oscillation Amplitude to Time.....</b>	569
<i>O. Zaytsev, T. Tankeliun, V. Urbanavicius</i>	
<b>Real-Time Microwave Characterization of Low-Molecular-Weight Antioxidant Biomarkers .....</b>	573
<i>N. Naumova, H. Hlukova, A. Barannik, A. Gubin, I. Protsenko, N. Cherpak, S. Vitusevich</i>	
<b>Broadband Characterization of Dielectrics in Sub-THz Range.....</b>	576
<i>K. Godziszewski, Y. Yashchyshyn</i>	

<b>Coordinate Transformation Approach to the Solution of the Fabry-Perot Open Resonator</b>	580
<i>T. Karpisz, B. Salski, P. Kopyt, P. Krupka</i>	
<b>Millimetre Band Detectors Based on GaN/AlGaN HEMT</b>	582
<i>D. But, P. Sai, I. Yahniuk, G. Cywinski, N. Dyakonova, W. Knap, B.-W. Zhang, W. Yan, Z.-F. Li, F.-H. Yang</i>	
<b>Millimeter and Submillimeter Range Detector Based on Graphene Ballistic Rectifiers</b>	585
<i>D. But, C. Consejo, D. Coquillat, F. Tepe, W. Knap, L. Varani, J. Torres, G. Auton, J. Zhang, E. Hill, A. Song</i>	
<b>Preliminary Experimental Results of STAP for Passive Radar on a Moving Platform</b>	589
<i>P. Wojaczek, A. Summers, D. Cristallini</i>	
<b>Single Channel Clutter Cancelation in Mobile PCL</b>	593
<i>K. Kulpa, B. Dawidowicz, L. Maslikowski, Z. Gajó</i>	
<b>Cluster Analysis for Multistatic Passive Combined PCL and PET Fusion System</b>	595
<i>T. Brenner, W. Dyszyński, L. Lamentowski</i>	
<b>Robust Pulse Repetition Interval (PRI) Classification Scheme Under Complex Multi Emitter Scenario</b>	597
<i>U. Ahmed, T. Rehman, S. Baqar, I. Hussain, M. Adnan</i>	
<b>Software Arbitrary Signal Generator on the PXI Platform for Application in Microwave Medical Diagnostic System Development</b>	601
<i>P. Krasnowski, G. Jaworski</i>	
<b>Influence of Train Interior on Train-Onboard Communication</b>	605
<i>J. Lichtblau, B. Sanftl, C. Kraus, R. Weigel, A. Koelpin</i>	
<b>Basic Channel Parameters of Ultrasound Transmission in Air</b>	607
<i>G. Mazurek</i>	
<b>Short Range Mini-radar Making Use of Polarimetric Technique for Detection of Pollutions on Sea Surface</b>	610
<i>P. Kabacik, A. Byndas, M. Hofman, D. Sysak, T. Wasik</i>	
<b>Detection of Harmonic Signal in the Mixture with Narrow Band Clutter</b>	614
<i>I. Prokopenko</i>	
<b>Monopulse Estimation of Direction of Arrival in Case of Multiple Incoherent Sources</b>	618
<i>R. Mularzuk</i>	
<b>Mobile System for Localization of People Inside Buildings</b>	621
<i>P. Kaniewski, T. Kraszewski</i>	
<b>Evaluation of BAQ on Tiangong-2 Interferometric Imaging Radar Altimeter Data Compression</b>	623
<i>X. Shi, Y. Zhang, X. Dong</i>	
<b>An Interacting Multiple Model Filtering Method Aided by Radial Velocity Information</b>	625
<i>R. Jiao, J. Wang, S. Qian, Y. Gu</i>	
<b>Chosen Results of Frequency Modulation and Window Weighting for Radar Pulse Compression</b>	629
<i>M. Kniola, T. Rogala, A. Kawalec</i>	
<b>Frequency Divider Module for the European XFEL Phase Reference Signal Distribution System</b>	631
<i>M. Urbanski, P. Jatczak, D. Sikora, K. Czuba, F. Ludwig, J. Branlard, H. Schlarb</i>	
<b>Leaky-Wave Antenna Designed in SIW Technique with SRR Slots</b>	634
<i>I. Slomian, S. Gruszczynski, K. Wincza</i>	
<b>Evaluation of Angular Dispersion for Various Propagation Environments in Emerging 5G Systems</b>	637
<i>J. Kelner, C. Ziolkowski, B. Uljasz</i>	
<b>Passive Analysis of Prism-Like Folded Cavity Surface-Emitting Laser Diode</b>	642
<i>J. Cuper, M. Krysicki, B. Salski, P. Kopyt, A. Malag</i>	
<b>Differentially-fed Band-Pass Filter with Common Mode Rejection</b>	644
<i>K. Janisz, R. Smolarz, J. Sorocki, K. Wincza, S. Gruszczynski</i>	
<b>IFM Receiver Based on Microwave Frequency Discriminator That Uses Rat-Race Directional Couplers</b>	646
<i>A. Rutkowski, H. Stadnik</i>	
<b>Interactive Application for Visualization of the Basic Phenomena in RF and Microwave Devices</b>	649
<i>S. Dziedziewicz, M. Jasinski, R. Lech, P. Kowalczyk</i>	
<b>Dielectric Strength of Micromechanically Tunable Microstrip Lines</b>	653
<i>V. Kazmirenko, I. Golubeva, Y. Prokopenko</i>	
<b>Evaluation of Substrate's Characteristics from the Relation Between Wave and Characteristic Impedances for a CPW</b>	656
<i>K. Hamze, C. Mayor, C. Gautier, D. Pasquet, P. Descamps, D. Lesenechal</i>	
<b>Milimeter-wave Propagation in 3D Knitted Fabrics</b>	660
<i>M. Kokolia, Z. Raida</i>	
<b>Study of Residual VNA Measurement Errors Due to Imperfect Thru-Reflect-Match Calibration Standards</b>	664
<i>J. Szatkowski, W. Wiatr</i>	

<b>A Fractional-N Phase-Locked Loop Synthesizer Optimized for Microwave Q-Meter Application .....</b>	668
<i>A. Musial, P. Korpas</i>	
<b>Microwave Synthesizer Subsystem.....</b>	672
<i>B. Csepento, T. Berceli</i>	
<b>Mutual Coupling Reduction Using Metamaterial Supersubstrate for High Performance &amp; Densely Packed Planar Phased Arrays .....</b>	675
<i>M. Alibakhshikenari, A. Salvucci, G. Polli, B. Virdee, C. See, R. Abd-Alhameed, F. Falcone, A. Andujar, J. Anguera, E. Limiti</i>	
<b>On the Broadband Behaviour of Planar Elliptical Dipole -Modal Approach.....</b>	679
<i>M. Pergol, W. Zieniutycz</i>	
<b>Isotropic Antenna Design via Machine Learning.....</b>	683
<i>Saifullah, B. Ahmed</i>	
<b>Important Effects Related to the Graphene Layer Implemented into Antennas .....</b>	688
<i>P. Kabacik, A. Byndas, M. Hofman</i>	
<b>Suppressing Antenna Sidelobes by Means of Inhomogeneous Radome Wall Design .....</b>	691
<i>A. Solovey</i>	
<b>Drone RCS Estimation Using Simple Experimental Measurement in the WIFI Bands .....</b>	695
<i>S. Rzewuski, K. Kulpa, B. Salski, P. Kopyt, K. Borowiec, M. Malanowski, P. Samczynski</i>	
<b>Evaluating the Radar Cross Section of Commercial Drones to Design Anti-Drone Radar.....</b>	699
<i>S. Pisa, E. Piuzzi, E. Pittella, P. Lombardo, N. Ustalli, W. Cao, D. Bloisi, D. Nardi, P. D'Atanasio, A. Zambotti</i>	
<b>Frequency-Domain Chipless RFID Transponders: Improvement the Reading Response .....</b>	704
<i>J. Machac, M. Polivka, M. Svanda, J. Havlicek</i>	
<b>Radar Cross-Section of a Volley Sport Ball in 0.8 - 18 GHz Range.....</b>	708
<i>B. Salski, P. Kopyt, J. Cuper, P. Samczynski, J. Misiurewicz</i>	
<b>Terahertz Vision Using Field Effect Transistors Detectors Arrays.....</b>	711
<i>J. Susek, A. Siemion, M. Sypek, D. But, P. Sai, I. Yahniuk, G. Cywinski, J. Marczewski, M. Zaborowski, D. Tomaszewski, P. Zagrajek</i>	
<b>Towards Resonant THz Detector Devices Based on Schottky Diodes to 2DEG GaN/AlGaN .....</b>	715
<i>G. Cywinski, P. Sai, I. Yahniuk, P. Kruszewski, B. Grzywacz, J. Przybytek, P. Prystawko, A. Khachapuridze, K. Nowakowski-Szkudlarek, W. Knap, G. Simin, S. Rumyantsev</i>	
<b>Quasi Optical THz Detectors in Si CMOS.....</b>	719
<i>K. Ikamas, J. Zdanevicius, L. Dundulis, S. Pralgauskaitė, A. Lisauskas, D. Cibiraite, V. Krozer, H. Roskos, D. Voß</i>	
<b>A Simulation Study of Terahertz Dielectric Resonator Using Graphitic Carbon Nitride .....</b>	722
<i>U. Memon, A. Ibrahim, A. Pattanayak, S. Duttagupta, A. Sarkar, R. Raman</i>	
<b>THz Resonant-Tunneling Diodes.....</b>	726
<i>M. Feiginov</i>	
<b>Author Index</b>	