

2020 IEEE International Conference on RFID (RFID 2020)

**Orlando, Florida, USA
28 September – 16 October 2020**



**IEEE Catalog Number: CFP20RFI-POD
ISBN: 978-1-7281-5577-7**

**Copyright © 2020 by the Institute of Electrical and Electronics Engineers, Inc.
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 republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. 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:	CFP20RFI-POD
ISBN (Print-On-Demand):	978-1-7281-5577-7
ISBN (Online):	978-1-7281-5576-0
ISSN:	2374-0221

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

PARTICLE FILTER-BASED SAR APPROACH AND TRAJECTORY OPTIMIZATION FOR REAL-TIME 3D UHF-RFID TAG LOCALIZATION	1
<i>Matthias Gareis; Patrick Fenske; Christian Carlowitz; Martin Vossiek</i>	
CAPTURING CUSTOMER BROWSING INSIGHTS THROUGH RFID TAG MOTION DETECTION IN HIGH TAG DENSITY ENVIRONMENTS	9
<i>Chieh-Yih Wan; Cagri Tanriover; Rahul C. Shah</i>	
A SYNTHETIC APERTURE BASED METHOD FOR REFLECTOR POSITIONING VIA MOVING TAG IN UHF RFID SYSTEM	17
<i>Yongtao Ma; Hankai Liu; Yue Jiang; Yanxi Fu; Xiuyan Liang</i>	
RIGHT-ANGLED V-SHAPED CONFORMAL DUAL-PATCH ANTENNA ARRAY FOR RAIN RFID DOORWAY PORTALS	25
<i>Prabakar Parthiban</i>	
AN ISAR-SAR BASED LOCALIZATION METHOD USING PASSIVE UHF RFID SYSTEM WITH MOBILE ROBOTIC PLATFORM	32
<i>Zheng Liu; Zhe Fu; Tongyun Li; Ian White; Richard Penty; Michael Crisp</i>	
TOWARDS FULLY INTEROPERABLE NFC DEVICES	39
<i>Martin Erb; Christian Steger; Martin Troyer; Josef Preishuber-Pfluegl</i>	
A DUAL-BAND SHARED-HARDWARE 900 MHZ 6.25 MBPS DQPSK AND 2.4 GHZ 1.0 MBPS BLUETOOTH LOW ENERGY (BLE) BACKSCATTER UPLINK FOR WIRELESS BRAIN-COMPUTER INTERFACES	47
<i>James Rosenthal; Matthew S. Reynolds</i>	
REAL-TIME 3D LOCALIZATION OF RFID-TAGGED PRODUCTS BY GROUND ROBOTS AND DRONES WITH COMMERCIAL OFF-THE-SHELF RFID EQUIPMENT: CHALLENGES AND SOLUTIONS	53
<i>Anastasios Tzitzis; Alexandros Filotheou; Stavroula Siachalou; Emmanouil Tsardoulis; Spyros Megalou; Aggelos Bletsas; Konstantinos Panayiotou; Andreas Symeonidis; Traianos Yioultsis; Antonis G. Dimitriou</i>	
MODELING AND DESIGN OF SMALL, PASSIVE, AND STANDARD-COMPLIANT PROXIMITY COUPLING TRANSPONDERS	61
<i>Mladen Pesic; Walther Pachler; Stephan Rampetzreiter; Holger Arthaber</i>	
ANALYSIS OF A 1Kbps BACKSCATTER RECEIVER WITH UP TO -80DBM TAG-TO-TAG RECEIVE SENSITIVITY	68
<i>R. J. De Jong; R. A. R. Van Der Zee; A. B. J. Kokkeler</i>	
NON-LINEAR SHUNT REGULATOR WITH RF POWER DETECTOR FOR RFID APPLICATIONS	76
<i>Rafael Cantalice; Fernando Paixao Cortes; Eric Fabris; Sandro Binsfeld Ferreira; Hamilton Klimach</i>	
SCOPE AND APPLICATION OF HARMONIC RFID FOR IMPLANTED BODY AREA NETWORK	84
<i>Saikat Mondal; Deepak Kumar; Saranraj Karuppuswami; Premjeet Chahal</i>	
FINE-SCALE THROUGH-WALL POSITIONING USING TUNNELING RFID TAGS	92
<i>Cheng Qi; Francesco Amato; Billy Kihei; Gregory D. Durgin</i>	
SIMULTANEOUS GEN2 INVENTORY AND ANGLE OF ARRIVAL MEASUREMENT OF BACKSCATTER SIGNALS WITH MULTIPLE COMMODITY SDRS	99
<i>Jin Mitsugi; Yuusuke Kawakita</i>	
ROBOT LOCALIZATION VIA PASSIVE UHF-RFID TECHNOLOGY: STATE-OF-THE-ART AND CHALLENGES	106
<i>Andrea Motroni; Paolo Nepa; Alice Buffi; Bernardo Tellini</i>	
PHYSICS-AWARE PROCESSING OF ROTATIONAL MICRO-DOPPLER SIGNATURES FOR DBN-BASED UAS CLASSIFICATION RADAR	114
<i>Arjuna Madanayake; Gihan J. Mendis; Vidumeth Ariyaratna; Sravan Pulipati; Tharindu Randeny; Shubhendu Bhardwaj; Xin Wang; Soumyajit Mandal; Jin Wei</i>	
NONLINEAR LEAST-SQUARES STATE ESTIMATION FOR 2D RFID-BASED MOTION CAPTURE	122
<i>Qian Yang; David G. Taylor; Gregory D. Durgin</i>	
SIMULATION MODEL OF RFID SYSTEM FOR RFID-BASED MOTION-CAPTURE AND LOCALIZATION	130
<i>Qian Yang; David G. Taylor; Gregory D. Durgin</i>	

BACKSCATTER EX-NIHILO: SINGLE-COMPONENT, FULLY-PASSIVE BACKSCATTERING FOR MICROCONTROLLERS	136
<i>Stewart J. Thomas; Brian P. Degnan; Cristel Callupe Chavez; Billy Culver</i>	
COUPLED PLANAR COIL (CPC) ANTENNA AS A DISPLACEMENT SENSOR FOR NFC OR HF RFID TAGS	142
<i>Yulong Liu; Terry Tao Ye</i>	
5 MM RANGE 61 GHZ SYSTEM ON CHIP EPC GEN2 RFID TAG IN 22NM FD-SOI TECHNOLOGY	148
<i>Armen Harutyunyan; Andreas Heinig; Raik Fiedler; Matthias Landwehr; Ralf Hildebrandt; Hans-Juergen Holland</i>	
SHOW ME THE MONEY: RFID-BASED ARTICLE-TO-FIXTURE PREDICTIONS FOR FASHION RETAIL STORES	156
<i>Matthias Wölbitsch; Thomas Hasler; Denis Helic; Simon Walk</i>	
DESTRUCTIVE FULL DUPLEX RELAY FOR COMMODITY RFID SYSTEM	164
<i>Wei Sun</i>	
ALLERGIE: RELATIVE VEHICULAR LOCALIZATION WITH COMMODITY RFID SYSTEM	172
<i>Wei Sun; Kannan Srinivasan</i>	
RECEIVER SELECTIVITY LIMITS ON BISTATIC BACKSCATTER RANGE	180
<i>Mohamad Katanbaf; Ali Saffari; Joshua R. Smith</i>	
A 3D RAY-TRACING MODEL FOR UHF RFID	188
<i>Rui Chen; Shuai Yang; Zheng Liu; Richard V. Penty; Michael Crisp</i>	
3D-PRINTED OMNIDIRECTIONAL LUNEBURG LENS RETROREFLECTORS FOR LOW-COST MM-WAVE POSITIONING	196
<i>Ryan A. Bahr; Ajibayo O. Adeyeye; Samantha Van Rijs; Manos M. Tentzeris</i>	
A LOW-COST 1 MBPS FREQUENCY SHIFT KEYING BACKSCATTER RECEIVER AND CARRIER WAVE GENERATOR SYSTEM FOR WIRELESS NEURAL RECORDING	203
<i>Tyler G. Petrie; James Rosenthal; Matthew S. Reynolds</i>	
THEORETICAL MODELING OF COMPLICATED INDUCTIVE WIRELESS POWER TRANSFER SYSTEMS	208
<i>Scott Roman; Gregory D. Durgin</i>	
Author Index	