

MILCOM 2018 – 2018 IEEE Military Communications Conference (MILCOM 2018)

**Los Angeles, California, USA
29 – 31 October 2018**

Pages 1-540



**IEEE Catalog Number: CFP18MIL-POD
ISBN: 978-1-5386-7186-3**

**Copyright © 2018 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:	CFP18MIL-POD
ISBN (Print-On-Demand):	978-1-5386-7186-3
ISBN (Online):	978-1-5386-7185-6
ISSN:	2155-7578

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

LONG SHORT-TERM MEMORY FOR RADIO FREQUENCY SPECTRAL PREDICTION AND ITS REAL-TIME FPGA IMPLEMENTATION	1
<i>Siddhartha ; Yee Hui Lee ; Duncan J. M. Moss ; Julian Faraone ; Perry Blackmore ; Daniel Salmond ; David Boland ; Philip H. W. Leong</i>	
BAND ASSIGNMENT IN DUAL BAND SYSTEMS: A LEARNING-BASED APPROACH.....	7
<i>Daoud Burghal ; Rui Wang ; Andreas F. Molisch</i>	
REINFORCEMENT LEARNING FOR QUALITY OF EXPERIENCE OPTIMIZATION IN TACTICAL NETWORKS.....	14
<i>G�r�me Bovet ; Kevin S. Chan</i>	
HIERARCHICAL MODULATION CLASSIFICATION USING DEEP LEARNING	20
<i>Garrett Vanhoy ; Noah Thurston ; Andrew Burger ; Jacob Breckenridge ; Tamal Bose</i>	
CLUSTERING LEARNED CNN FEATURES FROM RAW I/Q DATA FOR EMITTER IDENTIFICATION	26
<i>Lauren J. Wong ; William C. Headley ; Seth Andrews ; Ryan M. Gerdes ; Alan J. Michaels</i>	
UNSUPERVISED ESTIMATION OF DOMAIN APPLICABILITY OF MODELS	34
<i>Nirmal Desai ; Raghu K. Ganti ; Heesung Kwon ; Ian Taylor ; Mudhakar Srivatsa</i>	
PROVISIONING ROBUST AND INTERPRETABLE AI/ML-BASED SERVICE BUNDLES	40
<i>Alun Preece ; Dan Harborne ; Ramya Raghavendra ; Richard Tomsett ; Dave Braines</i>	
MODELS FOR PREDICTING COMMUNITY-SPECIFIC INTEREST IN NEWS ARTICLES	46
<i>Benjamin D. Horne ; William Dron ; Sibel Adali</i>	
RESOLVING ACCESS CONFLICTS: AN AUCTION-BASED INCENTIVE APPROACH.....	52
<i>Liang Fang ; Lihua Yin ; Yunchuan Guo ; Zhen Wang ; Fenzhua Li</i>	
FAST AND ACCURATE TYPOSQUATTING DOMAINS EVALUATION WITH SIAMESE NETWORKS.....	58
<i>Jing Ya ; Tingwen Liu ; Quangang Li ; Pin Lv ; Jinqiao Shi ; Li Guo</i>	
P4GUARD: DESIGNING P4 BASED FIREWALL	64
<i>Rakesh Datta ; Sean Choi ; Anurag Chowdhary ; Younghee Park</i>	
A FRAMEWORK FOR CHARACTERIZING THE EVOLUTION OF CYBER ATTACKER-VICTIM RELATION GRAPHS	70
<i>Richard B. Garcia-Lebron ; Kristin M. Schweitzer ; Raymond M. Bateman ; Shouhuai Xu</i>	
CHARACTERIZING THE EFFECTIVENESS OF NETWORK-BASED INTRUSION DETECTION SYSTEMS	76
<i>Eric Ficke ; Kristin M. Schweitzer ; Raymond M. Bateman ; Shouhuai Xu</i>	
SECURE NEIGHBOR DISCOVERY USING SYMMETRIC LINK MANAGEMENT IN TACTICAL SENSOR NETWORKS	82
<i>Kelvin Chew ; Preetha Thulasiraman</i>	
EFFICIENT INTERCONNECTIVITY AMONG NETWORKS UNDER SECURITY CONSTRAINT	88
<i>Pankaz Das ; Rezoan A. Shuvro ; Mahshid Rahnamay-Naeini ; Nasir Ghani ; Majeed M. Hayat</i>	
MULTIPLE ACCOUNTS DETECTION ON FACEBOOK USING SEMI-SUPERVISED LEARNING ON GRAPHS	94
<i>Xiaoyun Wang ; Chun-Ming Lai ; Yu-Cheng Lin ; Cho-Jui Hsieh ; S. Felix Wu ; Hasan Cam</i>	
ATTACK AND DEFENSE OF DYNAMIC ANALYSIS-BASED, ADVERSARIAL NEURAL MALWARE DETECTION MODELS.....	102
<i>Jack W. Stokes ; De Wang ; Mady Marinescu ; Marc Marino ; Brian Bussone</i>	
ON DEFENSIVE CYBER DECEPTION: A CASE STUDY USING SDN.....	110
<i>Cho-Yu J. Chiang ; Sridhar Venkatesan ; Shridatt Sugrim ; Jason A. Youzwak ; Ritu Chadha ; Edward I. Colbert ; Hasan Cam ; Massimiliano Albanese</i>	
ECHO: EFFICIENT ZERO-CONTROL NETWORK-WIDE BROADCAST FOR MOBILE MULTI-HOP WIRELESS NETWORKS	116
<i>Ram Ramanathan ; Christophe Servaes ; Warren Ramanathan</i>	
IMPACT OF HEADER COMPRESSION ON TACTICAL NETWORKS	122
<i>David Kidston ; Philip Hugg</i>	
FOUNTAIN-CODED MULTICAST IN TACTICAL PACKET RADIO NETWORKS: THROUGHPUT IMPROVEMENTS PROVIDED BY RELAY NODES	128
<i>Siddhartha S. Borkotoky ; Michael B. Pursley</i>	

EXPERIMENTAL EVALUATION OF GROUP COMMUNICATIONS PROTOCOLS FOR TACTICAL DATA DISSEMINATION	133
<i>Niranjan Suri ; Roberto Fronteddu ; Eelco Cramer ; Maggie Breedy ; Kelvin Marcus ; Ronald In 'T Velt ; Jan Nilsson ; Mattia Mantovani ; Lorenzo Campioni ; Filippo Poltronieri ; Giacomo Benincasa ; Blake Ordway ; Markus Peuhkuri ; Mathias Rautenberg</i>	
TACTICAL COMMUNICATION LINK UNDER JOINT JAMMING AND INTERCEPTION BY SAME-FREQUENCY SIMULTANEOUS TRANSMIT AND RECEIVE RADIO	140
<i>Taneli Riihonen ; Dani Korpi ; Matias Turunen ; Tatu Peltola ; Joni Saikanmäki ; Mikko Valkama ; Risto Wichman</i>	
ANALYSIS OF SPECTRUM ALLOCATION TO SUPPORT MOBILE AD-HOC NETWORKS IN CONTESTED ENVIRONMENTS.....	145
<i>Paul J. Nicholas ; Karla L. Hoffman</i>	
PERFORMANCE METRICS FOR COGNITIVE ELECTRONIC WARFARE - ELECTRONIC SUPPORT MEASURES	151
<i>Scott Kuzdeba ; Andrew Radlbeck ; Matthew Anderson</i>	
ROUTING, NETWORK CODING AND TCP SUPPORT FOR WIDEBAND HF COMMUNICATIONS	157
<i>Tugba Erpek ; Yalin E. Sagduyu ; Yi Shi ; Maice Costa ; Kemal Davaslioglu ; Hao Han ; Daniel Fayette ; Eric Johnson ; Elizabeth Bentley ; Clif Banner</i>	
UTILIZATION OF INTER-BLOCK INTERFERENCE IN MIMO-OFDM COMMUNICATION SYSTEMS	163
<i>Jason R. Pennington ; Richard K. Martin</i>	
MODELING OF HIGHLY NON-STATIONARY LOW ALTITUDE AIRCRAFT-TO-AIRCRAFT CHANNELS	169
<i>Michael Walter ; Dmitriy Shutin ; Armin Dammann ; David W. Matolak</i>	
ANTENNA RADIATION PATTERN COMPRESSIVE SENSING	174
<i>Michael L. Don ; Gonzalo R. Arce</i>	
THE IMPACT OF CORRELATED BLOCKING ON MILLIMETER- WAVE PERSONAL NETWORKS.....	182
<i>Enass Hriba ; Matthew C. Valenti</i>	
FREQUENCY CORRELATION MODELLING FOR TACTICAL VHF CHANNELS IN MOUNTAINOUS TERRAIN	188
<i>Jeff Pugh ; Mohamad Alkadmani ; Colin Brown ; Vivianne Jodalen</i>	
JOINT CHARACTERIZATION OF MM-WAVE AND CM-WAVE DEVICE-TO-DEVICE FADING CHANNELS	194
<i>S. Sangodoyin ; U. T. Virk ; D. Burghal ; K. Haneda ; A. F. Molisch</i>	
HOW SECURE ARE MULTICARRIER COMMUNICATION SYSTEMS AGAINST SIGNAL EXPLOITATION ATTACKS?	201
<i>Alireza Nooraiepour ; Kenza Hamidouche ; Waheed U. Bajwa ; Narayan Mandayam</i>	
DEEP REINFORCEMENT LEARNING FOR DYNAMIC SPECTRUM ACCESS IN WIRELESS NETWORKS.....	207
<i>Y. Xu ; J. Yu ; W. C. Headley ; R. M. Buehrer</i>	
DEEPMOD: AN OVER-THE-AIR TRAINABLE MACHINE MODEM FOR RESILIENT PHY LAYER COMMUNICATIONS	213
<i>Adam Anderson ; Steven R. Young ; Thomas P. Karnowski ; Jason M. Vann</i>	
TDDEHT: THREAT DETECTION USING DISTRIBUTED ENSEMBLES OF Hoeffding TREES ON STREAMING CYBER DATASETS	219
<i>Asmah Muallem ; Sachin Shetty ; Liang Hong ; Jan Wei Pan</i>	
PREDICTION AND DETECTION OF MALICIOUS INSIDERS' MOTIVATION BASED ON SENTIMENT PROFILE ON WEBPAGES AND EMAILS	225
<i>Jianguo Jiang ; Jiuming Chen ; Kim-Kwang Raymond Choo ; Kunying Liu ; Chao Liu ; Min Yu ; Prasant Mohapatra</i>	
A PLATFORM SERVICE FOR REMOTE INTEGRITY MEASUREMENT AND ATTESTATION.....	231
<i>J. Aaron Pendergrass ; Sarah Helble ; John Clemens ; Peter Loscocco</i>	
CAPACITY OF DELIBERATE SIDE-CHANNELS CREATED BY SOFTWARE ACTIVITIES.....	237
<i>Baki Berkay Yilmaz ; Milos Prvulovic ; Alenka Zajic</i>	
TOWARDS PRACTICAL PROTECTION OF DATA ACCESS PATTERN TO CLOUD STORAGE	243
<i>Qiumao Ma ; Wensheng Zhang</i>	
PRIVACY PRESERVING FINE-GRAINED DATA DISTRIBUTION AGGREGATION FOR SMART GRID AMI NETWORKS	249
<i>Enahoro Oriero ; Mohammad Ashiqur Rahman</i>	
LOOP-FREE INTEGRATED FORWARDING AND ROUTING WITH GRADIENTS	255
<i>J. J. Garcia-Luna-Aceves ; James Mathewson ; Ram Ramanathan ; Bishal Thapa</i>	

ASAP: PREVENTING STARVATION IN BACKPRESSURE FORWARDING	261
<i>Laura Poplawski Ma ; Samuel Nelson ; Gregory Lauer ; Stephen Zabele</i>	
A REINFORCEMENT LEARNING APPROACH TO ADAPTIVE REDUNDANCY FOR ROUTING IN TACTICAL NETWORKS	267
<i>Matthew Johnston ; Claudiu Danilov ; Kevin Larson</i>	
TOPOLOGY ALGORITHM ENHANCEMENTS FOR AERIAL HIGH CAPACITY DIRECTIONAL NETWORKS	273
<i>Joy Wang ; Patricia Deutsch ; Scott Moore ; Bow-Nan Cheng</i>	
THROUGH-THE-BODY LOCALIZATION OF IMPLANTED BIOCHIP IN WEARABLE NANO- BIOSENSING NETWORKS	278
<i>Haochen Hu ; Zhi Sun ; Josep M Jornet</i>	
SIGNAL COMBINATION TECHNIQUES TO IMPROVE LONG RANGE COMMUNICATION WITH MULTINLE RELAYS	284
<i>David A. Heide ; Aaron E. Cohen ; Thomas M. Moran</i>	
OUTAGE PROBABILITY AND CONSTRAINED CAPACITY OF MODERATE-LENGTH CODES FOR GAUSSIAN MIXTURE OVER AWGN CHANNEL	290
<i>Lan K. Nguyen ; Richard B. Wells ; Duy H. N. Nguyen ; Nghi H. Tran</i>	
COMMUNICATIONS PERFORMANCE BASED SPECIFICATION OF PHASE NOISE FOR SATCOM SYSTEMS	296
<i>A. J. Vigil ; Mike D. Rhoades</i>	
NONLINEAR CO-SITE INTERFERENCE MEASUREMENT	303
<i>Josh Wetherington ; Glen Garner ; Todd Nichols ; Shaun Gidcumb ; Eric Phillips ; Michael Steer</i>	
DESIGN AND PERFORMANCE EVALUATION OF HIGH-CAPACITY MOBILE TROPOSCATTER LINKS UNDER MOBILITY, FREQUENCY SELECTIVITY, AND ANTENNA POINTING ERRORS	307
<i>Ramesh Annavajjala ; James Zagami</i>	
MULTI-CARRIER ENVELOPE TRACKING POWER AMPLIFIER	313
<i>Jonmei J. Yan ; Donald E. Cowles ; Donald Kimball ; Anders Mattsson</i>	
ON JAMMER POWER ALLOCATION AGAINST OFDM SIGNALS IN FADING CHANNELS	317
<i>Saidhiraj Amuru ; R. Michael Buehrer</i>	
DISTORTION FILTERING FOR COMMUNICATIONS LOCALIZATION DENIAL	323
<i>Jonathan P. Beaudeau ; Prabahan Basu ; David Couto ; William D. Watson</i>	
CHIRP SPREAD SPECTRUM PERFORMANCE IN LOW PROBABILITY OF INTERCEPT THEATER	329
<i>Bijan G. Mobasseri ; Khanh D. Pham</i>	
SECURITY REGION ANALYSIS WITH ARTIFICIAL NOISE BASED ON SECRECY OUTAGE PROBABILITY	336
<i>Litao Mao ; Yongzhao Li ; Tao Li ; Mingjun Gao ; Hailin Zhang</i>	
ANALYSIS OF PILOT-SPOOFING ATTACK IN MISO-OFDM SYSTEM OVER CORRELATED FADING CHANNEL	341
<i>Jasmin A. Mahal ; T. Charles Clancy</i>	
LOW PROBABILITY OF EXPLOITATION WAVEFORM DESIGN USING BARANKIN BOUND FORMULATION	347
<i>William D. Watson ; David J. Couto ; Jonathan P. Beaudeau</i>	
PRECODING FOR NON-COHERENT DETECTION OF CONTINUOUS PHASE MODULATIONS	353
<i>Charles-Ugo Piat-Durozoi ; Charly Poulliat ; Nathalie Thomas ; Marie-Laure Boucheret ; Guy Lesthievant</i>	
BROADBAND IP OVER SATCOM NETWORKING FOR ROTARY WING AIRCRAFT	358
<i>Maroula Bratakos ; Rohit Gupta ; William Harbison</i>	
VERY SHORT CHANNEL CODES FOR BURST-TYPE TRANSMISSIONS	364
<i>Andreas Lang ; Berthold Lankl</i>	
HIGH BANDWIDTH ELECTRICALLY SMALL ANTENNAS THROUGH BFSK DIRECT ANTENNA MODULATION	370
<i>Jean Paul Santos ; Foad Fereidoony ; Yikun Huang ; Yuanxun Ethan Wang</i>	
A RECEIVER FOR MULTICARRIER LOGARITHMIC WARPED FREQUENCY DOMAIN CODE WAVEFORMS	376
<i>Alex Bvrley ; Adly Fam</i>	
MACHINE LEARNING BASED FEATURELESS SIGNALLING	382
<i>Ismail Shakeel</i>	
MULTI-ROBOT ENHANCED MANET INTELLIGENT ROUTING AT UNCERTAIN AND VULNERABLE TACTICAL EDGE	389
<i>Ming Feng ; Lijun Qian ; Hao Xu</i>	

COOPERATIVE AD HOC NODE LOCALIZATION WITH GROUND-LEVEL SUBURBAN MEASUREMENTS VIA MACHINE LEARNING TECHNIQUES	395
<i>Andreas Polydoros ; Ioannis Dagres ; Cenk Kose</i>	
GENERATING REALISTIC DATA FOR NETWORK ANALYTICS	401
<i>Jon J. Aho ; Alexander W. Witt ; Carter B. F. Casey ; Nirav Trivedi ; Venkatesh Ramaswamy</i>	
SPECTRUM DATA POISONING WITH ADVERSARIAL DEEP LEARNING	407
<i>Yi Shi ; Tugba Erpek ; Yalin E. Sagduyu ; Jason H. Li</i>	
NETWORK TRAFFIC OBFUSCATION: AN ADVERSARIAL MACHINE LEARNING APPROACH	413
<i>Gunjan Verma ; Ertugrul Ciftcioglu ; Ryan Sheatsley ; Kevin Chan ; Lisa Scott</i>	
TOWARDS THE DEVELOPMENT OF ROBUST DEEP NEURAL NETWORKS IN ADVERSARIAL SETTINGS	419
<i>Todd P. Huster ; Cho-Yu Jason Chiang ; Ritu Chadha ; Ananthram Swami</i>	
ENABLERS OF ADVERSARIAL ATTACKS IN MACHINE LEARNING	425
<i>Rauf Izmailov ; Shridatt Sugrim ; Ritu Chadha ; Patrick McDaniel ; Ananthram Swami</i>	
ON DETECTING MANIFESTATION OF ADVERSARY CHARACTERISTICS	431
<i>Sridhar Venkatesan ; Shridatt Sugrim ; Rauf Izmailov ; Cho-Yu J. Chiang ; Ritu Chadha ; Bharat Doshi ; Blaine Hoffman ; E. Allison Newcomb ; Norbou Buchler</i>	
ASSESSMENT METHODOLOGY FOR COLLATERAL DAMAGE AND MILITARY (DIS)ADVANTAGE IN CYBER OPERATIONS	438
<i>Clara Maathuis ; Wolter Pieters ; Jan Van Den Berg</i>	
WARGAMING A CLOSED NATIONAL NETWORK	444
<i>Heikki Lantto ; Juha Kukkola ; Bernt Åkesson ; Juha-Pekka Nikkarila ; Mari Ristolainen</i>	
MEASURING RELATIVE ACCURACY OF MALWARE DETECTORS IN THE ABSENCE OF GROUND TRUTH	450
<i>John Charlton ; Pang Du ; Jin-Hee Cho ; Shouhuai Xu</i>	
FOOLING A NEURAL NETWORK IN MILITARY ENVIRONMENTS: RANDOM UNTARGETED ADVERSARIAL EXAMPLE	456
<i>Hyun Kwon ; Yongchul Kim ; Hyunsoo Yoon ; Daeseon Choi</i>	
AGE OF INFORMATION FOR QUEUES IN TANDEM	462
<i>Clement Kam ; Joseph P. Molnar ; Sastry Kompella</i>	
ON THE DESIGN OF RESOURCE ALLOCATION ALGORITHMS FOR LOW-LATENCY VIDEO ANALYTICS	468
<i>Victor Valls ; Heesung Kwon ; Tom Laporta ; Sebastian Stein ; Leandros Tassiulas</i>	
LATENCY-AWARE FORWARDING FOR IRON: LATENCY SUPPORT FOR BACK-PRESSURE FORWARDING	474
<i>Christophe J. Merlin ; Laura Poplawski Ma ; Gregory Lauer ; Stephen Zabele</i>	
HIERARCHICAL-CACHING BASED STATISTICAL QOS PROVISIONING OVER 5G MULTIMEDIA BIG-DATA MOBILE WIRELESS NETWORKS	480
<i>Xi Zhang ; Qixuan Zhu</i>	
AUTONOMOUS, COOPERATIVE UAV OPERATIONS USING COTS CONSUMER DRONES AND CUSTOM GROUND CONTROL STATION	486
<i>Espen Skjervold ; Oistein T. Hoelsreter</i>	
EMULATION OF LARGE-SCALE LTE NETWORKS IN NS-3 AND CORE: A DISTRIBUTED APPROACH	493
<i>Ayman Sabbah ; Abdallah Jarwan ; Ismael Al-Shiab ; Mohamed Ibnkahla ; Maoyu Wang</i>	
ADAPTIVE LINK OPTIMIZATION FOR 802.11 UAV UPLINK USING A RECONFIGURABLE ANTENNA	499
<i>Stephen Wolfe ; Simon Begashaw ; Yuqiao Liu ; Kapil R. Dandekar</i>	
LTE UPLINK INTERFERENCE MITIGATION FEATURES	505
<i>Howard McDonald ; Dj Shyy ; Matt Steele ; Cameron Patterson</i>	
ENHANCING SERVICE AVAILABILITY OF LTE-IN-A-BOX SYSTEMS USING 3GPP-COMPLIANT STRATEGIES	512
<i>Venkatesh Ramaswamy ; Jeffrey T. Correia</i>	
CAPACITY ANALYSIS AND BIT ALLOCATION DESIGN FOR VARIABLE-RESOLUTION ADCS IN MASSIVE MIMO	518
<i>I. Zakir Ahmed ; Hamid Sadjadpour ; Shahram Yousefi</i>	
PERFORMANCE ANALYSIS FOR MIMO HF COMMUNICATIONS WITH DOMINANT GALACTIC NOISE	524
<i>Hung-Yi Lo ; James S. Lehnert ; Phuong Tran</i>	

DIMENSION-OPTIMIZED TWO-STAGE PRECODER DESIGN FOR MASSIVE MIMO SYSTEMS WITH LIMITED FEEDBACK.....	530
<i>Jinho Kang ; Jung Hoon Lee ; Wan Choi</i>	
A NOISE-MASKING PHYSICAL LAYER SECURITY TECHNIQUE FOR MIMO COMMUNICATIONS SYSTEMS.....	536
<i>Lieutenant Commander Robert Sellin ; Frank Kragh</i>	
A CODED MIMO SPATIAL MULTIPLEXING APPROACH WITH LOW-COMPLEXITY MATCHED-FILTER DETECTOR AND CRC-ASSISTED INTERFERENCE CANCELLATION	541
<i>Kentaro Masukawa ; Hideki Ochiai</i>	
DETECTING ADVERSARIAL EXAMPLES USING DATA MANIFOLDS.....	547
<i>Susmit Jha ; Uyeong Jang ; Somesh Jha ; Brian Jalaian</i>	
ON THE DEFENSE AGAINST ADVERSARIAL EXAMPLES BEYOND THE VISIBLE SPECTRUM.....	553
<i>Anthony Ortiz ; Olac Fuentes ; Dalton Rosario ; Christopher Kiekintveld</i>	
ADVERSARIAL EXAMPLES AGAINST THE DEEP LEARNING BASED NETWORK INTRUSION DETECTION SYSTEMS	559
<i>Kaichen Yang ; Jianqing Liu ; Chi Zhang ; Yuguang Fang</i>	
MACHINE LEARNING BASED DDOS DETECTION THROUGH NETFLOW ANALYSIS.....	565
<i>Jiangpan Hou ; Peipei Fu ; Zigang Cao ; Anlin Xu</i>	
ROBUST NEURAL MALWARE DETECTION MODELS FOR EMULATION SEQUENCE LEARNING.....	571
<i>Rakshit Agrawal ; Jack W. Stokes ; Mady Marinescu ; Karthik Selvaraj</i>	
DEEPGFL: DEEP FEATURE LEARNING VIA GRAPH FOR ATTACK DETECTION ON FLOW-BASED NETWORK TRAFFIC	579
<i>Yepeng Yao ; Liya Su ; Zhigang Lu</i>	
SOTA: SECURE OVER-THE-AIR PROGRAMMING OF IOT DEVICES.....	585
<i>Halim Burak Yesilyurt ; Hidayet Aksu ; Selcuk Uluagac ; Raheem Beyah</i>	
BLOCKCHAIN-EMPOWERED SECURE INTERNET -OF- BATTLEFIELD THINGS (IOBT) ARCHITECTURE.....	593
<i>Deepak K. Tosh ; Sachin Shetty ; Peter Foytik ; Laurent Njilla ; Charles A. Kamhoua</i>	
SECURE COMMUNICATIONS USING BLOCKCHAIN TECHNOLOGY.....	599
<i>Peter Menegay ; Jason Salyers ; Griffin College</i>	
A BRIEF INTRODUCTION TO NAMED DATA NETWORKING	605
<i>Alex Afanasyev ; Jeff Burke ; Tamer Refaei ; Lan Wang ; Beichuan Zhang ; Lixia Zhang</i>	
A BRIEF INTRODUCTION TO NDN DATASET SYNCHRONIZATION (NDN SYNC).....	612
<i>Tianxiang Li ; Wentao Shang ; Alex Afanasyev ; Lan Wang ; Lixia Zhang</i>	
PUBLISH/SUBSCRIBE VERSUS A CONTENT-BASED APPROACH FOR INFORMATION DISSEMINATION	619
<i>Frank T. Johnsen ; Lars Landmark ; Mariann Hauge ; Erlend Larsen ; Øivind Kure</i>	
NAC: AUTOMATING ACCESS CONTROL VIA NAMED DATA	626
<i>Zhiyi Zhang ; Yingdi Yu ; Sanjeev Kaushik Ramani ; Alex Afanasyev ; Lixia Zhang</i>	
ENABLING A DATA-CENTRIC BATTLEFIELD THROUGH INFORMATION ACCESS GATEWAYS.....	634
<i>Tamer Refaei ; Alex Afanasyev</i>	
NDN IMPACT ON TACTICAL APPLICATION DEVELOPMENT	640
<i>Jeff Burke ; Alex Afanasyev ; Tamer Refaei ; Lixia Zhang</i>	
TACTICAL ROUTER INTEROPERABILITY: CONCEPTS AND EXPERIMENTS.....	647
<i>Arjen Holtzer ; Ronald In'T Velt ; Floris Drijver ; Henning Rogge ; Jonathan Kirchhoff ; Christoph Barz ; Niels Van Adrichem ; Mariann Hauge</i>	
SECURE MULTI-DOMAIN INFORMATION SHARING IN TACTICAL NETWORKS.....	655
<i>Filippo Poltronieri ; Lorenzo Campioni ; Rita Lenzi ; Alessandro Morelli ; Niranjan Suri ; Mauro Tortonesi</i>	
ENABLING XEP-0258 SECURITY LABELS IN XMPP.....	661
<i>Juha Järvinen ; Aleksi Marttinen ; Risto Järvinen ; Per Carlén ; Marko Luoma ; Markus Peuhkuri ; Jukka Manner</i>	
DOES NATO NEED A BLOCKCHAIN?.....	667
<i>Konrad Wrona ; Michal Jarosz</i>	
FUNCTIONAL ANALYSIS OF CYBERSPACE OPERATIONS	673
<i>Alberto Domingo ; Manisha Parmar</i>	
DCIS CUBE: DEFINING ARCHITECTURE BUILDING BLOCKS FOR NEXT GENERATION DEPLOYABLE IT SYSTEMS	679
<i>Marc Van Selm ; Hermann Wietgreffe ; Joel Varanda ; Detlef Janezic</i>	

TIME SYNCHRONIZATION SEQUENCE WITH WEIGHTED CONJUGATE SYMMETRY PROPERTY FOR FBMC-OQAM SYSTEMS.....	685
<i>Liming Li ; Yang Wang ; Liqin Ding</i>	
RAKE RECEIVER FOR HF FILTER BANK MULTICARRIER SPREAD SPECTRUM SYSTEMS.....	691
<i>Stephen A. Laraway ; Hussein Moradi ; Behrouz Farhang-Boroujeny</i>	
EFFICIENT MULTIRATE FILTER BANK STRUCTURE WITH FULL SPECTRAL UTILIZATION FOR MULTICARRIER COMMUNICATIONS	697
<i>Ravi Kadlimatti ; Adly T. Fam</i>	
FILTER BANK MULTI-CARRIER SPREAD SPECTRUM WITH BIORTHOGONAL SIGNALING FOR HIGH SPEED DATA TRANSMISSION THROUGH HF SKYWAVE CHANNELS.....	703
<i>David B. Haab ; Hussein Moradi ; Behrouz Farhang-Boroujeny</i>	
PAPR ANALYSIS FOR DUAL-POLARIZATION FBMC	709
<i>Hosseinali Jamal ; David W. Matolak</i>	
EXPERIMENTAL COMPARISON OF FB-MC-SS AND DS-SS IN HF CHANNELS	714
<i>Stephen A. Laraway ; Jose Loera ; Hussein Moradi ; Behrouz Farhang-Boroujeny</i>	
SEPARATING TERRORIST-LIKE TOPOLOGICAL SIGNATURES EMBEDDED IN BENIGN NETWORKS.....	720
<i>Kshiteesh Hegde ; Malik Magdon-Ismail</i>	
EXPLOITING KNOWLEDGE ACROSS DISTINCT DOMAINS: LEARNING EVENT DETAILS FROM NETWORK LOGS.....	725
<i>Muchen Wu ; Charu Aggarwal ; Zhou Yu ; Ananthram Swami ; Prasant Mohapatra</i>	
UNCERTAINTY-BASED OPINION INFERENCE ON NETWORK DATA USING GRAPH CONVOLUTIONAL NEURAL NETWORKS	731
<i>Xujiang Zhao ; Feng Chen ; Jin-Hee Cho</i>	
THE INTERNET OF BATTLEFIELD THINGS: THE NEXT GENERATION OF COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE (C3I) DECISION-MAKING	737
<i>Stephen Russell ; Tarek Abdelzaher</i>	
ON TRACKING REALISTIC TARGETS IN A MEGACITY WITH CONTESTED DOMAIN ACCESS	743
<i>Jongdeog Lee ; Tarek Abdelzaher ; Hang Qiu ; Ramesh Govindan ; Kelvin Marcus ; Reginald Hobbs ; Niranjani Suri ; Will Dron</i>	
INVESTIGATING LORA FOR THE INTERNET OF BATTLEFIELD THINGS: A CYBER PERSPECTIVE	749
<i>Torkjel Sondrol ; Brian Jalaian ; Niranjani Suri</i>	
ENABLING EFFICIENT AND INTEROPERABLE CONTROL OF IOBT DEVICES IN A MULTI- FORCE ENVIRONMENT.....	757
<i>Filippo Poltronieri ; Laurel Sadler ; Giacomo Benincasa ; Timothy Gregory ; John M. Harrell ; Somiya Metu ; Christine Moulton</i>	
RADIO FREQUENCY IOT SENSORS IN MILITARY OPERATIONS IN A SMART CITY	763
<i>Aaron E. Cohen ; Gina G. Jiang ; David A. Heide ; Vincenzo Pellegrini ; Niranjani Suri</i>	
RUNTIME STATE VERIFICATION ON RESOURCE-CONSTRAINED PLATFORMS	768
<i>John Clemens ; Raj Pal ; Branden Sherrell</i>	
SHARING SUSCEPTIBLE PASSWORDS AS CYBER THREAT INTELLIGENCE FEED	774
<i>Iman Vakiliinia ; Sui Cheung ; Shamik Sengupta</i>	
SECURE PROXY-REENCRIPTION-BASED INTER-NETWORK KEY EXCHANGE.....	780
<i>Lloyd Greenwald ; Kurt Rohloff ; David Stott</i>	
AN EMPIRICAL UPPER BOUND ON SECRECY CAPACITY OF MULTIPATH FADING CHANNELS.....	786
<i>Sima Azizi ; Arash Komaee</i>	
SECRECY PERFORMANCE OF A RELAYING SYSTEM OVER NON-IDENTICAL FADING CHANNELS.....	792
<i>Xian Liu</i>	
DISTRIBUTED COHERENT GROUP COMMUNICATIONS	798
<i>Yi Shi ; Satya Ponnaluri ; Yalin E. Sagduyu ; Eric Van Doorn</i>	
INTER-NETWORK INTERFERENCE IN SYNCHRONIZED COOPERATIVE BROADCAST SYSTEMS	804
<i>Ulf Sterner ; Sara Linder ; Jan Nilsson ; Karina Fors</i>	
SOCIO-SPATIAL RESOURCE MANAGEMENT IN WIRELESS POWERED PUBLIC SAFETY NETWORKS.....	810
<i>Dimitrios Sikeridis ; Eirini Eleni Tsiropoulou ; Michael Devetsikiotis ; Symeon Papavassiliou</i>	
THE EFFECTS OF A UAV ON A TERRESTRIAL MANET	816
<i>Erlend Larsen ; Lars Landmark ; Øivind Kure</i>	

EMULATING WIRELESS NETWORKS WITH HIGH FIDELITY RF INTERFERENCE MODELING	822
<i>Thomas Schucker ; Tamal Bose ; Bo Ryu</i>	
SPATIAL MODULATION FOR IMPROVED EAVESDROPPING RESISTANCE IN MULTI- BEAM SATELLITE DOWNLINKS.....	829
<i>Stephan P. Winter ; Matthias G. Schraml ; Marcus T. Knopp ; Andreas Knopp</i>	
SYNCHRONOUS WAVEFORM CLOCK SYNCHRONIZATION WITHOUT A SYSTEM CONTROLLER.....	835
<i>George M. Vachula ; Mu-Cheng Wang ; Mario D Amico ; Gurpartap S. Takhar ; Steven Howard</i>	
PASSIVE CHANNEL ORTHOGONALITY MEASUREMENT TECHNIQUE FOR MIMO SATCOM.....	841
<i>Balachander Ramamurthy ; Robert T. Schwarz ; William G. Cowley ; Gerald Bolding ; Andreas Knopp</i>	
RESILIENT SATELLITE COMMUNICATIONS WITH AUTONOMOUS MULTI-MODEM ADAPTER.....	847
<i>Rajeev Gopal</i>	
SATELLITE DOWNLINK JAMMING PROPAGATION MEASUREMENTS AT KU-BAND.....	853
<i>Christian A. Hofmann ; Andreas Knopp</i>	
LATENCY ANALYSIS FOR MATCHED FILTER BASED DETECTION OF WEAK SIGNALS.....	859
<i>Richard M. Gutierrez ; Arindam Dutta ; Daniel W. Bliss</i>	
DEALING WITH PARTIAL OBSERVATIONS IN DYNAMIC SPECTRUM ACCESS: DEEP RECURRENT Q-NETWORKS	865
<i>Y. Xu ; J. Yu ; R. M. Buehrer</i>	
APPLYING PERIODIC RETRAINING TO SURVIVAL ANALYSIS-BASED DYNAMIC SPECTRUM ACCESS ALGORITHMS.....	871
<i>Michael V. Lipski ; Ram M. Narayanan</i>	
ON THE PERFORMANCE OF SINGLE-CHANNEL SOURCE SEPARATION OF TWO CO- FREQUENCY PSK SIGNALS WITH CARRIER FREQUENCY OFFSETS.....	877
<i>Xiao-Bei Liu ; Yong Liang Guan ; Soo Ngee Koh ; Teo Kok Ann Donny ; Zilong Liu</i>	
DOUBLY-SELECTIVE CHANNEL ESTIMATION FOR CONTINUOUS PHASE MODULATION	882
<i>Romain Chayot ; Nathalie Thomas ; Charly Poulliat ; Marie-Laure Bouchcret ; Nicolas Van Wambeke ; Guy Lesthievant</i>	
A MULTI-BRANCH LINEAR AMPLIFICATION WITH NONLINEAR COMPONENTS TECHNIQUE.....	888
<i>João Guerreiro ; Rui Dinis ; Paulo Montezuma ; João P. Oliveira ; Mário Silva</i>	
RF PHOTONIC EQUALIZATION USING STIMULATED BRILLOUIN SCATTERING	893
<i>Elliott Grafer ; George Miles ; Alex Cramer ; Anthony Klee ; Charles Middleton ; Richard Desalvo</i>	
FREQUENCY ESTIMATION FOR BURST COMMUNICATION BASED ON IRREGULAR REPETITION OF DATA SYMBOLS	896
<i>Alptekin Yilmaz ; Mustafa Kesal ; Furuzan Atay Onat</i>	
IOT DEVICES FINGERPRINTING USING DEEP LEARNING.....	901
<i>Hossein Jafari ; Oluwaseyi Omotere ; Damilola Adesina ; Hsiang-Huang Wu ; Lijun Qian</i>	
DECENTRALIZED PUBLIC KEY INFRASTRUCTURE FOR INTERNET-OF-THINGS.....	907
<i>Jongho Won ; Ankush Singla ; Elisa Bertino ; Greg Bollella</i>	
EXECUTING ANALYTICS AND FUSION WORKLOADS ON TRANSIENT COMPUTING RESOURCES IN TACTICAL ENVIRONMENTS.....	914
<i>Ahmed Ali-Eldin ; Deepak Ganesan ; Heesung Kwon ; Benjamin Marlin ; Prashant Shenoy ; Mani Srivastava ; Don Towsley</i>	
MULTI-STAGE ATTACK DETECTION USING CONTEXTUAL INFORMATION	920
<i>Franciso J. Aparicio-Navarro ; Konstantinos G. Kyriakopoulos ; Ibrahim Ghafir ; Sangarapillai Lambotharan ; Jonathon A. Chambers</i>	
OS INDEPENDENT AND HARDWARE-ASSISTED INSIDER THREAT DETECTION AND PREVENTION FRAMEWORK	926
<i>Enes Erdin ; Hidayet Aksu ; Selcuk Uluagac ; Micheal Vai ; Kemal Akkaya</i>	
AUTOMATIC CONSTRUCTION OF ATTACK GRAPHS IN CYBER PHYSICAL SYSTEMS USING TEMPORAL LOGIC	933
<i>Mark Moulin ; Emeka Eyisi ; Devu Manikantan Shila ; Qinqing Zhang</i>	
PATCHSWEETNER: EXPLOIT DETECTION THROUGH THE AUTOMATIC TRANSFORMATION OF SECURITY PATCHES	939
<i>Adriaan Larmuseau ; Devu Shila</i>	
UTILIZING NFV FOR EFFECTIVE MOVING TARGET DEFENSE AGAINST LINK FLOODING RECONNAISSANCE ATTACKS.....	946
<i>Abdullah Aydeger ; Nico Saputro ; Kemal Akkaya</i>	

LATTE: LARGE-SCALE LATERAL MOVEMENT DETECTION	952
<i>Qingyun Liu ; Jack W. Stokes ; Rob Mead ; Tim Burrell ; Ian Hellen ; John Lambert ; Andrey Marochko ; Weidong Cui</i>	
ATTRIBUTE BASED ENCRYPTION FOR INFORMATION SHARING ON TACTICAL MOBILE NETWORKS	960
<i>Jim Luo ; Qiuxiang Dong ; Dijiang Huang ; Myong Kang</i>	
CUSTOMIZATION MODES FOR THE HARRIS MK-3 AUTHENTICATED ENCRYPTION ALGORITHM	966
<i>Peter Bajorski ; Alan Kaminsky ; Michael Kurdziel ; Marcin Lukowiak ; Stanislaw Radziszowski</i>	
DRONECRYPT - AN EFFICIENT CRYPTOGRAPHIC FRAMEWORK FOR SMALL AERIAL DRONES	971
<i>Muslum Ozgur Ozmen ; Attila A. Yavuz</i>	
ACHIEVING PERFECT SECRECY WITH ONE BIT KEYS	977
<i>Mohsen Karimzadeh Kiskani ; Hamid R. Sadjadpour</i>	
ARRAY-BASED STATISTICAL ANALYSIS OF THE MK-3 AUTHENTICATED ENCRYPTION SCHEME	983
<i>Peter Bajorski ; Alan Kaminsky ; Michael Kurdziel ; Marcin Lukowiak ; Stanislaw Radziszowski</i>	
A NEW LIGHTWEIGHT TWO-PARTY KEY AGREEMENT PROTOCOL DEFINED ON UNDERDETERMINED SYSTEMS OF POLYNOMIAL EQUATIONS FOR PROBABLE SECURITY	989
<i>Jun Liu</i>	
OPENSDC: A NOVEL, GENERIC DATAPATH FOR SOFTWARE DEFINED COALITIONS	995
<i>Qiao Xiang ; Franck Le ; Yeon-Sup Lim ; Vinod K. Mishra ; Christopher Williams ; Y. Richard Yang ; Hongwei Zhang</i>	
CONTROL PLANE PERFORMANCE IN TACTICAL SOFTWARE DEFINED NETWORKS	1001
<i>Joakim Flathagen ; Ole Ingar Bentstuen</i>	
AN ENVIRONMENT FOR TACTICAL SDN EXPERIMENTATION	1007
<i>Kelvin M. Marcus ; Kevin S. Chan ; Rommie L. Hardy ; Paul L. Yu</i>	
SOFTWARE DEFINED MULTI-PATH TCP SOLUTION FOR MOBILE WIRELESS TACTICAL NETWORKS	1013
<i>Qi Zhao ; Pengyuan Du ; Mario Gerla ; Adam J. Brown ; Jae H. Kim</i>	
CHIL: COMMON-MODEM HARDWARE INTEGRATED LIBRARY	1019
<i>Ryan Murphy ; Ben Barnett ; Landon Wagner ; Jeffrey Wildman ; Leonid Veytser ; David Wiggins ; Scott Buscemi ; Tim Arganbright ; Steve Clark ; Bow-Nan Cheng</i>	
ENHANCING THE COMMON-MODEM HARDWARE INTEGRATED LIBRARY (CHIL) FRAMEWORK	1025
<i>Jeffrey Wildman ; Thomas Capuano ; David Wiggins ; Leonid Veytser ; Omar Salama ; Robert Spaanenburg ; Jason Hillger ; Bow-Nan Cheng</i>	
TOWARDS RAPID WAVEFORM DESIGN AND DEPLOYMENT VIA MODULAR SIGNAL PROCESSING FRAMEWORKS	1031
<i>Jeffrey Wildman ; Scott Moore ; Leonid Veytser ; Thomas Capuano ; Jon Shapiro ; Jason Hillger ; Bow-Nan Cheng</i>	
IMAGE CLASSIFICATION ON THE EDGE FOR FAST MULTI-CAMERA OBJECT TRACKING	1037
<i>Nick Nordlund ; Heesung Kwon ; Geeth Ranmal De Mel ; Leandros Tassioulas</i>	
STATE ESTIMATION FOR TACTICAL NETWORKS: CHALLENGES AND APPROACHES	1042
<i>Roberto Fronteddu ; Alessandro Morelli ; Mattia Mantovani ; Blake Ordway ; Lorenzo Campioni ; Niranjana Suri ; Kelvin M. Marcus</i>	
ON COOPERATIVE BROADCAST IN MANETS WITH IMPERFECT CLOCK SYNCHRONIZATION	1049
<i>Serdar Sahin ; Antonio Maria Cipriano ; Charly Poulliat ; Marie-Laure Boucheret</i>	
HOW TO INTRODUCE A NARROWBAND IOT SOLUTION TO AN EXISTING WIRELESS COMMUNICATIONS SYSTEM	1056
<i>Cagri Goken ; Guven Yenihayat ; Tolga Numanoglu</i>	
POWER OPTIMIZATION FOR ENERGY EFFICIENT WIRELESS COMMUNICATIONS USING HYBRID-ARQ	1062
<i>Yi Li ; Wenhao Xiong ; Nichole Sullivan ; Genshe Chen ; Biao Chen ; Gregory Hadynski ; Clifden Banner ; Yiran Xu ; Xin Tian</i>	
NORMALIZED MATCHED FILTER FOR BLIND INTERFERENCE SUPPRESSION	1068
<i>Taylor Sibbett ; Hussein Moradi ; Behrouz Farhang-Boroujeny</i>	
MULTI-DOMAIN INTEGRATION AND CORRELATION ENGINE	1074
<i>William Dron ; Andrew Hunter ; Ali Sydney ; Siddharth Pal ; John Hancock ; Lisa Scott ; Tarek Abdelzaher ; Jiawei Han ; Sibel Adali ; Benjamin Horne</i>	

LEARNING SERVICE SEMANTICS FOR SELF-ORGANIZATION IN DISTRIBUTED ENVIRONMENTS: CONCEPTS AND RESEARCH DIRECTIONS	1080
<i>Graham Bent ; Geeth De Mel ; Raghu Ganti ; Tom La Porta ; Gavin Pearson ; Tien Pham ; Sebastian Stein ; Leandros Tassiulas ; Ian Taylor</i>	
LEARNING ORDINAL INFORMATION UNDER BIPARTITE STOCHASTIC BLOCK MODELS.....	1086
<i>Xiao Xu ; Qing Zhao ; Ananthram Swami</i>	
Author Index	