

# TECHNICAL PROGRAM TRACK COLOR KEY

The Technical Program is composed of eleven tracks. As you will see on the following pages, each track has its own color and an acronym.

TRACK NAME	ACRONYM
Advanced Communications Technologies	ACT
Information Assurance and Security	IAS
Interoperability, Services, and Standards	ISS
Modulation, Coding, and Signal Processing	MCS
Network Architecture Protocols and Management	NAPM
Network Centric Systems and Simulation	NCS
Radio Systems and Architectures	RSA
Satellite, Airborne, and Space	SAS
Situation Management	SIMA
Wireless Mobile Communications	WMC
Wireless and Sensor Networks	WSN

## Steering Committee

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Dr. Ken Young, *Telcordia Technologies*

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Professor John M. Shea, *University of Florida*

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Dr. Jeff Wysocarski, *MIT Lincoln Laboratory*

**WMC** Prof. Geoffrey Li, *Georgia Tech*

**SIMA** Dr. Gabriel Jakobson, *Altusys*

# UNCLASSIFIED SESSIONS

The MILCOM 2007 Team would like to acknowledge the Unclassified and Classified Technical Program Session Organizers and Chairs for their efforts in organizing the technical program.

	ACT	IAS	ISS	MCS	NAPM	NCS	RSA	SAS	SIMA	WMC	WSN
<b>10-29 MONDAY MORNING</b>	ACT-3 ACT-6 ACT-8	IAS-1		MCS-7 MCS-8	NAPM-2 NAPM-7	NCS-3 NCS-4	RSA-3 RSA-6	SAS-2 SAS-10		WMC-3 WMC-9	WSN-15
<b>10-29 MONDAY AFTERNOON</b>	ACT-1 ACT-2	IAS-2	ISS-1	MCS-2 MCS-3	NAPM-1	NCS-1 NCS-7	RSA-2	SAS-1 SAS-7		WMC-1 WMC-10	WSN-3 WSN-8 WSN-12
<b>10-30 TUESDAY MORNING</b>	ACT-4 ACT-9 ACT-12	IAS-3	ISS-2	MCS-4 MCS-11	NAPM-4	NCS-2 NCS-5	RSA-1	SAS-5	SIMA-1	WMC-2	WSN-4 WSN-9
<b>10-30 TUESDAY AFTERNOON</b>	ACT-5 ACT-7	IAS-4		MCS-1 MCS-6		NCS-8 NCS-9 NCS-12	RSA-5	SAS-8 SAS-9	SIMA-2 SIMA-3	WMC-4	WSN-2 WSN-5 WSN-10
<b>10-31 WEDNESDAY MORNING</b>	ACT-11	IAS-5	ISS-3	MCS-5 MCS-9	NAPM-3 NAPM-6	NCS-6 NCS-10	RSA-4	SAS-3 SAS-6		WMC-5 WMC-6	WSN-6 WSN-11 WSN-16
<b>10-31 WEDNESDAY AFTERNOON</b>	ACT-10	IAS-6		MCS-10	NAPM-5	NCS-11 NCS-13	RSA-7	SAS-4		WMC-7 WMC-8	WSN-1 WSN-7 WSN-13 WSN-14

## MONDAY, 29 October 2007

**ACT-3****CDL and TDL Communication Developments**

Monday 9:30 a.m.–noon  
Tallahassee 1

The session describes the latest innovations for the Common Data Link (CDL) and Tactical Datalink Systems (TDL) to support wideband communication links. The papers focus on the transition of CDL to support a logical transition of the well established waveform into both SATCOM and Tactical data communications. Additionally, new techniques are allowing wideband operations of the traditional narrowband TDLs, thus enabling them to meet the growing bandwidth needs of the network centric user.

**Session Organizer/Chair:** Jim Bachelor, *Harris Corporation*

**ACT-3.1 Exchanging Link 16 CoT Messages and U.S. Army ABCS Messages Via Pass**

Ashley Elledge, *The MITRE Corporation*  
Terrance Zimmerman, *The MITRE Corporation*  
Bruce Robinson, *The MITRE Corporation*  
Jasen Jacobsen, *The MITRE Corporation*

**ACT-3.2 Next Generation Half-Duplex Common Data Link**

Jiankan Yang, *Cubic Defense Applications*  
John Boyd, *Cubic Defense Applications*  
Jennifer Schlenzig, *Cubic Defense Applications*  
David Laney, *Cubic Defense Applications*

**ACT-3.3 TACSAT 3 CDL Communications—A Communications Link for Mission Utility**

Richard Galindez, *L-3 Communications, CSW*  
Thom Davis, *AFRL-VSE*  
Brent Ovard, *L-3 Communications, CSW*

**ACT-3.4 RF Communications Design Optimization Using Genetic Algorithms Applied to IRFDE**

Jon Hauris, *BAE Systems*  
Jeremy Micel, *BAE Systems*  
Cahit Ozbay, *BAE Systems*  
James Chi, *BAE Systems*  
Donya He, *BAE Systems*

**ACT-3.5 Propagation Measurements and Modelling for Multiband Communications on Tactical VHF Channels**

Jeff Pugh, *CRC*  
Robert Bultitude, *CRC*  
Phil Vigneron, *CRC*

**ACT-6****Waveforms for Tactical Networks**

Monday 9:30 a.m.–noon  
Tallahassee 2

This session focuses on the design considerations and performance of next generation waveforms for tactical wireless networking. Requirements to be satisfied include robustness to interference and jamming, variable throughput, spectral occupancy limitations, IP traffic, and other factors impacted by an evolving network.

**Session Organizers/Chairs:** Colin Brown, *CRC*, & Dr. Phil Vigneron, *CRC*

**ACT-6.1 Sinusoidal SBPSK Modulation Waveform for UHF SATCOM Channels With Improved Adjacent Channel Emissions**

Madjid Belkerdid, *Mnemonics Inc.*  
TJ Mears, II, *Mnemonics Inc.*

**ACT-6.2 Implementing Mobile Ad Hoc Networking (MANET) Over Legacy Tactical Radio Links**

Haidong Wang, *Thales Communications, Inc.*  
Brian Crilly, *Thales Communications, Inc.*  
Wei Zhao, *Thales Communications, Inc.*  
Chris Autry, *Scientific Research Corporation*  
Sean Swank, *Scientific Research Corporation*

**ACT-6.3 Low Spectral Efficiency Trellis Coded Modulation Systems in a Pulse-Noise Interference Environment**

Konstantinos Pyloudis, *Naval Postgraduate School*  
Clark Robertson, *Naval Postgraduate School*  
Frank Kragh, *Naval Postgraduate School*  
Tri Ha, *Naval Postgraduate School*

**ACT-6.4 Spectrally Efficient Digital Modulation Using New Pulse Shapes**

Frank Kragh, *Naval Postgraduate School*  
Chee Wei Nga, *Naval Postgraduate School*  
Douglas Hermes, *Naval Postgraduate School*  
R. Clark Robertson, *Naval Postgraduate School*

**ACT-6.5 Coherent mMCSK-mMFSK Modulation in Rayleigh Fading Channel**

Ari Pouttu, *University of Oulu, Centre for Wireless Communications*  
Harri Saarnisaari, *University of Oulu, Centre for Wireless Communications*  
Savo Glisic, *University of Oulu, Telecommunication Laboratory*

# UNCLASSIFIED SESSIONS

## ACT-8

### Network Coding: Recent Developments

Monday 9:30 a.m.–noon  
Tallahassee 3

Network coding and cooperative communications represent two emerging fields of research which possess not only theoretical implications but also practical applications to future multi-hop communications and networks. Although these fields have distinct origins and findings, network coding and cooperative communications both illustrate the potential benefits of cooperation among network nodes in improving performance at various layers in multi-hop networks.

**Session Organizer/Chair:** Dr. John D. Choi, *MIT Lincoln Laboratory*

#### ACT-8.1 On Network Coding for Security

Muriel Medard, *Massachusetts Institute of Technology*  
Ralf Koetter, *Technical University Munich*  
Han Keesook, *AFRL*

Tracey Ho, *California Institute of Technology*  
Fang Zhao, *Massachusetts Institute of Technology*

#### ACT-8.2 On the Coding-Link Cost Tradeoff in Network Coding

Minkyu Kim, *Massachusetts Institute of Technology*  
Muriel Medard, *Massachusetts Institute of Technology*  
Varun Aggarwal, *Massachusetts Institute of Technology*  
Una-May O'Reilly, *Massachusetts Institute of Technology*

#### ACT-8.3 Achievable Rates of Network Coding on the Exchange Channel

Yonggang Hao, *University of Massachusetts*  
Zhiguo Ding, *Imperial College*  
Dennis Goeckel, *University of Massachusetts*  
Donald Towsley, *University of Massachusetts*  
Kin Leung, *Imperial College*

#### ACT-8.4 Concatenated Random Parity Forwarding in Large-Scale Wireless Relay Networks

Sang Kim, *Iowa State University*

#### ACT-8.5 Attack Resilient Network Channel Code for the Wireless Multiple Access Relay Network

Cheng-Chun Chang, *Ph.D. Student, University of Pittsburgh*  
Heung-No Lee, *Professor, University of Pittsburgh*

#### ACT-8.6 A Queueing Model for Random Linear Coding

Brooke Shrader, *University of Maryland*  
Anthony Ephremides, *University of Maryland*

## IAS-1

### Security Technologies-1

Monday 9:30 a.m.–noon  
Tampa 1

This session focuses on security technologies and risk assessment methodologies that are relevant to computer networks and communications systems but not specific to wireless technologies or Military systems. In particular, papers on homeland security applications were solicited.

**Session Organizers:** Dr. Richard Lippmann, *MIT Lincoln Laboratory*, & Dr. Peter Sholander, *Sandia National Laboratories*

**Session Chair:** Dr. Peter Sholander, *Sandia National Laboratories*

#### IAS-1.1 Next Generation HoneyNet Technology With Real-Time Forensics for U.S. Defense

Alen Capalik, *NeuralIQ, Inc.*

#### IAS-1.2 Verified Enforcement of Security Policies for Cross-Domain Information Flows

Simon Tsang, *Telcordia Technologies, Inc.*  
Michael Hicks, *University of Maryland*  
Nikhil Swamy, *University of Maryland*

#### IAS-1.3 Guidelines for Reference Monitors in Embedded INFOSEC Applications

David Vallese, *Harris Corporation*

#### IAS-1.4 Tuning Intrusion Detection To Work With a Two-Encryption Key Version of IPsec

Ahren Studer, *MIT Lincoln Laboratory and Carnegie Mellon University*  
Richard Lippmann, *MIT Lincoln Laboratory*  
Cynthia McLain, *MIT Lincoln Laboratory*

#### IAS-1.5 MDL Compress for Intrusion Detection: Signature Inference and Masquerade Identification

Scott Evans, *GE Research*  
Adam Laczko, *Lockheed Martin*  
Jeremy Impson, *Lockheed Martin*

#### IAS-1.6 Simulating the National Telephone Network: A Socio-technical Approach to Assessing Infrastructure Criticality

Venkatesh Ramaswamy, *Los Alamos National Laboratory*  
Stephan Eidenbenz, *Los Alamos National Laboratory*  
Sunil Thulasidasan, *Los Alamos National Laboratory*  
Phil Romero, *Los Alamos National Lab*  
Leticia Cuellar, *Los Alamos National Laboratory*

**MCS-7****Spread Spectrum and CDMA**

Monday  
Tampa 2

9:30 a.m.–noon

This section consists of six papers describing CDMA systems with respect to the estimation methods, bit error rate for multiuser MC-CDMA systems. Some of the latest technologies such as LDPC coded MC-CDMA are discussed. The cooperative communication networks for parallel spreading of CDMA systems is also given.

**Session Organizer:** Dr. Kesh Bakhru, *Cubic Defense Systems*

**Session Chair:** Prof. Matti Latva-aho, *University of Oulu, Finland*

**MCS-7.1 LMSE-Based Parameter Acquisition for Multicarrier CDMA Systems**

James Lehnert, *School of ECE, Purdue University*  
Shun-Te Tseng, *School of ECE, Purdue University*

**MCS-7.2 An Efficient Channel Impulse Response Estimation Method for DS-CDMA Communications**

Mark Takatz, *University of Colorado, Colorado Springs*  
Rodger Ziemer, *University of Colorado, Colorado Springs*

**MCS-7.3 Bit Error Rate Analysis of Multiuser and Space-Time Coded MC-CDMA Systems**

Bijan Golkar, *Carleton University*  
Florence Danilo-Lemoine, *Carleton University*

**MCS-7.4 Performance of LDPC-Coded MC-CDMA System With Constant Envelope Spread Sequences**

Jun Luo, *Florida International University*  
Jean H. Andrian, *Florida International University*  
Chi Zhou, *Illinois Institute of Technology*

**MCS-7.5 Window Selection for Multicarrier CDMA Systems With an MMSE Receiver**

Shun-Te Tseng, *School of ECE, Purdue University*  
James Lehnert, *School of ECE, Purdue University*

**MCS-7.6 Cooperative Communication Network With Parallel Spreading for MC-CDMA Systems**

Hyungwon Park, *Graduate School, Ajou University*  
Jaesung Lim, *Graduate School, Ajou University*

**MCS-8****Advanced Modulation Theory and Practice**

Monday  
Sanibel 1

9:30 a.m.–noon

The design of efficient modulation and demodulation techniques has been extensively studied over the years. However, there is often a disconnect between the design of modulation techniques and their application in systems with real channels, circuits, and system constraints. This session focuses on the intersection of theory and practice. The papers cover modulation selection for wireless sensor networks with energy constraints and imperfect channel information, performance and with nonlinear and unbalanced amplification, design of modulation for underwater and ionospheric channels, and design of hardware structures for SNR estimation.

**Session Organizer:** Prof. Tan F. Wong, *University of Florida*

**Session Chair:** Dr. Fred Block, *MIT Lincoln Laboratory*

**MCS-8.1 Signaling With Imperfect Channel State Information: A Battery Efficiency Comparison**

Fengzhong Qu, *University of Florida*  
Dongliang Duan, *University of Florida*  
Liuqing Yang, *University of Florida*  
Ananthram Swami, *U.S. Army Research Lab*

**MCS-8.2 Analysis of Adaptive Automatic Gain Control for Nonlinearly Amplified 16-QAM**

Eugene Grayver, *The Aerospace Corporation*  
Neil Morgan, *The Aerospace Corporation*

**MCS-8.3 Code-Aided Adaptive Decorrelator for IQ Imbalance Compensation for Iterative Receivers in Flat Fading Channels**

Raghunath Cherukuri, *University of Texas, Dallas*  
Poras Balsara, *University of Texas, Dallas*

**MCS-8.4 Channel Estimation and Phase-Correction for Robust Underwater Acoustic Communications**

Rosa Zheng, *University of Missouri–Rolla*  
Chengshan Xiao, *University of Missouri–Columbia*

**MCS-8.5 Multi-Carrier Techniques Performance on Ionospheric Channel for Delay-Sensitive Applications**

Javier Lopez-Perez, *Universidad de Las Palmas de Gran Canaria*  
Santiago Zazo-Bello, *Universidad Politecnica de Madrid*  
Ivan Perez-Alvarez, *Universidad de Las Palmas de Gran Canaria*  
Ivana Raos, *Universidad Politecnica de Madrid*  
Eduardo Mendieta-Otero, *Universidad de Las Palmas de Gran Canaria*

**MCS-8.6 A Simple Hardware Structure for SNR Estimation**

Sungmoon Yeo, *Chonbuk National University*  
Sooyoung Kim, *Chonbuk National University*  
Eunwoo Park, *Chonbuk National University*  
Do Seob Ahn, *Electronics & Telecommunications Research Institute*  
Jong Yeol Lee, *Chonbuk National University*

# UNCLASSIFIED SESSIONS

## NAPM-2

### Network Management-1

Monday  
Sanibel 2

9:30 a.m.–noon

This section focuses on the monitoring and management of enterprise systems with emphasis on the management issues inherent in mobile and tactical networks.

**Session Organizer/Chair:** Prof. John Hoag, *Ohio University*

#### NAPM-2.1 Metrics for End-to-End Monitoring and Management of Enterprise Systems

Paul Hershey, *HAI, A Raytheon Company*  
Donald Runyon, *HAI, A Raytheon Company*  
Yangwei Wang, *DISA*

#### NAPM-2.2 Explicit Rate Flow Control in Metro Ethernet Networks

Deepak Kataria, *Agere Systems*  
Chengzhou Li, *Agere Systems*

#### NAPM-2.3 Defining Availability for High-Rate Data Links With Fading

Thomas Shake, *MIT Lincoln Laboratory*

#### NAPM-2.4 Managing Communication Resources in Live, Virtual, and Constructive Training Environments

Stephanie Lackey, *Naval Air Warfare Center Training Systems Division*  
Christopher Sprague, *Naval Air Warfare Center Training Systems Division*  
David Kotick, *Naval Air Warfare Center Training Systems Division*  
Linda Malone, *University of Central Florida*

#### NAPM-2.5 GBS IPv6 Pilot Milestone Objective 2: Secure Integration of IPv6 Across Operational DoD Networks

Kathir Ramaswami, *Booz Allen Hamilton*  
Brian Myers, *Booz Allen Hamilton*  
Bruce Bennett, *Defense Information Systems Agency*  
Michael Skowrunski, *Booz Allen Hamilton*

#### NAPM-2.6 Efficient Tradeoff of Restricted Epidemic Routing in Mobile Ad Hoc Networks

Seung Keun Yoon, *ECE, Cornell University*  
Zygmunt J. Haas, *ECE, Cornell University*

## NAPM-7

### IPv6 in Military Networks

Monday  
Sanibel 3

9:30 a.m.–noon

There is a mandate within DoD to migrate all communication systems to IPv6. This session focuses on some of the challenges, both practical and theoretical, facing the system developer and will cover lessons learned and will provide examples of pilot programs that have already begun the migration process. Papers

discussing security issues, transition techniques and testbeds/pilot programs will be presented.

**Session Organizer/Chair:** Larry Levine, *U.S. Army CERDEC, Space and Terrestrial Communications Directorate*

#### NAPM-7.1 IPv6 Protocol Security Assessment

Cynthia Martin, *SI International*  
Jeff Dunn, *Netstar-1*

#### NAPM-7.2 Implementing IPv6 on an Army Installation

Trace Gunsch, *U.S. Army ISEC-TIC*

#### NAPM-7.3 IPv6 Experimental Results Portend Operational Benefits for Military Systems

Thomas Walsh, *U.S. Army PD CHS/Northrop Grumman*  
Joyce Kerr, *U.S. Army PD CHS/SRI International*  
Ashok Jain, *PD CHS*

#### NAPM-7.4 Performance and Scaling of Wireless Ad Hoc IPv6 Stateless Address Autoconfiguration Under Mobile Gateways

Jeffrey Wildman, *Drexel University*  
David Hamel, *Drexel University*  
Dan Oakum, *Drexel University*  
Ryan Measel, *Drexel University*  
Steven Weber, *Drexel University*  
Moshe Kam, *Drexel University*

#### NAPM-7.5 Role of the Mobile IPv6 in DoD Service Oriented Architecture

Derya Cansever, *SI International*  
Carl Williams, *SI International*  
Junaid Islam, *Piano Networks*

#### NAPM-7.6 IPv6 = From Concept to Field Trials

Mitchell Mayer, *U.S. Army CERDEC/S&TCD*  
Kwai Chan, *U.S. Army CERDEC/S&TCD*  
Bob Grillo, *SRI Corporation*  
Edward Thomas, *Northrop Grumman Corporation*

## NCS-3

### Black Core Networks

Monday  
Sarasota 1

9:30 a.m.–noon

The black core networks entail networks that require all data to remain encrypted as it is transported across the core. Additionally, core component networks are directly connected, thus there is inter-working of routing and quality of service across the core. Advantages of the black networks core include the maintenance of end-to-end security services across the core, while disadvantages of a black core include the difficulty in applying perimeter protection at the edge of each administrative domain and scalability of the resulting network. This session introduces the latest research and analysis of the GIG when implementing black core architecture concepts and introduces new proposed concepts.

**Session Organizers/Chairs:** Dr. Bharat Doshi, *Johns Hopkins University, Applied Physics Laboratory*, & Dr. Kimberly S. King, *The MITRE Corporation*

## NCS-3.1 Defining the Core

Julie Tarr, *OSD-NII*

Antonio De Simone, *OSD-NII*

## NCS-3.2 Protecting Premium Traffic in Colorless Core Backbone: Test Results

Mitesh Patel, *U.S. Army CERDEC*

Jeffrey Bowcock, *U.S. Army CERDEC*

Aristides Staikos, *U.S. Army CERDEC*

## NCS-3.3 Approaches to Using Performance Enhancing Proxies in the GIG Black Core

Michael Molinari, *Booz Allen Hamilton*

Jonah Pezeshki, *Booz Allen Hamilton*

## NCS-3.4 An Analytical Modeling Approach for a Large Scale Mobile Ad Hoc Network

Junghoon Lee, *XPRT Solutions, Inc.*

## NCS-4

### GIG Tactical Edge and Sensor Networks

Monday

9:30 a.m.–noon

Sarasota 2

In a tactical environment networked communication systems are stressed by channel bandwidth and throughput limitations, channel impairments, and mobility. Mobile ad hoc networks offer one class of solution—self-forming, self-healing, distributed systems. This session addresses the communications networks and sensor networks at the tactical edge.

**Session Organizers:** William Carmichael, *Rockwell Collins*, & Dr. Bassam “Sam” Farroha, *Johns Hopkins University, Applied Physics Laboratory*

**Session Chair:** Dr. Robert Butler, *Rockwell Collins*

## NCS-4.1 Advances in Ad Hoc Network Design—the Network Engineering Design and Analysis Tool (NEDAT)

Charles Graff, *U.S. Army REDECOM, CERDEC-STCD*

## NCS-4.2 Seamless Soft Handoff in Wireless Battlefield Networks Using Local and Remote LFAPS

Ibrahim Hokelek, *Telcordia Technologies, Inc.*

Mariusz A. Fecko, *Telcordia Technologies, Inc.*

Provin Gurung, *Telcordia Technologies, Inc.*

Sunil Samtani, *Telcordia Technologies, Inc.*

John Sucec, *Telcordia Technologies, Inc.*

Aristides Staikos, *U.S. Army CERDEC*

Jeffrey Bowcock, *U.S. Army CERDEC*

Zhensheng Zhang, *San Diego Research Center, Inc.*

## NCS-4.3 Scatterable Sensor Networks for Network-Centric Warfare Applications

Kenneth Viall, *U.S. Army*

## NCS-4.4 A Lightweight Location-Aware Position Update Scheme for High Mobility Battlefield Networks

Ratul Guha, *University of Pennsylvania*

Yibei Ling, *Telcordia Technologies*

Wai Chen, *Telcordia Technologies*

## NCS-4.5 Clock Sampling Mutual Network Synchronization for Mobile Multihop Wireless Ad Hoc Networks

Carlos Rentel, *Eaton Corp.*

Thomas Kunz, *Carleton University*

## NCS-4.6 Detecting and Mitigating DoS Attacks in Wireless Networks Without Affecting the Normal Behaving Nodes

Yi Xu, *North Carolina State University*

Wenye Wang, *North Carolina State University*

## RSA-3

### Cognitive Radio Technology-1

Monday

9:30 a.m.–noon

Sarasota 3

Cognitive Radio technology is gaining momentum as an enabler for enhancing and extending radio system capabilities and performance. Much of the initial technology focus has been in the area of dynamic spectrum access, as evidenced the DAPRA NeXt Generation (XG) program and the IEEE Dynamic Spectrum Access and Networking (DySPAN) Conferences and related IEEE SCSA41 working groups. The growth of this technology for military communications is evidenced by the substantial number of paper submissions resulting in three Cognitive Radio Technology paper sessions.

**Session Organizer/Chair:** Dr. Vincent Kovarik, *Harris Corporation*

## RSA-3.1 Multiple Access-Inspired Cooperative Spectrum Sensing for Cognitive Radio

Chia-han Lee, *Princeton University*

Wayne Wolf, *Georgia Institute of Technology*

## RSA-3.2 Dynamic Spectrum Access Enabled DoD Net-Centric Spectrum Management

Kevin Zhang, *The MITRE Corporation*

Darcy Swain, *The MITRE Corporation*

Mary Lin, *DISA*

## RSA-3.3 Satellite Assisted Spectrum Agility Concept

Suzan Bayhan, *SATLAB, Bogazici University*

Gurkan Gur, *SATLAB, Bogazici University*

Fatih Alagoz, *SATLAB, Bogazici University*

## RSA-3.4 Transmission Power and Capacity of Secondary Users in a Dynamic Spectrum Access Network

Juite Hwu, *State University of New York at Binghamton*

Fan Ng, *State University of New York at Binghamton*

Xiaohua Li, *State University of New York at Binghamton*

# UNCLASSIFIED SESSIONS

## **RSA-3.5 Secondary User Cooperation Access Scheme in Opportunistic Cognitive Radio Networks**

Zhiyao Ma, EE, *Tsinghua University*  
Zhigang Cao, EE, *Tsinghua University*

## **RSA-3.6 A Cognitive Spectrum Assignment Protocol Using Distributed Conflict Graph Construction**

Subir Biswas, *Michigan State University*  
Tao Wu, *Michigan State University*  
Anthony Plummer Jr., *Michigan State University*

## **RSA-6**

### **Joint Tactical Radio Systems—Technologies and Advanced Concepts**

Monday 9:30 a.m.–noon  
Miami 1

The paper mini-session provides key, descriptive insights into the JTRS program, the SCA, and development of radio systems hardware, waveforms, networking, and infrastructure components for an integrated, SCA-compliant system.

The extended topic mini-session provides an extended and more detailed view into the Joint Program Executive Office (JPEO) that builds upon the selected paper topics presented during the first half of the session. The JPEO organization and its responsibilities related to the JTRS program will be covered along with methods for industry to engage with the JPEO in the development of SCA compliant radio systems. Areas that will be presented include:

- The state of the JTRS activities;
- Insight to the industrial community on the organization, operation, and function of the JPEO;
- The relationship between standards such as the Software Communications Architecture (SCA), Modem Hardware Abstraction Layer (MHAL) and recently released public APIs;
- How the above standards are applied within a JTR set, and the relationship and impact of the standards on the waveform development process;
- The development of JTRS waveforms.

This session will provide an overview of developing JTRS waveforms for session attendees.

**Session Organizer:** Leonard Schiavone, *The MITRE Corporation*

**Session Chair:** Dr. Richard North, *JTRS Program Executive Office (JPEO), SPAWAR*

## **RSA-6.1 JTRS/SCA and Custom Waveform Comparison**

Daniel Oldham, *NASA Glenn Research Center*  
Maximilian Scardelletti, *NASA Glenn Research Center*

## **RSA-6.2 Joint Tactical Radio System: Tactical Network Planning and Management**

Matthew Maher, *Booz Allen Hamilton*

## **RSA-6.3 Designing the Joint Tactical Radio System (JTRS) Handheld, Manpack, and Small Form Fit (HMS) Radios for Interoperable Networking and Waveform Applications**

M. Sayeed Hasan, *JTRS HMS PMO*  
Mike LaMacchia, *General Dynamics C4 Systems*  
Larry Muzzelo, *JTRS HMS PMO*  
Richey Gunsaulis, *JTRS HMS PMO*  
Joe Miller, *General Dynamics C4 Systems*  
LTC Richard Housewright, *JTRS HMS PMO*

## **RSA-6.4 SRW, Lessons Learned in Implementing & Porting to Software-Defined Radio Platforms**

Tom Brown, *Trellisware Technologies, Inc.*  
Ryan Milne, *Trellisware Technologies, Inc.*  
Sungill Kim, *Trellisware Technologies, Inc.*  
Adam Blair, *TrellisWare Technologies, Inc.*  
Jonathan Cromwell, *TrellisWare Technologies, Inc.*

## **SAS-2**

### **Airborne Networking Technologies-2**

Monday 9:30 a.m.–noon  
Miami 2

An Airborne Network (AN) can be loosely defined as an infrastructure that provides communication transport services through at least one node that is on a platform capable of flight. While Airborne Networks will essentially be airborne extensions of the DoD's Global Information Grid (GIG), the AN will differ from its terrestrial and space-based counterparts due to its unique environment. The AN will be composed of subnetworks of heterogeneous networks and links. Airborne platforms will enter and leave different subnetworks and the AN as they transit through the area at speeds of up to Mach 2. Links making up the subnetworks and the AN will consist of a collection of differing types to include point-to-point, broadcast, ad hoc, simplex, plus many other kinds. This is obviously a very complex problem and we could not possibly provide an exhaustive accounting of all of the research topics involved in a single MILCOM session, but with two full sessions in this year's conference, we attempt to at least illustrate the breadth of the technical challenges associated with developing the future Airborne Network. Although several of the papers presented here cut across more than one research area, we've roughly organized these two sessions by research area. In general, this session will address enterprise (network) management, modeling and simulation, and information assurance/cyber defense. A companion session, Airborne Networking Technologies-1, will concentrate on the networks & links research area.

**Session Organizers/Chairs:** Gregory Hadynski, *Civ AFRL/IFGC*, & Brian Spink, *Civ T AFRL/IFGA*

## **SAS-2.1 Advanced Resource Reservations for QoS in Airborne Tactical Networks**

Mei Ngan, *Lockheed Martin IS&GS*  
Ishan Weerakoon, *Lockheed Martin IS&GS*

Prakash Sessa, *Lockheed Martin IS&GS*  
 Gregory Hadynski, *Air Force Rome Labs*  
 Dave Climek, *Air Force Rome Labs*  
 Diane Kiwior, *ESC/The MITRE Corporation*  
 David Parker, *ESC/The MITRE Corporation*  
 Prakash Sessa, *Lockheed Martin IS&GS*

## **SAS-2.2 Models for Network Services in Airborne Tactical Networks**

Mei Ngan, *Lockheed Martin IS&GS*  
 Andy Wong, *Lockheed Martin IS&GS*  
 Ishan Weerakoon, *Lockheed Martin IS&GS*  
 Prakash Sessa, *Lockheed Martin IS&GS*  
 Gregory Hadynski, *Air Force Rome Labs*  
 Dave Climek, *Air Force Rome Labs*  
 Diane Kiwior, *ESC/The MITRE Corporation*  
 Dave Parker, *ESC/The MITRE Corporation*  
 John Strohm, *Lockheed Martin IS&GS*  
 John DelMedico, *AFRL*  
 Suresh Iyer, *Lockheed Martin IS&GS*  
 Giri Kuthethoor, *Lockheed Martin IS&GS*  
 Prakash Sessa, *Lockheed Martin IS&GS*

## **SAS-2.3 Mission Aware Configuration Management for Agile Ad Hoc Wireless Networking**

Douglas Woods, *Scientific Research Corporation*  
 Robert Figucia, *Scientific Research Corporation*  
 Gregory Hadynski, *AFRL/IFGC*

## **SAS-2.4 Implementation and Performance of a Network Control Plane for Airborne Networks**

Wayne Bynoe, *MIT Lincoln Laboratory*  
 Stephen McGarry, *MIT Lincoln Laboratory*  
 Leonid Veytser, *MIT Lincoln Laboratory*  
 Mark Yeager, *MIT Lincoln Laboratory*  
 Paul Christensen, *MIT Lincoln Laboratory*  
 Andrea Coyle, *MIT Lincoln Laboratory*  
 David Nedzel, *MIT Lincoln Laboratory*

## **SAS-2.5 Airborne Networking Component Architecture and Simulation Environment (AN-CASE)**

Frederick Hall, *U.S. Air Force Research Laboratory*  
 Mary Carol Chruscicki, *Northrop Grumman/TASC*

## **SAS-2.6 Information Assurance for Airborne Networks**

Doug Hill, *General Dynamics C4 Systems*  
 Rico Cody, *U.S. Air Force*  
 Jeff Morrow, *General Dynamics C4 Systems*

## **SAS-10**

### **Transformational Satellite Communications**

Monday 9:30 a.m.–noon  
 Miami 3

This session presents papers on Department of Defense (DoD) communications programs contributing to the development of Transformational Communications (TC) systems, such as JTRS, TSAT, and MUOS. The session also presents papers on concepts and/or technologies applicable to TC system(s) as well as papers presenting systems interoperability and/or enabling capabilities in Transformational Communications Architecture (TCA), i.e., system of systems.

**Session Organizers/Chairs:** LTC David Stroud, *USSTRATCOM J843*, & Ms. Phong Tran, *SAIC*

#### **SAS-10.1 Internet Routing in Space: Prospects and Challenges of the IRIS JCTD**

Enrique Cuevas, *Johns Hopkins University, Applied Physics Laboratory*  
 Michael Florio, *U.S. Army Space and Missile Defense Command–Battle Lab*  
 Andrew Worthen, *MIT Lincoln Laboratory*  
 David Heuser, *Cisco Systems*  
 Salim Yaghmour, *Intelsat*  
 Gerry Jansson, *Intelsat General Corp.*  
 Paul Murray, *SEAKR Engineering, Inc.*  
 Susan Fisher, *U.S. Air Force Space & Missile Systems Center (SMC)*  
 Shaum Mittal, *U.S. Defense Information Systems Agency (DISA)*

#### **SAS-10.2 Integrating COTS Routers Into Terminals for Future Protected SATCOM Systems With Dynamic Resource Allocation**

Jeff Wysocarski, *MIT Lincoln Laboratory*  
 Aradhana Narula-Tam, *MIT Lincoln Laboratory*  
 Mu-Cheng Wang, *MIT Lincoln Laboratory*  
 Ryan Kingsbury, *MIT Lincoln Laboratory*

#### **SAS-10.3 Digital Modular Radio: An Interoperable Capability Enabler in Net-Centric Environment**

Phong Tran, *SAIC*  
 Samuel Milligan, *SSC-SD*  
 James Crowe, *General Dynamics C4S*  
 Kathy Nelson, *SSC-SD*  
 Hazael Estrada, *SSC-SD*

#### **SAS-10.4 The Automated Digital Network System (ADNS) Interface to Transformational Satellite Communications System (TSAT)**

Joanna Ptasinski, *SPAWAR SYS CEN San Diego*  
 Yenchi Congtang, *SAIC*

#### **SAS-10.5 Establishing TSAT-DISN Peering via the TGBE**

Archana Vemulapalli, *Booz Allen Hamilton/JTEO*  
 Ani Karmakar, *Lockheed Martin/TMOS*  
 George Bradshaw, *DISA*  
 Vineet Mehta, *MCSW*  
 Joshua Haines, *MCSW*

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## SAS-10.6 Transformational IP Services Over Transponded SATCOM: An Architectural Approach

Jerry Rippon, *AASKI Technology, Inc.*  
Bharat Parikh, *AASKI Technology, Inc.*  
Jay Hicks, *PM DCATS TMD*  
Daniel Gray, *AASKI Technology, Inc.*  
David Fritz, *AASKI Technology, Inc.*  
Jeff Ruff, *AASKI Technology, Inc.*

## WMC-3

### OFDM-1

Monday 9:30 a.m.–noon  
Naples 1

OFDM has been used in many commercial and tactical communication systems. This is one of two OFDM sessions. It focuses on techniques for Peak-to-Average Power Ratio (PAPR) reduction and dealing with impact caused by time-varying channels.

**Session Organizers:** Dr. Gary Pei, *Boeing Phantom Works*, & Prof. Xiang-Gen Xia, *University of Delaware*

**Session Chair:** Dr. Gary Pei, *Boeing Phantom Works*

### WMC-3.1 Effects of Nonlinear Amplifier and Partial Band Jammer in OFDM With Application to 802.11n WLAN

David Chi, *University of California, San Diego*  
Pankaj Das, *University of California, San Diego*

### WMC-3.2 Equalization for OFDM With Multiple Delay Doppler Paths Using Conjugate Gradients With Chebyshev Preconditioning

Chad Lau, *School of Electrical and Computer Engineering, Purdue University*  
Michael Zoltowski, *School of Electrical and Computer Engineering, Purdue University*

### WMC-3.3 Threshold Extending Receiver Structures for CE-OFDM

Ahsen Ahmed, *SPAWAR Systems Center*  
Steve Thompson, *Acorn Technologies*  
James Zeidler, *University of California, San Diego*

### WMC-3.4 SNDR Considerations for the Minimum Clipping Power Loss Scheme

Robert J. Baxley, *Georgia Institute of Technology*  
G. Tong Zhou, *Georgia Institute of Technology*

### WMC-3.5 A Method for Joint Peak-to-Average Power Ratio Reduction and Synchronization in OFDM

Robert J. Baxley, *Georgia Institute of Technology*  
John E. Kleider, *General Dynamics, C4 Systems*  
G. Tong Zhou, *Georgia Institute of Technology*

### WMC-3.6 An Intercarrier Interference Reduction Receiver for OFDM Systems in Time Varying Channels

Mishal Al-Gharabally, *University of California, San Diego*  
Pankaj Das, *University of California, San Diego*

## WMC-9

### Wireless Communications-2

Monday 9:30 a.m.–noon  
Naples 2

This session covers a variety of topics in wireless networks. They include ad hoc network scalability and security, energy and bandwidth efficiency, simultaneous mobility, and physical layer issues in MIMO and Transform Domain Communications.

**Session Organizers:** Dr. Harold Zheng, *Johns Hopkins University, Applied Physics Laboratory*, Prof. Xiang-Gen Xia, *University of Delaware*, & Prof. Kejie Lu, *University of Puerto Rico Mayagüez*

**Session Chair:** Dr. Harold Zheng, *Johns Hopkins University, Applied Physics Laboratory*

### WMC-9.1 Scalability and Security of Self-Organized Wireless Ad Hoc Networks

Chi Zhang, *University of Florida*  
Yuguang Fang, *University of Florida*

### WMC-9.2 A Tradeoff Between Energy and Bandwidth Efficiency in Wireless Networks

Changhun Bae, *University of Florida*

### WMC-9.3 Performance of a Novel Adaptive Traffic Aggregation Scheme for WMNs

Roberto Riggio, *University of Florida*  
Francesco De Pellegrini, *CREATE-NET, Italy*  
Nicola Scalabrino, *University of Florida*  
Pan Li, *University of Florida*

Yuguang Fang, *University of Florida*  
Imrich Chlamtac, *CREATE-NET, Italy*

### WMC-9.4 Analysis of Simultaneous Mobility Under Asymmetric Mobility Conditions

K. Daniel Wong, *Malaysia University of Science and Technology*  
Wei Lee Woon, *Malaysia University of Science and Technology*

### WMC-9.5 Comparison of Hardware Implementation of Transform Domain Communications to Theoretical Results

Marshall Haker, *U.S. Air Force Research Laboratory*  
Richard Martin, *U.S. Air Force Institute of Technology*  
Vasu Chakravarthy, *U.S. Air Force Research Laboratory*

## WSN-15

### Disruption Tolerant Networks (DTN)

Monday 9:30 a.m.–noon  
Naples 3

Disruption Tolerant Networks (DTN) is a newly developed program under DARPA that enables mobile nodes to access information in some challenging and harsh network environments. For example, in battlefield and disaster recovery scenarios, mobile nodes may suffer from the intermittent connectivity and parti-

tions, thus reliable end-to-end paths do not exist. Sometimes network infrastructure cannot be warranted for assurable access to information. DTN technologies are designed to overcome the disruptions to connectivity by utilizing opportunistic routing with mobility and persistence within the network nodes.

This session covers various aspects of the DTN technologies to ensure information access. The session starts with an overview on the DTN system architecture and related technologies being developed under the DTN program. Enhanced delivery in DTN using smart antenna capability is presented next. Then robust packet forwarding schemes using erasure coding and DTN routing using content-based retrieval are presented. A theoretical analysis of the homing pigeon based delivery in DTN is presented as well.

**Session Organizer/Chair:** Dr. Qinqing Zhang, *Johns Hopkins University, Applied Physics Laboratory*

## **WSN-15.1 The SPINDLE Disruption-Tolerant Networking System**

Rajesh Krishnan, *BBN Technologies*  
 Prithwish Basu, *BBN Technologies*  
 Joanne M. Mikkelson, *BBN Technologies*  
 Christopher Small, *BBN Technologies*  
 Ram Ramanathan, *BBN Technologies*  
 Daniel W. Brown, *BBN Technologies*  
 John R. Burgess, *BBN Technologies*  
 Armando L. Caro, *BBN Technologies*  
 Matthew Condell, *BBN Technologies*  
 Nicholas C. Goffee, *BBN Technologies*  
 Regina Rosales Hain, *BBN Technologies*  
 Richard E. Hansen, *BBN Technologies*  
 Christine E. Jones, *BBN Technologies*  
 Vikas Kawadia, *BBN Technologies*  
 David P. Mankins, *BBN Technologies*  
 Beverly I. Schwartz, *BBN Technologies*  
 William T. Strayer, *BBN Technologies*  
 Jeffrey W. Ward, *BBN Technologies*  
 David P. Wiggins, *BBN Technologies*  
 Stephen H. Polit, *BBN Technologies*

## **WSN-15.2 Enhanced Delivery in Disruption Tolerant Networks Using Advantaged Nodes With Directional Antenna Capability**

Yong Xi, *Lehigh University*  
 Mooi Choo Chuah, *Lehigh University*

## **WSN-15.3 Cooperative Robust Forwarding Schemes in DTNs Using Erasure Coding**

Yong Liao, *University of Massachusetts Amherst*  
 Zhensheng Zhang, *San Diego Research Center*  
 Bo Ryu, *San Diego Research Center*  
 Lixin Gao, *University of Massachusetts Amherst*

## **WSN-15.4 Performance Analysis of Homing Pigeon Based Delay Tolerant Networks**

Hui Guo, *Howard University*

## **WSN-15.5 Performance Evaluations of Content-Based Information Retrieval Schemes for Disruption Tolerant Networks**

Mooi Choo Chuah, *Lehigh University*  
 Peng Yang, *Lehigh University*

### **ACT-1**

## **Advanced Antenna Technologies**

Monday 2:15–5:00 p.m.  
 Tallahasee 1

Secure and dependable communication is a very important segment of modern day warfare. Usage of advanced antenna technology is critical to achieving this goal in the battlefield environment. MILCOM antennas need to be easy to set up, immune to jamming signals, wideband, lightweight, rugged and operate in adverse operating conditions. This session describes the current developments in the field of antenna technology that address these issues. New technologies for use in the joint forces are described.

**Session Organizer/Chair:** Dr. Mysore Sheshadri, *Harris Corporation*

### **ACT-1.1 Compact GPS Microstrip Patch Antenna**

Abdelaziz Abdelaziz, *Misr International University, Cairo, Egypt*  
 Dalia Nashaat, *Electronic Research Institute, Giza, Egypt*

### **ACT-1.2 Impact of Statistical Errors on Active Phased-Array Antenna Performance**

Mark Lange, *The Aerospace Corporation*

### **ACT-1.3 A New Approach to Broadband Array Design Using Tightly Coupled Elements**

Mark Jones, *Harris Corporation*  
 James Rawnick, *Harris Corporation*

### **ACT-1.4 Flap Antenna for Communications**

Yong Kim, *The Boeing Company*

### **ACT-1.5 Lightweight, High-Bandwidth Conformal Antenna System for Ballistic Helmets**

David Herold, *SI2 Technologies, Inc.*  
 Lance Griffiths, *L3 Communications*  
 Tat Fung, *U.S. Army, RDECOM, CERDEC*

### **ACT-1.6 Design and Analysis of a Tri-Band Center-Fed SATCOM Reflector Antenna**

Jay Kralovec, *Harris Corporation*  
 Griff Gothard, *Harris Corporation*

### **ACT-1.7 New Era in Performance of Soldier Worn Antennas**

Pablo Diez, *Harris Corporation*  
 Malcolm Packer, *Harris Corporation*

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## ACT-2

### Advanced Communications and Techniques

Monday 2:15–5:00 p.m.  
Tallahasee 2

This session provides a forum for a variety of advanced communication techniques. Topics include: improving situational awareness through 3D audio, protocols for bidirectional coded cooperation in MANETs and tactical edge networks, quality improvement of underwater acoustic phone systems, evaluation of anti-jamming capabilities and probability of detection for secure communication, methods to efficiently estimate the angle of arrival (AOA) and the two-dimensional (2D) direction of arrival (DOA) for coherent and noncoherent sources, and design of an improved linear wideband VHF/UHF quad LINC transmitter system.

**Session Organizer/Chair:** Randy Coleburn, *Scientific Research Corporation*

#### ACT-2.1 Creating a Multidimensional Communication Space To Improve the Effectiveness of 3D Audio

Duane Satorius, *Harris Corporation*  
Paul Sauk, *The MITRE Corporation*

#### ACT-2.2 Coded Bidirectional Relaying in Combat Scenarios

Sang Joon Kim, *Harvard University*  
Patrick Mitran, *Harvard University*  
Christina John, *BAE Systems Inc.*  
Reza Ghanadan, *BAE Systems Inc.*  
Vahid Tarokh, *Harvard University*

#### ACT-2.3 A Low Bit-Rate Speech Underwater Acoustic Phone Using Channel Coding for Quality Improvement

Joël Trubuil, *ENST Bretagne*  
André Goalic, *ENST Bretagne*  
Nicolas Beuzelin, *GESMA*

#### ACT-2.4 Simultaneous AJ and LPD Evaluations for Secure Communication

Chien-Hsing Liao, *Department of Communication Engineering, National Central University*  
Mu-King Tsay, *Department of Communication Engineering, National Central University*  
Chung-Shen Shyn, *Communication Research Center, National Central University*  
Tai-Yueh Yang, *Communication Research Center, National Central University*

#### ACT-2.5 Unitary Root MUSIC and Unitary MUSIC With Real-Valued Rank Revealing Triangular Factorization

Nizar Tayem, *Louisiana State University*  
Mort Naraghi-Pour, *Louisiana State University*

#### ACT-2.6 Propagator Method and Triangular Factorization for Source Bearing Estimation of Coherent Sources

Nizar Tayem, *Louisiana State University*  
Mort Naraghi-Pour, *Louisiana State University*

#### ACT-2.7 Linear Wideband VHF/UHF Quad LINC Transmitter System

Gamal Hegazi, *Rockwell Collins*  
Thanh Chu, *Rockwell Collins*  
Scott Heibel, *Rockwell Collins*  
Jake Jordan, *Rockwell Collins*  
Haluk Sasmazer, *Rockwell Collins*

## IAS-2

### Information Assurance Solutions for Networked Systems

Monday 2:15–5:00 p.m.  
Tallahasee 3

Future Net-Centric Operations will require lightweight and adaptive security mechanisms and infrastructures to facilitate formation of and operations by joint and coalition forces. These mechanisms and infrastructures include, but are not limited to, methods for establishing and maintaining trust and cryptographic keys, as well as self-organizing, distributed, intrusion tolerant authorities, scalable intrusion detection and access management systems. The mechanisms and forward elements of these infrastructures must deal with the harsh conditions found in mobile, ad hoc, wireless tactical networks. These conditions include high node mobility, intermittent connectivity, and noisy channels, as well as lack of contact with central authorities. Operations must reliably continue despite node compromises resulting from physical and cyber attacks. The adversaries launching these attacks will have capabilities and constraints that do not conform to traditional adversarial models, further complicating the design and assurance of these mechanisms and infrastructures.

This session will address the above challenges through innovations in intrusion detection, coalition establishment, authentication for MANET and performance analysis.

**Session Organizers/Chairs:** Dr. Scott C. Evans, *General Electric*, & Dr. Brian Matt, *Johns Hopkins University, Applied Physics Laboratory*

#### IAS-2.1 Endpoint-Driven Intrusion Detection and Containment of Fast Spreading Worms in Enterprise Networks

Frank Akujobi, *Carleton University*  
Ioannis Lambadaris, *Carleton University*  
Evangelos Kranakis, *Carleton University*

#### IAS-2.2 Correlation-Based Feature Selection for Intrusion Detection Design

Te-Shun Chou, *Florida International University*  
Kang Yen, *Florida International University*

Jun Luo, *Florida International University*  
 Niki Pissinou, *Florida International University*  
 Kia Makki, *Florida International University*

### IAS-2.3 Distributed Data Parallel Techniques for High-Speed Intrusion Detection Systems

Patrick Wheeler, *University of California at Davis*  
 Christopher Kopek, *Wake Forest University/GreatWall Systems*  
 Errin Fulp, *Wake Forest University*

### IAS-2.4 Task Secure Dynamic Community Establishment in Coalitions

Morris Sloman, *Imperial College*  
 Emil Lupu, *Imperial College*  
 Seraphin Calo, *IBM Research*  
 Jorge Lobo, *IBM Research*  
 Naranker Dulay, *Imperial College*  
 Eskinder Asmare, *Imperial College*

### IAS-2.5 Homogeneous Security in Heterogeneous Networks: Towards a Generic Security Management Protocol

Justin P. Rohrer, *The University of Kansas*  
 Weichao Wang, *The University of Kansas*  
 James P.G. Sterbenz, *The University of Kansas*

### IAS-2.6 Authentication Via Ambassadors: A Novel Authentication Mechanism in MANETs

Feng Li, *Florida Atlantic University*  
 Jie Wu, *Florida Atlantic University*

### IAS-2.7 A Performance Study of $\pm 1$ Steganalysis Employing a Realistic Operating Scenario

Lisa Marvel, *U.S. Army Research Laboratory*  
 Brian Henz, *U.S. Army Research Laboratory*  
 Charles Bonchelet, *University of Delaware*

## ISS-1

### Interoperable Communications

Monday 2:15–5:00 p.m.  
 Tampa 1

This session consists of seven papers discussing the safety and interoperability, communications waveforms for combat effectiveness, interoperability enhancements for mobile wireless networks, and IP-based technologies for interoperable tactical environment. This session also focuses on discussions of RFID systems.

**Session Organizer/Chair:** Dr. Amit Kulkarni, *General Electric*

### ISS-1.1 Public Safety Interoperability With an SCA Military Radio Using the P25 Waveform

Paul Kiley, *Harris Corporation*  
 Thomas Benedett, *Harris Corporation*

### ISS-1.2 Connecting Communications Waveforms for Combat Effectiveness

Siamak Dastangoo, *MIT Lincoln Lab*  
 Tom Macdonald, *MIT Lincoln Lab*  
 Steve Davidson, *MIT Lincoln Lab*

### ISS-1.3 Enhancing Interoperability in Heterogeneous Mobile Wireless Networks for Disaster Response

F. Richard Yu, *Carleton University*  
 Helen Tang, *Defence R&D Canada*  
 Victor C.M. Leung, *The University of British Columbia*

### ISS-1.4 Employing IP-Based Technologies for Pervasive Connectivity and Interoperability in the Tactical Environment

Chai Seck Lew, *DSTA*  
 Anthony Chua, *SCME*  
 Mervyn Cheah, *SCME*  
 Stephen Tan, *DSTA*  
 Alan Tan, *DSTA*  
 Tin Hua Lee, *SCME*

### ISS-1.5 Developing an Interoperable Coalition Communication Strategy Using Suite B

Todd Moore, *Harris Corporation*

### ISS-1.6 TDM Services Over IP Networks

Keyur Parikh, *Harris Corporation*  
 Junius Kim, *Harris Corporation*

### ISS-1.7 Data Integrity in RFID Systems

Weilian Su, *Naval Postgraduate School*  
 Nikolaos Alchazidis, *Naval Postgraduate School*  
 Tri Ha, *Naval Postgraduate School*

## MCS-2

### Iterative, LDPC, and Other Coding Techniques

Monday 2:15–5:00 p.m.  
 Tampa 2

**Session Organizer/Chair:** John W. Nieto, *Harris Corporation*

### MCS-2.1 High Performance Nonbinary Quasi-Cyclic LDPC Codes on Euclidean Geometries

Bo Zhou, *University of California, Davis*  
 Jingyu Kang, *University of California, Davis*  
 Ying Tai, *University of California, Davis*  
 Qin Huang, *University of California, Davis*  
 Shu Lin, *University of California, Davis*

### MCS-2.2 Frequency-Hop Antijam Communications With Nonbinary Error-Control Coding

Michael Masse, *Clemson University*  
 Michael Pursley, *Clemson University*  
 Shu Lin, *University of California, Davis*

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Shumei Song, *University of California, Davis*  
Thomas C. Royster IV, *Clemson University*

## **MCS-2.3 Short Protograph-Based LDPC Codes**

Dariusz Divsalar, *Jet Propulsion Laboratory*  
Sam Dolinar, *Jet Propulsion Laboratory*  
Christopher Jones, *Jet Propulsion Laboratory*

## **MCS-2.4 Recent Progress in Interleave Division Multiple Access (IDMA)**

Ping Li, *City University of Hong Kong*  
Peng Wang, *City University of Hong Kong*  
Xiaodong Wang, *Columbia University*

## **MCS-2.5 Constellation Labeling Maps for Low Error Floors**

Don Torrieri, *U.S. Army Research Laboratory*  
Mathew Valenti, *University of West Virginia*

## **MCS-2.6 On the Sensibility of the Arranged List of the Most A Priori Likely Tests Algorithm**

Andrzej Kabat, *ENST-Bretagne*  
Frederic Guilloud, *ENST-Bretagne*  
Ramesh Pyndiah, *ENST-Bretagne*

## **MCS-2.7 EM Channel Estimation for Iterative DS-CDMA Receiver Using LDPC Codes With M-Ary Modulation**

Amitav Mukherjee, *Wichita State University*  
Hyuck Kwon, *Wichita State University*  
Don Torrieri, *U.S. Army Research Laboratory*

## **MCS-3**

### **Interference Mitigation and Suppression**

Monday 2:15–5:00 p.m.  
Sanibel 1

Electromagnetic interference corrupts communications. Sources of interference include hostile transmitters, other users of a multiuser communications system, radar systems, and cross-substream interference such as experienced by MIMO communications systems. This session addresses interference mitigation and suppression using techniques including advanced modulation, forward error correction coding, antenna design, beamforming techniques, adaptive filtering, interference cancellation algorithms, and multiuser detection strategies.

**Session Organizer:** Prof. R. Clark Robertson, *Naval Postgraduate School*

**Session Chair:** Prof. Frank Kragh, *Naval Postgraduate School*

## **MCS-3.1 Performance Analysis of MQAM With Errors-and-Erasures Decoding To Mitigate the Effects of Pulse-Noise Interference**

Clark Robertson, *Naval Postgraduate School*  
Georgios Zouros, *Naval Postgraduate School*

## **MCS-3.2 Performance of Quantized Feedback Beamforming in MIMO-OFDM Links Over Time-Varying, Frequency-Selective Channels**

Xiantao Sun, *University of Delaware*  
Leonard Cimini, *University of Delaware*  
Larry Greenstein, *University of Delaware*  
Douglas Chan, *Cisco Systems*  
Brett Douglas, *Cisco Systems*

## **MCS-3.3 Performance Analysis of TCM Systems Transmitted Over Channels With AWGN and Pulse-Noise Interference**

Clark Robertson, *Naval Postgraduate School*  
Athanasios Drivas, *Hellenic Navy*  
Tri Ha, *Naval Postgraduate School*

## **MCS-3.4 Iterative Post-Successive Interference Cancellation in V-BLAST**

Sang Kim, *Iowa State University*  
Wei-Tan Hsu, *Iowa State University*

## **MCS-3.5 Antenna Downselection for Co-Channel Interference Mitigation in a Mobile-to-Mobile Channel**

Brett Walkenhorst, *Georgia Tech Research Institute*  
Tom Pratt, *Georgia Tech Research Institute*  
Sudhanshu Gaur, *Georgia Institute of Technology*  
Mary Ann Ingram, *Georgia Institute of Technology*

## **MCS-3.6 A Bandwidth Selective Frequency Domain Excision Filter for Use in Front of Adaptive Array Antennas**

Neil Tisdale, *University of Southampton*  
Tom Kazmierski, *University of Southampton*  
Duncan Brooks, *ERA Technology Ltd.*

## **MCS-3.7 List Detection for Overloaded Receivers With a Linear Array**

Michael Krause, *University of Canterbury*  
Desmond P. Taylor, *University of Canterbury*  
Philippa A. Martin, *University of Canterbury*

## **NAPM-1**

### **Advances in Network and Service Management**

Monday 2:15–5:00 p.m.  
Sanibel 2

This section focuses on recent advances in network and service management in support of network enabling operations. Topics cover policy-based management, management applications, and enabling technologies for management of tactical and enterprise networks and services. Also included are pertinent issues related to performance, Quality of Service (QoS), and network survivability and resilience.

**Session Organizer/Chair:** Dr. Cam Tran, *SPAWAR Systems Center, San Diego*

## **NAPM-1.1 An Automated Policy Generation System for Mobile Ad Hoc Networks**

Cho-Yu Jason Chiang, *Telcordia Technologies*  
 Gary Levin, *Telcordia Technologies*  
 Yitzchak Gottlieb, *Telcordia Technologies*  
 Ritu Chadha, *Telcordia Technologies*  
 Shihwei Li, *Telcordia Technologies*  
 Alex Poylisher, *Telcordia Technologies*  
 Scott Newman, *U.S. Army CERDEC*  
 William Izzo, *Booz Allen Hamilton*

## **NAPM-1.2 Performance of Some Service Oriented Architecture-Based Systems**

Orton Huang, *MIT Lincoln Laboratory*

## **NAPM-1.3 Multimedia QoS Through Content Aware Triage: An Integrated DiffServ Framework**

Ping Liu, *GE Global Research Center*  
 Scott Evans, *GE Global Research*  
 Ishan Weerakoon, *Lockheed Martin, IS&GS*

## **NAPM-1.4 Migration to Defense Enterprise Computing Centers**

Dillon Bussert, *Booz Allen Hamilton*  
 Bruce Bennett, *Defense Information Systems Agency*  
 Rebecca Pham, *Booz Allen Hamilton*

## **NAPM-1.5 MOSS: Gathering Names in Networks of Mobile Nodes**

Yitzchak Gottlieb, *Telcordia Technologies, Inc.*  
 Ritu Chadha, *Telcordia Technologies, Inc.*  
 Kong Cheng, *Telcordia Technologies, Inc.*

## **NAPM-1.6 Planning and Management of Dynamic Publish-Subscribe Communications in Tactical Networks Using IP Multicast Groups**

Shrirang Gadgil, *Telcordia Technologies, Inc.*  
 Yow-Jian Lin, *Telcordia Technologies, Inc.*  
 N. Natarajan, *Telcordia Technologies, Inc.*

## **NAPM-1.7 A Protocol Framework for Managing Dynamically Formed Joint Mobile Networks**

Matthew W. Breiner, *Applied Information Sciences Department, Johns Hopkins University, Applied Physics Laboratory*  
 Paul A. Hanke, *Applied Information Sciences Department, Johns Hopkins University, Applied Physics Laboratory*  
 Paramasiviah Harshavardhana, *Applied Information Sciences Department, Johns Hopkins University, Applied Physics Laboratory*  
 Xi Jiang, *Applied Information Sciences Department, Johns Hopkins University, Applied Physics Laboratory*  
 Amanpreet S. Johal, *Applied Information Sciences Department, Johns Hopkins University, Applied Physics Laboratory*  
 Kevin B. Pettee, *Applied Information Sciences Department, Johns Hopkins University, Applied Physics Laboratory*

Sitaram Kowtha, *Applied Information Sciences Department, Johns Hopkins University, Applied Physics Laboratory*  
 Tuan K. Nguyen-Viet, *Applied Information Sciences Department, Johns Hopkins University, Applied Physics Laboratory*  
 Zhuangbo Tang, *Applied Information Sciences Department, Johns Hopkins University, Applied Physics Laboratory*

## **NCS-1**

### **Network-Centric Systems and Technologies**

Monday  
 Sanibel 3

2:15–5:00 p.m.

This session focuses on recent developments in network-centric systems, services and technologies. Topics include common network services supporting across the Joint Tactical Radio System (JTRS) family of radios, Voice over IP (VoIP) over Wireless LAN (WiFi), and network-enabling applications and services. Also included are pertinent issues related to performance, Quality of Service (QoS), and network survivability and resilience.

**Session Organizer:** Dr. Cam Tran, *SPAWAR Systems Center, San Diego*

**Session Chair:** Dr. Ryan P. Lu, *SPAWAR Systems Center, San Diego*

### **NCS-1.1 Joint Tactical Radio System Common Network Services**

Tanya Yuan, *Booz Allen Hamilton*  
 Yong Chen, *Booz Allen Hamilton*  
 CDR Matt LeTourneau, *SPAWAR, JTRS/JPEO*

### **NCS-1.2 On the Suitability of Composable Services for a Next General Assurable Network**

Daniel Stevenson, *RTI International*  
 Ilia Baldine, *Renaissance Computing Institute*  
 Rudra Dutta, *North Carolina State University*  
 George Rouskas, *North Carolina State University*  
 Douglas Reeves, *North Carolina State University*

### **NCS-1.3 NEW-CATR: Network-Enabled Electronic Warfare for Collaborative Automatic Target Recognition**

Qilian Liang, *University of Texas at Arlington*  
 Sherwood Samn, *AFRL/HEX*

### **NCS-1.4 Performance Assessment of Data and Time-Sensitive Wireless Distributed Networked-Control-Systems in Presence of Information Security**

Rachana Gupta, *North Carolina State University*  
 Avesh Kumar Agarwal, *North Carolina State University*  
 Mo-Yuen Chow, *North Carolina State University*  
 Wenye Wang, *North Carolina State University*

# UNCLASSIFIED SESSIONS

## **NCS-1.5 Bifurcation Control in PRMA Joint Voice-Data System Using Multiple Transmission Power Levels**

Amirali Sharifi, *Department of Electrical and Computer Engineering and the Institute for Systems Research—University of Maryland*

Eyad Abed, *Department of Electrical and Computer Engineering and the Institute for Systems Research—University of Maryland*

## **NCS-1.6 Security Aspects of the Linear Network Coding**

Haruko Kawahigashi, *Mitsubishi Electric Corp.*

Yoshiaki Terashima, *Mitsubishi Electric Corp.*

## **NCS-7**

### **Systems Engineering Architecture, Modeling and Simulations (SEAMS)**

Monday

2:15–5:00 p.m.

Sarasota 1

The move towards net-centric operations poses several challenges in understanding, selecting, and enabling of architectural framework; network design; and optimum allocation of network resources. This session includes several interesting papers in this domain plus papers in large-scale simulation and wireless design.

**Session Organizer/Chair:** Dr. S. Kandaswamy (Kanda), *Johns Hopkins University, Applied Physics Laboratory*

## **NCS-7.1 An Optimization Model To Determine Data Center Locations for the Army Enterprise**

Shin-Jyh Chang, *The MITRE Corporation*

Susmit Patel, *The MITRE Corporation*

James (Marc) Withers, *The MITRE Corporation*

## **NCS-7.2 Dynamic Scheduling in High-Speed Downlink Packet Access Networks: Heuristic Approach**

Hussein Al-Zubaidy, *Carleton University*

Ioannis Lambadaris, *Carleton University*

Jerome Talim, *Carleton University*

## **NCS-7.3 Large-Scale Simulation—Convolution of High Fidelity Model**

Subhabrata Sen, *XPRT Solutions, Inc.*

Anthony Khouzam, *XPRT Solutions, Inc.*

Roy Life, *XPRT Solutions, Inc.*

## **NCS-7.4 Wireless Network Design With Directional Antennae**

Latha Kant, *Telcordia Technologies*

Praveen Gopalakrishnan, *Telcordia Technologies*

## **NCS-7.5 Dynamic DoDAF and Executable Architectures**

Steven Silverman, *Raytheon*

Erik Baumgarten, *Raytheon*

## **NCS-7.6 Enabling Rapid Architecture Validation in the Analysis Phase of Developing Enterprise or Complex Systems Using Enterprise Architecture Simulation Environment (EASE)**

Steven Brink, *Harris Corporation*

## **NCS-7.7 Network Design and Implementation Using Emulation-Based Analysis**

Sheetalkumar Doshi, *Scalable Network Technologies*

Rajive Bagrodia, *Scalable Network Technologies*

Unghee Lee, *Scalable Network Technologies*

Douglas McKeon, *U.S. Army CERDEC, Ft. Monmouth*

## **RSA-2**

### **HF Communications and Software Defined Radio Topics**

Monday

2:15–5:00 p.m.

Sarasota 2

This session covers two important military communications topics. First HF communications is examined from a direction finding, propagation and technology perspective. This is followed by a number of topics relative to the design and implementation of software defined radio systems including system timing, power amplifier design and propagation prediction.

**Session Organizer/Chair:** William Furman, *Harris Corporation*

## **RSA-2.1 An Operational HF System for Single Site Localization**

Yvon Erhel, *Centre de Recherches des Ecoles de Coetquidan*

François Marie, *IETR Université de Rennes 1*

## **RSA-2.2 NVIS Communications During the Solar Minimum**

Eric Johnson, *NMSU*

## **RSA-2.3 Channel Quality Variation as a Design Consideration for Wireless Data Link Protocols**

William Batts, Jr., *Harris Corporation*

William Furman, *Harris Corporation*

Eric Koski, *Harris Corporation*

## **RSA-2.4 Hard Time Meets a Soft World—Management of Time Concepts in Software Defined Radios**

Charles Linn, *Harris Corporation*

## **RSA-2.5 Broadband Characterization of GaN Transistors for Software Defined Radio Power Amplifier Applications**

Howard Patterson, *General Dynamics C4 Systems*

Forrest Scarpitto, *General Dynamics C4 Systems*

Brian Bielick, *General Dynamics C4 Systems*

## **RSA-2.6 Software Defined Radio-Based Multimode DVB-RCS Terminals**

Floriano De Rango, *DEIS Dept., University of Calabria*

Fiore Veltri, *DEIS Dept., University of Calabria*

Amilcare Franco Santamaria, *DEIS Dept., University of Calabria*  
 Mauro Tropea, *DEIS Dept., University of Calabria*  
 Peppino Fazio, *DEIS Dept., University of Calabria*  
 Salvatore Marano, *DEIS Dept., University of Calabria*

### **RSA-2.7 A Simplified Analytical Urban Propagation Model (UPM) for Use in CJSMP**

Chrysanthos Chrysanthou, *U.S. Army CERDEC*  
 James K. Breakall, *Pennsylvania State University*  
 Kyle L. Labowski, *Pennsylvania State University*

## **SAS-1**

### **Airborne Networking Technologies-1**

Monday 2:15–5:00 p.m.  
 Sarasota 3

An Airborne Network (AN) can be loosely defined as an infrastructure that provides communication transport services through at least one node that is on a platform capable of flight. While Airborne Networks will essentially be airborne extensions of the DoD's Global Information Grid (GIG), the AN will differ from its terrestrial and space-based counterparts due to its unique environment. The AN will be composed of subnetworks of heterogeneous networks and links. Airborne platforms will enter and leave different subnetworks and the AN as they transit through the area at speeds of up to Mach 2. Links making up the subnetworks and the AN will consist of a collection of differing types to include point-to-point, broadcast, ad hoc, simplex, plus many other kinds. This is obviously a very complex problem and we could not possibly provide an exhaustive accounting of all of the research topics involved in a single MILCOM session, but with two full sessions in this year's conference, we attempt to at least illustrate the breadth of the technical challenges associated with developing the future Airborne Network. Although several of the papers presented here cut across more than one research area, we've roughly organized these two sessions by research area. In general, this session will concentrate on the networks and links research area. A companion session, Airborne Networking Technologies-2, will address enterprise (network) management, modeling and simulation, and information assurance/cyber defense.

**Session Organizers/Chairs:** Gregory Hadynski, *Civ AFRL/IFGC*, & Brian Spink, *Civ T Civ AFRL/IFGA*

#### **SAS-1.1 Routing Protocol Performance Over Intermittent Links**

Diane Kiwior, *The MITRE Corporation*  
 Lucas Lam, *The MITRE Corporation*

#### **SAS-1.2 Interdomain Routing for Mobile Nodes**

Diane Kiwior, *The MITRE Corporation*  
 Katie Schroth, *The MITRE Corporation*

#### **SAS-1.3 Performance of Disruption-Tolerant Network Mechanisms Applied to Airborne Networks**

Bishwaroop Ganguly, *MIT Lincoln Laboratory*  
 Vijaynarayanan Subramanian, *ECSE Dept., RPI*

Shivkumar Kalyanaraman, *ECSE Dept., RPI*  
 K.K. Ramakrishnan, *AT&T Labs Research*

#### **SAS-1.4 Integrating Local Neighborhood Congestion and Path Stability Into QoS Routing for Airborne Tactical Networks**

Phong Khuu, *BAE Systems–NES*  
 Reza Ghanadan, *BAE Systems–NES*  
 John Gu, *BAE Systems–NES*  
 Gregory Sadosuk, *BAE Systems–NES*  
 Jessica Hsu, *BAE Systems–NES*  
 Brian Loop, *BAE Systems–NES*  
 Michael Weber, *BAE Systems–NES*

#### **SAS-1.5 A Mesh in the Sky: A Routing Protocol for Airborne Networks**

Bo Fu, *Virginia Tech*  
 Luiz DaSilva, *Virginia Tech*

#### **SAS-1.6 A Routing Architecture for the Airborne Network**

Steven Pizzi, *The MITRE Corporation*

#### **SAS-1.7 Planning an Airborne High-Capacity Backbone (HCB)—An Operational Approach**

Kevin Gunn, *The MITRE Corporation*  
 John Dahlgren, *The MITRE Corporation*

## **SAS-7**

### **MUOS Ground and Terminals**

Monday 2:15–5:00 p.m.  
 Miami 1

The Mobile User Objective System (MUOS) is a narrowband Military Satellite Communications (MILSATCOM) system that supports worldwide, multi-Service population of mobile and fixed-site terminal users in the Ultra High Frequency (UHF) band, providing increased communications capabilities to smaller terminals while still supporting interoperability to legacy terminals. As MUOS has adapted the commercial third generation (3G) Wideband Code Division Multiple Access (WCDMA) cellular phone network architecture, several challenges and lessons have been learned. This session will describe those issues, from both a terminal side (the MUOS waveform) and base station side (the MUOS ground transport).

**Session Organizer/Chair:** Patrick Browne, *U.S. Navy*

#### **SAS-7.1 The MUOS-WCDMA Air Interface**

John Sadowsky, *General Dynamics C4 Systems*  
 David Lee, *General Dynamics C4 Systems*

#### **SAS-7.2 MUOS Spectrum Notching Effect on Handheld Terminal Uplink Performance**

Keith Kumm, *WaveLogic Corporation*  
 Gary Huckell, *L-3 Communications*

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## **SAS-7.3 Filterbanks for Adaptive Transmit Filtering in MUOS**

Chad Spooner, *NorthWest Research Associates*

## **SAS-7.4 High Rate Ka-Band Downlink Digital Receiver for MUOS**

Arthur Helwig, *General Dynamics C4 Systems*

Bin Hu, *General Dynamics C4 Systems*

## **SAS-7.5 MUOS Ka-Band Feederlink Availability Model and Performance Analysis**

Daisy Cheng, *Lockheed Martin*

John Bush, *Lockheed Martin*

## **SAS-7.6 MUOS User-to-Base Interference Mitigation**

Randall Bahr, *General Dynamics C4 Systems*

David K. Lee, *General Dynamics C4 Systems*

## **WMC-1**

### **MIMO-1**

Monday

2:15–5:00 p.m.

Miami 2

One of the challenges in net-centric operations is to provide universal connectivity with high levels of communication performance across diverse military environments. Multiple-Input, Multiple-Output (MIMO) radio techniques, in which multiple antennas are used by both the transmitter and the receiver, offer the potential for significant enhancements in spectral efficiency and link reliability. This session focuses on the design and application of MIMO techniques (cooperative or noncooperative), especially for military communications. This session is one of two and covers space-time coding, synchronization, and information assurance issues.

**Session Organizer/Chair:** Dr. Feng Ouyang, *Johns Hopkins University, Applied Physics Laboratory*

## **WMC-1.1 Comparative Study of SVD and QRS in Closed-Loop Beamforming Systems**

Chau Yuen, *I2R*

Sumei Sun, *I2R*

Jian-kang Zhang, *McMaster University*

## **WMC-1.2 Link and Network Capacity Gains in Ad Hoc Networks Utilizing MIMO Techniques**

Jan Nilsson, *FOI*

Otto Tronarp, *FOI*

Gunnar Eriksson, *FOI*

Peter Holm, *FOI*

Elisabeth Löfsved, *FOI*

Jouni Rantakokko, *FOI*

## **WMC-1.3 Dual Codebooks for Beamforming With No Direct Channel Estimation**

Keith M. Chugg, *Ming-Hsieh Department of Electrical Engineering, Viterbi School of Engineering, University of Southern California*

Bertan Tezcan, *Ming-Hsieh Department of Electrical Engineering, Viterbi School of Engineering, University of Southern California*

## **WMC-1.4 A Novel Blind Carrier Synchronization Method for MIMO OFDM System**

Degang Wang, *National University of Defense Technology*

Jibo Wei, *National University of Defense Technology*

Xiaoying Zhang, *National University of Defense Technology*

## **WMC-1.5 Multi-Element Adaptive Arrays With Trapped Delay Lines for Interference Mitigation in IEEE 802.11G OFDM Systems**

Ayham Al-Banna, *Illinois Institute of Technology*

Joseph LoCicero, *Illinois Institute of Technology*

Donald Ucci, *Illinois Institute of Technology*

## **WMC-1.6 On the Throughput of Zero-Forcing Beamforming Using Random Vector Quantization Limited Feedback in MIMO Broadcast Channels**

Lei Zhang, *National Key Lab of Commun, Univ of Electro Sci & Tech of China*

Hongming Zheng, *Intel China Research Center*

May Wu, *Intel China Research Center*

Shaoqian Li, *National Key Lab of Commun, Univ of Electro Sci & Tech of China*

## **WMC-1.7 Asymptotic Symbol Error Probabilities of Multiple Inputs and Multiple Outputs (MIMO) Diversity Configurations and a Novel Closed Loop Code Division MIMO Diversity Scheme**

Ning Kong, *ECE UCSD*

## **WMC-10**

### **Selected Cutting Edge Topics**

Monday

2:15–5:00 p.m.

Miami 3

This session consists of cutting-edge topics for future telecommunication systems. It ranges from advanced antenna selection and MIMO techniques to power allocation.

**Session Organizer:** Dr. Feng Ouyang, *Johns Hopkins University, Applied Physics Laboratory*

**Session Chair:** Prof. Pentti Leppanen, *University of Oulu, Finland*

## **WMC-10.1 Power Allocation and Self-Scheduling for Cooperative Transmission Using Opportunistic Large Arrays**

Aravind Kailas, *Georgia Institute of Technology*

Lakshmi Thanayankizil, *Georgia Institute of Technology*

Mary Ann Ingram, *Georgia Institute of Technology*

## **WMC-10.2 Optimum Reference Signal Structure for MIMO Multiplexing Using Precoding in Evolved UTRA Downlink**

Hidekazu Taoka, *NTT DoCoMo, Inc.*

Yoshihisa Kishiyama, *NTT DoCoMo, Inc.*

Kenichi Higuchi, *NTT DoCoMo, Inc.*

Mamoru Sawahasi, *Musashi Institute of Technology*

### **WMC-10.3 Detecting the Number of Transmit Antennas With Unauthorized or Cognitive Receivers in MIMO Systems**

Oren Somekh, *Princeton University*

Osvaldo Simeone, *NJIT*

Yehekel Bar-Ness, *NJIT*

Wei Su, *U.S. Army RDECOM CERDEC, Ft. Monmouth*

### **WMC-10.4 Joint Iterative Channel Allocation and Beamforming Algorithm for Interference Mitigation in Multiple-Antenna Ad Hoc Networks**

Engin Zeydan, *Stevens Institute of Technology*

Didem Kivanc Tureli, *Stevens Institute of Technology*

Ufuk Tureli, *Stevens Institute of Technology*

### **WMC-10.5 A Special Open-Loop Transmit Antenna Selection Mode in the SC-FDMA Systems for 3G LTE**

Jin Liu, *Alcatel-Lucent*

Liang Wang, *Alcatel-Lucent*

Mingli You, *Alcatel-Lucent*

Pingping Wen, *Alcatel-Lucent*

### **WMC-10.6 Transmission Range Optimization for FH-CDMA Networks in Time-Varying Channels**

Haichang Sui, *University of California, San Diego*

James Zeidler, *University of California, San Diego*

### **WSN-3.2 Rate-Power-Range Design Tradeoffs in IEEE 802.11 Based Ad Hoc Wireless Networks**

Rima Khalaf, *University of California, Los Angeles*

### **WSN-3.3 Automatic Optimization of Reliable Collaborative Services in OLSR Mobile Ad Hoc Networks**

Christophe Guettier, *SAGEM Defense and Security*

Philippe Jacquet, *INRIA*

Laurent Viennot, *INRIA*

Jacques Yelloz, *SAGEM Defense and Security*

### **WSN-3.4 The ARL TOPODEF Tool for Designing Mobile Ad Hoc Network Topologies To Support Emulation**

Binh Nguyen, *U.S. Army Research Lab*

### **WSN-3.5 NCR: A Unifying Parameter to Characterize and Evaluate Data Dissemination Scenarios and Its Analytic Study**

Biao Zhou, *University of California, Los Angeles*

Mario Gerla, *University of California, Los Angeles*

### **WSN-3.6 Performance Improvements of OSPF MANET Extensions: A Cross-Layer Approach**

Guangyu Pei, *The Boeing Company*

Phil Spagnolo, *The Boeing Company*

Sang Bae, *The Boeing Company*

Tom Henderson, *The Boeing Company*

Jae Kim, *The Boeing Company*

## **WSN-3**

### **Tactical MANET—Part 1**

Monday

2:15–5:00 p.m.

Naples 1

DoD is developing wireless networking technologies for network-centric warfare. Tactical MANET is the key enabler for such a reliable, mobile, secure, self-forming ad hoc networking among warfighting forces for network-centric operation. The related technical issues, current status, and the future direction of tactical MANET will be addressed in a series of two sessions on “Tactical MANET (Part 1–Protocols)” and “Tactical MANET (Part 2–Applications).”

Tactical MANET (Part 1–Protocols)

- MAC, routing, transport layer protocols issues with MANET
- MANET cross-layer design issues
- Performance optimization and topology control
- Any new concepts, approaches, and related subjects

**Session Organizer/Chair:** Dr. Jae Kim, *Boeing Phantom Works*

### **WSN-3.1 Two-Tier Slotted Aloha in Mobile Ad Hoc Networks**

Di Zheng, *Stevens Institute of Technology*

Yu-Dong Yao, *Stevens Institute of Technology*

Charles Graff, *U.S. Army RDECOM CERDEC*

Trevor Cook, *U.S. Army RDECOM CERDEC*

## **WSN-8**

### **Sensor Networks-1**

Monday

2:15–5:00 p.m.

Naples 3

Wireless sensor networking is a topic that has continued to receive significant research and development interest over the past decade. This reflects the significant interest in sensor networking both in the military and commercial domains. This session considers the topic of wireless sensor networking, with a particular emphasis on the topics of sensor network topology construction and sensor network security, both of paramount interest to the military application of wireless sensor networks.

**Session Organizers/Chairs:** Jack L. Burbank, *Johns Hopkins University, Applied Physics Laboratory*, & William Kasch, *Johns Hopkins University, Applied Physics Laboratory*

### **WSN-8.1 Fail-Safe Hierarchical Organization for Wireless Sensor Networks**

Stefano Basagni, *Northeastern University*

Chiara Petrioli, *Rome University “La Sapienza”*

Roberto Petroccia, *Rome University “La Sapienza”*

### **WSN-8.2 Responding to Changing Situations: Learning Automata for Sensor Placement**

Tal Ben-Zvi, *Stevens Institute of Technology*

Jeffrey Nickerson, *Stevens Institute of Technology*

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## **WSN-8.3 Optimal Node Placements in Decision Fusion Wireless Sensor Networks for Distributed Detection of a Randomly Located Target**

Sudharman Jayaweera, *University of New Mexico*

## **WSN-8.4 Integrated Mobile and Static Sensing for Target Tracking**

Oliver Kosut, *Cornell University*

Andrey Turovsky, *Cornell University*

John Sun, *Cornell University*

Matthew Ezovski, *Cornell University*

Gene Whipps, *Army Research Laboratory*

Lang Tong, *Cornell University*

## **WSN-8.5 Clustered Adaptive Rate Limiting: Defeating Denial-of-Sleep Attacks in Wireless Sensor Networks**

David Raymond, *Virginia Tech*

Scott Midkiff, *Virginia Tech*

## **WSN-8.6 Minimizing False Alarms on Intrusion Detection for Wireless Sensor Networks in Realistic Environments**

Bhavik Parekh, *Arizona State University*

Hasan Cam, *Arizona State University*

## **WSN-8.7 An Efficient PKC-Based Security Architecture for Wireless Sensor Networks**

Md. Mokammel Haque, *Networking Lab, KHU*

Al-Sakib Khan Pathan, *Networking Lab, KHU*

Choong Seon Hong, *Kyung Hee University*

## **WSN-12**

### **MANET Quality of Service (QoS)**

Monday

2:15–5:00 p.m.

Naples 2

Providing users with acceptable Quality of Service (QoS) is very challenging in a MANET. The challenges mainly arise from the fact that wireless links are often unreliable, hence causing frequent link data rate fluctuation and topology change. Therefore, MANET QoS has been a very active research area, and it has attracted a lot of attention both from academia and industry. In this session, we present seven interesting papers on this important topic. This set of papers offers a holistic view on how to ensure QoS in MANETs, from architecture design, and network planning, to solutions specifically implemented in PHY, link, and network layer.

**Session Organizers:** Dr. Kirk K. Chang, *Telcordia Technologies*, Dr. Moussa Ayyash, *Illinois Institute of Technology*, & Prof. Khaled Alzoubi, *Saint Xavier University*

**Session Chair:** Dr. Kirk K. Chang, *Telcordia Technologies*

## **WSN-12.1 Placement of UAVs as Communication Relays Aiding Mobile Ad Hoc Wireless Networks**

Izhak Rubin, *University of California, Los Angeles*

Runhe Zhang, *University of California, Los Angeles*

## **WSN-12.2 A Two-Level Quality of Service Scheme for Collision Based Mobile Ad Hoc Networks**

Robert Hall, *AT&T Labs Research*

Josh Auzins, *Scientific Research Corporation*

## **WSN-12.3 Traffic Aware QoS Routing in Ad Hoc Wireless Networks**

Jason H. Li, *Intelligent Automation Inc.*

Song Luo, *Intelligent Automation Inc.*

Wei Tang, *Intelligent Automation Inc.*

Renato Levy, *Intelligent Automation Inc.*

Kihong Park, *Purdue University*

## **WSN-12.4 Towards Scheduling MIMO Links in Interference-Limited Wireless Ad Hoc Networks**

Tamer El Batt, *SDRC Argon ST*

## **WSN-12.5 QoS Architecture for a Mobile Ad Hoc Network**

Richard C. Bernhardt, *Harris Corporation*

J. Bibb Cain, *Harris Corporation*

William A. Windham, *Harris Corporation*

## **WSN-12.6 Network Layer Congestion Control To Ensure Quality of Service (QoS) in Tactical Mobile Ad Hoc Networks**

Kirk Chang, *Telcordia Technologies*

Keith Kim, *Telcordia Technologies*

Larry Wong, *Telcordia Technologies*

Sunil Samtani, *Telcordia Technologies*

Aristedis Staikos, *U.S. Army CERDEC*

Mitesh Patel, *U.S. Army CERDEC*

## **WSN-12.7 QoS Management in Disadvantaged Tactical Environments**

Sherry Wang, *Johns Hopkins University, Applied Physics Laboratory*

Harold Zheng, *Johns Hopkins University, Applied Physics Laboratory*

Phong Khuu, *BAE Systems–NES*

## TUESDAY, 30 October 2007

**ACT-4****Directional Hybrid Optical/RF Networks**

Tuesday 9:15 a.m.–noon  
Tallahassee 1

This session addresses the fundamental issues of physical layer design, mobility, and control required to support tactical C4ISR on the move. Real-time control and dynamical systems for directional networks are necessary to overcome the shortcomings inherent in present broadcast wireless approaches, which use omnidirectional, mobile ad hoc wireless networks (OMANET). In contrast, directional mobile ad hoc wireless networks (DMANET) are characterized by high data rates, efficient use of spatial diversity, and can include both free space optical and RF links. Papers discuss networks, which can: 1) dynamically and autonomously configure their physical links (requiring pointing, acquisition, and tracking of high capacity directional links); 2) provide real-time, autonomous topological formation and reconfiguration of a wireless Internet backbone; 3) possess communication platform mobility control to assure connectivity and coverage for real-time C4ISR applications; and 4) provide very high bandwidth over long distances using both free space optics and radio frequency.

**Session Organizer:** Dr. Stuart Milner, *University of Maryland*

**Session Chair:** Dr. Richard DeSalvo, *Harris Corporation*

**ACT-4.1 Topology Formation in Degree-Constrained Directional Antenna Networks**

Martin Duke, *The Boeing Company*  
Guangyu Pei, *The Boeing Company*  
Jae Kim, *The Boeing Company*

**ACT-4.2 Demonstration of High Data Rate Wavelength Division Multiplexed Transmission Over a 150-km Free Space Optical Link**

David Young, *Johns Hopkins University, Applied Physics Laboratory*  
Juan Juarez, *Johns Hopkins University, Applied Physics Laboratory*  
Joseph Sluz, *Johns Hopkins University, Applied Physics Laboratory*  
Marc Airola, *Johns Hopkins University, Applied Physics Laboratory*  
Raymond Sova, *Johns Hopkins University, Applied Physics Laboratory*  
Harry Hurt, *Johns Hopkins University, Applied Physics Laboratory*  
Malcolm Northcott, *AOptix Technologies, Inc.*  
John Phillips, *AOptix Technologies, Inc.*  
Andy McClaren, *AOptix Technologies, Inc.*  
Don Driver, *AOptix Technologies, Inc.*  
David Abelson, *AOptix Technologies, Inc.*  
James Foshee, *U.S. Air Force Research Laboratory/IFGD*

**ACT-4.3 A Control Plane Architecture for Mobile Free Space Optical Network and Directional RF MANETs**

Anurag Dwivedi, *Johns Hopkins University, Applied Physics Laboratory*  
Daniel Tebben, *Johns Hopkins University, Applied Physics Laboratory*  
Harshavardhana Paramasiviah, *Johns Hopkins University, Applied Physics Laboratory*  
Roger Hammons, *Johns Hopkins University, Applied Physics Laboratory*  
Robert Nichols, *Johns Hopkins University, Applied Physics Laboratory*

**ACT-4.4 High Capacity Tactical Networks With Reconfigurable, Steerable, Narrow-Beam Agile Point-to-Point RF Links**

Quirino Balzano, *University of Maryland*  
Stuart Milner, *University of Maryland*  
Christopher Davis, *University of Maryland*

**ACT-4.5 A Precise Pointing Technique in Free Space Optical Networking**

Yohan Shim, *University of Maryland*  
Stuart Milner, *University of Maryland*  
Christopher Davis, *University of Maryland*

**ACT-4.6 An Algorithm (DAPR) for Assured Availability Directional RF and FSO MANET**

Paramasiv Harshavardhana, *Johns Hopkins University, Applied Physics Laboratory*  
Dan Tebben, *Johns Hopkins University, Applied Physics Laboratory*

**ACT-4.7 Mobility Control for Joint Coverage-Connectivity Optimization in Directional Wireless Backbone Networks**

Jaime Llorca, *University of Maryland*  
Christopher Davis, *University of Maryland*  
Stuart Milner, *University of Maryland*

**ACT-9****Network Coding 2: The Balance of Evidence**

Tuesday 9:15 a.m.–noon  
Tallahassee 2

Network coding has emerged as a potentially revolutionary paradigm for wired and wireless information transfer. However, despite recent research and experimentation, the balance of evidence in favor of network coding is not yet decisive. On the one hand, there are promising theoretical and practical results that show gains in throughput, delay, robustness, and confidentiality. On the other hand, the overhead of coding and hyper-path construction combined with the specialized nature of certain results is cause for skepticism. This session brings together a

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small group of experts to highlight and debate the most recent and compelling results on either side. Discussion will include not just intra-flow multicast results, but also those involving specializations or generalizations such as inter-session coding and dispersity routing.

**Session Organizers/Chairs:** Chris Ramming, *DARPA*, & Dr. Ananthram Swami, *Civ ARL/CISD*

## **ACT-9.1 Wireless Network Coding: Opportunities and Challenges**

Dina Katabi, *Massachusetts Institute of Technology*

Christina Fragouli, *EPFL*

Athina Markopoulou, *University of California, Irvine*

Hariharan Rahul, *Massachusetts Institute of Technology*

Muriel Medard, *Massachusetts Institute of Technology*

## **ACT-9.2 Information-Theoretic Relaying for Multicast in Wireless Networks**

Ivana Maric, *Stanford University*

Andrea Goldsmith, *Stanford University*

Muriel Medard, *Massachusetts Institute of Technology*

## **ACT-9.3 Dispersity Routing: Past and Present**

Nicholas Maxemchuk, *Columbia University*

## **ACT-9.4 On Network Coding for Stable Multicast Communication**

Yalin Sagduyu, *University of Maryland, College Park*

Anthony Ephremides, *University of Maryland, College Park*

## **ACT-9.5 Network Coding Performance for Reliable Multicast**

Majid Ghaderi, *University of Massachusetts*

Don Towsley, *University of Massachusetts*

Jim Kurose, *University of Massachusetts*

## **ACT-9.6 On the Scaling Law of Network Coding Gains in Wireless Networks**

Ebad Ahmed, *Massachusetts Institute of Technology*

Atilla Eryilmaz, *Massachusetts Institute of Technology*

Muriel Medard, *Massachusetts Institute of Technology*

Asuman Ozdaglar, *Massachusetts Institute of Technology*

## **ACT-12**

### **Optical Communications: Systems and Network Technologies, Algorithms and Protocols**

Tuesday

9:15 a.m.–noon

Tallahassee 3

This session will describe directional RF and optical communications systems, networking technologies and associated algorithms and protocols. This session includes papers on both static fiber optical networks as well as directional RF and free space optical wireless mobile networks, optical switching, network control and management protocols, network architectures, physical layer routing, network protection, restoration, reli-

ability, and availability, dynamic topology control, multi-layer network protocol integration, prototypes and field demonstrations. Discussion will be focused on recent advances in these technologies and their effectiveness in solving directional RF and laser communications and networking challenges for the military.

**Session Chair/Organizer:** Dr. Anurag Dwivedi, *Johns Hopkins University, Applied Physics Laboratory*

## **ACT-12.1 Design Principles and Formulation for Optical SMART Networks**

Tao Zhang, *New York Institute of Technology*

Kejie Lu, *University of Puerto Rico at Mayagüez*

Gaoxi Xiao, *Nanyang Technological University (NTU)*

S.Q. Zheng, *University of Texas at Dallas*

## **ACT-12.2 Simulation-Based Performance Robustness Studies for Optical Gigabit LAN in Military Applications**

Gary Shaulov, *The MITRE Corporation*

Jigesh Patel, *RSoft Design Group*

## **ACT-12.3 Cross-Layer Design of XCP on Agile All-Photonic Network (AAPN)**

Yong Deng, *University of Ottawa*

Oliver Yang, *University of Ottawa*

Yang Hong, *University of Ottawa*

## **ACT-12.4 Performance of DTN Free-Space Optical Communications in Mobility**

Robert Nichols, *Johns Hopkins University, Applied Physics Laboratory*

Roger Hammons, *Johns Hopkins University, Applied Physics Laboratory*

## **ACT-12.5 An Assembly and Offset Assignment Scheme for Self-Similar Traffic in Optical Burst Switched Networks**

Benon Muwonge, *University of Cape Town*

Anthony H. Chan, *University of Cape Town*

## **ACT-12.6 Topology Reconfiguration of Directional Wireless Networks With Successive Approximations**

Eswaran Baskaran, *University of Maryland*

Jaime Llorca, *University of Maryland*

Christopher Davis, *University of Maryland*

Stuart Milner, *University of Maryland*

## **ACT-12.7 Minimizing Protection Cost for High-Speed Recovery of Mission Critical Traffic in WDM Mesh Networks**

Sun-il Kim, *University of Illinois at Urbana–Champaign*

Xiaolan Zhang, *University of Illinois at Urbana–Champaign*

Steve Lumetta, *University of Illinois at Urbana–Champaign*

## IAS-3

### Information Assurance in Military Communications

Tuesday 9:15 a.m.–noon  
Tampa 1

Information Security challenges in Military/Government Communications Systems are numerous and application requirements can be extreme. Factors such as the operating environment, performance requirements, performance period, threat level and the cost of a compromise, sometimes require novel solutions to otherwise traditional security problems. In addition, the Communication Platforms themselves can offer unique challenges to the systems designers. Unique requirements for the GIG, Ad Hoc Networks, Programmable Platforms, Low Band-Width Systems and Telemetry/Control for Unmanned Aircraft and Sensor/Munitions Arrays all have forced innovation in the application of security solutions.

This session will provide a forum for presentation on advances in the application of Information Security technology to Military Communication Systems. Areas of interest include: Methods for Key Management, Source Authentication, Data Integrity Verification and Access Control. Other potential topics include advances in Network Intrusion Detection, Robust Secure Protocols and Cryptographic Methods and Cryptoanalysis for Government/Military applications.

**Session Organizer/Chair:** Dr. Mike Kurdziel, *Harris Corporation*

#### IAS-3.1 A Scalable Hardware Architecture to Support Applications of the HAIPE 3.1 Standard

Brian Boorman, *Harris Corporation*  
Christopher Mackey, *Harris Corporation*  
Michael Kurdziel, *Harris Corporation*

#### IAS-3.2 Experimental Results of Routing Protocol Convergence in a HAIPE Protected Fault Tolerant Network

LeMonte Green, *Johns Hopkins University, Applied Physics Laboratory*  
Frank P. Mackowick, *Johns Hopkins University, Applied Physics Laboratory*

#### IAS-3.3 Exploring Cross-Layer Techniques for Security: Challenges and Opportunities in Wireless Networks

Geethapriya Thamilarasu, *University of Buffalo*  
Ramalingam Sridhar, *University at Buffalo*

#### IAS-3.4 Elliptic Curve Cryptosystem-Based Group Key Management on Secure Group Communications

Pitipatana Sakarindr, *New Jersey Institute of Technology*  
Nirwan Ansari, *New Jersey Institute of Technology*

#### IAS-3.5 Trust Document Distribution in Mobile Ad Hoc Networks

John Baras, *University of Maryland*  
Tao Jiang, *University of Maryland*

#### IAS-3.6 Coalition and Cross-Domain Information Sharing Challenges

Cecilia Phan, *The Joint Staff J6/C4 Directorate*  
Erik Metala, *SPARTA Inc.*  
Rod Fleischer, *SPARTA, Inc.*

#### IAS-3.7 End-to-End Channel Assurance for Communication Over Open Voice Channels

David Coumou, *University of Rochester*  
Gaurav Sharma, *University of Rochester*

## ISS-2

### Information and Application Services

Tuesday 9:15 a.m.–noon  
Tampa 2

This session is focused on interoperability standards, data dissemination in mobile disaster recovery environment, and multilevel secure ad hoc infrastructures. In addition, discussion on applications with reference to security access and semantically mediated data fusion are included.

**Session Organizer:** Bonnie Gorsic, *The Boeing Company*

**Session Chair:** Ari Pouttu, *University of Oulu, Finland*

#### ISS-2.1 Adaptive Mobility-Assisted Data Dissemination in Mobile Disaster/Recovery Environments

Long Vu, *University of Illinois at Urbana-Champaign*  
Klara Nahrstedt, *University of Illinois at Urbana-Champaign*

#### ISS-2.2 Multilevel Secure Ad Hoc Infrastructure Supporting Coalition Force Operations

Gordon Uchenick, *Objective Interface Systems, Inc.*  
W. Mark Vanfleet, *National Security Agency*

#### ISS-2.3 An Application of Security Access and Control to Semantic Metadata Management

Ben Snively, *Harris Corporation*  
Tahia Infantes Morris, *Harris Corporation*  
Kevin Fox, *Harris Corporation*  
Reg Ita, *Harris Corporation*

#### ISS-2.4 Computing Social Organizational Structure From Externally Observable Communications Patterns

David Rosenbluth, *Telcordia Technologies*  
Marc Pucci, *Telcordia Technologies*

#### ISS-2.5 Approaches to Semantically Mediated Data Fusion

Baofeng Guo, *University of Southampton*  
Ye Wang, *University of Southampton*  
Paul Smart, *University of Southampton*  
Mark Nixon, *University of Southampton*  
Nigel Shadbolt, *University of Southampton*  
Thyagaraju Damarla, *U.S. Army Research Laboratory*

# UNCLASSIFIED SESSIONS

## MCS-4

### Cooperative Communications

Tuesday  
Naples 3

9:15 a.m.–noon

One of the challenges of net-centric operations is to provide universal connectivity with high levels of communication performance across diverse military environments. Multiple-Input, Multiple-Output (MIMO) radio techniques, in which multiple antennas are used by both the sender of information and the intended recipient, offer the potential for much higher spectral efficiencies than are possible with conventional wireless radio systems. This session focuses on the design and application of cooperative MIMO techniques, in which the transmit resources are provided by a pool of autonomous radios.

**Session Organizer/Chair:** Dr. A. Roger Hammons, Jr.,  
*Johns Hopkins University, Applied Physics Laboratory*

#### MCS-4.1 Efficient Power Allocation for Decentralized Distributed Space-Time Block Coding

Lu Zhang, *University of Delaware*

Leonard Cimini, *University of Delaware*

#### MCS-4.2 Optimum Energy Allocation in Cooperative Networks: A Comparative Study

Woong Cho, *University of Florida*

Liuqing Yang, *University of Florida*

Rui Cao, *University of Florida*

#### MCS-4.3 Differential Modulation and Demodulation for Decode-and-Forward Wireless Relay Systems

Yan Xin, *National University of Singapore*

Yonglan Zhu, *National University of Singapore*

Pooi-Yuen Kam, *National University of Singapore*

#### MCS-4.4 Bit Loading Algorithms for Cooperative OFDM Systems

Bo Gui, *University of Delaware*

Leonard Cimini, *University of Delaware*

#### MCS-4.5 Cooperative Transmissions Over Code Division Multiplexing Channels

Lili Wei, *State University of New York at Buffalo*

Stella N. Batalama, *State University of New York at Buffalo*

Dimitris A. Pados, *State University of New York at Buffalo*

Bruce Suter, *U.S. Air Force Research Laboratory*

#### MCS-4.6 On Performance of Cooperative CDMA Random Access Networks

Junjun Li, *City University of New York*

Yi Sun, *City University of New York*

Myung J. Lee, *City University of New York*

Jong-suk Chae, *Telematics and USN Research Division, ETRI*

#### MCS-4.7 Outage Probability and Assignment Protocols in Cooperative Diversity

Oguz Dogan, *University of Virginia*

Stephen Wilson, *University of Virginia*

## MCS-11

### Video Coding for Mobile and Wireless Networking

Tuesday  
Sanibel 2

9:15 a.m.–noon

Video is expected to play an increasing role in military operations. The transport of video over wireless, and in particular ad hoc, networks is challenging because of the high data rates and low latencies required. The papers in this session consider a broad spectrum of video coding and higher-layer protocols to enable the use of video in mobile and wireless networks.

**Session Organizer/Chair:** Prof. Dapeng Oliver Wu,  
*University of Florida*

#### MCS-11.1 An Adaptive Slice Group Multiple Description Coding Technique for Real-Time Video Transmission Over Wireless Networks

Viswesh Parameswaran, *Arizona State University*

Sudheendra Murthy, *Arizona State University*

Arunabha Sen, *Arizona State University*

Baoxin Li, *Arizona State University*

#### MCS-11.2 Delay-Constrained Motion-Compensated FGS Video Transport With Optimal Interleaving

Dian Fan, *Electrical and Computer Engineering Department, University of Miami*

James Modestino, *Electrical and Computer Engineering Department, University of Miami*

Yee Sin Chan, *Verizon Wireless*

Xunqi Yu, *Microsoft*

#### MCS-11.3 Complexity-Controllable Video Coding With Spatial Scalability

Guangxi Zhu, *Huazhong University of Science and Technology*

King Ngi Ngan, *The Chinese University of Hong Kong*

Xin Jin, *Huazhong University of Science and Technology*

#### MCS-11.4 Improved Path Selection Algorithms for Multipath Video Streaming in Wireless Ad Hoc Networks

Sudheendra Murthy, *Arizona State University*

Prasad Hegde, *Arizona State University*

Viswesh Parameswaran, *Arizona State University*

Baoxin Li, *Arizona State University*

Arunabha Sen, *Arizona State University*

#### MCS-11.5 A Novel Region-Based Color Video Compression Technique

Amr Hanafy, *Military Technical College, Cairo, Egypt*

Yahya Mohasseb, *Military Technical College, Cairo, Egypt*

Gouda Salama, *Military Technical College, Cairo, Egypt*

Medhat Moukhtar, *Military Technical College, Cairo, Egypt*

**NAPM-4****Cross-Layer Protocols**

Tuesday  
Sanibel 3

9:15 a.m.–noon

This section focuses on recent advances in cross-layer protocol design and implementation with emphasis on QoS, congestion and routing optimizations enabled by cross-layer design.

**Session Organizer/Chair:** Prof. Song Ci, *University of Nebraska at Lincoln*

**NAPM-4.1 Performance of an Adaptive Routing Overlay Under Dynamic Link Impairments**

Brian Mark, *George Mason University*  
Shidong Zhang, *George Mason University*  
Rick McGeer, *HP Laboratories*  
Jack Brassil, *HP Laboratories*  
Puneet Sharma, *HP Laboratories*  
Praveen Yalagandula, *HP Laboratories*

**NAPM-4.2 Proactive Link Selection for Network Robustness (PILSNER)**

Aristides Staikos, *U.S. Army CERDEC S&TCD*  
Jeffrey Bowcock, *U.S. Army CERDEC S&TCD*  
Mitesh Patel, *U.S. Army CERDEC S&TCD*  
Jonathan Simbol, *U.S. Army CERDEC S&TCD*  
David Yee, *U.S. Army CERDEC S&TCD*  
Jeffrey Keehn, *U.S. Army CERDEC S&TCD*

**NAPM-4.3 MUD Enabled Media Access Control for High Capacity, Low-Latency Spread Spectrum Communications**

Yiftach Eisenberg, *BAE Systems*  
Keith Conner, *BAE Systems*  
Mathew Sherman, *BAE Systems*  
Joshua Niedzwiecki, *BAE Systems*  
Reggie Brothers, *DARPA*

**NAPM-4.4 SIDSP: Simple Inter-Domain QoS Signaling Protocol**

Luis Bernardo, *Universidade Nova de Lisboa*  
António Santos, *Universidade Nova de Lisboa*  
Pedro Amaral, *Universidade Nova de Lisboa*  
Paulo Pinto, *Universidade Nova de Lisboa*

**NAPM-4.5 A Tunable Cross-Layer Congestion Reducing Medium Access Control (CRMAC) Protocol for Wireless Networks**

Anirban Bag, *University of Central Florida*  
Mostafa Bassiouni, *University of Central Florida*

**NAPM-4.6 Designing OSPF Routing Areas To Meet Diverse End-to-End Performance**

Kyriakos Manousakis, *Telcordia Technologies*  
Anthony McAuley, *Telcordia Technologies*

**NAPM-4.7 MIMO and TCP: A Case for Cross-Layer Design**

Joon-Sang Park, *Hong-Ik University*  
Soon Oh, *University of California, Los Angeles, Computer Science Dept.*  
Mario Grela, *University of California, Los Angeles, Computer Science Dept.*

**NCS-2****Modeling and Simulation of Large-Scale Networks**

Tuesday  
Sarasota 1

9:15 a.m.–noon

This session focuses on some of the challenges facing Modeling and Simulating of large-scale networks. Relevant papers study issues like abstract network simulation, trade-offs between detailed and simulation objectives, and scope of model validation and verification. The session also covers approaching large-scale networking through computational simplification, distributed algorithms, and harnessing any information the network may make available. Also included are papers discussing Software-In-The-Loop, Hardware-In-The-Loop, Network-In-The-Loop, operational planning tools, model validation and verification techniques, and algorithm development.

**Session Organizer:** Dr. George F. Elmasry, *XPRT Solutions, Inc.*

**Session Chair:** Walter Lucchesi, *U.S. Army CERDEC*

**NCS-2.1 A Generic Solution to Software-in-the-Loop**

Stephanie Demers, *Telcordia Technologies*  
Latha Kant, *Telcordia Technologies*  
Praveen Gopalakrishnan, *Telcordia Technologies*

**NCS-2.2 Dynamic Activation of Reach-Back Resources for Future Force BCT**

Subhabrata Sen, *XPRT Solutions, Inc.*  
Thomas Boney, *XPRT Solutions, Inc.*  
James DeRagon, *XPRT Solutions, Inc.*  
Manoj Jain, *XPRT Solutions, Inc.*

**NCS-2.3 On the Formation of Multilayer Hierarchical Structures Using Simulated Annealing**

Kyriakos Manousakis, *Telcordia Technologies*  
Anthony McAuley, *Telcordia Technologies*

**NCS-2.4 NEDAT = A Network Engineering Design Analytic Toolset to Design and Analyze Large-Scale MANETs**

Latha Kant, *Telcordia Technologies*  
Kirk Chang, *Telcordia Technologies*  
Praveen Gopalakrishnan, *Telcordia Technologies*  
Kyriakos Manousakis, *Telcordia Technologies*  
Anthony McAuley, *Telcordia Technologies*  
Krishnan Komandur, *Telcordia Technologies*  
Eric Van den Berg, *Telcordia Technologies*

# UNCLASSIFIED SESSIONS

Kenneth Young, *Telcordia Technologies*  
Charles Graff, *U.S. Army CERDEC, Ft. Monmouth*  
David Yee, *U.S. Army CERDEC, Ft. Monmouth*  
Trevor Cook, *U.S. Army CERDEC, Ft. Monmouth*

## **NCS-2.5 Tactical Network Connectivity Planning**

Paul Kim, *Johns Hopkins University, Applied Physics Laboratory*  
Anurag Dwivedi, *Johns Hopkins University, Applied Physics Laboratory*  
Daniel Tebben, *Johns Hopkins University, Applied Physics Laboratory*

## **NCS-2.6 An Approach for Real-Time Monitoring and Control of Tactical Network Simulations**

John Stine, *The MITRE Corporation*  
Nancy Schult, *The MITRE Corporation*  
Mohammad Mirhakkak, *The MITRE Corporation*  
Jonathan Schwartz, *The MITRE Corporation*

## **NCS-2.7 Routing Versus Network Coding in Erasure Networks With Broadcast and Interference Constraints**

Brian Smith, *University of Texas at Austin*  
Piyush Gupta, *Bell Labs Alcatel-Lucent*  
Sriram Vishwanath, *University of Texas at Austin*

## **NCS-5**

### **IP Converged/Integrated GIG and Broadband Services for the Warfighter**

Tuesday 9:15 a.m.–noon  
Sarasota 2

This session addresses the potential and challenges for the design and development of an All-IP integrated GIG architecture to offer broadband services. The papers presented in this session cover broad spectrum of topics ranging from modeling and simulations of GIG, end-to-end performance and quality of service (QoS) provisioning for voice and video in fixed and wireless networks, routing and resource management. In addition, VoIP systems engineering and integration solutions along with congestion control and security issues, and their impact on next generation IP networks, are also presented.

**Session Organizer/Chair:** Dr. Syed A. Shah, *Civ DISA*

## **NCS-5.1 Modeling and Simulation of GIG Networking Scenarios Using Efficient HAIPE**

Mohammad Mirhakkak, *The MITRE Corporation*  
Phong Ta, *The MITRE Corporation*

## **NCS-5.2 GIG Performance Assessment Framework**

Tony Modelfino, *Stratogis Networks*  
George Case, *Stratogis Networks*  
Tony Desimone, *OSD NII*  
Subramaniam Kandaswamy, *Johns Hopkins University, Applied Physics Laboratory*

## **NCS-5.3 Communications Over Public Networks for Network-Assisted Defense**

Jorma Jormakka, *National Defence University, Finland*  
Henryka Jormakka, *Technical Research Centre*

## **NCS-5.4 Scheduling for Streaming Application Over Wideband Cellular Network in Mixed Service Scenarios**

Pingping Wen, *Alcatel Shanghai Bell*  
Mingli You, *Alcatel Shanghai Bell*  
Jin Liu, *Alcatel Shanghai Bell*

## **NCS-5.5 An Efficient Method for Hop Selection and Capacity Enhancement in Multi-Hop Wireless Ad Hoc Networks**

Xiaohua Li, *State University of New York at Binghamton*

## **NCS-5.6 GIG QoS Inter-Domain Interoperability Challenges**

Christina Dee, *Booz Allen Hamilton*  
Christopher Gedo, *Defense Information Systems Agency*  
Yong Xue, *Defense Information Systems Agency*  
John Evans, *Defense Information Systems Agency*  
Christos Christou, *Booz Allen Hamilton*

## **RSA-1**

### **Radio Systems and Architectures**

Tuesday 9:15 a.m.–noon  
Sarasota 3

With the development and deployment of the high-speed Net-Centric Network, it is essential to interconnect the tactical edge network with the backbone network so that we can achieve a global end-to-end network. This session will cover novel research in the area tactical radio network technologies, network performance analysis for communication systems, radar sensor networks, radio frequency identification technologies and assessment of CSMA radio support for PLI, C2, SA data traffic.

**Session Organizer/Chair:** Akinwale Akinpelu, *Johns Hopkins University, Applied Physics Laboratory*

## **RSA-1.1 Spectrum Adaptability Scan Based Notching in MUOS**

Vincent Vella, *Maxim Systems, Inc.*  
Ron Fish, *Maxim Systems, Inc.*  
Keith Kumm, *WaveLogic Corporation*

## **RSA-1.2 A Stable Recursive Algorithm for Memory Polynomial Predistorter**

Lingjun Xu, *Beijing University of Posts and Telecommunications*  
Xiaoguang Wu, *Beijing University of Posts and Telecommunications*  
Yong Wang, *Beijing University of Posts and Telecommunications*  
Jianhua Zhang, *Beijing University of Posts and Telecommunications*  
Ping Zhang, *Beijing University of Posts and Telecommunications*

## RSA-1.3 Collaborative Multi-Target Detection in Radar Sensor Networks

Hung D. Ly, *University of Texas at Arlington*  
Qilian Liang, *University of Texas at Arlington*

## RSA-1.4 RFID Potential for Army Field Operations

Derek Morris, *U.S. Army CERDEC STCD*  
Kristopher Glover, *U.S. Army CERDEC STCD*

## RSA-1.5 Radio Transmitter Classification Using a New Method of Stray Features Analysis Combined With PCA

Shuhua Xu, *IEEE*  
Benxiong Huang, *Professor, Huazhong University, P. R. China*  
Lina Xu, *Lecturer, Huazhong University, P. R. China*

## RSA-1.6 Performance Analysis of Transform Domain Communication Systems in the Presence of Spectral Mismatches

Yu T. Su, *Department of Communication Engineering, National Chiao Tung University, Taiwan*  
Jen-Yang Liu, *Department of Communication Engineering, National Chiao Tung University, Taiwan*

## RSA-1.7 Assessment of Enhanced Position Location Reporting System (EPLRS) Radio Support PLI, C2 and SA in Joint Opera

Akinwale Akinpelu, *Johns Hopkins University, Applied Physics Laboratory*  
Andrea Kagel, *Johns Hopkins University, Applied Physics Laboratory*  
Dennis Moy, *Johns Hopkins University, Applied Physics Laboratory*  
Clifford Ratliff, *Johns Hopkins University, Applied Physics Laboratory*  
Christopher Rogers, *Johns Hopkins University, Applied Physics Laboratory*

## SAS-5

### Future Satellite Communication Systems

Tuesday 9:15 a.m.–noon  
Miami 1

This session covers architectures and technologies for Future Satellite Communication Systems. A variety of different military SATCOM systems are represented. The papers present architectures for integrating satellite and terrestrial networks, novel uses of existing satellite architectures to provide enhanced services, network architectures for providing Quality of Service and general design principles for future satellite systems as well as a new receiver technology.

**Session Organizer/Chair:** Dr. Aradhana Narula-Tam, *MIT Lincoln Laboratory*

## SAS-5.1 Some Research Directions for Future Integrated Satellite and Terrestrial Networks

Vincent Chan, *Massachusetts Institute of Technology*

## SAS-5.2 SATCOM-CX

Reginald Brothers, *BAE Systems*  
James DeBardelaben, *Ivysys Technologies*  
Carl Symborski, *SAIC*  
Steve Carson, *SAIC*

## SAS-5.3 Providing Unsignaled Critical Services for Future Satellite

Kathleen Nichols, *Pollere LLC*  
Max Williams, *ITT*

## SAS-5.4 Standards-Based MILSATCOM Mesh-Overlay Networks

Kevin Zhang, *The MITRE Corporation*  
Steve Hryckiewicz, *The MITRE Corporation*  
George Kinal, *The MITRE Corporation*  
Shaum Mittal, *DISA*

## SAS-5.5 Italian Next-Generation MILSATCOM—the Sicral 2 SHF Payload

Alessandro Le Pera, *Thales Alenia Space, Rome, Italy*  
Alessandro Pisano, *Thales Alenia Space, Rome, Italy*  
Giampero Di Paolo, *Thales Alenia Space, Rome, Italy*

## SAS-5.6 Flexible Satellite Systems

Philip Lin, *The MITRE Corporation*  
Thomas Kostas, *C. S. Draper Laboratory*

## SAS-5.7 High Performance All Digital RF Receiver Tested at 7.5 GHz

Jack Wong, *U.S. Army CERDEC S&TCD*  
Rick Dunnegan, *U.S. Army CERDEC S&TCD*  
Deep Gupta, *HYPRES, Inc.*  
Richard Hitts, *HYPRES, Inc.*

## SIMA-1

### Domain Models and Frameworks

Tuesday 9:15 a.m.–noon  
Miami 2

Using techniques ranging from context-awareness to game theory, these papers describe new results in modeling, fusing, and maintaining situation awareness.

**Session Chair:** Dr. Lundy Lewis, *Southern New Hampshire University*

## SIMA Welcome

Dr. Gabriel Jakobson, *Altusys*

## SIMA Program

Dr. John Buford, *Avaya Labs Research*  
Dr. John Salerno, *AFRL*

## SIMA Keynote Talk—"Electronic Chronicling for DARPA ASSIST"

Dr. Gopal Pingali, *Manager, IBM Research*

## **SIMA-1.1 Presenting the Story Behind the Data: Enhancing Situational Awareness Using Multimedia Narrative**

Steven Wark, *Defence Science & Technology Organization*  
Dale Lambert, *Defence Science & Technology Organization*

## **SIMA-1.2 Model Based Framework for Implementing Situation Management Infrastructure**

Rajeev Gopal, *Hughes Network Systems*

## **SIMA-1.3 Intelligence Exchange (IntellEx)**

Adam Stotz, *CUBRC*  
Moises Sudit, *University at Buffalo*

## **SIMA-1.4 Context Aware Information Retrieval for Enhanced Situation Awareness**

Ali Bahrami, *The Boeing Company Phantom Works*  
Jun Yuan, *The Boeing Company Phantom Works*  
Paul Smart, *University of Southampton*  
Nigel Shadbolt, *University of Southampton*

## **SIMA-1.5 Adaptive Markov Game Theoretic Data Fusion Approach for Cyber Network Defense**

Dan Shen, *Intelligent Automation, Inc.*  
Genshe Chen, *Intelligent Automation, Inc.*  
Erik Blasch, *AFRL/SNAA*  
George Tadda, *AFRL/IFEA*

## **WMC-2**

### **MIMO-2**

Tuesday 9:15 a.m.–noon  
Miami 3

One of the challenges in net-centric operations is to provide universal connectivity with high levels of communication performance across diverse military environments. Multiple-Input, Multiple-Output (MIMO) radio techniques, in which multiple antennas are used by both the transmitter and the receiver, offer the potential for significant enhancements in spectral efficiency and link reliability. This session focuses on the design and application of MIMO techniques (cooperative or noncooperative), especially for military communications. The session is divided into 2 parts, each containing 7 presentations. This session is one of two and covers beam forming and cross-layer techniques.

**Session Organizer/Chair:** Dr. Feng Ouyang, *Johns Hopkins University, Applied Physics Laboratory*

## **WMC-2.1 Punctured Space-Time Convolutional Codes for Adaptive Modulation Schemes**

Francois Chan, *Royal Military College of Canada*  
David Bernier, *Royal Military College of Canada*

## **WMC-2.2 Minimization of the Dropped Users for MIMO Multicasting Channels**

Jianqi Wang, *Purdue University*  
David J. Love, *Purdue University*  
Michael D. Zoltowski, *Purdue University*

## **WMC-2.3 A Robust Adaptive MIMO-OFDM Over Mobile Fading Channels**

Sanho Choe, *The Catholic University of Korea*

## **WMC-2.4 Scalable MIMO ARQ Retransmission Using Differential Space-Time Block Codes**

Tahmineh Kazemi, *University of California, Davis*  
Zhi Ding, *University of California, Davis*

## **WMC-2.5 Timing Synchronization in Distributed Mobile MISO Rayleigh Fading Channels**

John Kleider, *General Dynamics*  
Ghassan Maalouli, *General Dynamics*  
Xiaoli Ma, *Georgia Institute of Technology*

## **WMC-2.6 On Delay-Tolerant Distributed Space-Time Coding**

Roger Hammons, *Johns Hopkins University, Applied Physics Laboratory*  
M.O. Damen, *University of Waterloo*

## **WSN-4**

### **Tactical MANET—Part 2**

Tuesday 9:15 a.m.–noon  
Naples 1

DoD is developing wireless networking technologies for network-centric warfare. Tactical MANET is the key enabler for such a reliable, mobile, secure, self-forming ad hoc networking among warfighting forces for network-centric operation. The related technical issues, current status, and the future direction of tactical MANET will be addressed in a series of two sessions on “Tactical MANET (Part 1–Protocols)” and “Tactical MANET (Part 2–Applications).”

Tactical MANET (Part 2–Applications)

- MANET scalability and multicast
- Tactical Edge (TE) networking architecture
- Battlefield demonstration experience of large-scale MANETs
- Any new concepts, approaches, and related subjects

**Session Organizer/Chair:** Dr. Jae H. Kim, *Boeing Phantom Works*

## **WSN-4.1 An Efficient Scalable Structure-Free Intercluster Multicast Routing (SAFIR) Protocol for Large Tactical MANETs**

Lucile Canourgues, *Rockwell Collins France*  
Jérôme Lephay, *Rockwell Collins France*  
Laurent Soyer, *Rockwell Collins France*  
André-Luc Beylot, *TeSA Laboratory*

## **WSN-4.2 Network Autoconfiguration for Mobile Ad Hoc**

Seung Yi, *The Boeing Company*  
Jeff R. Meegan, *The Boeing Company*  
Jae H. Kim, *The Boeing Company*

## **WSN-4.3 Adaptive Management of Scalable Mobile Ad Hoc Networks With Non-Homogeneous Topology**

Kyle Guan, *BAE Systems, Network Systems*  
 Jessica Hsu, *BAE Systems, Network Systems*  
 Reza Ghanadan, *BAE Systems, Network Systems*

## **WSN-4.4 Performance of Network-Coding for Multicast Applications in Rate-Diverse Wireless Environments**

Luiz Vieira, *University of California, Los Angeles*  
 Archan Misra, *IBM*  
 Mario Gerla, *University of California, Los Angeles*

## **WSN-4.5 Connecting MANET Multicast**

Ian Chakeres, *The Boeing Company*  
 Thomas Henderson, *The Boeing Company*

## **WSN-4.6 Multicast Forwarding Using Multiple Gateways and Hash for Duplicate Packet Detection in a Tactical MANET**

Lars Landmark, *Unik University Norway*  
 Yannick Lacharité, *Communications Research Centre Canada*  
 Louise Lamont, *Communications Research Centre Canada*

## **WSN-4.7 MIMO-CAST: A Cross-Layer Ad Hoc Multicast Protocol Using MIMO Radios**

Soon Oh, *University of California, Los Angeles*  
 Babak Daneshrad, *University of California, Los Angeles, Electrical*  
 Mario Gerla, *University of California, Los Angeles*  
 Guangyu Pei, *The Boeing Company*  
 Jae Kim, *The Boeing Company*  
 Pengkai Zhao, *University of California, Los Angeles*

## **WSN-9**

### **Sensor Networks-2**

Tuesday 9:15 a.m.–noon  
 Naples 2

Wireless sensor networking is a topic that has continued to receive significant research and development interest over the past decade. This reflects the significant interest in sensor networking both in the military and commercial domains. This session considers the topic of wireless sensor networking, with a particular emphasis on the topics of MAC design and routing in wireless sensor networks. These topics are both extremely important as the military aims to achieve potentially very large and complex sensor network applications.

**Session Organizers/Chairs:** Jack L. Burbank, *Johns Hopkins University, Applied Physics Laboratory*, & William Kasch, *Johns Hopkins University, Applied Physics Laboratory*

## **WSN-9.1 Cooperative Node Localization for Tactical Wireless Sensor Networks**

Li Li, *Communications Research Centre, Canada*  
 Thomas Kunz, *Carleton University, Ottawa, Canada*

## **WSN-9.2 On Scheduling Guaranteed Time Slots for Time Sensitive Transactions in IEEE 802.15.4 Networks**

Amitabh Mishra, *Virginia Polytechnic Institute and State University*  
 Chewoo Na, *Virginia Polytechnic Institute and State University*  
 Dwayne Rosenburgh, *U.S. Department of Defense*

## **WSN-9.3 Reducing Routing Overhead Using Off-Network Route Computation in Sensor Networks**

Tao Wu, *Michigan State University*  
 Fan Yu, *Michigan State University*  
 Subir Biswas, *Michigan State University*

## **WSN-9.4 EDGE: A Routing Algorithm for Maximizing Throughput and Minimizing Delay in Wireless Sensor Networks**

Shuang Li, *Auburn University*  
 Santosh Kulkarni, *Auburn University*  
 Cong Liu, *Auburn University*  
 Alvin Lim, *Auburn University*

## **WSN-9.5 An Energy-Efficient MAC Protocol Exploiting the Tree Structure in Wireless Sensor Networks**

Xiao Liang, *University of Victoria*  
 Wei Li, *University of Victoria*  
 T. Aaron Gulliver, *University of Victoria*

## **WSN-9.6 Dynamic Energy-Based Encoding and Filtering in Sensor Networks**

Raheem Beyah, *Georgia State University*  
 Hailong Hou, *Georgia State University*  
 Cherita Corbett, *Sandia National Lab*  
 Yingshu Li, *Georgia State University*

## **WSN-9.7 Improving System-Wide Detection Performance for Sonar Buoy Networks Using In-Network Fusion**

Anshu Saksena, *Johns Hopkins University, Applied Physics Laboratory*  
 Lotfi Benmohamed, *Johns Hopkins University, Applied Physics Laboratory*  
 Jeffrey Dunne, *Johns Hopkins University, Applied Physics Laboratory*  
 Dennis Lucarelli, *Johns Hopkins University, Applied Physics Laboratory*  
 I-Jeng Wang, *Johns Hopkins University, Applied Physics Laboratory*

# UNCLASSIFIED SESSIONS

## ACT-5

### Enabling Technologies for Optical Communications and Networking

Tuesday 2:15–5:00 p.m.  
Tallahassee 1

Optical communications and network have made significant emergence in the military community. Examples of this emergence are address free space optical links, RF photonics, and WDM-based GIG bandwidth expansion opportunities. Recent free space optical link demonstrations have shown the capability to transmit 10+ Gb/s, but the limiting factor to higher transmission rates and longer reaches tends to be atmospheric turbulence and scattering from obscurants. Significant optical component developments over the last 10 years have provided some of the performance needed to deploy RF photonics system solutions, but linearity becomes the limiting factor. This session will describe the enabling technologies for optical communications and networking as they relate to military applications. Discussion will be focused on recent advances in these technologies and their effectiveness in solving the laser communications and networking challenges for the military.

**Session Organizer:** Dr. Richard DeSalvo, *Harris Corporation*

**Session Chair:** Prof. Chris Davis, *University of Maryland*

#### ACT-5.1 Optical Scattering in Battlefield Obscurants: Analysis of Channel Spatial, Angular and Temporal Dispersion

Binbin Wu, *Center for Information & Communications Technology Research, Pennsylvania State University*

Brian Marchant, *Center for Information & Communications Technology Research, Pennsylvania State University*

Mohsen Kavehrad, *FIEEE, Center for Information & Communications Technology Research, Pennsylvania State University*

#### ACT-5.2 Optimization of Pulse Shaping System for Optical Wireless Communication

Shanhong You, *CICTR, Pennsylvania State University*

Mohsen Kavehrad, *Fellow, IEEE & CICTR, Pennsylvania State University*

#### ACT-5.3 Adaptive High-Speed Optical Transceivers Using a Dual Electrode Modulator

Jeffrey Minch, *The MITRE Corporation*

David Gervais, *The MITRE Corporation*

Daniel Townsend, *The MITRE Corporation*

#### ACT-5.4 Electrical Equalization in Fiber-Optic Transmission Systems

André Richter, *VPIsystems*

Hadrien Louchet, *VPIsystems*

#### ACT-5.5 Modulating Retro-Reflector Devices and Current Link Performance at the Naval Research Laboratory

Peter G. Goetz, *NRL*

William S. Rabinovich, *NRL*

Rita Mahon, *Titan/Jaycor/L3*

Mike S. Ferraro, *SFA*

James L. Murphy, *NRL*

H. Ray Burris, *NRL*

Mena F. Stell, *Research Support Instruments, Inc.*

Chris I. Moore, *NRL*

Michelle R. Suite, *NRL*

Wade Freeman, *Smart Logic, Inc.*

G. Charmaine Gilbreath, *NRL*

Steven C. Binari, *NRL*

#### ACT-5.6 Broadband Adaptive Feedforward Photonic Linearization for High Dynamic Range Signal Remoting

Dalma Novak, *Pharad, LLC*

Thomas Clark, *JHU Applied Physics Laboratory*

#### ACT-5.7 Effect of Atmospheric Turbulence on Packet Detection in Optical Communications

Jacob Brandenburg, *Oakland University*

John Liu, *Wayne State University*

Michael Polis, *Oakland University*

## ACT-7

### Information Management and Dissemination

Tuesday 2:15–5:00 p.m.  
Tallahassee 2

Information Management and Dissemination discusses the strategy for managing and publishing information within a distributed network to consuming devices. The session emphasizes the topologies and characteristics of the networks, the type of information being managed, and the types of devices consuming the information. Special consideration is given to dynamic configuration and decision making with the goal of creating flexible and efficient communications.

**Session Organizers:** John Rollins, *Harris Corporation*, & Neil Ferguson, *Harris Corporation*

**Session Chair:** John Rollins, *Harris Corporation*

#### ACT-7.1 Managing Information Sharing in Tactical Environments

James Hanna, *Air Force Research Laboratory*

Vaughn Combs, *Air Force Research Laboratory*

Michael Muccio, *Air Force Research Laboratory*

Christopher Vincelle, *ITT Industries, AES*

James Reilly, *Rome Research Corporation*

#### ACT-7.2 Loose Couplers as an Information Design Strategy

Robert Miller, *The MITRE Corporation*

Daniel Winkowski, *The MITRE Corporation*

## ACT-7.3 On-Demand Transient Data Storage and Backup in Mobile Systems

Jeffrey Hemmes, *University of Notre Dame*  
 Christian Poellabauer, *University of Notre Dame*  
 Douglas Thain, *University of Notre Dame*

## ACT-7.4 The Join/Leave Policy for Video Multicast Group Members

Yousef Abdelmalek, *CCNY*  
 Tarek Saadawi, *CCNY*  
 Ahmed Abdelal, Ph.D., *CCNY*  
 Myung Lee, *CCNY*  
 John Sucec, *Telcordia*  
 Mariuz Fecko, *Telecorida*

## IAS-4.5 Securing Wireless Local Area Networks Using Smart-Card-Based Digital Certificates From the DoD Public Key Infrastructure

Chris Williams, *SAIC*

## IAS-4.6 Feature Suppression for Physical-Layer Security in OFDM Systems

Tevfik Yucek, *University of South Florida*  
 Huseyin Arslan, *University of South Florida*

## IAS-4.7 Distributed Rate Control and Power Control in Resource-Constrained Wireless Sensor Networks

Yang Song, *University of Florida*  
 Yuguang Fang, *University of Florida*

## IAS-4

### Wireless Network Security-1

Tuesday 2:15–5:00 p.m.  
 Tallahassee 3

This session focuses on recent advances and certain challenge issues in wireless network security. Topics cover security in mobile ad hoc networks, wireless local area networks, and wireless sensor networks, ranging from physical layer security, privacy and non-reputation, and key management issues. Also included are resilient opportunistic forwarding, distributed rate control and power control issues for wireless security.

**Session Organizer/Chair:** Dr. Yi Qian, *National Institute of Standards and Technology*

### IAS-4.1 An Optimal Key Management Scheme for Wireless Sensor Networks

Yi Qian, *University of Puerto Rico at Mayagüez*  
 Kejie Lu, *University of Puerto Rico at Mayagüez*  
 Bo Rong, *University of Puerto Rico at Mayagüez*  
 Hector Lugo, *University of Puerto Rico at Mayagüez*  
 David Tipper, *University of Pittsburgh*

### IAS-4.2 Resilient Opportunistic Forwarding: Issues and Challenges

Hua Zhu, *San Diego Research Center, Inc.*  
 Kejie Lu, *University of Puerto Rico at Mayagüez*

### IAS-4.3 An ID-Based Framework Achieving Privacy and Non-Repudiation in Vehicular Ad Hoc Networks

Jinyuan Sun, *University of Florida*  
 Chi Zhang, *University of Florida*  
 Yuguang Fang, *University of Florida*

### IAS-4.4 Key Refreshing in Identity-Based Cryptography and Its Application in MANETS

Kenneth G. Paterson, *Royal Holloway, University of London*  
 Kent D. Boklan, *City University of New York*  
 Zev Klagsbrun, *City University of New York*  
 Shane Balfe, *Royal Holloway, University of London*

## MCS-1

### Modulation Theory and Signal Processing

Tuesday 2:15–5:00 p.m.  
 Tampa 1

This session addresses the need for modulation and signal processing techniques that can achieve good performance and low complexity. Papers cover performance evaluation, reduced-complexity detection techniques, improved low-complexity equalizers, and the design of adaptive RF front-ends for performance enhancement in wireless communications.

**Session Organizer/Chair:** Dr. Wayne Phoel, *MIT Lincoln Laboratory*

### MCS-1.1 Performance Evaluation of Variable-Rate Polynomial Phase Modulation

Rahul Sinha, *Samsung*  
 Guillermo Atkin, *Illinois Institute of Technology*  
 Chi Zhou, *Illinois Institute of Technology*

### MCS-1.2 Reduced Complexity Sequence Detection of Continuous Phase Modulation as the Superposition of Time-Varying Amplitude Modulated Pulses

Erik Perrins, *University of Kansas*  
 Marilyn Wylie-Green, *Nokia Siemens Networks*

### MCS-1.3 Trellis-Based Conflict Resolution for Bidirectional Decision-Feedback Equalization

Chan Wong Wong, *University of Florida*  
 Yumin Lee, *National Taiwan University*  
 John M. Shea, *University of Florida*

### MCS-1.4 Novel Receiver Architecture for the Detection of QAM Signals in the Presence of Residual Phase Error and Channel Fading

Beilei Zhang, *UTD*  
 Kamran Kiasaleh, *UTD*

### MCS-1.5 Performance Analysis of BPSK Signals Transmitted Over Slow, Flat, Nakagami Fading Channels With Pulse-Noise Interference and Modified Noise-Normalizat

Clark Robertson, *Naval Postgraduate School*  
 Konstantinos Taxeidis, *Naval Postgraduate School*

## **MCS-1.6 Simplified 2-State Detectors for SOQPSK**

Balachandra Kumaraswamy, *University of Kansas*

Erik Perrins, *University of Kansas*

## **MCS-1.7 A Study on the Adaptive RF Front-End for Low Power Consumption ISDB-T Receiver**

Soo-hwan Kim, *NAIST*

Minoru Okada, *NAIST*

Takao Hara, *NAIST*

Masato Saito, *NAIST*

## **MCS-6**

### **Spread Spectrum Communications and Adaptive Antenna Arrays**

Tuesday

2:15–5:00 p.m.

Tampa 2

Spread-spectrum communication techniques are important in military communications for their ability to provide low probabilities of detection, intercept, and localization, as well as their ability to provide multiple access and interference rejection. Adaptive antenna arrays can be used to improve spatial reuse, increase signal quality, and reject interference. The papers in this session investigate the use of these techniques separately and jointly.

**Session Organizer/Chair:** Dr. Kesh Bakhru, *Cubic Systems*

## **MCS-6.1 A Low Complexity Spatial Rake Receiver Using Main Beam Multipath Combining for a CDMA Smart Antenna System**

Seema Sud, *GCI, Inc.*

## **MCS-6.2 Impact of Phase-Shift Beamforming on Wideband Communication Systems**

Osama S. Haddadin, *L-3 Communications*

Jonathan R. Lawton, *L-3 Communications*

David G. Landon, *L-3 Communications*

Paul C. Cherry, *L-3 Communications*

Robert J. Stadel, *L-3 Communications*

## **MCS-6.3 Multiuser Detection of Spread Spectrum Signals Using Antenna Arrays**

Rez Karim, *CACI*

## **MCS-6.4 A Normalized Lower-Order Moment Algorithm for Space-Time Adaptive Processing in Phased Array Radar Systems**

Rosa Zheng, *University of Missouri–Rolla*

Genshe Chen, *Intelligent Automation Inc.*

## **MCS-6.5 Packet Acquisition Performance of Frequency-Hop Spread-Spectrum Systems in Partial-Band Interference**

Frederick Block, *MIT Lincoln Laboratory*

Everest Huang, *MIT Lincoln Laboratory*

## **MCS-6.6 Polarized Signal Unmixing Utilizing Homology Groups Representing Momentum States**

Arthur Olsen, *Harris Corporation*

## **MCS-6.7 Detection Probability of a WCDMA-Based Cellular Radar System**

Yeejung Kim, *Information and Communications University*

Seungmo Kim, *Information and Communications University*

Youngnam Han, *Information and Communications University*

Kyung Bin Bae, *Agency of Defense Development*

Myung Deuk Jeong, *Agency of Defense Development*

## **NCS-8**

### **Communications Channel Modeling and Assessment**

Tuesday

2:15–5:00 p.m.

Sanibel 1

This session focuses on communications channel challenges and how to mitigate them. Relevant papers address issues such as RF propagation, fading, filtering techniques, and modeling of detection and estimation techniques.

**Session Organizer:** Dr. George F. Elmasry, *XPRT Solutions, Inc.*

**Session Chair:** David Rhodes, *OpCoast*

## **NCS-8.1 Swarm-Based Particle Filtering Detector for Wireless Communications Over Flat Fading Channel**

Hai Hoang, *Florida State University*

Bing Kwan, *Florida State University*

## **NCS-8.2 Designing Soft Detectors Based on Seysen's Algorithm**

Wei Zhang, *Georgia Institute of Technology*

Xiaoli Ma, *Georgia Institute of Technology*

Ananthram Swami, *U.S. Army Research Laboratory*

## **NCS-8.3 Asymptotic Performance Analysis of DOA Estimation Method for an Incoherently Distributed Source**

Jooshik Lee, *LG Electronics*

Doo Whan Sang, *LG Electronics*

Jingon Joung, *KAIST*

## **NCS-8.4 A Fast Suboptimal Algorithm for Detection of 16-QAM Signaling in MIMO Channels**

Soonchul Park, *Kyungpook National University, Korea*

Eunsu Kang, *Kyungpook National University, Korea*

Jim Kim, *Kyungpook National University, Korea*

Dong Seog Han, *Kyungpook National University, Korea*

William Hager, *University of Florida*

Hongchao Zhang, *IMA, University of Minnesota*

## **NCS-8.5 Emulation of Fading Wireless Link Effects in NEWS Wired Testbed**

Homayoun Yousefzadeh, *UCI*

Xiaolong Li, *UCI*

Wojtek Furmanski, *The Boeing Company*

David Lofquist, *The Boeing Company*

## **NCS-8.6 A Low-Variance and Low-Complexity Carrier-Frequency-Offset Estimator Using Multiple Pilot Sequences**

Joseph Palmer, *Brigham Young University*

Michael Rice, *Brigham Young University*

Brent Nelson, *Brigham Young University*

## **NCS-9**

### **Assured Net-Centric Services for the GIG**

Tuesday

2:15–5:00 p.m.

Sanibel 2

The GIG assured services session of the Network Centric track presents the latest innovations in providing several levels of assurance in delivering data by classifying data and in a manner that supports military communications needs for delivery over the GIG's infrastructure. The precedence level of each data component is assigned by the originator to support the execution of a mission. The data carried over the GIG includes various new and converged services; therefore, there is a need to satisfy minimum QoS requirements of the applications in addition to operational needs of the users.

**Session Organizers/Chairs:** Dr. Bassam "Sam" Farroha, *Johns Hopkins University*, & Deborah L. Farroha, *Defense Intelligence Agency*

### **NCS-9.1 Impact of Precedence Enabled Per Hop Behaviors on TCP Flows**

Robert Cole, *Johns Hopkins University, Applied Physics Laboratory*

### **NCS-9.2 Sustaining Precedence-Based Communications in Secure IP Networks**

Rob Goode, *NC3A*

Craig Ulsh, *NC3A*

Julie Tarr, *OSD-NII*

Ryan McKenica, *Booz Allen Hamilton*

Antonio De Simone, *Johns Hopkins University, Applied Physics Laboratory*

### **NCS-9.3 Implications of Precedence and Preemption Requirement on Packet-Based Transport Architectures**

Robert Cole, *Johns Hopkins University, Applied Physics Laboratory and Dept. of Computer Science*

Bassam Farroha, *Johns Hopkins University, Applied Physics Laboratory*

## **NCS-9.4 Issues Associated With the Support of Military Precedence in IP Networks**

Burt Liebowitz, *The MITRE Corporation*

Yong Xue, *DISA*

Chris Gedo, *DISA*

## **NCS-9.5 A Framework for Military Precedence-Based Assured Service in the GIG IP Networks**

Yong Xue, *DoD/DISA*

Chris Gedo, *DoD/DISA*

Burt Liebowitz, *The MITRE Corporation*

Chris Christou, *Booz Allen Hamilton*

## **NCS-9.6 Using AF-PHB BOUDICCA Configuration for Reliable Real-Time Precedence-Based SLAs in Degraded IP Networks**

Jonathan Pitts, *Queen Mary, University of London*

Qiang Yang, *Queen Mary, University of London*

John Schormans, *Queen Mary, University of London*

## **NCS-12**

### **Network Centric Enabling Sciences-1**

Tuesday

2:15–5:00 p.m.

Sanibel 3

This session encompasses papers that investigate the sciences that enable net-centricity and makes the projected benefits possible. The objective of the presented research is aimed at all layers of the communications stack starting with the physical layer and its security and moving up to the applications over the GIG. The outcome of these papers is particularly beneficial for developing robust datalinks for data communications and providing situational awareness for the warfighter and strategic assets.

**Session Organizers:** Dr. Bassam "Sam" Farroha, *Johns Hopkins University*, & Dr. Sastri Kota, *Harris Corporation*

**Session Chair:** Dr. Jeff Wysocarski, *MIT Lincoln Laboratory*

### **NCS-12.1 Objective Speech Intelligibility Measure for Low Bit-Rate Speech Codecs Operating in Noisy Channels**

Yan Teng, *University of Wyoming*

Robert Kubichek, *University of Wyoming*

Jim Schroeder, *Harris Corporation*

Richard Anderson-Sprecher, *University of Wyoming*

### **NCS-12.2 Multiplane Model Realization in an Optical/RF Hybrid System**

Sherry Wang, *Johns Hopkins University, Applied Physics Laboratory*

Harold Zheng, *Johns Hopkins University, Applied Physics Laboratory*

### **NCS-12.3 The Use of Ray Tracing Models to Predict UAV Air Relay Coverage in an Urban Area**

Carmen Cerasoli, *The MITRE Corporation*

# UNCLASSIFIED SESSIONS

## **NCS-12.4 Achieving Physical Layer Security/Privacy With Self-Wrapped OCDM Transmission**

Yue-Kai Huang, *Princeton University*  
Bernard Wu, *Princeton University*  
Ivan Glesk, *Princeton University*  
Konstantin Kravtsov, *Princeton University*  
Evgenii Narimanov, *Princeton University*  
Paul Prucnal, *Princeton University*  
Ting Wang, *NEC Laboratories America, Inc.*

## **NCS-12.5 Doppler Frequency Geolocation of Uncooperative Radars**

Haynes Lee, *Royal Military College of Canada*  
Y.T. Chan, *Royal Military College of Canada*  
Francois Chan, *Royal Military College of Canada*  
Huai-Jing Du, *Royal Military College of Canada*  
Fred Dilkes, *Defence Research & Development Canada*

## **NCS-12.6 Managing Video in a One Frame Per Second Environment**

John DeLay, *Harris Corporation*

## **NCS-12.7 A Special Open-Loop Transmit Antenna Selection Mode in the SC-FDMA Systems for 3G LTE**

Jin Liu, *Alcatel-Lucent*  
Liang Wang, *Alcatel-Lucent*  
Mingli You, *Alcatel-Lucent*  
Pingping Wen, *Alcatel-Lucent*

## **RSA-5**

### **Cognitive Radio Technology-2**

Tuesday 2:15–5:00 p.m.  
Sarasota 1

Cognitive Radio Technology is gaining momentum as an enabler for enhancing and extending radio system capabilities and performance. Much of the initial technology focus has been in the area of dynamic spectrum access, as evidenced by the DAPRA NeXt Generation (XG) program and the IEEE Dynamic Spectrum Access and Networking (DySPAN) Conferences and related IEEE SCSA41 working groups. The growth of this technology is for military communications which is evidenced by the substantial number of paper submissions resulting in three Cognitive Radio Technology paper sessions.

**Session Chair:** Dr. William Clark, *General Dynamics C4 Systems*

## **RSA-5.1 Multiresolution White-Space Detection for Cognitive Radio**

Chad Spooner, *NorthWest Research Associates*

## **RSA-5.2 Machine Learning Based Cognitive Communications in White As Well As the Gray Space**

Apurva Mody, *BAE Systems*  
Stephen Blatt, *BAE Systems*  
Ned Thammakhoune, *BAE Systems*  
Joshua Niedwiecki, *BAE Systems*

Matthew Sherman, *BAE Systems*  
Cory Myers, *BAE Systems*

## **RSA-5.3 Robust Localization With Unknown Transmission Power for Cognitive Radio**

Sunghun Kim, *Infomation and Communications University*  
Hyoungsuk Jeon, *Infomation and Communications University*  
Joongsoo Ma, *Infomation and Communications University*

## **RSA-5.4 Performance Evaluation of Radio Environment Map-Enabled Cognitive Radios Coexisting With Incumbent Users**

Youping Zhao, *MPRG, Virginia Tech*  
David Raymond, *Virginia Tech*  
Claudio da Silva, *Virginia Tech*  
Jeffrey Reed, *Virginia Tech*  
Scott Midkiff, *Virginia Tech*

## **RSA-5.5 Statistical Wireless Channel Propagation Characteristics in Underground Mines at 900 MHz**

Serhan Yarkan, *University of South Florida*  
Huseyin Arslan, *University of South Florida*

## **SAS-8**

### **SATCOM on the Move Systems and Technology**

Tuesday 2:15–5:00 p.m.  
Sarasota 2

This session focuses on some of the challenges facing the design of Satellite Communications (SATCOM) On-The-Move (OTM) systems for use with both DoD and commercial satellites. The session also covers the evolving SATCOM technology, design drivers for SATCOM On-The-Move (SOTM) terminals, key elements/equations for satellite link engineering, principle elements of a SATCOM system, techniques in transmission access, modulation, and coding.

**Session Organizer:** Dr. Raphael Lyman, *Harris Corporation*

**Session Chair:** Richard Wexler, *The MITRE Corporation*

## **SAS-8.1 The WIN-T MF-TDMA Mesh Network Centric Waveform**

John Wiss, *L-3 Communications, Linkabit Division*  
Rohit Gupta, *L-3 Communications, Linkabit Division*

## **SAS-8.2 Soldier Network Extension (SNE) On-The-Move Satellite Communications (SATCOM) for Army Tactical Brigade Level Network Healing and Thickening**

Richard Wexler, *The MITRE Corporation*  
Syed Ali, *Janus Research Inc.*  
Richard Hoffmann, *PM WIN-T*

## **SAS-8.3 Considerations of the Waveform/Platform Boundary in SATCOM Terminal Architecture**

David Hendry, *Raytheon*  
Jerry Kazin, *Raytheon*

George Vachula, *Raytheon*  
John Pehowich, *Raytheon*

## SAS-8.4 SKYNET 5: MILSATCOM Using SDR

Taj A. Sturman, *Astrium Limited*  
M.D.J. Bowyer, *Astrium Limited*  
N. Petfield, *Astrium Limited*

## SAS-8.5 Spectrum Management Issues Related to the AEHF System

Arthur Einhorn, *Aerospace Corporation*

## SAS-9

### Satellite Communications Channel Utilization

Tuesday  
Sarasota 3

2:15–5:00 p.m.

In this session, the focus will be on enhancing and improving the performance and capability of new and existing SATCOM systems.

**Session Organizers/Chairs:** Lori Jeromin, *MIT Lincoln Laboratory*, & Dr. Barry Felstead, *Communication Research Center*

### SAS-9.1 The Future of SCPS-TP

Christopher Ross, *Booz Allen Hamilton*

### SAS-9.2 Resource Request Strategies for a Satellite Network With Dynamic Resource Allocation

Aradhana Narula-Tam, *MIT Lincoln Laboratory*  
Huan Yao, *MIT Lincoln Laboratory*  
Julee Pandya, *MIT Lincoln Laboratory*  
Jeff Wysocarski, *MIT Lincoln Laboratory*

### SAS-9.3 DoD IP SATCOM Network Management System

Minh Nguyen, *Booz Allen Hamilton*  
Kathir Ramaswami, *Booz Allen Hamilton*  
Bruce Bennett, *Defense Information Systems Agency*  
Brian Myers, *Booz Allen Hamilton*  
Christopher Meyer, *Booz Allen Hamilton*

### SAS-9.4 DoD IP SATCOM Transition to WGS

Kensing Quock, *Booz Allen Hamilton*  
Joseph Greeves, *Booz Allen Hamilton*  
Bruce Bennett, *Defense Information Systems Agency*  
Minh-Huy Nguyen, *Booz Allen Hamilton*

### SAS-9.5 Applying a Secure and Efficient Low Earth Orbit Satellite-Based Multicast Architecture in a Deployed Environment

Victor Hubenko, Jr., *U.S. Air Force Institute of Technology*  
Richard Raines, *U.S. Air Force Institute of Technology*  
Rusty Baldwin, *U.S. Air Force Institute of Technology*  
Barry Mullins, *U.S. Air Force Institute of Technology*

Robert Mills, *U.S. Air Force Institute of Technology*  
Michael Grimaila, *U.S. Air Force Institute of Technology*

## SAS-9.6 Preamble Design and Analysis for Channels With Significant Doppler Variation

Kevin Page, *Xenotran*  
Andreas Pappas, *DISA*  
Jeffrey Westra, *Xenotran*

## SAS-9.7 Spectral Efficiency of Mobile VSAT Systems

Vijitha Weerackody, *Johns Hopkins University, Applied Physics Laboratory*  
Lino Gonzalez, *Johns Hopkins University, Applied Physics Laboratory*

## SIMA-2

### Fusion and Data Collection for Situation Management

Tuesday  
Miami 1

2:15–5:00 p.m.

In this session, researchers describe examples of situation management from domains including emergency response, cyber security, scene analysis and underwater surveillance. These systems show a variety of information fusion approaches appropriate for the given domains.

**Session Chair:** Dr. John Salerno, *AFRL, Rome*

### SIMA-2.1 Web-Service Based Distributed System for Decision Support in Emergency Situations

Alexander Smirnov, *SPIIRAS*  
Tatiana Levashova, *SPIIRAS*  
Mikhail Pashkin, *SPIIRAS*  
Andrew Krizhanovsky, *SPIIRAS*  
Alexey Kashevnik, *SPIIRAS*  
Anna Komarova, *SPIIRAS*  
Nikolay Shilov, *SPIIRAS*

### SIMA-2.2 A Qualia Framework for Awareness in Cyberspace

Timothy Lacey, *U.S. Air Force Institute of Technology*  
Robert Mills, *U.S. Air Force Institute of Technology*  
Richard Raines, *U.S. Air Force Institute of Technology*  
Paul Williams, *U.S. Air Force Institute of Technology*  
Steven Rogers, *U.S. Air Force Institute of Technology*

### SIMA-2.3 Cognitively-Inspired Motion Pattern Learning & Analysis Algorithms for Higher-Level Fusion and Automated Scene Understanding

Brad Rhodes, *BAE Systems AIT*  
Neil Bomberger, *BAE Systems AIT*  
Majid Zandipour, *BAE Systems AIT*  
Allen Waxman, *BAE Systems AIT*  
Michael Seibert, *BAE Systems AIT*

# UNCLASSIFIED SESSIONS

## **SIMA-2.4 Delay Tolerant Dynamic Data Collection Over a Sensor Network**

Serge Chaumette, *Labri, Université Bordeaux 1*  
Lionel Barrere, *Labri, Université Bordeaux 1*  
Cyril De Peretti, *Labri, Université Bordeaux 1*

## **SIMA-3**

### **Taking Action and Adapting in Situation Management**

Tuesday 2:15–5:00 p.m.  
Miami 1

Given the operational pictures produced by the situation management algorithms, we expect the system to provide two categories of guidance, internal and external ones. The internal guidance leads the situation management system to adapt its behavior to accommodate new features in its environment, and the research in this session includes results related to learning based on genetic algorithms and cooperative learning. The external guidance enables the situation space to be organized so that appropriate action can be taken and is the subject of papers on decision and incident management.

**Session Chair:** Dr. John Buford, *Avaya Labs Research*

#### **SIMA-3.1 A Methodology to Glean Demographics From Open Sources to Support Commanders in Unfamiliar Urban Areas**

Bob Dourandish, *Quimba Software*  
Nina Zumel, *Quimba Software*

#### **SIMA-3.2 Situational Awareness for Enhanced Incident Management (SAFE-IM)**

Mike Walter, *BAE Systems*

#### **SIMA-3.3 Decision Management**

Joseph Antonik, *Air Force Research Laboratory*

#### **SIMA-3.4 Decision Support for Crowd Control: Using a Genetic Algorithms With Simulation to Learn Control**

Johan Schubert, *Swedish Defence Research Agency*  
Robert Suzic, *Swedish Defence Research Agency*

#### **SIMA-3.5 Optimizing Application Performance Through Learning and Cooperation in a Wireless Sensor Network**

Wai-Leong Yeow, *National University of Singapore*  
Chen-Khong Tham, *National University of Singapore*  
Wai-Choong Wong, *National University of Singapore*

## **WMC-4**

### **OFDM-2**

Tuesday 2:15–5:00 p.m.  
Miami 2

OFDM has been used in many commercial and tactical communication systems. This is one of two OFDM sessions. It consists of various techniques to improve the performance of OFDM-based telecommunication systems, including cooperative techniques, partial channel feedback for performance improvement, etc.

**Session Organizers:** Prof. Xiang-Gen Xia, *University of Delaware*, & Dr. Gary Pei, *Boeing Phantom Works*

**Session Chair:** Dr. Gary Pei, *Boeing Phantom Works*

#### **WMC-4.1 Design Guidelines for Cooperative MTCM OFDM Systems**

Jialing Li, *Polytechnic University*  
Andrej Stefanov, *Polytechnic University*

#### **WMC-4.2 Opportunistic Scheduling With Partial CQRI Feedback in OFSDMA Systems**

Mingyu Kang, *Yonsei University*  
Duho Rhee, *Yonsei University*  
Hae Gwang Hwang, *Yonsei University*  
Kwang Soon Kim, *Yonsei University*

#### **WMC-4.3 OFDM Receiver Performance in Fading Channels and the Effects of the Phase Noise Distribution With Imperfect Channel Estimation**

Mohamed Jalloh, *University of California, San Diego*

#### **WMC-4.4 Orthogonal Impulse Postfix OFDM Transmission for Efficient MIMO Channel Estimation**

Namseok Chang, *Information and Communications University*  
Joonhyuk Kang, *Information and Communications University*  
Wan Choi, *Information and Communications University*  
Youngok Kim, *Korea Telecom*  
Hyunbeom Lee, *Korea Telecom*

#### **WMC-4.5 Comparison of Limited Feedback Schemes for OFDMA Scheduling**

Jieying Chen, *Northwestern University*  
Randall Berry, *Northwestern University*  
Michael Honig, *Northwestern University*

#### **WMC-4.6 Computationally Efficient IFFT/FFT Approximations for OFDM**

Chris Moffatt, *Harris Corporation*  
Anders Mattsson, Ph.D., *Harris Corporation*

#### **WMC-4.7 Variable Sub-Carrier OFDM Using OOK-7PSK Modulation in AWGN Channel**

Chuanhui Ma, *Illinois Institute of Technology*  
Guillermo E. Atkin, *Illinois Institute of Technology*  
Chi Zhou, *Illinois Institute of Technology*  
Ting Wang, *NEC Laboratories America*

**WSN-2****WiMAX in Military Networks**

Tuesday  
Miami 3

2:15–5:00 p.m.

The standardization efforts for broadband wireless access being conducted by the IEEE 802.16 committee are being complemented by the efforts of the WiMAX Forum to define and test interoperability profiles for Worldwide Interoperability for Microwave Access. The technical standards from 802.16 and the WiMAX profiles will drive product availability that will impact military networks in the near future.

This session focuses on recent advances in WiMAX and 802.16-based implementations for military networks. Topics cover security and QoS issues in WiMAX networks. Also included are pertinent WiMAX issues related to performance, antenna impacts in deployed networks, and network resilience.

**Session Organizer/Chair:** Jerome Sonnenberg, *Harris Corporation*

**WSN-2.1 WiMAX for Highly Deployable Mission-Critical Communications Networks**

Luis Bastos, *NATO C3 Agency*  
Hermann Wietgreffe, *NATO C3 Agency*

**WSN-2.2 A Security Scheme for Centralized Scheduling in IEEE 802.16 Mesh Networks**

Bongkyoung Kwon, *Georgia Institute of Technology*  
Christopher P. Lee, *Georgia Institute of Technology*  
Yusun Chang, *Georgia Institute of Technology*  
John A. Copeland, *Georgia Institute of Technology*

**WSN-2.3 The Uniformly Fair Deficit Round-Robin Scheduler for Improved QoS Guarantees in IEEE 802.16 WiMAX Networks**

Namita Vamaney, *Qualcomm India Pvt. Ltd.*  
Vishal Sharma, *Metanoia, Inc./IIT Bombay*

**WSN-2.4 WiMAX for Networks With Enhanced Security and Reliability Characteristics**

Keith Cobler, *Tektronix, Inc.*  
Othmar Kyas, *Tektronix, Inc.*

**WSN-2.5 A Scheduling Approach for Enhancing Vehicle Data Transport Performance in Mobile WiMAX Mesh Networks**

Kuang-Ching Wang, *Clemson University*  
Amin Rahul, *Clemson University*

**WSN-2.6 Antenna Selection for Brigade-Level Headquarter Use of WiMAX**

Jorma Jormakka, *National Defence University, Finland*  
Henryka Jormakka, *Technical Research Centre of Finland*

**WSN-2.7 VoIP Transmission Cross-Layer Design Over Satellite–WiMAX Hybrid Network**

Sastri Kota, *Harris Corporation*  
M.A. Vazquez Castro, *Universitat Autònoma de Barcelona*  
David Pradas Fernández, *Universitat Autònoma de Barcelona*

**WSN-5****MANET–Cross-Layer Design**

Tuesday  
Naples 1

2:15–5:00 p.m.

Traditional protocol stacks for communication systems typically design the link and network layers with limited interfaces that make simple assumptions about the performance of the other layers. However, for mobile ad hoc networks the wireless links are highly dynamic and unreliable, and coordination between the actions taken at different layers is required to achieve efficient communications. Recently there has been much interest in improving network performance by accounting for and adapting to the wireless environment through joint design of protocols at the different layers. In the session, various approaches to cross-layer protocol design are presented that lead to adaptive protocols to coordinate actions across the physical, link, and network layers.

**Session Organizer/Chair:** Prof. Harlan B. Russell, *Clemson University*

**WSN-5.1 A Cross-Layer Approach to Optimal Wireless Link Scheduling With SINR Constraints**

Sastry Kompella, *NRL*  
Jeffrey Wieselthier, *NRL*

Anthony Ephremides, *University of Maryland, College Park*

**WSN-5.2 The Overlapped Carrier-Sense Multiple Access (OCsMA) Protocol**

Surendra Boppana, *University of Florida*  
Madhan Sivakumar, *University of Florida*  
John Shea, *University of Florida*

**WSN-5.3 A Cross-Layer Multiple-Access Protocol With Adaptive Transmission for Direct-Sequence Spread-Spectrum Ad Hoc Networks**

Steven Boyd, *Clemson University*  
Michael Pursley, *Clemson University*  
Harlan Russell, *Clemson University*

**WSN-5.4 A Novel Channel Assignment Algorithm for Local Broadcast in Multi-Radio Multi-Channel Wireless Networks**

Xiuzhen Cheng, *George Washington University*  
Kai Xing, *George Washington University*

**WSN-5.5 Random Access Games: Selfish Nodes With Incomplete Information**

Hazer Inaltekin, *Cornell University*  
Stephen B. Wicker, *Cornell University*

**WSN-5.7 Power Controlled FCFS Splitting Algorithm for Wireless Networks**

Ashutosh Gore, *Indian Institute of Technology, Bombay*  
Abhay Karandikar, *Indian Institute of Technology, Bombay*

## WSN-10

### Sensor Networks-3

Tuesday  
Naples 2

2:15–5:00 p.m.

In this session, we cover a limited but interesting range wireless sensor network issues. In this session we address sensor network connectivity, location and target tracking and data fusion. These papers were accepted based on very strict evaluation and are of very high quality. The connectivity issue is covered via cooperative communication using relays, k-connected, m-dominating set algorithms for virtual backbones and through surface gateway deployment for underwater sensor networks. Localization is very important and interesting research topic in wireless sensor networks and boundary node based localization is a novel idea that is being investigated. Data fusion is very important in energy constrained sensor networks and an analysis that allows a system designer to determine the level of phase asynchrony to be present for noncoherent strategies to outperform partially coherent ones is a significant contribution. Data fusion does not necessarily have to be done at the higher layers of the protocol stack. A scheme that accommodates for fusion in the physical layer is novel. A simple yet novel target tracking based on yaw rate is another interesting topic covered in this session.

**Session Organizer/Chair:** Prof. Nirmala Shenoy, *Rochester Institute of Technology*

#### **WSN-10.1 Energy-Efficient Cooperative Communications Based on Power Control and Selective Relay in Wireless Sensor Networks**

Zhong Zhou, *CSE Department, University of Connecticut*  
Shengli Zhou, *ECE Department, University of Connecticut*  
Jun-hong Cui, *CSE Department, University of Connecticut*  
Shuguang Cui, *ECE Department, University of Arizona*

#### **WSN-10.2 A Boundary-Node Based Localization Scheme for Heterogeneous Wireless Sensor Networks**

Xiaojiang Du, *North Dakota State University*  
Devendar Mandala, *North Dakota State University*  
Chao You, *North Dakota State University*  
Yang Xiao, *University of Alabama*

#### **WSN-10.3 Constructing k-Connected m-Dominating Sets in Wireless Sensor Networks**

Yiwei Wu, *Georgia State University*  
Feng Wang, *University of Minnesota*  
My T. Thai, *University of Florida*  
Yingshu Li, *Georgia State University*

#### **WSN-10.4 Decision Fusion in Large Sensor Networks Using Partially Coherent and Noncoherent Strategies**

Saswat Misra, *U.S. Army Research Laboratory*  
Ananthram Swami, *U.S. Army Research Laboratory*  
Biao Chen, *Syracuse University*

#### **WSN-10.5 MAC-Free Reading of Correlated Sensor Networks**

Alper Akanser, *School of Electrical and Computer Engineering, Georgia Institute of Technology*  
Mary Ann Ingram, *School of Electrical and Computer Engineering, Georgia Institute of Technology*

#### **WSN-10.6 Surface-Level Gateway Deployment for Underwater Sensor Networks**

Jun-Hong Cui, *University of Connecticut*  
Saleh Ibrahim, *University of Connecticut*  
Reda Ammar, *University of Connecticut*

#### **WSN-10.7 A Yaw Rate Aware Sensor Wakeup Protocol (YAP) for Target Prediction and Tracking in Sensor Networks**

Muhammad Mehdi, *Ajou University*  
Ali Hammad Akbar, *Ajou University*  
Shafique Ahmad Chuadhry, *Ajou University*  
Gargi Bag, *Ajou University*  
Seung-wha Yoo, *Ajou University*  
Ki-Hyung Kim, *Ajou University*

## WEDNESDAY, 31 October 2007

**ACT-11****High-Capacity Communications Capability Terminal**

Wednesday 9:15 a.m.–noon  
Tallahassee 1

The HC3 Government Reference Architecture is being defined to support cost-effective implementation of a network-centric, reconfigurable, multiband family of SATCOM communications platforms. Primary GRA architecture goals are to promote waveform commonality and reuse, foster competition by enabling third-party development of GRA modules, allow future technology upgrade via modular design, enable the use of COTS and GOTS products to realize efficient terminal development. The architecture must support multiple, simultaneous, above 2 GHz waveforms including both military and commercial SATCOM. The HC3 GRA MILCOM session describes architecture concepts for optimally partitioning the platform and components in a way that will maximize hardware and software reuse over multiple generations of terminals.

**Session Organizer:** Dan Hampel, *Booz Allen Hamilton*

**Session Chair:** Tom Rittenbach, *U.S. Army CECOM*

**ACT-11.1 Modular Open Systems Design Considerations for Above 2 GHz Software Radios**

Tom Rittenbach, *U.S. Army CECOM*

**ACT-11.2 SCA Boundary in the HC3 Government Reference Architecture**

David Hendry, *Raytheon*  
Jerry Kazin, *Raytheon*  
George Vachula, *Raytheon*  
John Pehowich, *Raytheon*  
Paulo Barroso, *Raytheon*

**ACT-11.3 Integrated Terminal System Development: The HC3 Reference Architecture**

Vincent Kovarik, *Harris Corporation*

**ACT-11.4 On the Implementation Advantages of an Open Modular Modem Architecture**

Jerry Brand, *Harris Corporation*

**ACT-11.5 All Digital RF SATCOM Transceiver Provides Modular, Open Systems Architecture Required To Meet HC3 GRA**

Wesley Littlefield, *Hypres, Inc.*  
Thomas Rittenbach, *U.S. Army RDECOM CERDEC STCD*  
Oleg Mukhanov, *Hypres, Inc.*  
Richard Hitt, *Hypres, Inc.*

**ACT-11.6 Policy-Based Network Operations and Management for Transformational Networks**

Adam Payne, *General Dynamics*  
Reuben Fischman, *General Dynamics*

**ACT-11.7 Design Considerations for the Next Generation Satellite Terminal**

Piya Bhaskar, *Lockheed Martin*  
Jason Zhao, *Lockheed Martin*

**IAS-5****Wireless Network Security-2**

Wednesday 9:15 a.m.–noon  
Tallahassee 2

Apart from the inherent vulnerability of the wireless medium, the resource limitations, intermittent connectivity, and need for collaborative communication and computing require innovative solutions to provide security at all levels in mobile wireless networks.

This session presents the latest progress in wireless security studies from academia, commercial industry, and military. This session focuses on the areas of intelligent jamming, security threats analysis, authentication, authorization, key management, and performance.

**Session Organizer:** Dr. Sherry Wang, *Johns Hopkins University, Applied Physics Laboratory*

**Session Chair:** Prof. Janise McNair, *University of Florida*

**IAS-5.1 Jamming Vulnerabilities of IEEE 802.11e**

David Thuent, *North Carolina State University*  
Ben Newlin, *North Carolina State University*

**IAS-5.2 LAP: Link-Aware Protection for Improving Performance of Loss and Delay Sensitive Applications in Wireless LANs**

Avesh Agarwal, *North Carolina State University*  
Wenye Wang, *North Carolina State University*  
Rachana Gupta, *North Carolina State University*  
Mo-Yuen Chow, *North Carolina State University*

**IAS-5.3 Multicast Authentication Over Lossy Channels**

Yun Zhou, *University of Florida*  
Yuguang Fang, *Professor, University of Florida*

**IAS-5.4 CAB: A Cellular Automata-Based Key Management Scheme for Wireless Sensor Networks**

Liran Ma, *George Washington University*  
Amin Teymorian, *George Washington University*  
Xiuzhen Cheng, *George Washington University*

**IAS-5.5 Efficient Trust Authority Distribution in Tactical MANET Environments**

Steffen Reidt, *Royal Holloway, University of London*  
Stephen Wolthusen, *Royal Holloway, University of London*

# UNCLASSIFIED SESSIONS

## **IAS-5.6 Intrusion Detection System Resiliency to Byzantine Attacks: The Case Study of Wormholes in OLSR**

John Baras, *University of Maryland*

Svetlana Radosavac, *University of Maryland*

George Theodorakopoulos, *University of Maryland*

Dan Sterne, *SPARTA, Inc.*

Peter Budulas, *U.S. Army Research Laboratory*

Richard Gopaul, *U.S. Army Research Laboratory*

## **ISS-3**

### **Standards and Design Patterns**

Wednesday

9:15 a.m.–noon

Tallahassee 3

This session consists of seven papers describing Joint Tactical Radio System infrastructure, systems engineering plan and application programming interfaces. Discussions on the transition plan to IPv6 and authentication protocols including those for low-cost RFID tags are included.

**Session Organizer:** Bonnie Gorsic, *The Boeing Company*

**Session Chair:** Dr. William Squires, *Raytheon*

### **ISS-3.1 JTRS Enterprise System Engineering**

Eric Bala, *SAIC*

Tom Woodland, *SAIC*

Richard North, *JPEO/JTRS*

Calvin Vu, *JPEO JTRS SE*

Jarratt Mowery, *JPEO JTRS*

### **ISS-3.2 Design Patterns of the JTRS Infrastructure**

Donald Stephens, *JPEO JTRS*

Cinly Magsombol, *JPEO JTRS*

Chalena Jimenez, *JPEO JTRS*

### **ISS-3.3 Joint Tactical Radio System—Application Programming Interfaces**

Don Stephens, *JPEO JTRS*

Chalena Jimenez, *JPEO JTRS*

Cinly Magsombol, *JPEO JTRS*

### **ISS-3.4 Standard Interfaces for FPGA Components**

Leigh McLeod, *Mercury Computer Systems, Inc.*

Joshua Noseworthy, *Mercury Computer Systems, Inc.*

James Kulp, *Mercury Computer Systems, Inc.*

### **ISS-3.5 Information Assurance and the Transition to IP Version 6 (IPv6)**

Craig Partridge, *BBN Technologies*

Alfred Arsenault, *BBN Technologies*

Stephen Kent, *BBN Technologies*

### **ISS-3.6 Analyzing Authentication Protocols for Man-in-the-Middle Attacks**

Ratan Guha, *University of Central Florida*

Shahabuddin Muhammad, *University of Central Florida*

Zeeshan Furqan, *University of Central Florida*

### **ISS-3.7 A Privacy Preserving Lightweight Authentication Protocol for Low-Cost RFID Tags**

Shucheng Yu, *Worcester Polytechnic Institute*

Kui Ren, *Illinois Institute of Technology*

Wenjing Lou, *Worcester Polytechnic Institute*

## **MCS-5**

### **Signal Processing Technologies for Robust Network Waveforms**

Wednesday

9:15 a.m.–noon

Tampa 1

This session addresses the need for signal processing techniques that enable robust, high data-rate waveforms to operate in tactical IP networking environments. The focus is on robust architectures for equalization, synchronization, and modulation that perform well in the presence of jamming and interference, and have low computational complexity for implementation on low-cost SDR platforms.

**Session Organizers:** Dr. Philip Vigneron & Dr. Colin Brown, *Communications Research Centre (CRC) Canada*

**Session Chair:** Dr. Colin Brown, *Communications Research Centre (CRC) Canada*

### **MCS-5.1 Tactical Mobile Mesh Network System Design**

Adam Blair, *TrellisWare Technologies*

Thomas Brown, *TrellisWare Technologies*

Keith Chugg, *University Southern California & TrellisWare Technologies*

Mark Johnson, *TrellisWare Technologies*

### **MCS-5.2 A General Receiver and Constant Envelope Direct Sequence Signals**

Harri Saarnisaari, *Centre for Wireless Communications/University of Oulu*

### **MCS-5.3 Coherent and Multisymbol Noncoherent CPFSK: Capacity and Code Design**

Shi Cheng, *West Virginia University*

Matthew Valenti, *West Virginia University*

Don Torrieri, *U.S. Army Research Laboratory*

### **MCS-5.4 Decision Directed Timing Recovery for SOQPSK**

Prashanth Chandran, *University of Kansas*

Erik Perrins, *University of Kansas*

### **MCS-5.5 Coarse and Fine Timing Synchronization for Partial Response CPM in a Frequency Hopped Tactical Network**

Colin Brown, *Communications Research Centre*

## MCS-5.6 Frequency Estimation of Uncooperative Coherent Pulse Radars

Jing Gai, *Royal Military College of Canada*  
 Francois Chan, *Royal Military College of Canada*  
 Y.T. Chan, *Royal Military College of Canada*  
 Huai-Jing Du, *Defence Research & Development Canada*  
 Fred Dilkes, *Defence Research & Development Canada*

## MCS-9

### Modulation Classification and Feature Extraction

Wednesday 9:15 a.m.–noon  
 Tampa 2

The use of wireless communications admits the possibility of electronic eavesdropping. The first step in this is to determine the modulation formats in use and the modulation parameters, such as the symbol duration and modulation order. The papers in this session present several new approaches to modulation classification and feature extraction.

**Session Organizer:** Dr. Yahong Rosa Zheng, *University of Missouri*

**Session Chair:** Dr. Richard Kurth, *Raytheon*

### MCS-9.1 Automatic Classification of Joint Analog and Digital Communication Signals in Blind Environment

Yun Qing Shi, *New Jersey Institute of Technology*  
 Wei Su, *U.S. Army RDECOM, CERDEC*  
 Zaihe Yu, *New Jersey Institute of Technology*

### MCS-9.2 An Efficient, PSP-Based Digital Modulation Classifier

Prokopios Panagiotou, *Helix Communication Technologies, Inc.*  
 Andreas Polydoros, *TrellisWare Technologies, Inc.*  
 Chul Oh, *U.S. Army RDECOM, CERDEC*

### MCS-9.3 Population Size Identification for CDMA Eavesdropping

Ming Li, *Department of Electrical Engineering, State University of New York at Buffalo*  
 Stella Batalama, *Department of Electrical Engineering, State University of New York at Buffalo*  
 Dimitris Pados, *Department of Electrical Engineering, State University of New York at Buffalo*

### MCS-9.4 Feature Bispectra-Based Real-Time FM Signal Recognition Using Adaptive Incremental Learning Feedforward Neural Network

Huang Yuchun, *Huazhong University of Science and Technology*  
 Huang Zailu, *Huazhong University of Science and Technology*  
 Huang Benxiong, *Huazhong University of Science and Technology*  
 Xu Shuhua, *Huazhong University of Science and Technology*

## MCS-9.5 FM Signal Feature Extraction Using FFT-Based Integrated Interpolation Frequency Estimator

Yuchun Huang, *Huazhong University of Science and Technology*  
 Zailu Huang, *Huazhong University of Science and Technology*

## NAPM-3

### Network Management-2

Wednesday 9:15 a.m.–noon  
 Sanibel 1

Realizable communications are a necessity for today's and tomorrow's warfighter. Communication networks enable the soldier to stay connected anytime and anywhere by providing mobility and reliable bandwidth. The Department of Defense (DoD) Net-Centric Services Strategy (NCSS) states that, "A services oriented approach can accelerate the DoD's ongoing effort to achieve net-centric operations by ensuring that our warfighters receive the right information, from trusted and accurate sources, when and where it is needed." This session will focus on network techniques being developed for the warfighter that provide the secure agility and flexibility needed to support the wide number and types of missions that today's military is faced with in a constantly changing threat environment.

**Session Organizer/Chair:** Dr. Fran Zenzen, *General Dynamics C4 Systems*

### NAPM-3.1 Traffic Engineering With OSPF Multi-Topology Routing

Thomas Henderson, *The Boeing Company*  
 Kyle Bae, *The Boeing Company*

### NAPM-3.2 Airborne Solutions for True Net-Centric Connectivity at the Tactical Edge

David Hernandez, *Telephonics Corporation*

### NAPM-3.3 Planning Robust and Scalable OSPF Domains for Future Battlefield Networks

John Sucec, *Telcordia Technologies*  
 Mariusz Fecko, *Telcordia Technologies*  
 John Unger, *Telcordia Technologies*  
 Sunil Samtani, *Telcordia Technologies*  
 Aristides Staikos, *U.S. Army CERDEC*

### NAPM-3.4 Network Design and Performance Evaluation of an Early Warning Network

Subrat Kar, Professor, *IIT Delhi*  
 Himanshu Bhatnagar, *IIT Dehi*  
 C.H. Siva Shankar, *IIT Delhi*

### NAPM-3.5 Fault Tolerant Approaches for Distributed Real-Time and Embedded Systems

Joseph Loyall, *BBN Technologies*  
 Paul Rubel, *BBN Technologies*  
 Matthew Gillen, *BBN Technologies*  
 Aniruddha Gokhale, *Vanderbilt University*  
 Jaiganesh Balasubramanian, *Vanderbilt University*  
 Aaron Paulos, *Carnegie Mellon University*

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Priya Narasimhan, *Carnegie Mellon University*

## **NAPM-3.6 Integrated Network Operations for the Future Army Tactical Networks**

Cho-Yu Jason Chiang, *Telcordia Technologies*

Ritu Chadha, *Telcordia Technologies*

Scott Newman, *U.S. Army CERDEC*

Richard Lo, *U.S. Army CERDEC*

Rosie Bauer, *U.S. Army CERDEC*

## **NAPM-3.7 Mobile Ad Hoc Networks (MANET) Protocols Evaluation Framework**

Vadim Slavin, *Lockheed Martin Space Systems*

Michael Polyakov, *Lockheed Martin Space Systems*

Mark Quilling, *Lockheed Martin Space Systems*

Mike Wittie, *University of California*

Matthew Andrews, *Lockheed Martin Space Systems*

## **NAPM-6**

### **Implementing QoS for Military and Heterogeneous Networks**

Wednesday

9:15 a.m.–noon

Sanibel 2

This session focuses on Quality of Service (QoS) which plays an important role in the areas of messaging and communication. It is especially relevant as DoD deploys the Global Information Grid (GIG), a network of networks that will be the core for internal and external communications. Net-Centricity is now the strategic foundation for all DoD systems. The objective is to migrate current capabilities in addition to providing new capabilities over a common infrastructure in order to optimize resource utilization and facilitating the orderly end-to-end message delivery. QoS becomes critical to the successful implementation of the GIG, particularly in times of high demand or crisis, to ensure the delivery of vital information to the intended destination with the reliability, integrity, latency and security that is required.

**Session Organizer/Chair:** Dr. Bassam “Sam” Farroha, *Johns Hopkins University, Applied Physics Laboratory*

### **NAPM-6.1 IP Switching Enhancements Over IP Differentiated Services for QoS Interworking**

Mario Marchese, *DIST University of Genoa*

Annamaria Raviola, *Selex Communications*

Vincenzo Gesmundo, *Selex Communications*

Maurizio Mongelli, *DIST University of Genoa*

### **NAPM-6.2 Bandwidth Estimation for Network Quality of Service Management**

Alimuddin Mohammad, *The Boeing Company*

Orlie Brewer, *The Boeing Company*

Arun Ayyagari, *The Boeing Company*

### **NAPM-6.3 Fairness Guarantees an Achievable QoS in Differentiated Services**

Abiola Adegboyega, *Broadband Networks Laboratories at Carleton University*

Ioannis Lambadaris, *Broadband Networks Laboratories at Carleton University*

### **NAPM-6.4 Network Quality of Service Through Local Adaptive Provisioning (LAP)**

Scott Evans, *GE Research*

Steve Markham, *GE Research*

Ping Liu, *GE Research*

Ishan Weerakoon, *Lockheed Martin*

### **NAPM-6.5 A Distributed Hierarchical Policy Management System for Security Control Over Tactical Mobile Ad Hoc Networks**

Kirthika Parmeswaran, *Applied Research, Telcordia Technologies*

Brian Coan, *Applied Research, Telcordia Technologies*

Jim Burns, *Applied Research, Telcordia Technologies*

Petros Mouchtaris, *Applied Research, Telcordia Technologies*

Stephen Lucas, *U.S. Army CERDEC*

### **NAPM-6.6 A Tiered, Model for Cross-Domain QoS Delivery**

Sham Chakravorty, *The MITRE Corporation*

## **NCS-6**

### **Next Generation Warfighter Networks and Systems**

Wednesday

9:15 a.m.–noon

Sanibel 3

Looking ahead to meet the mission needs of our warfighter from a technology perspective has always been a challenge. This MILCOM 2007 session focuses how we transition the technologies of today to meet our network and system requirements of tomorrow. With the major advances in network and enterprise architectures, routing, protocols, net-centric systems and mobile networks, the opportunities are practically endless. This session focuses on state-of-the-art communications and information processing system technologies and capabilities that address the 21st century challenges of National Defense, Intelligence, Homeland Security, Disaster Response and Interoperability.

**Session Organizer/Chair:** Deborah Farroha, *Defense Intelligence Agency*

### **NCS-6.1 USCENTCOM C2J6 Network Engineering Study**

Boris Kilimnik, *Booz Allen Hamilton*

Bruce Bennett, *Defense Information Systems Agency*

Kensing Quock, *Booz Allen Hamilton*

Christopher Meyer, *Booz Allen Hamilton*

### **NCS-6.2 A Credential-Based Data Path Architecture for Assurable Global Networking**

Tilman Wolf, *University of Massachusetts*

### **NCS-6.3 Global Information Grid (GIG) Edge Network Interface Architecture**

Marcelo Albuquerque, *The Boeing Company*

Arun Ayyagari, *The Boeing Company*  
 Michael Dorsett, *The Boeing Company*  
 Michael Foster, *The Boeing Company*

## **NCS-6.4 Cross-Layer Architecture Enhancements in Mobile Tactical Radios**

Song Ci, *University of Nebraska at Lincoln*  
 Jerome Sonnenberg, *Harris Corporation*

## **NCS-6.5 Beacon-Based Routing for Tactical MANETS**

Robert Cole, *Johns Hopkins University, Applied Physics Laboratory and Dept. of Computer Science*  
 Baruch Awerbuch, *Johns Hopkins University Dept. of Computer Science*  
 David Holmer, *Johns Hopkins University Dept. of Computer Science*  
 Herbert Rubens, *Johns Hopkins University Dept. of Computer Science*

## **NCS-6.6 Assessment and Analysis of Tactical Communications in a Net-Centric Environment**

Alan Hermelee, *Computer Sciences Corp.*  
 Stephen Turczyn, *U.S. Army CERDEC S&TCD*

## **NCS-6.7 LMS Predictive Link Triggering for Seamless Handovers in Heterogeneous Wireless Networks**

Sang-Jo Yoo, *NIST*  
 David Cypher, *NIST*  
 Nada Golmie, *NIST*

## **NCS-10**

### **Modeling and Simulation Techniques for Performance Analysis**

Wednesday 9:15 a.m.–noon  
 Sarasota 1

This session covers Modeling and Simulation techniques for the purpose of performance analysis with protocol stack layers focus. Relevant papers have a focus on RF Simulation and Spectrum Analysis where terrain, propagation and fading are some of the factors studied. Other papers focus on MAC layer challenges and techniques that enhance network performance.

**Session Organizer/Chair:** Dr. George F. Elmasry, *XPRT Systems, Inc.*

### **NCS-10.1 Scalable Urban Network Simulation (SUNS)**

David Rhodes, *OpCoast*  
 Benjamin Epstein, *OpCoast*  
 Barry Perlman, *U.S. Army CERDEC*

### **NCS-10.2 Fast, Accurate RF Propagation Modeling & Simulation Tool for Highly Cluttered Environments**

Teja Kuruganti, *ORNL*  
 James Nutaro, *ORNL*

### **NCS-10.3 An Approximate Numerical Model for Simulation of Long-Distance Near-Ground Radiowave Propagation Over Random Terrain Profiles**

DaHan Liao, *Radiation Laboratory, University of Michigan*  
 Kamal Sarabandi, *Radiation Laboratory, University of Michigan*

### **NCS-10.4 Frequency Reuse in MANET Network**

Subhabrata Sen, *XPRT Solutions, Inc.*  
 Makonnen Melaku, *XPRT Solutions, Inc.*  
 Manoj Jain, *XPRT Solutions, Inc.*

### **NCS-10.5 Modeling Architecture for DTDMA Channel Access Protocol for Mobile Network Using Directional Antenna**

Peter Griessler, *Harris Corporation*  
 J. Bibb Cain, *Harris Corporation*  
 Ryan Hanks, *Harris Corporation*

### **NCS-10.6 Effective Exchange of Real-Time Location Information Packets in an Integrated Voice/Data Ad Hoc Network Based on the MIL-STD-188-220C Standard**

Sung Soo Cho, *KT Corporation*  
 Chong Woon Lyu, *Korea Telecom Freetel*  
 Bang Chul Jung, *Korean Advanced Institute of Science and Technology*  
 Dan Keun Sung, *Korean Advanced Institute of Science and Technology*  
 Soonuk Seol, *KT Corporation*

### **NCS-10.7 A Unified Framework of Node Mobility Models**

Noun Choi, *University of Texas at Dallas*  
 Alieza Mahdian, *University of Texas at Dallas*  
 Ravi Prakash, *University of Texas at Dallas*  
 S. Venkatesan, *University of Texas at Dallas*  
 Neeraj Mittal, *University of Texas at Dallas*  
 Albert Anderson, *Rockwell Collins*  
 Eric Redding, *Rockwell Collins*  
 Robert Butler, *Rockwell Collins*

## **RSA-4**

### **Radio Network Architecture and Indoor Geolocation**

Wednesday 9:15 a.m.–noon  
 Sarasota 2

The evolution of reconfigurable and adaptable radio communications systems has resulted in additional functions and capabilities supporting by and in the radio system. This has led to the radio system functioning more as a component in an overall communications network than as a point-to-point system. This session explores some of these capabilities such as networking and geolocation.

# UNCLASSIFIED SESSIONS

**Session Chair:** Dr. John Bard, *Space Coast Communications*

## **RSA-4.1 Integration of SDR Cellular Basestations Into Military Telephone Networks**

Steve Muir, *Vanu, Inc.*

Jagadeesh Yedetore, *Vanu, Inc.*

Laura Stich, *Vanu, Inc.*

John Chapin, *Vanu, Inc.*

## **RSA-4.2 DCLAD: Distributed Cluster Based Localization Anomaly Detection in Wireless Sensor Networks Using Single Mobile Beacon**

Lakshmi Santhanam, *University of Cincinnati*

Bin Xie, *University of Cincinnati*

Dharma Agrawal, *University of Cincinnati*

Karthika Paladugu, *University of Cincinnati*

## **RSA-4.3 Indoor Geolocation for Military Applications**

Don Torrieri, *U.S. Army Research Laboratory*

Kesh Bakhru, *Cubic Defense Applications*

## **RSA-4.4 Geographical Based Situational Awareness in Military Mobile Domain**

Theo Sierksma, *Defense Materiel Organisation/C2SC*

Berry Jansen, *Defense Materiel Organisation/C2SC*

Jurjen Hoekstra, *Defense Materiel Organisation/C2SC*

Bert Boltjes, *TNO Information and Communication Technology*

Jaap van de Oever, *TNO Information and Communication Technology*

## **RSA-4.5 Improving Localization Accuracy in Wireless Sensor Networks Using Location Verification Feedback**

Dawood Al-Abri, *University of Florida*

Janise McNair, *University of Florida*

## **RSA-4.6 Multifunction Highband Software Radio With Digital Transceivers**

W. Joel D. Johnson, *Harris Corporation*

Keith Olds, *Harris Corporation*

## **RSA-4.7 High-Data-Rate, Network Radio for Wireless Communications in Military Environments**

Chris Moffatt, *Harris Corporation*

Richard Lilley, *Harris Corporation*

mode and TDMA, as well as papers using MF-TDMA, DVB-S/-RCS/-S2, 802.16/WiMAX, GBS and IP services for a variety of other missions. The GBS paper addresses increased WGS capabilities using variable coding and modulation techniques. SAS-2 presents DVB-RCS using bandwidth performance metric analysis providing insight into effective bandwidth management. Another DVB-RCS paper deals with dynamic resource allocation using optimizations spanning multiple network layers. A Satellite TDMA paper describing tactical capability over MUOS using Demand Assigned Multiple Access (DAMA) and Continuous Phase Modulation (CPM) rounds out the session. Overall, the Space and Satellite Systems session presents a good selection of timely topics that should be of interest to a wide MILCOM community.

**Session Organizer/Chair:** Dr. Jerry Brand, *Harris Corporation*

## **SAS-3.1 On the Use of Small Satellites for Operationally Responsive Missions**

Jerry Brand, *Harris Corporation*

## **SAS-3.2 WGS Air-Interface for AISR Missions**

Ludong Wang, *Booz Allen Hamilton*

Douglas Ferguson, *MILSATCOM JTEO*

## **SAS-3.3 GBS Over WGS Using DVB-S and DVB-S2**

Bruce Bennett, *DISA*

Daniel Hannan, *SMDC/ARSTRAT*

James Marshall, *The MITRE Corporation*

Richard Gibbons, *The MITRE Corporation*

## **SAS-3.4 DVB-RCS Bandwidth Performance Metric Analysis**

Boris Kilimnik, *Booz Allen Hamilton*

Christopher Meyer, *Booz Allen Hamilton*

Bruce Bennett, *Defense Information Systems Agency*

## **SAS-3.5 Satellite TDMA Capability**

James Norris, *Harris Corporation*

## **SAS-3.6 Enhanced Dynamic Resource Allocation for DVB-RCS: A Cross-Layer Operation Framework**

Antoni Morell, *Universitat Autònoma de Barcelona*

Gonzalo Seco-Granados, *Universitat Autònoma de Barcelona*

Ángeles Vázquez-Castro, *Universitat Autònoma de Barcelona*

## **SAS-3.7 Tactical Services Provider: Wireless and SATCOM Integration for Tactical Services**

Joseph Greeves, *Booz Allen Hamilton*

Pamela Hemmings, *Booz Allen Hamilton*

Bruce Bennett, *Defense Information Systems Agency*

Michael Skowrunski, *Booz Allen Hamilton*

## **SAS-3**

### **Space and Satellite Systems**

Wednesday

9:15 a.m.–noon

Sarasota 3

The Space and Satellite Systems session consists of topics covering a variety of satellite systems and their uses. This includes the Wideband Global Satellite (WGS) and Mobile User Objective System (MUOS) systems as well as one paper on small satellites used for Operationally Responsive Space (ORS) missions. The WGS applications cover Airborne Intelligence, Surveillance and Reconnaissance (AISR) missions using the wideband bypass

**SAS-6****MUOS Architecture and Space**

Wednesday  
Miami 1

9:15 a.m.–noon

The Mobile User Objective System (MUOS) is a narrowband Military Satellite Communications (MILSATCOM) system that supports a worldwide, multi-service population of mobile and fixed-site terminal users in the Ultra High Frequency (UHF) band, providing increased communications capabilities to smaller terminals while still supporting interoperability to legacy terminals. The MUOS architecture has uniquely adapted commercial technology in several areas to provide new services to the mobile warfighter. This session will discuss system performance trades and capabilities, as well as provide an overview of several critical technologies that the MUOS spacecraft has been designed to utilize.

**Session Organizer/Chair:** Capt. (Sel) Jack Nicholson, *U.S. Navy*

**SAS-6.1 What the Mobile User Objective System Will Bring to UHF SATCOM**

Frank Tirpak, *Maxim Systems, Inc.*

Gary Huckell, *L-3 Communications Titan Group*

**SAS-6.2 Beyond Raw IP: MUOS Architecture As a Platform for Future Services**

Adam Bawor, *General Dynamics C4 Systems*

**SAS-6.3 MUOS System Performance Trade Study**

Angela Wang, *Lockheed Martin Corporation*

John Thacker, *LMCO*

John Bush, *LMCO/Questiny*

**SAS-6.4 Asynchronous Aggregate Resource Management for MUOS**

Edward Orcutt, *General Dynamics C4S*

Dean Vanden Heuvel, *General Dynamics C4S*

**SAS-6.5 Algorithms for MUOS Capacity Analysis**

Jim Marshall, *The MITRE Corporation*

Lyman Hazelton, *General Dynamics (consultant)*

Parimal Pal, *General Dynamics C4 Systems*

Per Kullstam, *Paircom*

Anne Grigals, *General Dynamics*

**SAS-6.6 Peak-to-Average Power Ratio Characteristics of WCDMA Over Satellite Links—Satellite-to-User Downlink**

John Oetting, *Johns Hopkins University, Applied Physics Laboratory*

**SAS-6.7 UHF SSPA Design for WCDMA Space Applications**

James Martinetti, *Lockheed Martin*

George Pallas, *Lockheed Martin*

Thu Hoang, *Lockheed Martin*

Dave Skarbowski, *Lockheed Martin*

Jody Byram, *Lockheed Martin*

Allen Katz, *Lockheed Martin and The College of New Jersey*

**WMC-5****Channel Model and RF Propagation**

Wednesday  
Miami 2

9:15 a.m.–noon

This session addresses RF propagation issues and their impact on communication system performance. Topics to be addressed include urban propagation modeling, MIMO channel characterization, satellite link effects, ducting and its impact on covert communications, and fading channel measurement techniques.

**Session Organizer/Chair:** Jerry Hampton, *Johns Hopkins University, Applied Physics Laboratory*

**WMC-5.1 The Impact of Evaporative Ducting on Covert Communications**

Jerry Hampton, *Johns Hopkins University, Applied Physics Laboratory*

**WMC-5.2 3D Simulation Models for Wideband MIMO Mobile-to-Mobile Channels**

Gordon Stuber, *Georgia Institute of Technology*

Alenka Zajic, *Georgia Institute of Technology*

**WMC-5.3 Performance of Regularized Zero-Forcing Receivers for QAM Constellations on Multi-Antenna Rayleigh Fading Channels**

Ramesh Annavajjala, *ArrayComm LLC*

Mishal Algharabally, *University of California, San Diego*

**WMC-5.4 Analysis of Propagation Effects in Mobile Satellite Communications**

Vijitha Weerackody, *Johns Hopkins University, Applied Physics Laboratory*

**WMC-5.5 Analysis of a Stochastic Urban Propagation Model**

Carmen Cerasoli, *The MITRE Corporation*

Chad Edwards, *The MITRE Corporation*

**WMC-5.6 Parametric Doppler Spread Estimation in Mobile Fading Channels**

Mingzheng Cao, *New Jersey Institute of Technology*

Hongya Ge, *New Jersey Institute of Technology*

Hong Zhang, *New Jersey Institute of Technology*

Ali Abdi, *New Jersey Institute of Technology*

# UNCLASSIFIED SESSIONS

## WMC-6

### Ultra Wideband (UWB) for Military Applications

Wednesday

9:15 a.m.–noon

Miami 3

Ultra Wideband (UWB) for Military Applications—UWB communications systems offer many advantages over conventional narrowband and spread-spectrum systems such as low power spectral density, exploitation of multipath diversity, and inexpensive receiver architectures. This session considers the generic topic of UWB for military applications and focuses on physical-layer UWB communication issues such as narrowband interference, UWB system coexistence, and receiver and pulse design.

**Session Organizer/Chair:** Jon Ward, *Johns Hopkins University, Applied Physics Laboratory*

#### WMC-6.1 Chip Discrimination for UWB Impulse Radio Networks in Multipath Channels

Jon Ward, *Johns Hopkins University, Applied Physics Laboratory*  
Keith Townsend, *North Carolina State University*

#### WMC-6.2 Cognitive Radio With Ultra-Wide Bandwidth Location-Capable Nodes

Riccardo Minutolo, *Thales Italia*  
Andrea Giorgetti, *University of Bologna*  
Marco Chiani, *University of Bologna*  
Davide Dardari, *University of Bologna*  
Riccardo Minutolo, *Thales Italia*

#### WMC-6.3 UWB Coexistence With GPS and UWB Aggregate Noise Raise in the Selected Radio Bands

Ari Isola, *Centre for Wireless Communications*  
Matti Hämäläinen, *Centre for Wireless Communications*  
Jari Linatti, *Centre for Wireless Communications*  
Esa Airos, *Finnish Defence Forces Technical Research Centre*

#### WMC-6.4 Frequency-Band Coded Orthogonal UWB Pulse Design Based on Chirp Signals for Cognitive NBI Suppression

Fangmin Xu, *Beijing University of Posts and Telecommunications*  
Zheng Zhou, *Beijing University of Posts and Telecommunications*  
ChengLin Zhao, *Beijing University of Posts and Telecommunications*  
Jie Zong, *China Satellite Communications Corporation*

#### WMC-6.5 A Simple Closed-Form Linear Source Localization Algorithm

Zhengyuan Xu, *University of California, Riverside*  
Ning Liu, *University of California, Riverside*  
Brian Sadler, *U.S. Army Research Laboratory*

#### WMC-6.6 A Class of Ultra Wideband (UWB) Systems With Simple Receivers

Dennis Goeckel, *University of Massachusetts*  
Jeffrey Mehlman, *University of Massachusetts*  
Justin Burkhart, *MIT Lincoln Laboratory*

## WSN-6

### WLAN

Wednesday

9:15 a.m.–noon

Naples 1

Over the years, wireless LANs offered effective extension of a wired network at broadband speeds up to 300 yards from the access point to personal computers and laptops equipped with wireless LAN cards. Starting from IEEE 802.11b standard offering connectivity of up to 11 Mbps, 802.11n is now currently being developed with the maximum target data rate of 100 Mbps.

This session focuses on recent advances in WLAN technologies covering security and QoS issues. Topics on various network configuration issues and performance assessment for various advanced techniques are also addressed.

**Session Organizer/Chair:** Prof. Sooyoung Kim, *Chonbuk National University, Korea*

#### WSN-6.1 STC-MAC: A Security-Enabled Wireless Token Cluster MAC Protocol With Intelligent Token Policy

Chunxiao Chigan, *Michigan Tech*  
Tao Jin, *Northeastern University*

#### WSN-6.2 Synchronizing Transmission Schedules of Partitioned Ad Hoc Networks

Brian Wolf, *Clemson University*  
Kuang-Ching Wang, *Clemson University*  
Harlan Russell, *Clemson University*

#### WSN-6.3 DPHA: A Novel MAC Protocol to Enhance Network Capacity in Non-Infrastructure WLANs

Delia Wu, *Wuhan National Laboratory for Optical-Electronics*  
Guangxi Zhu, *Wuhan National Laboratory for Optical-Electronics*  
Gan Liu, *Wuhan National Laboratory for Optical-Electronics*

#### WSN-6.4 A Simple and Cost-Effective Ring-Based Local Access C/DWDM-PON Architecture for Supporting a Truly Shared LAN Capability

Hasan Erkan, *City College of New York*  
Rashid Zaidi, *City College of New York*  
Roger Dorsinville, *City College of New York*  
Mohamed Ali, *City College of New York*

#### WSN-6.5 Localized Access Point Selection in Infrastructure Wireless LAN

Mingming Lu, *Florida Atlantic University*  
Jie Wu, *Florida Atlantic University*

#### WSN-6.6 Performance of IEEE 802.11n in Multichannel Multiradio Wireless Ad Hoc Network

Omar Villavicencio, *UPR-Mayagüez*  
Kejie Lu, *UPR-Mayagüez*  
Hua Zhu, *SDRC*  
Sastri Kota, *Harris Corporation*

**WSN-11****Sensor Networks-4**

Wednesday  
Naples 2

9:15 a.m.–noon

In this session, Wireless Sensor Networking discussions focus building a Distributed Sensor Network with low power as a goal, security as a requirement, and efficient data delivery an objective. This set of metrics places emphasis on efficiency and resource allocation in a distributed trusted environment. In LOCOMOTE there is network topology discovery through a minimum number of transmissions. An experimental path loss model discussion creates an environment to reduce interference and power output which enhances the spatial reuse through carrier sense adaptation. This feeds directly into a discussion of the relationship of routing to both interference and efficient streaming services. The MAC provides the central nerve center of the WSN through utilization of the efficiency of the topology state information and the application state information to further maximize user throughput with minimum energy. Lightweight security is discussed to ensure the node membership is not compromised, and finally a discussion of data delivery through head-end nodes in a tree structure created by advantaging the known structure of the WSN. Many challenges have been identified and methods for mitigation have been presented. A final integrating effort is required to optimize the technology advances to create optimal solutions.

**Session Organizer/Chair:** Timothy J. Hughes, *Raytheon Company*

**WSN-11.1 A Secure Lightweight Approach of Node Membership Verification in Dense HDSN**

Al-Sakib Khan Pathan, *Kyung Hee University*  
Choong Seon Hong, *Kyung Hee University*

**WSN-11.2 Experimental Path Loss Models for Wireless Sensor Networks**

Rahul Sawant, *University of Texas at Arlington*  
Qilian Liang, *University of Texas at Arlington*  
Dan Popa, *Automation & Robotics Research Institute, University of Texas at Arlington*  
Frank Lewis, *Automation & Robotics Research Institute, University of Texas at Arlington*

**WSN-11.3 Interference-Minimized Multipath Routing With Congestion Control in Wireless Sensor Network for Multimedia Streaming**

Jenn Yue Teo, *National University of Singapore*  
Yajun Ha, *National University of Singapore*  
Chen Khong Tham, *National University of Singapore*

**WSN-11.4 Enhancing Spatial Reuse in Ad Hoc Networks by Carrier Sense Adaptation**

Francesco Rossetto, *Facoltà di Ingegneria, University of Padova*  
Michele Zorzi, *University of Padova*

**WSN-11.5 Analysis and Design of a MAC Protocol for Wireless Sensor Networks With Periodic Monitoring Applications**

Miguel A. Erazo, *University of Puerto Rico at Mayagüez*  
Yi Qian, *University of Puerto Rico at Mayagüez*  
Kejie Lu, *University of Puerto Rico at Mayagüez*  
Domingo Rodriguez, *University of Puerto Rico at Mayagüez*

**WSN-11.6 LOCOMOTE: A Simple Anchor-Free Localization Scheme for Wireless Sensor Networks**

Aaron Tu, *LinQuest Corporation*

**WSN-16****Routing in Wireless Mobile Ad Hoc/Mesh Tactical Networks**

Wednesday  
Naples 3

9:15 a.m.–noon

Routing in wireless mobile ad hoc and mesh networks is challenging as nodes are moving and environments change constantly. Even though many routing protocols have been proposed in the literature for mobile ad hoc networks, there are still many open issues in routing for tactical ad hoc networks. To address some of the open issues, this session consists of several state of the art routing protocols for ad hoc networks. To be more specific, the topics covered in this session include multi-rate geographic opportunistic routing, privacy aware position based routing, hole (or void zone) aware greedy routing for geometric ad hoc networks, hybrid routing protocols in wireless mesh networks, comparison study of AODV and OSLR in the ORBIT test-bed, mobility management in disadvantaged environments using session initiation protocol (SIP), and finally spatially aware wireless networks using directional antennas.

**Session Organizer/Chair:** Dr. Zhensheng Zhang, *San Diego Research Center (SDRC)*

**WSN-16.1 Multirate Geographic Opportunistic Routing in Wireless Ad Hoc Networks**

Kai Zeng, *Worcester Polytechnic Institute*  
Wenjing Lou, *Worcester Polytechnic Institute*  
Yanchao Zhang, *New Jersey Institute of Technology*

**WSN-16.2 PPBR: Privacy-Aware Position-Based Routing in Mobile Ad Hoc Networks**

Chenxi Zhang, *University of Waterloo, Canada*  
Xiaodong Lin, *University of Waterloo, Canada*  
Pin-Han Ho, *University of Waterloo, Canada*  
Xiaoting Sun, *David R. Cheriton School of Computer Science, University of Waterloo, Canada*  
Xin Zhan, *David R. Cheriton School of Computer Science, University of Waterloo, Canada*

**WSN-16.3 HAGR: Hole Aware Greedy Routing for Geometric Ad Hoc Networks**

Fei Xing, *North Carolina State University*  
Yi Xu, *North Carolina State University*

# UNCLASSIFIED SESSIONS

Ming Zhao, *North Carolina State University*  
Khaled Harfoush, *North Carolina State University*

## **WSN-16.4 A Hybrid Routing Protocol for Communications Among Nodes With High Relative Speed in Wireless Mesh Networks**

Nikolaos Peppas, *University of Central Florida*  
Damla Turgut, *University of Central Florida*

## **WSN-16.5 A Comparative Study of AODV and OLSR on the ORBIT Testbed**

Devashish Rastogi, *WINLAB, Rutgers University*  
Sachin Ganu, *WINLAB, Rutgers University*  
Yanyong Zhang, *WINLAB, Rutgers University*  
Wade Trappe, *WINLAB, Rutgers University*  
Charles Graff, *U.S. Army CERDEC*

## **WSN-16.6 Mobility Management in Disadvantaged Tactical Environments**

Harold Zheng, *Johns Hopkins University, Applied Physics Laboratory*  
Sherry Wang, *Johns Hopkins University, Applied Physics Laboratory*

## **WSN-16.7 Spatially Aware Wireless Networks (SPAWN) for Higher Data Rate and Range Performance With Lower Probability of Detection**

Christopher Meagher, *SPAWAR Systems Center, San Diego*  
Randall Olsen, *SPAWAR Systems Center, San Diego*  
Robert Ferro, *SPAWAR Systems Center, San Diego*  
Stephan Lopic, *SPAWAR Systems Center, San Diego*  
Christina de Jesus, *SPAWAR Systems Center, San Diego*  
Allen Shum, *SPAWAR Systems Center, San Diego*

## **ACT-10**

### **Service Oriented Architectures**

Wednesday 2:15–5:00 p.m.  
Tallahassee 1

The implementation of Service Oriented Architectures (SOA) in an IP-centric network environment offers many benefits to the warfighter. Networks largely remain transparent while ensuring a certain level of service quality expectation. Both provider and consumer participate in SOAs, and software agents provide the coupling. However in the DoD it is critical that services are provisioned correctly, security and information assurance remain unbreached, and the system of systems must have enough dynamics to reflect real-time changes. This session will focus on these latter issues, which could inhibit SOA development and therefore slow the advantages gained. The session will first focus on provisioning SOA services, and will then branch into design approaches. The session will then conclude with the security issues associated with SOAs, with recommendations on how an agency could implement such an architecture across multiple security domains.

**Session Organizer:** Pamela Skilj, *Lockheed Martin Corporation*

**Session Chair:** Robert R. Cleave, *Lockheed Martin Corporation*

## **ACT-10.1 A Design Pattern for Asynchronous Web Services in Secure, Cross-Domain Information Sharing**

Robert Dourandish, *Quimba Software*  
Nina Zumel, *Quimba Software*  
Michael Manno, *Air Force Research Labs*

## **ACT-10.2 Agile Capability Development, Assessment and Transition in Support of Fighting the Global War on Terror (GWoT)**

Robert Cherinka, *The MITRE Corporation*  
Dave Pitcher, *The MITRE Corporation*  
Jason Mathews, *The MITRE Corporation*  
Ted Semanchik, *The MITRE Corporation*  
Robert Miller, *The MITRE Corporation*  
William Sears, *The MITRE Corporation*  
Dave Edwards, *The MITRE Corporation*

## **ACT-10.3 A Security Framework for Service Oriented Architectures**

Catharina Candolin, *The Finnish Defence Forces*

## **ACT-10.4 Assessing Dynamic Service Discovery in the Network Centric Battlefield**

Tommy Gagnes, *Norwegian Defence Research Establishment (FFI)*

## **ACT-10.5 For the United SOA, the Future Is Federated = Establishing Horizontal Trust in Federated SOA Application Environments**

Jessica Alario, *PAN Communications for iTKO*  
John Michelsen, *Chief Architect and co-founder of iTKO*

## **ACT-10.6 Services Oriented Architecture (SOA) = Security Challenges and Mitigation Strategies**

Cecilia Phan, *The Joint Staff J6/C4 Directorate*  
Rod Fleischer, *SPARTA Inc.*  
Laura Lee, *SPARTA Inc.*

## **ACT-10.7 Designing a Large SOA Across Multiple Security Domains**

Alex Alten, *Narus, Inc.*  
Kathleen Cutler, *Booze Allen Hamilton*

## **IAS-6**

### **Security Technologies-2**

Wednesday 2:15–5:00 p.m.  
Tallahassee 2

This session focuses on security technologies and risk assessment methodologies that are relevant to computer networks and communications systems but not specific to wireless technologies or military systems. In particular, papers on homeland security applications were solicited.

**Session Organizer/Chair:** Dr. Peter Sholander, *Sandia Labs*

## IAS-6.1 Multi-Factor Fingerprints for Personal Computer Hardware

Timothy Salo, *Salo IT Solutions, Inc.*

## IAS-6.2 A Statistical Approach to Networked Physical Device Fingerprinting

Russell Fink, *Johns Hopkins University, Applied Physics Laboratory*

## IAS-6.3 Vulnerabilities of PKI-Based Smartcards

Partha Dasgupta, *Arizona State University*  
Sandeep Gupta, *Arizona State University*

## IAS-6.4 Discriminating Between Faults and Attacks in Secure Optical Network

Stamatis Kartalopoulos, *The University of Oklahoma*

## IAS-6.5 Enhancing the Deployment and Security of SIPRNET and JWICS Networks

Cary Murphy, *Network Integrity Systems, Inc.*  
Shane Shaneman, *Computer Sciences Corporation*

## IAS-6.6 Investigative Data Mining: Practical Algorithms and Mathematical Models for Analysing, Visualizing and Destabilizing Terrorist Networks

Nasrullah Memon, *European Center for Counterterrorism Research and Studies, Aalborg University*  
David Lane Hicks, *European Center for Counterterrorism Research and Studies, Aalborg University*  
Dil Muhammad Akbar Hussain, *Aalborg University*  
Henrik Legind Larsen, *Software Intelligence Security Research Center, Aalborg University*

## MCS-10

### Space-Time Communication

Wednesday 2:15–5:00 p.m.  
Tallahassee 3

Space-time techniques use multiple antennas to allow coding across both space and time to achieve spatial multiplexing and protection against channel fading. The papers in this session consider practical issues associated with using space-time coding for military communications, including the use of space-time coding with bandwidth-efficient modulation, low-complexity iterative detection techniques for V-BLAST, and the performance of space-time codes with imperfect channel estimates.

**Session Organizer:** Dr. A. Roger Hammons, *Johns Hopkins University, Applied Physics Laboratory*

**Session Chair:** Prof. Matthew C. Valenti, *West Virginia University*

## MCS-10.1 Detection of Alamouti Encoded Shaped Offset QPSK

Tom Nelson, *Brigham Young University*  
Michael Rice, *Brigham Young University*

## MCS-10.2 Low Complexity Iterative Sequential Detection Algorithm for V-BLAST Systems

Sujin Kim, *Information and Communications University*  
Jongsub Cha, *Engineering, Information and Communications University, Korea*

Joonhyuk Kang, *Engineering, Information and Communications University, Korea*

## MCS-10.3 Quasi-Orthogonal STBC With Adaptive Power Allocation Under Imperfect Channel Estimation

Changyeul Huh, *Gwangju Institute of Science and Technology*  
Donghun Lee, *Gwangju Institute of Science and Technology*  
Kiseon Kim, *Gwangju Institute of Science and Technology*

## NAPM-5

### Emerging Network Standards Applied to DoD Network Systems

Wednesday 2:15–5:00 p.m.  
Tampa 1

GIG Networks are increasingly incorporating emerging networking standards being developed within committees and work groups like the IETF. New standards or enhancements to existing standards are also being developed to address unique GIG requirements. Papers in this session explore the role of emerging networking standards within the GIG. Specifically, these papers look at issues and role of standards in key areas such as routing and security.

**Session Organizer/Chair:** Dilip S. Gokhale, *Lockheed Martin Corporation*

## NAPM-5.1 Connecting OSPF MANET to Backbone Networks

Phillip Spagnolo, *The Boeing Company*  
Thomas Henderson, *The Boeing Company*

## NAPM-5.2 Secure Inter-Domain Routing Standards Evolution and Role in the Future GIG

Sandra Murphy, *Sparta Inc.*

## NAPM-5.3 BGP Dynamic AS Reconfiguration

Susan Hares, *NextHop Technologies*  
Russ White, *Cisco*

## NAPM-5.4 Performance Implications of Instantiating IPsec Over BGP Enabled RFC 4364 VPNs

Jonah Pezeshki, *Booz Allen Hamilton*  
LaTonya Jeffress, *Booz Allen Hamilton*  
Victor Chao, *Booz Allen Hamilton*  
William Hall, *Joint Terminal Engineering Office*

## NAPM-5.5 Seamless Soft Handoff in Multiradio Wireless Networks

Jason H. Li, *Intelligent Automation Inc.*  
Song Luo, *Intelligent Automation Inc.*  
Subir Das, *Telcordia Technologies*  
Tony McAuley, *Telcordia Technologies*

# UNCLASSIFIED SESSIONS

Aristides Staikos, *U.S. Army CERDEC*

Mitesh Patel, *U.S. Army CERDEC*

Seth Spoenlein, *U.S. Army CERDEC*

Mario Gerla, *Department of Computer Science, University of California, Los Angeles*

## **NAPM-5.6 A Cross-Layer Mobility Management Framework Based on IEEE 802.21**

Mohamed Abdelatif, *University of Cape Town*

George Kalebaila, *University of Cape Town*

H. Anthony Chan, *University of Cape Town*

## **NCS-11**

### **Net-Centric Communications Technologies and Services**

Wednesday

2:15–5:00 p.m.

Tampa 2

This session presents papers that investigate the essential technologies to build and operate a network-centric environment for the warfighter. The session presents research in the areas of QoS, SoA, VoIP and others to support forming IP networks that carry converged services.

**Session Organizer:** Dr. Bassam “Sam” Farroha, *Johns Hopkins University, Applied Physics Laboratory*

**Session Chairs:** Dr. Robert Cole, *Johns Hopkins University, Applied Physics Laboratory*, & Burt Liebowitz, *The MITRE Corporation*

#### **NCS-11.1 Cluster-Based Region Formation for Modeling FCS Networks**

Henry Suoto, *XPRT Solutions, Inc.*

Subhabrata Sen, *XPRT Solutions, Inc.*

#### **NCS-11.2 Policy-Based QoS Implementation in a SoA Enterprise Framework**

Deborah Farroha, *Defense Intelligence Agency*

Bassam Farroha, *University of Maryland, University College*

#### **NCS-11.3 Policy-Based Management: Deployment Challenges in the GIG**

Rahim Choudhary, *SI International*

#### **NCS-11.4 Multimedia QoS for Satellite DVB Network With Fading Mitigation**

Sastri Kota, *Harris Corporation*

David Bradley, *Harris Corporation*

#### **NCS-11.5 Low Power TCAM Forwarding Engine for IP Packets**

Alireza Mahini, *Islamic Azad University-Gorgan Branch*

Reza Berangi, *IUST*

Seyedeh Fatemeh Khatami Firoozabadi, *Islamic Azad University-Center Tehran Branch*

Hamidreza Mahini, *IUST*

#### **NCS-11.6 Notification About Congestion Information Through SIP Session for Call Congestion Control of VoIP Application**

Hiroshi Yamada, *NTT Service Integration Laboratories*

Takehiro Kawata, *NTT Service Integration Laboratories*

## **NCS-13**

### **Network Centric Enabling Sciences-2**

Wednesday

2:15–5:00 p.m.

Sanibel 1

This session is a continuation of Network Centric Enabling Sciences-1. This session encompasses papers that investigate the sciences that enable net-centricity and makes the projected benefits possible. The objective of the presented research is aimed at all layers of the communications stack starting with the physical layer and its security and moving up to the applications over the GIG. The outcome of these papers is particularly beneficial for developing robust datalinks for data communications and providing situational awareness for the warfighter and strategic assets.

**Session Organizers:** Dr. Bassam “Sam” Farroha, *Johns Hopkins University*, & Dr. Sastri Kota, *Harris Corporation*

**Session Chair:** Dr. Peter Choi, *Harris Corporation*

#### **NCS-13.1 Incorporating Environmental Information Into Underwater Acoustic Sensor Coverage Estimation in Estuaries**

Hongyuan Shi, *Center for Decision Technologies, Howe School of Technology Management, Stevens Institute of Technology*

Dov Kruger, *Center for Maritime Systems, Stevens Institute of Technology*

Jeffrey Nickerson, *Center for Decision Technologies, Howe School of Technology Management, Stevens Institute of Technology*

#### **NCS-13.2 Rogue Access Point Detection for Wireless Networks**

Min Song, *Old Dominion University*

Sachin Shetty, *Old Dominion University*

#### **NCS-13.3 FTS: A Fractional Transmission Scheme for Efficient Broadcasting Via Rateless Coding in Multi-Hop Wireless Networks**

Faramarz Fekri, *Georgia Tech*

Nazanin Rahnnavard, *Georgia Tech*

Badri N. Vellambi, *Georgia Tech*

#### **NCS-13.4 AOA Assisted NLOS Error Mitigation for TOA-Based Indoor Positioning Systems**

Ferit Akgul, *Worcester Polytechnic Institute*

Kaveh Pahlavan, *Worcester Polytechnic Institute*

#### **NCS-13.5 Performance Comparison of Ds/SS Code Acquisition Using Mmse and Mvdr Beamforming In Jamming**

Henri Puska, *University of Oulu/Centre for Wireless Communications (CWC)*

Harri Saarnisaari, *University of Oulu/Centre for Wireless Communications (CWC)*

Jari Iinatti, *University of Oulu/Centre for Wireless Communications (CWC)*

Pekka Lilja, *University of Oulu/Centre for Wireless Communications (CWC)*

## **NCS-13.6 Effective Channel Utilization Using the RI-BTMA Protocol**

Nehaben Patel, *Stevens Institute of Technology*

Didem Kivanc-Tureli, *Stevens Institute of Technology*

Uf Tureli, *Stevens Institute of Technology*

## **RSA-7**

### **Cognitive Radio Technology-3**

Wednesday

2:15–5:00 p.m.

Sanibel 2

Cognitive Radio technology is gaining momentum as an enabler for enhancing and extending radio system capabilities and performance. Much of the initial technology focus has been in the area of dynamic spectrum access, as evidenced by the DARPA NeXt Generation (XG) program and the IEEE Dynamic Spectrum Access and Networking (DySPAN) Conferences and related IEEE SCSA41 working groups. The growth of this technology for military communications is evidenced by the substantial number of paper submissions resulting in three Cognitive Radio Technology paper sessions.

**Session Organizer/Chair:** Dr William Clark, *General Dynamics*

### **RSA-7.1 CMAP: A Real-Time Prototype for Cognitive Medium Access**

Stefan Geirhofer, *Cornell University*

John Sun, *Cornell University*

Lang Tong, *Cornell University*

Brian M. Sadler, *U.S. Army Research Laboratory*

### **RSA-7.2 Spectrum Assignment for Flexible Rate Cognitive OFDM Systems**

Catalin Lacatus, *University of Texas at San Antonio*

David Akopian, *University of Texas at San Antonio*

### **RSA-7.3 Adaptive Estimation of the Number of Transmit Antennas**

Miao Shi, *CWCSRP, NJIT*

Yehekel Bar-Ness, *CWCSRP, NJIT*

Wei Su, *U.S. Army RDECOM CERDEC*

### **RSA-7.4 Constrained Rate-Maximization Scheduling for Uplink OFDMA**

Yao Ma, *Iowa State University*

### **RSA-7.5 Distributed Spectral Access Schemes for Cognitive Radio Networks**

Yao Ma, *Iowa State University*

### **RSA-7.6 Optimal SINR Balancing for Multiple Antenna Multiple Access Channels in Cognitive Radio Network**

Yan Xin, *National University of Singapore*

Ian Zhang, *National University of Singapore*

Ying-Chang Liang, *Institute of Informcom Research*

## **SAS-4**

### **Terminals, Antennas, and RF Subsystems**

Wednesday

2:15–5:00 p.m.

Sanibel 3

This session is unique in that it covers a range of topics important to the design and operation of communication systems. Starting at the antenna moving to RF component design and analysis and finally system analysis. Papers include: Smart Antenna for airborne communications; Feed for dual band operations; VCOs incorporating MEMs switches. Regarding RF components: Power amplifier design and analysis; LC Ladder Bessel Filter Tabulation; and at the system level: Commonality and Variability analysis for system implementation; Unmanned Airborne Relay Coverage; and 3D approach to analyze Low Probability of Detection (LPD) space.

**Session Organizer/Chair:** Jonathan McNeilly, *Harris Corporation*

### **SAS-4.1 SEVR: A LPD Metric for a 3D Battle Space**

John Dishman, *Harris Corporation*

Edward Beadle, *Harris Corporation*

### **SAS-4.2 Feed for Simultaneous X-Band and Ka-Band Operations on Large Aperture Antennas**

Mark Cavalier, *Overwatch TEXTRON Systems, Ltd.*

### **SAS-4.3 Development of High Power, High Efficiency GaN HEMT Based Distributed Power Amplifier**

Chenggang Xie, *Rockwell Collins, Inc.*

### **SAS-4.4 Simulation of the Effects of Q-Band Amplifier Nonlinearities on Non-Constant Envelope SATCOM Waveforms**

David Hendry, *Raytheon*

Robert Gels, *Raytheon*

Macdonald Andrews, *Raytheon*

### **SAS-4.5 Thermally Actuated Multiband Voltage Controlled Oscillator Design With MEMS Switch**

Shumin Zhang, *George Washington University*

Mona Zaghoul, *George Washington University*

Wansheng Su, *Hughes Network Systems*

### **SAS-4.6 Analysis of Backward Wave Oscillations for a Stable TWT Amplifier**

Vikas Kumar, *Kurukshetra University*

Anil Vohra, *Kurukshetra University*

# UNCLASSIFIED SESSIONS

## **SAS-4.7 Complete LC Ladder Bessel Filter Tabulation**

Chien-Hsing Liao, *Department of Communication Engineering, National Central University*

Fu-Nian Ku, *Consultant for Communications Circuits and Systems*

Mu-King Tsay, *Department of Communication Engineering, National Central University*

Chung-Shen Shyn, *Communication Research Center, National Central University*

Tai-Yueh Yang, *Communication Research Center, National Central University*

## **WMC-7**

### **Ultra Wideband (UWB) Systems**

Wednesday

2:15–5:00 p.m.

Sarasota 1

Emerging applications of UWB are foreseen for sensor networks that are critical to mobile computing. Such networks combine low to medium rate communications (50 kbps to 1 Mbps) with ranges of 100 meters with positioning capabilities. UWB radio is a promising solution for high-rate short-range and moderate-range wireless communications and ranging, further extensive investigation, experimentation and development are necessary towards developing effective and efficient UWB communication systems. This session will report the research toward this direction.

**Session Organizer/Chair:** Prof. Robert Qiu, *Tennessee Technological University*

### **WMC-7.1 Time Delay Estimation Bounds in Wideband Random Channels**

Zhengyuan Xu, *University of California, Riverside*

Brian Sadler, *U.S. Army Research Laboratory*

### **WMC-7.2 Intra-Vehicle Ultra-Wideband Communication Testbed**

Weihong Niu, *Oakland University*

Jia Li, *Oakland University*

Shaojun Liu, *Oakland University*

Timothy Talty, *General Motors Corporation*

### **WMC-7.3 Performance of Transmitted Reference UWB Communications With Imperfect Power Control**

Liping Li, *North Carolina State University*

Keith Townsend, *North Carolina State University*

Robert Ulman, *U.S. Army Research Office*

### **WMC-7.4 Nonlinear Interference Mitigation in Multiple-Access Ultra-Wideband Communications**

Chih-Wei Wang, *University of Michigan, EECS*

Wayne Stark, *University of Michigan, EECS*

### **WMC-7.5 Effect of CDMA Schemes on UWB Time-of-Arrival Estimation**

Joon-Yong Lee, *Handong University*

Ji-Hoon Chung, *Handong University*

A-Young Kang, *Information and Communications University*

## **WMC-7.6 Performance Study on Time Reversed Impulse MIMO for UWB Communications Based on Measured Spatial UWB Channels**

Chenming Zhou, *Tennessee Technological University*

Nan Guo, *Tennessee Technological University*

Brian Sadler, *U.S. Army Research Laboratory*

Robert Qiu, *Tennessee Technological University*

## **WMC-8**

### **Wireless Communications-1**

Wednesday

2:15–5:00 p.m.

Sarasota 2

This session covers a variety of wireless networking topics. These topics include new MAC schemes and their performances, power allocations, wireless network outage calculations, duty cycle analysis, and network condition monitoring.

**Session Organizers:** Dr. Harold Zheng, *Johns Hopkins University, Applied Physics Laboratory*, & Prof. Kejie Lu, *University of Puerto Rico at Mayagüez*

**Session Chair:** Prof. Kejie Lu, *University of Puerto Rico Mayagüez*

### **WMC-8.1 An RTS-on-Demand Mechanism to Overcome Self-Interference in an 802.11 System**

Ye Chen, *Motorola*

Ivan Vukovic, *Motorola*

### **WMC-8.2 Performance Analysis of Random Access Channel With Retransmission Gain**

Junmin Shi, *RBS-Rutgers University*

Yi Sun, *City College of New York*

### **WMC-8.3 An Exact Solution for Outage Probability in Mobile Cellular Networks**

Shensheng Tang, *George Mason University*

Brian Mark, *George Mason University*

Alexe Leu, *George Mason University*

### **WMC-8.4 A New Power Allocation Scheme With Relay Selection in Multinode AF Relay Networks**

Junghyun Kim, *Yonsei University*

Daesik Hong, *Yonsei University*

Myeong-su Han, *Yonsei University*

Seungyoup Han, *Yonsei University*

Eunsung Oh, *Yonsei University*

### **WMC-8.5 Network Conditions Monitoring in the Mockets Communications Framework**

Mauro Tortonese, *University of Ferrara*

Marco Carvalho, *Florida Institute for Human & Machine Cognition*

Cesare Stefanelli, *University of Ferrara*

Niranjan Suri, *Florida Institute for Human & Machine Cognition*

### WMC-8.6 Modulation and Code Mapping Scheme for High Rate Transmission for IEEE 802.15.4b in AWGN Channels

Manjeet Singh, *Institute for Infocomm Research*  
 Zhongding Lei, *Institute for Infocomm Research*  
 Francois Chin, *Institute for Infocomm Research*

## WSN-1

### Wireless Mesh Networks

Wednesday  
 Sarasota 3

2:15–5:00 p.m.

Mesh Networks are community based networks that could provide wideband wireless access for multimedia traffic. There are many potential civilian applications of such Mesh Networks besides defense use of emergency response and battle management. A Mesh Network is usually implemented by forming wireless ad hoc networks among Mesh Routers (MRs) and Internet access is provided to very few routers, known as the Internet Gateways (IGWs). The MRs act as servers to many users as well as forward messages from other MRs towards the IGW. Designing such a Mesh Network is a challenging issue so that the QoS requirements could be satisfied with minimal resources. Enhancing the channel utilization, especially balancing the use of channels and the traffic load, is a critical issue. On one hand, traffic may change dynamically while installation of units may remain the same. How is the traffic need satisfied without excessive investment as many routers may remain idle for most of the time? Moreover, what needs to be done when there is an excessive amount of traffic by the users? Should a part of the ad hoc network be used as the backbone of the Mesh Network? Whether to use a single path between the user and the IGW via some intermediate MRs; or explore potential use of multiple paths to one or more IGWs? What do you do for correct reassembly of out-of-sequence packets? What kind of tradeoffs are there between the performance and partitioning overheads? What kind of pricing approach or structure should be used that could be reasonable and acceptable to the user community? Should there be any price differentiation for different types of service or the bandwidth requirements or minimum expected values? As the network is expected to be community based, how do you support hand-off and how do you effectively and quickly authenticate mobile users from one MR to another? This session deals with many such design and practical aspects of Mesh Networks.

**Session Organizer/Chair:** Prof. Dharma P. Agrawal,  
*University of Cincinnati*

### WSN-1.1 Enhancing Channel Utilization in Mesh Networks

Ali Khayatzaadeh Mahani, *Politecnico di Torino*  
 Claudio Casetti, *Politecnico di Torino*  
 Carla-Fabiana Chiasserini, *Politecnico di Torino*  
 Majid Naderi, *Department of Electrical and Electronic Engineering, IUST, Narmak, Tehran, Iran*

### WSN-1.2 Load-Balanced Mesh Portal Selection in Wireless Mesh Network

Yonggyu Kim, *Information and Communications University*  
 Yeonkwon Jeong, *Information and Communications University*  
 Myunghwan Seo, *Information and Communications University*  
 Joongsoo Ma, *Information and Communications University*

### WSN-1.3 Equilibrium Efficiency Improvement in Wireless Mesh Access Networks: A Pricing-Based Approach

Yang Song, *University of Florida*  
 Chi Zhang, *University of Florida*  
 Yuguang Fang, *University of Florida*

### WSN-1.4 MHRP: A Secure Multipath Hybrid Routing Protocol for Wireless Mesh Network

Muhammad Shoaib Shoaib, *Kyung Hee University*  
 Choong Seon Hong, *Kyung Hee University*  
 Syed Obaid Amin, *Kyung Hee University*

### WSN-1.5 Multi-Radio Nodes for Mobile Mesh Networks for Emergency Response and Battle Command Systems

Ben Burnett, *Architecture Technology Corporation*  
 Glenn Bowering, *Architecture Technology Corporation*  
 Ryan Hagelstrom, *Architecture Technology Corporation*  
 Ranga Ramanujan, *Architecture Technology Corporation*  
 Don Tate, *Architecture Technology Corporation*

### WSN-1.6 A Novel Architecture for Future Wireless Mesh Networks

Kejie Lu, *University of Puerto Rico at Mayagüez*  
 Shengli Fu, *UNT*  
 Yi Qian, *University of Puerto Rico*  
 Sastri Kota, *Harris Corporation*

### WSN-1.7 Service Differentiation in IEEE 802.11s Mesh Networks: A Dual Queue Strategy

Deepti Nandiraju, *University of Cincinnati*  
 Nagesh Nandiraju, *University of Cincinnati*  
 Dharma Agrawal, *University of Cincinnati*

# UNCLASSIFIED SESSIONS

## WSN-7

### Sensor Networks—Information Processing and Data Fusion

Wednesday 2:15–5:00 p.m.  
Miami 1

Sensor networks have found diverse applications in commercial and military environments and are being deployed for a variety of missions. Sensor networking involves a number of diverse disciplines including sensor technology and signal processing, wireless communication, and distributed algorithms and information management. This session focuses on sensor networking research and applications with emphasis on distributed information processing and algorithms in these networks. The session addresses distributed information processing and data fusion in sensor networks, including situations with limited resources, and covers in-network processing and aggregation, distributed inference and fusion, applications to target detection and tracking, and energy efficiency and resource management.

**Session Organizers:** Dr. Lotfi Benmohamed & Dr. I-Jeng Wang, *Johns Hopkins University, Applied Physics Laboratory*

**Session Chair:** Dr. I-Jeng Wang, *Johns Hopkins University, Applied Physics Laboratory*

#### WSN-7.1 CluRoL: Clustering Based Robust Localization in Wireless Sensor Networks

Satyajayant Misra, *Arizona State University*  
Guoliang Xue, *Arizona State University*

#### WSN-7.2 Energy-Constrained Distributed Estimation in Wireless Sensor Networks

Junlin Li, *Georgia Institute of Technology*  
Ghassan AlRegib, *Georgia Institute of Technology*

#### WSN-7.3 TEAN-Sleep for Distributed Sensor Networks: Introduction and $\alpha$ -Metrics Analysis

Manikanden Balakrishnan, *New Mexico State University*  
Eric Johnson, *New Mexico State University*  
Hong Huang, *New Mexico State University*

#### WSN-7.4 Sequential Monte Carlo Methods for Collaborative Multisensor Tracking

Xinrong Li, *University of North Texas*  
Jue Yang, *University of North Texas*

#### WSN-7.5 Sniper Fire Localization Using Wireless Sensor Networks and Genetic Algorithm Based Data Fusion

Patrick Kuckertz, *RWTH Aachen University*  
Junaid Ansari, *RWTH Aachen University*  
Janne Riihijarvi, *RWTH Aachen University*  
Petri Mahonen, *RWTH Aachen University*

#### WSN-7.6 Underwater Sensor Field Design Using Game Theory

Erik Golen, *Rochester Institute of Technology*  
Bruce Incze, *Naval Undersea Warfare Center Division Newport*  
Nirmala Shenoy, *Rochester Institute of Technology*

## WSN-13

### Network and Transport Protocols

Wednesday 2:15–5:00 p.m.  
Miami 2

The Network and Transport Layer Protocols session in the Wireless and Sensor Networks track investigates the performance of transport layer protocols in a wireless environment and explores cross-layer design approaches for improving routing. The benefits of having multiple network interfaces (MNIs) on a single computer in order to improve the performance of transport layer protocols are considered. In addition, the general cross-layer design approach is discussed and specific cross-layer designs that enhance the performance of routing protocols are presented.

**Session Organizer/Chair:** Julee Pandya, *Lockheed Martin*

#### WSN-13.1 Stability and Convergence of TCP With Faster Congestion Feedback

Chunlei Liu, *Valdosta State University*  
Xuerong Feng, *Valdosta State University*

#### WSN-13.2 Effect of Path Parameter Imbalance on the Performance of Concurrent Multipath TCPs

Dilip Sarkar, *University of Miami*  
Snigdhaddeb Paul, *University of Miami*  
Harendra Narayan, *University of Miami*  
Uttam Sarkar, *University of Miami*  
Sharat Prasad, *Netway Inc.*

#### WSN-13.3 Architecture, Implementation, and Evaluation of a Concurrent Multipath Realtime Transport Control Protocol

Dilip Sarkar, *University of Miami*  
Anand J. Sarkar, *University of Miami*

#### WSN-13.4 A Linux Implementation and Experimental Study of the Variable-Structure Congestion Control Protocol

Homayoun Yousefi'zadeh, *UCI*  
Xiaolong Li, *UCI*

#### WSN-13.5 Psiactive Networking for Military Applications: A Predictive Cross-Layer Approach

Robert Kennedy, *Harris Corporation*

#### WSN-13.6 MANET Route Optimization Using Cross-Layer Enhancements

Jerome Sonnenberg, *Harris Corporation*  
Miller Chin, *Harris Corporation*  
Ryan Hanks, *Harris Corporation*  
Peter Griessler, *Harris Corporation*

#### WSN-13.7 Neighbor Turn Taking—A Loosely Scheduled Medium Access Protocol for Wireless Networks

Nirmala Shenoy, *Rochester Institute of Technology*

## WSN-14

### Wireless Networks Performance

Wednesday  
Miami 3

2:15–5:00 p.m.

This session contains papers covering several aspects of wireless networks performance. These papers include performance analysis of fundamental limits on wireless network performance as well as analysis of performance of specific algorithms and protocols. In addition, several papers present new algorithms that enable improved network performance at the physical, link, and network layers.

**Session Organizer/Chair:** Dr. J. Bibb Cain, *Harris Corporation*

#### WSN-14.1 Capacity in Wireless Systems With Random Access and Delay Constraints

Linda Zeger, *MIT Lincoln Laboratory*

#### WSN-14.2 Interference Aware Routing for Congestion Control and Load Balancing in Tactical Wireless Networks

Carlos Ramos, *BAE Systems*

#### WSN-14.3 Channel Access Over Path Segments for Ultra Low Latency MANETs

Ram Ramanathan, *BBN Technologies*

Fabrice Tchakountiou, *BBN Technologies*

#### WSN-14.4 Performance Analysis of ROCSTAR Algorithm for CDMA Forward Link Code Detection and Cancellation Under Stressing Conditions

Seema Sud, *GCI, Inc.*

#### WSN-14.5 Balancing Power and Rate to Achieve Bounded Average Delay in Wireless Networks

Behzad Dogahe, *University of Miami*

Xingzhe Fan, *University of Miami*

Manohar Murthi, *University of Miami*

Kamal Premaratne, *University of Miami*

#### WSN-14.6 Loss Model Approximations and Sensitivity Computations for Wireless Network Design

John Baras, *University of Maryland, College Park*

George Papageorgiou, *University of Maryland*

Vahid Tabatabaee, *University of Maryland*

Yadong Shang, *University of Maryland*

Nicolas Rentz, *University of Maryland*