

**2015 9th Annual IEEE  
International Systems Conference  
(SysCon 2015)**

**Vancouver, British Columbia, Canada  
13-16 April 2015**



**IEEE Catalog Number: CFP15SYT-POD  
ISBN: 978-1-4799-5928-0**

# TABLE OF CONTENTS

Welcome to Vancouver for the 2015 IEEE International Systems Conference .....	xxii
2015 IEEE International Systems Conference Organizing Committee .....	xxiii
Tutorials .....	xxvi
Featured Speakers .....	xxviii
Program Grids .....	xxix

## Tuesday, April 13

**13:30 - 15:15**

### **2C1: Cyber Security**

**Room:** Pinnacle I

**Session Chair:** *Thomas Llansó (Johns Hopkins University Applied Physics Laboratory, USA)*

<b>A brief evaluation of Intel®MPX .....</b>	<b>1</b>
<i>Christian W. Otterstad (University of Bergen, Norway)</i>	

<b>Securing Systems on the Internet of Things via Physical Properties of Devices and Communications .....</b>	<b>8</b>
---	----------

*Christopher Huth (Robert Bosch GmbH, Germany)*

*Jan Zibuschka (Robert Bosch GmbH, Germany)*

*Paul Duplys (Robert Bosch GmbH, Germany)*

*Tim Güneysu (Ruhr University Bochum, Germany)*

<b>An Approach for Estimating Cyber Attack Level of Effort .....</b>	<b>14</b>
--	-----------

*Thomas Llansó (Johns Hopkins University Applied Physics Laboratory, USA)*

*Anurag Dwivedi (Johns Hopkins University Applied Physics Laboratory, USA)*

*Michael Smeltzer (Johns Hopkins University Applied Physics Laboratory, USA)*

**13:30 - 15:15**

### **2C2: Complex Systems Issues I**

**Room:** Shaughnessy I

**Session Chair:** *Michael D. Norman (The MITRE Corporation, USA)*

<b>Determination of the Required Product Platform Flexibility from a Change Perspective .....</b>	<b>20</b>
---	-----------

*Wolfgang Bauer (Technische Universität München, Germany)*

*Fatos Elezi (Technische Univeritaet Muenchen, Germany)*

*Michael Roth (Technische Univeritaet Muenchen, Germany)*

*Maik Maurer (Technische Universität München, Germany)*

<b>Engineering Innovation into Systems Engineering Practices .....</b>	<b>27</b>
--	-----------

*Jerry A. Krill (The Johns Hopkins University Applied Physics Laboratory, USA)*

*Ann Darrin (The Johns Hopkins University Applied Physics Laboratory, USA)*

*Conrad J. Grant (The Johns Hopkins University Applied Physics Laboratory, USA)*

*Ann Kedia (The Johns Hopkins University Applied Physics Laboratory, USA)*

### **Complex Systems Engineering in a Federal IT Environment:**

<b>Lessons Learned from Traditional Enterprise-Scale System Design and Change .....</b>	<b>33</b>
---	-----------

*Michael D. Norman (The MITRE Corporation, USA)*

<b>Complexity Costs Evaluation in Product Families by Incorporating Change Propagation.....</b>	<b>37</b>
<i>Wolfgang Bauer (Technische Universität München, Germany)</i>	
<i>Patrick Bosch (Technische Universität München, Germany)</i>	
<i>Nepomuk Chucholowski (Technische Universität München, Germany)</i>	
<i>Fatos Elezi (Technische Univeritaet Muenchen, Germany)</i>	
<i>Sebastian Maisenbacher (Technische Universität München, Germany)</i>	
<i>Udo Lindemann (Technische Universitaet Muenchen, Germany)</i>	
<i>Maik Maurer (Technische Universität München, Germany)</i>	
<b>13:30 - 15:15</b>	
<b>2C3: Research in Systems Engineering I</b>	
<b>Room:</b> Shaughnessy II	
<b>Session Chair:</b> <i>Peter Whitehead (The MITRE Corporation, USA)</i>	
<b>Quantifying the Quality of a Systems Approach.....</b>	<b>44</b>
<i>N. Peter Whitehead (The MITRE Corporation, USA)</i>	
<i>William T. Scherer (The University of Virginia, USA)</i>	
<b>Developing Systems Thinking among Engineers: Recent Study Findings.....</b>	<b>50</b>
<i>Sigal Koral Kordova (HIT - Holon Institute of Technology, Israel)</i>	
<i>Guy Ribnikov (Elbit Systems Ltd., Israel)</i>	
<i>Moti Frank (HIT - Holon Institute of Technology, Israel)</i>	
<b>Including Non-Functional Requirements in the Axiomatic Design Process .....</b>	<b>54</b>
<i>Mohamed A. Mabrok (University of New South Wales, Australia)</i>	
<i>Mahmoud Efatmaneshnik (University of New South Wales, Australia)</i>	
<i>Michael Ryan (University of New South Wales, Australia)</i>	
<b>System Design Issues for Future In-Vehicle Ethernet-Based Time- and Safety-Critical Networks .....</b>	<b>61</b>
<i>Aboubacar Diarra (Robert Bosch GmbH, Germany)</i>	
<i>Armin Zimmermann (Ilmenau University of Technology, Germany)</i>	
<b>13:30 - 15:15</b>	
<b>2C4: Model-Based Systems Engineering I</b>	
<b>Room:</b> Pinnacle III	
<b>Session Chair:</b> <i>Uri Shani (IBM Research, Israel)</i>	
<b>Tailoring Model-Based Systems Engineering - Concepts for Industrial Application.....</b>	<b>69</b>
<i>Christian Tschirner (Fraunhofer IPT, Germany)</i>	
<i>Roman Dumitrescu (Fraunhofer IPT, Germany)</i>	
<i>Michael Bansmann (Fraunhofer IPT, Germany)</i>	
<i>Juergen Gausemeier (Heinz Nixdorf Institute, Germany)</i>	
<b>Reuse in Model-Based Systems Engineering .....</b>	<b>77</b>
<i>Uri Shani (IBM Research, Israel)</i>	
<i>Henry Broodney (IBM Research, Israel)</i>	
<b>Analyzing Semantic Relationships between Multiformalism Models for Inconsistency Management .....</b>	<b>84</b>
<i>Ahsan Qamar (Georgia Institute of Technology, USA)</i>	
<i>Sebastian J. I. Herzig (Georgia Institute of Technology, USA)</i>	
<i>Christiaan J. J. Paredis (Georgia Institute of Technology, USA)</i>	
<i>Martin Törnqvist (KTH-Royal Institute of Technology, Sweden)</i>	
<b>Engineering Changes to Improve the Governance in Data Center Project Management.....</b>	<b>90</b>
<i>Montri Wiboonrat (Khon Kaen University, Thailand)</i>	
<i>Udomsak Kaewsiri (Khon Kaen University, Thailand)</i>	

13:30 - 15:15

**2C5: Systems Verification and Validation**

Room: Dunderave

Session Chair: Sebastian Siegl (Audi Electronics Venture GmbH, Germany)

**Partitioning the Requirements of Embedded Systems by Input/Output  
Dependency Analysis for Compositional Creation of Parallel Test Models..... 96**

Sebastian Siegl (Audi Electronics Venture GmbH, Germany)  
Martin Russer (University Erlangen-Nuremberg, Germany)  
Kai-Steffen Hielscher (University of Erlangen-Nuremberg, Germany)

**A Task Scenario oriented Test Requirement Modeling Method for Complex SOA-based System..... 10'**

Luo Xu (North China Institute of Computing Technology, P.R. China)  
Jing Shi (Institute of China Electronics System Engineering Company, P.R. China)  
Bo Hao (North China Institute of Computing Technology, P.R. China)  
Ning Li (North China Institute of Computing Technology, P.R. China)  
Zhiqiang Fan (North China Institute of Computing Technology, P.R. China)

**Digital System Robustness via Design Constraints: The Lesson of Formal Methods ..... 10-**

Jackson R. Mayo (Sandia National Laboratories, USA)  
Üj[ à^!t C. Armstrong (Sandia National Laboratories, USA)  
Ö^[- →^ ^ ÁÖP ~ |^c^ ÁÜg äã National Laboratories, USA)

15:30 - 16:45

**2D1: MoXeling and Simulation I**

Room: Pinnacle I

Session Chair: Mohamed Fahim Hassan (Kuwait University, Kuwait)

**Structure-based System Dynamics Analysis – A Case Study of Line Process Optimization ..... 115**

Daniel Kasperek (Technische Universität München, Germany)  
Lukas Bermond (Technische Universität München, Germany)  
Sebastian Maisenbacher (Technische Universität München, Germany)  
Michael A. Zaggl (Technische Universität München, Germany)  
Christina Raasch (Technische Universität München, Germany)  
Maik Maurer (Technische Universität München, Germany)

**Synchronization of Hyperchaotic Systems with Application to Secure Communication..... 121**

Mohamed Fahim Hassan (Kuwait University, Kuwait)

**Backtracking Search Optimization Algorithm-Based Approach to  
PID Controller Tuning for Torque Motor Systems ..... 127**

Radu-Emil Precup (Politehnica University of Timisoara, Romania)  
Alexandra-Dina Balint (Politehnica University of Timisoara, Romania)  
Mircea-Bogdan Radac (Politehnica University of Timisoara, Romania)  
Emil M. Petriu (University of Ottawa, Canada)

**Product-Service System Development with Discrete Event Simulation -  
Modeling Dynamic Behavior in Product-Service Systems ..... 133**

Dominik Weidmann (Technische Universität München, Germany)  
Sebastian Maisenbacher (Technische Universität München, Germany)  
Daniel Kasperek (Technische Universität München, Germany)  
Maik Maurer (Technische Universität München, Germany)

**Extending design space optimization heuristics for use with Stochastic Colored Petri nets ..... 139**

Christoph Bodenstern (Ilmenau University of Technology, Germany)  
Armin Zimmermann (Ilmenau University of Technology, Germany)

**15:30 - 17:45**

**2D2: Complex Systems Issues II**

**Room:** Pinnacle II

**Session Chair:** *Sana Ullah Qaisar (UNSW-Canberra, Australia)*

**Assessing Complexity of Carbon Capture and Storage using Multi-Criteria Decision-Making Methods ..... 145**

*J. Sara (Delft University of Technology, The Netherlands)*

*R.M. Stikkelman (Delft University of Technology, The Netherlands)*

*P.M. Herder (Delft University of Technology, The Netherlands)*

**System Construction Cost of Hierarchical-Modular Structures ..... 153**

*Mahmoud Efatmaneshnik (UNSW-Canberra, Australia)*

*Michael Ryan (UNSW-Canberra, Australia)*

*Sana Ullah Qaisar (UNSW-Canberra, Australia)*

**A Tool to Bridge the Gap from Functional Dependencies to Configuration Rules -  
Translating Knowledge on Functional Restrictions from Systems Engineers to a  
Configurator for Sales and Decision Makers ..... 158**

*Michael Roth (Technische Universität München, Germany)*

*Anton Nerb (Technische Universität München, Germany)*

*Daniel Kasperek (Technische Universität München, Germany)*

*Udo Lindemann (Technische Universität München, Germany)*

**15:30 - 17:45**

**2D3: Decision Making Systems I**

**Room:** Shaughnessy I

**Session Chair:** *Ivo Paixão de Medeiros (EMBRAER, Brazil)*

**Maintenance Cost Optimization for Multiple Components Using a Condition Based Method ..... 164**

*Leonardo Ramos Rodrigues (EMBRAER, Brazil)*

*Ivo Paixão de Medeiros (EMBRAER, Brazil)*

*Christian Strottmann Kern (EMBRAER, Brazil)*

**A Multi-Objective Evolutionary Algorithm-based Decision Support System:  
A Case Study on Job-Shop Scheduling in Manufacturing ..... 170**

*Choo Jun Tan (Wawasan Open University, Malaysia)*

*Samer Hanoun (Deakin University, Australia)*

*Chee Peng Lim (Deakin University, Australia)*

*Doug Creighton (Deakin University, Australia)*

*Saeid Nahavandi (Deakin University, Australia)*

**Requirements and Decision Model for a Taxiway Route Support System ..... 175**

*Dhara Modi (Florida Institute of Technology, USA)*

*Aldo Fabregas (Florida Institute of Technology, USA)*

*Luis Otero (Florida Institute of Technology, USA)*

**Integrated Task Assignment and Maintenance Recommendation based  
on System Architecture and PHM Information for UAVs ..... 182**

*Ivo Paixão de Medeiros (EMBRAER, Brazil)*

*Leonardo Ramos Rodrigues (EMBRAER, Brazil)*

*Christian Strottmann Kern (EMBRAER, Brazil)*

*Rafael Duarte Coelho dos Santos (INPE - National Institute for Space Research, Brazil)*

*Elcio Hideiti Shiguemori (DCTA - Aerospace Science and Technology Dept, Brazil)*

<b>Sensor Systems Integrated with Decision Algorithms for Risk Awareness in Hydraulic Fracking Surface Operations</b> .....	<b>B#5</b>
<i>Sterling S. Rooke (University of Maryland, USA)</i>	
<i>Miroslaw J. Skibniewski (University of Maryland, USA)</i>	
<b>15:30 - 17:45</b>	
<b>2D4: Model-Based Systems Engineering II</b>	
<b>Room:</b> Shaughnessy II	
<b>Session Chair:</b> <i>Jean-Philippe Schneider (ENSTA Bretagne Lab, France)</i>	
<b>A Systematic Approach for Safety Evidence Collection in the Safety-Critical Domain</b> .....	<b>194</b>
<i>Huan Lin (Beihang University, P.R. China)</i>	
<i>Yaping Luo (Eindhoven University of Technology, The Netherlands)</i>	
<i>Ji Wu (Beihang University, P.R. China)</i>	
<i>Chunchun Yuan (Beihang University, P.R. China)</i>	
<i>Mark van den Brand (Eindhoven University of Technology, The Netherlands)</i>	
<i>Luc Engelen (Eindhoven University of Technology, The Netherlands)</i>	
<b>A Role Language to Interpret Multi-Formalism System of Systems Models</b> .....	<b>200</b>
<i>Jean-Philippe Schneider (ENSTA Bretagne Lab, France)</i>	
<i>Joël Champeau (ENSTA Bretagne Lab, France)</i>	
<i>Ciprian Teodorov (ENSTA Bretagne Lab, France)</i>	
<i>Eric Senn (Université de Bretagne Sud Lab, France)</i>	
<i>Loïc Lagadec (ENSTA Bretagne Lab, France)</i>	
<b>Optimization of Multi-Satellite Systems Using Integrated Model Based System Engineering (MBSE) Techniques</b> .....	<b>206</b>
<i>Jeremiah Crane (Booz Allen Hamilton, USA)</i>	
<i>Leonard Brownlow (Booz Allen Hamilton, USA)</i>	
<b>15:30 - 17:45</b>	
<b>2D5: Medical Systems</b>	
<b>Room:</b> Dundarave	
<b>Session Chairs:</b> <i>Riley Magee (Royal Military College of Canada, Canada)</i>	
<b>Recognizing the System Impact of Technology Adoption on Inter-organizational Workflow: Exploring U.S. E-prescribing</b> .....	<b>212</b>
<i>Nelson King (Khalifa University, UAE)</i>	
<i>Bijan Azad (American University of Beirut, Lebanon)</i>	
<b>A Systems Approach to a Therapist-Guided Exercise for Restoring Musculoskeletal Balance</b> .....	<b>218</b>
<i>Munehiro Mike Kayo (Institute of System Design and Management, Japan)</i>	
<i>Yoshiaki Ohkami (Institute of System Design and Management, Japan)</i>	
<b>A Methodology to create Complex Adaptive System Models that support Cardiovascular Diseases Simulation</b> .....	<b>224</b>
<i>Orlando Simpson (University of Winnipeg, Canada)</i>	
<i>Sergio Camorlinga (University of Winnipeg, Canada)</i>	
<b>A Genetic Algorithm for Single-Trial P300 Detection with a Low-Cost EEG Headset</b> .....	<b>230</b>
<i>Riley Magee (Royal Military College of Canada, Canada)</i>	
<i>Sidney Givigi (Royal Military College of Canada, Canada)</i>	

## Wednesday, April 14

10:00 - 11:00

### 3A1: Modeling and Simulation II

Room: Pinnacle I

Session Chair: *Cairo L. Nascimento, Jr. (Instituto Tecnológico de Aeronáutica, Brazil)*

#### MoGFT-I: A Multi-objective Optimization Approach for the Cart and Pole Control Problem ..... 235

*Rogério Ishibashi (Instituto Tecnológico de Aeronáutica, Brazil)*

*Cairo Lúcio Nascimento Júnior (Instituto Tecnológico de Aeronáutica, Brazil)*

#### A conceptual model to support communication of systems modeling and simulation activities ..... 243

*Steven P. Haveman (University of Twente, The Netherlands)*

*G. Maarten Bonnema (University of Twente, The Netherlands)*

10:00 - 11:00

### 3A2: Complex Systems Issues III

Room: Pinnacle II

Session Chair: *Paul Hershey (Raytheon IIS, USA)*

#### Argumentation in Virtual Collaborative Environments -

#### Addressing Complex Issues through Remote Synchronous Collaboration ..... 249

*Mark John Hall (Airbus Group Innovations, United Kingdom)*

*Karl Jones (Airbus Group Innovations, United Kingdom)*

*Pablo Bermell-Garcia (Airbus Group Innovations, United Kingdom)*

*Devon David Hansen (Airbus Group Innovations, United Kingdom)*

#### Building a Better Model: A novel approach for mapping organisational and functional structure ..... 256

*Damian Flynn (University of Bristol, United Kingdom)*

10:00 - 11:00

### 3A3: Decision Making Systems II

Room: Shaughnessy I

#### Integrated Value Engineering – Adapted Approach to Assess different Concepts of a Jet Engine ..... 263

*Sebastian Maisenbacher (Technische Universität München, Germany)*

*Max Stanglmeier (Technische Universität München, Germany)*

*Florian Behncke (Technische Universität München, Germany)*

#### Achieving a Decision Paradigm for Distributed Warfare Resource Management ..... 269

*Bonnie W. Young (Naval Postgraduate School, USA)*

*John M. Green (Naval Postgraduate School, USA)*

10:00 - 11:00

### 3A4: Systems Engineering Issues I

Room: Dunderave

Session Chair: *Stephanie White (Long Island University, USA)*

#### An Approach for Functional Safety Improvement of an Existing Automotive System ..... 277

*Arash Khabbaz Saberi (Eindhoven University of Technology, The Netherlands)*

*Yaping Luo (Eindhoven University of Technology, The Netherlands)*

*Filip Pawel Cichosz (Eindhoven University of Technology, The Netherlands)*

*Mark van den Brand (Eindhoven University of Technology, The Netherlands)*

*Sven Jansen (TNO Technical Sciences/Automotive, The Netherlands)*

<b>Exergy Analysis of Rocket Systems</b> .....	<b>283</b>
<i>Andrew Gilbert (The University of Alabama in Huntsville, USA)</i>	
<i>Bryan Mesmer (The University of Alabama in Huntsville, USA)</i>	
<i>Michael D. Watson (NASA Marshall Space Flight Center, USA)</i>	
<b>10:00 - 11:00</b>	
<b>3A5: Research in Systems Engineering II</b>	
<b>Room:</b> Shaughnessy II	
<b>Session Chair:</b> <i>Ophir Kendler (AerialX, Canada)</i>	
<b>System risk analysis enhanced with system graph properties</b> .....	<b>289</b>
<i>Floriane Brunetto (Polytechnique Montreal, Canada)</i>	
<i>Julien Peuch (Polytechnique Montreal, Canada)</i>	
<i>Samuel Bassetto (Polytechnique Montreal, Canada)</i>	
<b>CodHoop: A System for Optimizing Big Data Processing</b> .....	<b>295</b>
<i>Zakia Asad (University of Toronto, Canada)</i>	
<i>Mohammad Asad Rehman Chaudhry (University of Toronto, Canada)</i>	
<i>David Malone (National University of Ireland, Ireland)</i>	
<b>11:00 - 12:00</b>	
<b>3B1: Modeling and Simulation III</b>	
<b>Room:</b> Pinnacle I	
<b>Session Chair:</b> <i>Thilo Sauter (Danube University Krems and Vienna University of Technology, Austria)</i>	
<b>TheReSe: SysML Extension for Thermal Modeling</b> .....	<b>301</b>
<i>Romain Barbedienne (IRT SystemX, France)</i>	
<i>Olivia Penas (SUPMECA, France)</i>	
<i>Jean-Yves Choley (SUPMECA, France)</i>	
<i>Laurent Gasser (IRT SystemX, France)</i>	
<b>Efficient thermal modeling for distributed energy management in industrial buildings</b> .....	<b>309</b>
<i>Anetta Nagy (Danube University Krems, Austria)</i>	
<i>Aleksey Bratukhin (Danube University Krems, Austria)</i>	
<i>Thilo Sauter (Danube University Krems, Austria)</i>	
<b>11:00 - 12:00</b>	
<b>3B2: Engineering Systems-of-Systems I</b>	
<b>Room:</b> Dunderave	
<b>Session Chair:</b> <i>Paul Hershey (Raytheon IIS, USA)</i>	
<b>A System of Systems Solution for Perimeter Control: Combining Unmanned Aerial System with Unattended Ground Sensor Network</b> .....	<b>317</b>
<i>Jaanus Kaugerand (Tallinn University of Technology, Estonia)</i>	
<i>Jürjo Preden (Tallinn University of Technology, Estonia)</i>	
<i>Erki Suurjaak (Tallinn University of Technology, Estonia)</i>	
<i>Sergei Astopov (Tallinn University of Technology, Estonia)</i>	
<i>Leo Motus (Tallinn University of Technology, Estonia)</i>	
<i>Raido Pahtmaa (Tallinn University of Technology, Estonia)</i>	
<b>Hard-Real-Time Scheduling on a Multicore Platform</b> .....	<b>324</b>
<i>Guillaume Vigeant (Royal Military College of Canada, Canada)</i>	
<i>Alain Beaulieu (Royal Military College of Canada, Canada)</i>	
<i>Sidney Givigi (Royal Military College of Canada, Canada)</i>	



11:00 - 12:00

**3B3: Decision Making Systems III**

Room: Pinnacle II

**Satisficing<sup>2</sup> (Squared) in System of Systems Engineering Design ..... 332**

*John Salmon (Brigham Young University, USA)*

**Battery Systems Management using a Goal-Seeking Framework ..... 335**

*Mukesh K. Chippa (The University of Akron, USA)*

*Shivakumar Sastry (The University of Akron, USA)*

11:00 - 12:00

**3B4: Technologies and Systems for Automated Border Control Gates**

Room: Shaughnessy II

Session Chair: *Stephanie White (Long Island University, USA)*

**Face-based recognition systems in the ABC e-Gates ..... 340**

*José Sánchez del Río Sáez (Rey Juan Carlos University, Spain)*

*Cristina Conde (Rey Juan Carlos University, Spain)*

*Aristeidis Tsitiridis (Rey Juan Carlos University, Spain)*

*Jorge Raúl Gómez (Rey Juan Carlos University, Spain)*

*Isaac Martin de Diego (Rey Juan Carlos University, Spain)*

*Enrique Cabello (Rey Juan Carlos University, Spain)*

**Document aging effects and automated security document authentication ..... 347**

*Svorad Štolc (AIT Austrian Institute of Technology GmbH, Austria)*

*Franz Daubner (AIT Austrian Institute of Technology GmbH, Austria)*

*Reinhold Huber-Mörk (AIT Austrian Institute of Technology GmbH, Austria)*

11:00 - 12:00

**3B5: Research in Systems Engineering III**

Room: Shaughnessy I

Session Chair: *Ophir Kandler (AerialX, Canada)*

**Using Expert Judgment to Establish Requirement Attributes for**

**Systems of Systems and Complex Systems ..... not available at time of production**

*Richard Stuckey (ManTech, USA)*

**Knowledge Based Development Practices in Systems Engineering Companies:**

**A Comparative Study ..... 353**

*Geir Ringen (Sintef Raufoss Manufacturing, Norway)*

*Torgeir Welo (Norwegian University of Science and technology, Norway)*

13:30 - 15:15

**3C1: Energy Management and Sustainability**

Room: Pinnacle II

Session Chair: *Constantin D. Pitis (BC Hydro, Canada)*

**Novel Method of Benchmarking Energetic Efficiency of Industrial Systems ..... 359**

*Constantin D. Pitis (BC Hydro, Canada)*

*Zaid A. Al-Chalabi (ASA Energy Consulting Ltd, Canada)*

**Multivariate Data Analysis in Hydroelectric System Maintenance:**

**A Decision Evaluation Case Study ..... 365**

*Reginald Wilson (Redawil Engineering Company, USA)*

<b>Case Study Of Energy Behavior: Systems Thinking Approach .....</b>	<b>373</b>
<i>Nasrin Khansari (Stevens Institute of Technology, USA)</i>	
<i>Hamid R. Darabi (Stevens Institution of Technology, USA)</i>	
<i>Mo Mansouri (Stevens Institute of Technology, USA)</i>	
<i>Ali Mostashari (Stevens Institute of Technology, USA)</i>	
<b>Energy Efficient Data Center Management Under Availability Constraints .....</b>	<b>377</b>
<i>Dinkar Sitaram (PES University, India)</i>	
<i>H.L. Phalachandra (PES University, India)</i>	
<i>Gautham S (PES University, India)</i>	
<i>Swathi HV (PES University, India)</i>	
<i>Sagar TP (PES University, India)</i>	
<b>13:30 - 15:15</b>	
<b>3C2: System Architecture I</b>	
<b>Room:</b> Pinnacle I	
<b>Session Chair:</b> <i>Maik Holle (Technische Universität München, Germany)</i>	
<b>A Methodology and Heuristics for Re-Architecting a Legacy System.....</b>	<b>382</b>
<i>Richard Wise (Georgia Tech Research Institute, USA)</i>	
<i>Lindsey Sheppard (Georgia Tech Research Institute, USA)</i>	
<i>John Huggins (Georgia Tech Research Institute, USA)</i>	
<i>Douglas Broadwell (nou Systems, Inc., USA)</i>	
<b>Minimizing Pleiotropic Effects in Modular and Hierarchical System Architectures.....</b>	<b>390</b>
<i>Sana Ullah Qaisar (University of New South Wales, Australia)</i>	
<i>Michael Ryan (University of New South Wales, Australia)</i>	
<b>Design for Open Innovation - Individualization-Oriented Product Architecture Planning .....</b>	<b>397</b>
<i>Maik Holle (Technische Universität München, Germany)</i>	
<i>Sebastian Maisenbacher (Technische Universität München, Germany)</i>	
<i>Udo Lindemann (Technische Universitaet Muenchen, Germany)</i>	
<b>13:30 - 15:15</b>	
<b>3C3: Systems Engineering Theory</b>	
<b>Room:</b> Shaughnessy II	
<b>Session Chair:</b> <i>Alberto Sols (Norwegian Institute of Systems Engineering, Spain)</i>	
<b>Validation of the Robustness of the Selection of the Preferred Design Concept through a Comprehensive Sensitivity Analysis .....</b>	<b>403</b>
<i>Alberto Sols (Norwegian Institute of Systems Engineering, Spain)</i>	
<b>DSM-based Complex Aerospace Projects Development Process Design and Optimization.....</b>	<b>409</b>
<i>Weitao Xiong (National University of Defense Technology, P.R. China)</i>	
<i>Can Liu (National University of Defense Technology, P.R. China)</i>	
<i>Qingsong Zhao (National University of Defense Technology, P.R. China)</i>	
<i>Kewei Yang (National University of Defense Technology, P.R. China)</i>	
<b>Towards Life Cycle Management of Industrial Manufacturing Systems: A Systems Perspective .....</b>	<b>B#5</b>
<i>Afifa Rahatulain (SenseAir AB, Sweden)</i>	
<i>Harold Lawson (Lawson Konsult AB, Sweden)</i>	
<b>Systems Theory, Systems Thinking .....</b>	<b>420</b>
<i>Stephanie M. White (Long Island University, USA)</i>	

13:30 - 15:15

**3C4: Autonomous Systems I**

Room: Shaughnessy I

Session Chair: *Cairo L. Nascimento, Jr. (Instituto Tecnológico de Aeronáutica, Brazil)*

**A Design Approach for Incorporating Task Coordination for Human-Robot-Coexistence within Assembly Systems .....426**

*Y. Shen (Technical University Munich, Germany)*

*G. Reinhart (Technical University Munich, Germany)*

*M.M. Tseng (Hong Kong University of Science and Technology, Hong Kong)*

**Real Time Tactic Switching for Multiple Cooperative UAVs via Model Predictive Control .....432**

*A. T. Hafez (Queens University, Canada)*

*S. N. Givigi (Royal Military College of Canada, Canada)*

*Howard M. Schwartz (Carleton University, Canada)*

*S. Yousefi (Queens University, Canada)*

*M. Iskandarani (Royal Military College of Canada, Canada)*

**Gait Synthesis of a Hybrid Legged Robot Using Reinforcement Learning .....439**

*Jeeves Lopes dos Santos (Instituto Tecnológico de Aeronáutica, Brazil)*

*Cairo Lúcio Nascimento Júnior (Instituto Tecnológico de Aeronáutica, Brazil)*

**Preliminary Experiments with Learning Agents in an Interactive Multi-agent Systems Architecture Tradespace Exploration Tool.....445**

*Daniel Selva (Cornell University, USA)*

*Clara Abello (Cornell University, USA)*

*Nozomi Hitomi (Cornell University, USA)*

13:30 - 15:15

**3C5: Sensors Integration and Applications I**

Room: Pinnacle I & II

Session Chair: *Thilo Sauter (Danube University Krems and Vienna University of Technology, Austria)*

**SigSeeker: A Mobile Application for Finding Strong Wireless Signals with Visualizations and Crowd-sensing ..... B#5**

*Carl Tucker (New Mexico Tech, USA)*

*Rachel Tucker (New Mexico Tech, USA)*

*Jun Zheng (New Mexico Tech, USA)*

**Towards Distributed Enthalpy Measurement in Large-Scale Air Conditioning Systems .....460**

*Thilo Sauter (Danube University Krems, Austria)*

*Harald Steiner (Danube University Krems, Austria)*

*Thomas Glatzl (Danube University Krems, Austria)*

*Wilfried Hortschitz (Danube University Krems, Austria)*

*Florian Wenig (University of Applied Sciences Burgenland, Austria)*

*Christian Heschl (University of Applied Sciences Burgenland, Austria)*

**Design and Development of an Automated Stacker for Highway Products of Nucor Steel Corporation .....466**

*L. Edwards (Michigan Technological University, USA)*

*S. Hayes (Michigan Technological University, USA)*

*S. Penny (Michigan Technological University, USA)*

*S. B. Lakshmikanth (Michigan Technological University, USA)*

*A. Sergeev (Michigan Technological University, USA)*

*S. M. Azizi (Michigan Technological University, USA)*

**Precision Timing on Low-Cost Linux Microcomputers** .....469  
*Gerald P. Duggan (Colorado State University, USA)*  
*Peter Young (Colorado State University, USA)*

**13:30 - 15:15**

**3C6: Cloud Computing**

**Room:** Dundarave

**Session Chair:** *Jianwen Chen (IBM Global Service, Australia)*

**System Integrations with OpenStack Architecture Based Clouds**.....B#5

*Jianwen Chen (IBM Global Service, Australia)*  
*George Africa (IBM Global Service, Australia)*  
*Chandra Aiyer (IBM Global Service, Australia)*  
*Rhonda Childress (IBM Global Service, Australia)*  
*Ron Gottschalk (IBM Global Service, Australia)*

**A Novel Image Encryption Method to Reduce Decryption Execution Time in Cloud** .....478

*Paul Rad (Rackspace the Managed Cloud Company, USA)*  
*Mohan Muppidi (the University of Texas at San Antonio, USA)*  
*Aldo S. Jaimes (the University of Texas at San Antonio, USA)*  
*Sos S. Agaian (the University of Texas at San Antonio, USA)*  
*Mo Jamshidi (the University of Texas at San Antonio, USA)*

**Towards a Holistic Multi-Cloud Brokerage System: Taxonomy, Survey and Future Directions** .....B#5

*B. Aldawsari (Liverpool John Moores University, United Kingdom)*  
*T. Baker (Liverpool John Moores University, United Kingdom)*  
*D. England (Liverpool John Moores University, United Kingdom)*

**15:30 - 17:45**

**3D1: Modeling and Simulation IV**

**Room:** Shaughnessy I

**Session Chair:** *Daniel Kasperek (Technische Universität München, Germany)*

**Resource Allocation in Cloud Computing Based on Clustering Method** .....B#5

*Zhou HaoHao (National University of Defense Technology, P.R. China)*  
*Su Deng (National University of Defense Technology, P.R. China)*  
*Huang HongBin (National University of Defense Technology, P.R. China)*  
*YaHui Wu (National University of Defense Technology, P.R. China)*

**An integrated framework for cooperative ground and aerial vehicle missions utilizing Matlab and X-Plane** .....495

*Adriano Bittar (University of Denver, USA)*  
*Nikolaos I. Vitzilaios (University of Denver, USA)*  
*Matthew J. Rutherford (University of Denver, USA)*  
*Kimion P. Valavanis (University of Denver, USA)*

**Structure-based System Dynamics Analysis of Engineering Design Processes**.....501

*Daniel Kasperek (Technische Universität München, Germany)*  
*Christian Lichtenberg (Technische Universität München, Germany)*  
*Sebastian Maisenbacher (Technische Universität München, Germany)*  
*Christoph Hollauer (Technische Universität München, Germany)*  
*Mayada Omer (Technische Universität München, Germany)*  
*Maik Maurer (Technische Universität München, Germany)*

15:30 - 17:45

**3D2: Engineering Systems-of-Systems II**

**Room:** Pinnacle II

**Session Chair:** *Dominique Ernadote (Airbus Defence and Space, France)*

**Systematic interdisciplinary reuse within the engineering of automated plants ..... 508**

*Sebastian Schröck (Helmut-Schmidt-University, Germany)*

*Alexander Fay (Helmut-Schmidt-University, Germany)*

*Tobias Jäger (Siemens AG, Germany)*

**Mastering SoS complexity through a methodical tailoring of modeling: benefits and new issues ..... 516**

*Freddy Kamdem Simo (Université de Technologie de Compiègne, France)*

*Dominique Lenne (Université de Technologie de Compiègne, France)*

*Dominique Ernadote (Airbus Defence and Space, France)*

**The Recursively Generative Nature of Complex Agri-Eco-Socio-Technical Systems -  
A Transdisciplinary Approach to Developing a Low Carbon Footprint Farming System ..... 521**

*Henk Roodt (Waikato Institute of Technology, New Zealand)*

**Recommended Practice: Systems of Systems Considerations in the Development of Systems ..... 527**

*Judith Dahmann (The MITRE Corporation, USA)*

*Kristen J. Baldwin (Office of the Deputy Assistant Secretary of Defense for Systems, USA)*

*Åse Jakobsson (Defence Systems Integration, Australia)*

*Denis JSRD Bertrand (Office of the Assistant Deputy Minister (Material) for System Engineering Policy, Canada)*

**Description Models for Technology System of Systems ..... B#5**

*Hanlin You (National University of Defense Technology, P.R. China)*

*Mengjun Li (National University of Defense Technology, P.R. China)*

*Kewei Yang (National University of Defense Technology, P.R. China)*

*Jiang Jiang (National University of Defense Technology, P.R. China)*

*Bingfeng Ge (National University of Defense Technology, P.R. China)*

*Jili Luo (National University of Defense Technology, P.R. China)*

15:30 - 17:45

**3D3: Special Session: Theoretical Foundations on Systems Engineering**

**Room:** Pinnacle I

**Session Chairs:** *Omar Hammami (ENSTA PARISTECH, France) and  
William Edmonson (North Carolina A&T State University, USA)*

**Systems Engineering Theory: What Needs to Be Done ..... 536**

*Paul D Collopy (University of Alabama in Huntsville, USA)*

**Pareto Optimality and Nash Equilibrium for Building Stable Systems..... 542**

*Abdelkrim Doufene (Massachusetts Institute of Technology, USA)*

*Daniel Kroh (Ecole Polytechnique, France)*

**Architecture Frameworks, Multiobjective Optimization and Multiphysics Simulation:  
Challenges and Opportunities ..... 546**

*Omar Hammami (ENSTA PARISTECH, France)*

**OPM & Color Petri Nets based Executable System of Systems Architecting:  
A Building block in FILA-SoS ..... 554**

*Renzhong Wang (Expedia, Inc., USA)*

*Siddhartha Agarwal (Missouri University of S&T, USA)*

*Cihan H. Dagli (Missouri University of S&T, USA)*

**Formal Modeling and Verification of Integrated Photonic Systems ..... 562**  
*Umair Siddique (Concordia University, Canada)*  
*Osman Hasan (National University of Sciences and Technology, Pakistan)*  
*Sofiène Tahar (Concordia University, Canada)*

**Model-Driven Multi-Level Safety Analysis of Critical Systems ..... 570**  
*Nataliya Yakymets (CEA LIST, France)*  
*Matthieu Perin (CEA LIST, France)*  
*Agnes Lanusse (CEA LIST, France)*

**15:30 - 17:45**

**3D4: Autonomous Systems II**

**Room:** Shaughnessy II

**Session Chair:** *Sara Dersten (Volvo Construction Equipment, Sweden)*

**Stable Path Planning Algorithm for Avoidance of Dynamic Obstacles ..... 578**  
*Won-Seok Kang (DGIST, Korea)*  
*Sanghun Yun (DGIST, Korea)*  
*Hyung-Oh Kwon (DGIST, Korea)*  
*Rock-hyun Choi (DGIST, Korea)*  
*Chang-Sik Son (DGIST, Korea)*  
*Dong-Ha Lee (DGIST, Korea)*

**An Analysis of a Layered System Architecture for Autonomous Construction Vehicles ..... 582**  
*Sara Dersten (Volvo Construction Equipment, Sweden)*  
*Jakob Axelsson (Mälardalen University, Sweden)*  
*Joakim Fröberg (Mälardalen University, Sweden)*

**Autonomous Controller Design for an Orbital Debris Chaser Craft ..... 589**  
*J. Labrado (The University of Texas at San Antonio, USA)*  
*P. Benavidez (The University of Texas at San Antonio, USA)*  
*Mo Jamshidi (The University of Texas at San Antonio, USA)*

**An Autonomic Approach to Extend the Business Value of a Legacy Order Fulfillment System ..... 595**  
*James J. Mulcahy (Florida Atlantic University, USA)*  
*Shihong Huang (Florida Atlantic University, USA)*

**15:30 - 17:45**

**3D5: Defense Systems**

**Room:** Pinnacle I & II

**Session Chair:** *Marko Suojanen (Finnish Defence Research Agency, Finland)*

**An Example of Scenario-based Evaluation of Military Capability Areas -  
An impact assessment of alternative systems on operations ..... 601**  
*Marko Suojanen (Finnish Defence Research Agency, Finland)*  
*Vesa Kuikka (Finnish Defence Research Agency, Finland)*  
*Juha-Pekka Nikkarila (Finnish Defence Research Agency, Finland)*  
*Jari Nurmi (Tampere University of Technology, Finland)*

**System Security Engineering Vulnerability Assessments for Mission-Critical Systems and Functions ..... 608**  
*JeanPaul LeSaint (Engility Corporation, USA)*  
*Paul Popick (Johns Hopkins University APL, USA)*  
*Melinda Reed (United States Department of Defense, USA)*

<b>A Novel Differential Evolution Algorithm for Threat-Oriented Weapon System Planning.....</b>	<b>614</b>
<i>Can Liu (National University of Defense Technology, P.R. China)</i>	
<i>Bingfeng Ge (National University of Defense Technology, P.R. China)</i>	
<i>Kewei Yang (National University of Defense Technology, P.R. China)</i>	
<i>Jiang Jiang (NUDT, P.R. China)</i>	
<i>Mengjun Li (NUDT, P.R. China)</i>	
<b>Data Fusion for Regionally Aligned Forces.....</b>	<b>620</b>
<i>David Beskow (United States Military Academy, USA)</i>	
<i>Caitlin Rowe (United States Military Academy, USA)</i>	
<i>Jed Lee (United States Military Academy, USA)</i>	
<i>Maxat Nugmanov (United States Military Academy, USA)</i>	
<i>Ruben Vargas (United States Military Academy, USA)</i>	
<b>15:30 - 17:45</b>	
<b>3D6: Systems Engineering Issues II</b>	
<b>Room:</b> Dundarave	
<b>Session Chair:</b> <i>Nelson King (Khalifa University, UAE)</i>	
<b>Predicting Citizens' Acceptance of M-Government Services in Saudi Arabia: An Empirical Investigation .....</b>	<b>627</b>
<i>Thamer F. Alrowili (Al Elm Information Security Company, Saudi Arabia)</i>	
<i>Mutlaq B. Alotaibi (Al Imam Mohammad Ibn Saud Islamic University (IMSIU), Saudi Arabia)</i>	
<i>Mohammed S. Alharbi (Al Elm Information Security Company, Saudi Arabia)</i>	
<b>IT Control Over Social Media Technology: A Systems View of Social Media Management.....</b>	<b>634</b>
<i>Nelson King (Khalifa University, UAE)</i>	
<i>Leila Khauli (American University of Beirut, Lebanon)</i>	
<b>Using Context Overlays to Analyse the Role of a priori Information with Process Mining.....</b>	<b>639</b>
<i>Paolo Pileggi (Technical University of Technology, Finland)</i>	
<i>Alejandro Rivero-Rodriguez (Tampere University of Technology, Finland)</i>	
<i>Ossi Nykänen (Tampere University of Technology, Finland)</i>	
<b>Shift Planning and Scheduling For IT Service Operations Management .....</b>	<b>645</b>
<i>Veerendra K Rai (Tata Consultancy Services, India)</i>	
<i>Praveen Chandak (Tata Consultancy Services, India)</i>	

## Thursday, April 16

08:00 - 09:45

### 4A1: Modeling and Simulation V

Room: Pinnacle I

#### Automatic Generation of Fuzzy Classification Rules Using Granulation-Based Adaptive Clustering .....653

*Mohammed Al-Shammaa (Brunel University, United Kingdom)*

*Maysam F. Abbod (Brunel University, United Kingdom)*

#### System Architecture Optimization With Runtime Reconfiguration of Simulation Models .....660

*Alexander Wichmann (Technische Universität Ilmenau, Germany)*

*Sven Jäger (Technische Universität Ilmenau, Germany)*

*Tino Jungebloud (Technische Universität Ilmenau, Germany)*

*Ralph Maschotta (Technische Universität Ilmenau, Germany)*

*Armin Zimmermann (Technische Universität Ilmenau, Germany)*

#### SynTiSe: A Modified Multi-Regime MCMC approach for Generation of Wind Power Synthetic Time Series.....668

*Evangelos A. Denaxas (North Carolina State University, USA)*

*Rubeka Bandyopadhyay (Duke University, USA)*

*Dalia Patiño-Echeverri (Duke University, USA)*

*Nikos Pitsianis (Duke University, USA)*

08:00 - 09:45

### 4A2: Network Issues

Room: Pinnacle II

Session Chair: *Youry Khmelevsky (Okanagan College, Canada)*

#### Game Network Traffic Simulation by a Custom Bot .....675

*Trevor Alstad (Okanagan College, Canada)*

*J. Riley Dunkin (Okanagan College, Canada)*

*Simon Detlor (Okanagan College, Canada)*

*Brad French (Okanagan College, Canada)*

*Heath Caswell (Okanagan College, Canada)*

*Zane Ouimet (Okanagan College, Canada)*

*Youry Khmelevsky (Okanagan College, Canada)*

*Gaétan Hains (University of Paris Est Creteil (UPEC), France)*

#### An Data-Forwarding Based Channel Condition Acknowledgment for Cognitive Radio Mobility Based Routing .....681

*Yan Sun (Queen Mary University of London, United Kingdom)*

*Roujia Sun (Queen University of London, United Kingdom)*

*Fenyu Jiang (Queen Mary University of London, United Kingdom)*

*Chris Phillips (Queen Mary University of London, United Kingdom)*

08:00 - 09:45

### 4A3: Space and Communication Systems I

Room: Shaughnessy I

Session Chair: *Lee Vishloff (Vishloff & Associates, Canada)*

#### TCP/ECN-capable Congestion Management Mechanism for Internet .....B#5

*Mohammed M. Kadhum (Queen's University & Universiti Sains Malaysia, Canada)*



<b>A Low-Complexity Residual CFO Estimation Scheme for OFDM Systems</b> .....	<b>694</b>
<i>Hen-Geul Yeh (California State University Long Beach, USA)</i>	
<i>Eric Lap-Shing Chan (California State University, Long Beach, USA)</i>	
<b>BER Performance Comparisons of Pulse Design Methods on TR-MAS UWB Systems</b> .....	<b>700</b>
<i>Hen-Geul Yeh (California State University Long Beach, USA)</i>	
<i>Tilson Yao-Yang Chung (California State University Long Beach, USA)</i>	
<b>Systems Engineering of Inter-Satellite Communications for Distributed Systems of Small Satellites</b> .....	<b>705</b>
<i>W. Edmonson (NC A &amp; T State University, USA)</i>	
<i>S. Gebreyohannes (NC A &amp; T State University, USA)</i>	
<i>A. Dillion (NC A &amp; T State University, USA)</i>	
<i>R. Radhakrishnan (NC A &amp; T State University, USA)</i>	
<i>J. Chenou (NC A &amp; T State University, USA)</i>	
<i>A. Esterline (NC A &amp; T State University, USA)</i>	
<i>F. Afghah (NC A &amp; T State University, USA)</i>	
<b>Hadamard SCFDMA—A Modified Uplink Transmission Scheme with Low PAPR and SER</b> .....	<b>711</b>
<i>Hen-Geul Yeh (California State University Long Beach, USA)</i>	
<i>Hannan Mutahir Abdul (California State University Long Beach, USA)</i>	
<b>08:00 - 09:45</b>	
<b>4A4: Transportation Systems</b>	
<b>Room:</b> Shaughnessy II	
<b>Session Chair:</b> <i>Andreas Trenkle (Karlsruhe Institute of Technology, Germany)</i>	
<b>A Systems Analysis Framework to Optimize the Utilization of Electric Vehicles at Military Facilities</b> .....	<b>716</b>
<i>Michael Jerue (Florida Institute of Technology, USA)</i>	
<i>Luis Daniel Otero (Florida Institute of Technology, USA)</i>	
<i>Aldo Fabregas (Florida Institute of Technology, USA)</i>	
<b>Interpretation of Pointing Gestures for the Gesture Controlled Transportation Robot "FiFi"</b> .....	<b>721</b>
<i>Andreas Trenkle (Karlsruhe Institute of Technology, Germany)</i>	
<i>Michel Göhl (Karlsruhe Institute of Technology, Germany)</i>	
<i>Kai Furmans (Karlsruhe Institute of Technology, Germany)</i>	
<b>Data-Driven Aircraft Estimated Time of Arrival Prediction</b> .....	<b>727</b>
<i>Christian Strottmann Kern (Embraer S.A., Brazil)</i>	
<i>Ivo Paixão de Medeiros (Embraer S.A., Brazil)</i>	
<i>Takashi Yoneyama (ITA - Instituto Tecnológico de Aeronáutica, Brazil)</i>	
<b>Systems Feasibility Study for Implementing Electric Vehicles into Urban Environments</b> .....	<b>734</b>
<i>Carlton Reininger (Brigham Young University, USA)</i>	
<i>John Salmon (Brigham Young University, USA)</i>	
<b>08:00 - 09:45</b>	
<b>4A5: Sensors Integration and Applications II</b>	
<b>Room:</b> Pinnacle I	
<b>Session Chair:</b> <i>Agnelo R Silva (University of Southern California, USA)</i>	
<b>Mobile Hosting and Sensor Eco-System for Radiation Detection</b> .....	<b>740</b>
<i>Richard K. Lomotey (University of Saskatchewan, Canada)</i>	
<i>Ralph Deters (University of Saskatchewan, Canada)</i>	
<i>Kai Kaletsch (Environment Instruments Canada Inc., Canada)</i>	

<b>System for Local/Regional/Global Jointed Object Recognition .....</b>	<b>747</b>
<i>Paul Hershey (Raytheon IIS, USA)</i>	
<i>Mike Sica (Raytheon IIS, USA)</i>	
<i>Jason Dudash (Raytheon IIS, USA)</i>	
<i>Betsy Umberger (Raytheon IIS, USA)</i>	
<b>Adaptive Touch Sampling for Energy-Efficient Mobile Platforms.....</b>	<b>754</b>
<i>Alexander W. Min (Intel Corporation, USA)</i>	
<i>Kyungtae Han (Intel Corporation, USA)</i>	
<i>Dongho Hong (Intel Corporation, USA)</i>	
<i>Yong-joon Park (Intel Corporation, USA)</i>	
<b>Strategic Frequency Adaptation for Mid-Range Magnetic Induction-Based Wireless Underground Sensor Networks .....</b>	<b>758</b>
<i>Agnelo R. Silva (University of Southern California, USA)</i>	
<i>Mahta Moghaddam (University of Southern California, USA)</i>	
<b>10:00 - 11:45</b>	
<b>4B1: Robotic Systems</b>	
<b>Room:</b> Pinnacle I	
<b>Session Chair:</b> <i>Romulo Lins (Faculdade SENAI Mariano Ferraz, Brazil)</i>	
<b>Development and Implementation of a Natural Interface to Control an Industrial Hydraulic Robot Arm .....</b>	<b>766</b>
<i>Romulo Gonçalves Lins (Faculty of Technology SENAI Mariano Ferraz, Brazil)</i>	
<i>Eduardo Wisniewski Moarcondes Gomes (Faculty of Technology SENAI Mariano Ferraz, Brazil)</i>	
<i>Marcio Corazzim (Faculty of Technology SENAI Mariano Ferraz, Brazil)</i>	
<i>Alain Beaulieu (Royal Military College of Canada, Canada)</i>	
<b>Cloud-Based Realtime Robotic Visual SLAM .....</b>	<b>773</b>
<i>Patrick Benavidez (University of Texas at San Antonio, USA)</i>	
<i>Mohan Muppidi (University of Texas at San Antonio, USA)</i>	
<i>Paul Rad (University of Texas at San Antonio, USA)</i>	
<i>John J. Prevost (University of Texas at San Antonio, USA)</i>	
<i>Mo Jamshidi (University of Texas at San Antonio, USA)</i>	
<b>10:00 - 11:45</b>	
<b>4B2: Complex Systems Issues IV</b>	
<b>Room:</b> Shaughnessy I	
<b>Session Chair:</b> <i>Agnelo R Silva (University of Southern California, USA)</i>	
<b>Use of Systemigrams to Identify Emergence in Complex Adaptive Systems .....</b>	<b>778</b>
<i>Tom McDermott (Georgia Tech Research Institute, USA)</i>	
<i>Molly Nadolski (Georgia Tech Research Institute, USA)</i>	
<i>Lindsey Sheppard (Georgia Tech Research Institute, USA)</i>	
<b>Case Study on the Reliability of Unattended Outdoor Wireless Sensor Systems .....</b>	<b>785</b>
<i>Agnelo R. Silva (University of Southern California, USA)</i>	
<i>Mahta Moghaddam (University of Southern California, USA)</i>	
<i>Mingyan Liu (University of Michigan, USA)</i>	
<b>Social Media in Emergency Management - Advances, Challenges and Future Directions .....</b>	<b>792</b>
<i>Sergio Luna (Stevens Institute of Technology, USA)</i>	
<i>Michael Pennock (Stevens Institute of Technology, USA)</i>	

**Public Facing Government Services: A Business Ecosystem Perspective**..... 798  
*Steve Scott (The MITRE Corporation, USA)*  
*Ken Hoffman (The MITRE Corporation, USA)*  
*Karen See (The MITRE Corporation, USA)*

**10:00 - 11:45**

**4B3: Space and Communication Systems II**

**Room:** Pinnacle I & II

**Session Chair:** *Paul Hershey (Raytheon IIS, USA)*

**General Purpose Modeling and Domain Specific Simulation:**

**A Framework for Space Mechanisms Design**..... 802

*Manolo Omicciolo (OHB System AG, Germany)*

*Markus Thiel (OHB System AG, Germany)*

*Klaus-Peter Förster (OHB System AG, Germany)*

*Kristin Paetzold (Universität der Bundeswehr München, Germany)*

*Roger Förstner (Universität der Bundeswehr München, Germany)*

**Performance and DSP Implementation of Soft Bit-Level Demapper for M-QAM-OFDM Systems** ..... 810

*Hen-Geul Yeh (California State University Long Beach, USA)*

*Wai-Yee Fung (Vektrex, USA)*

**A Space-Frequency Parallel ICI Cancellation Technique for OFDM Systems** ..... 816

*Hen-Geul Yeh (IEEE, USA)*

**10:00 - 11:45**

**4B4: System Architecture II**

**Room:** Pinnacle II

**Session Chair:** *Stephanie White (Long Island University, USA)*

**Towards Ubiquitous Mobile-Computing-Based Artificial Leg Control** ..... 821

*Robert Hernandez (IEEE, USA)*

*Jason Kane (IEEE, USA)*

*Fan Zhang (IEEE, USA)*

*Xiaorong Zhang (IEEE, USA)*

*He Huang (IEEE, USA)*

**A Taxonomy for Enterprise Architecture Framework**..... 828

*Bob Stroud (Raytheon Company, USA)*

*Atila Ertas (Texas Tech University, USA)*

**Continuous Process Auditing (CPA): an Audit Rule Ontology based approach to Audit-as-a-Service** ..... 832

*Numanul Subhani (University of Windsor, Canada)*

*Robert D. Kent (University of Windsor, Canada)*

**10:00 - 11:45**

**4B5: System Modeling and Integration**

**Room:** Shaughnessy II

**Session Chair:** *Yaniv Mordecai (Technion - Israel Institute of Technology, Israel)*

**Agile Modeling of an Evolving Ballistic Missile Defense System with Object-Process Methodology** ..... 839

*Yaniv Mordecai (Technion - Israel Institute of Technology, Israel)*

*Dov Dori (Technion - Israel Institute of Technology, Israel)*

<b>System integration in modularization and standardization programs .....</b>	<b>847</b>
<i>Michael Gepp (Siemens AG, Germany)</i>	
<i>Matthias Foehr (Siemens AG, Germany)</i>	
<i>Jan Vollmar (Siemens AG, Germany)</i>	
<i>Andreas Schertl (Siemens AG, Germany)</i>	
<i>Thomas Schaeffler (Siemens AG, Germany)</i>	
 <b>PSP-Auto: A DHT-based Data Storage and Retrieval System for Automation .....</b>	 <b>853</b>
<i>Jan Skodzik (University of Rostock, Germany)</i>	
<i>Peter Danielis (University of Rostock, Germany)</i>	
<i>Vlado Altmann (University of Rostock, Germany)</i>	
<i>Eike Bjoern Schweissguth (University of Rostock, Germany)</i>	
<i>Dirk Timmermann (University of Rostock, Germany)</i>	
 <b>AUTHOR INDEX .....</b>	 <b>859</b>