

2015 10th System of Systems Engineering Conference

(SoSE 2015)

**San Antonio, Texas, USA
17 – 20 May 2015**



**IEEE Catalog Number: CFP15SOS-POD
ISBN: 978-1-4799-7612-6**

Table of Content

Random Sampling in Collaborative and Distributed Mobile Sensor Networks utilizing Compressive Sensing for Scalar Field Mapping <i>Minh T Nguyen; Keith A Teague</i>	1–6
A Theory of Complexity Escalation and Collapse for System of Systems <i>Joseph Bradley; Mahmoud Efatmaneshnik; Mohammad Rajabalinejad</i>	7–11
Defending Mechanisms for Protecting Power Systems against Intelligent Attacks <i>Longfei Wei; Amir Moghadasi; Aditya Sundararajan; Arif Sarwat</i>	12–17
A Systematic Mapping of the Research Literature on System-of-Systems Engineering <i>Jakob Axelsson</i>	18–23
A Model Based Safety Architecture Framework for Dutch High Speed Train Lines <i>Katja Schuitemaker; Jasper Gerard Braakhuis; Mohammad Rajabalinejad</i>	24–29
Systems Engineering in Industry Internship and Academic Projects <i>Kourosh Rahnamai</i>	30–35
Direct versus Stigmergic Information Flow in Systems-of-Systems <i>Hermann Kopetz; Bernhard Frömel; Oliver Höftberger</i>	36–41
Factory Production Line as SoS; a Case Study in Airplane Engine Component Manufacturing <i>Gerrit Muller; June Andersen</i>	42–46
The OpenOrbiter CubeSat as a System-of-Systems (SoS) and How SoS Engineering (SoSE) Aids CubeSat Design <i>Sofiane Chaieb; Michael Wegerson; Jeremy Straub; Ronald Marsh; Benjamin Kading; David Whalen</i>	47–52
A Model of Enterprise Systems Engineering Contributions to Acquisition Success <i>Jill Drury; Gary Klein; Mark Pfaff; Craig Bonaceto</i>	53–58
Electric Mobility and Charging: Systems of Systems and Infrastructure Systems <i>G. Maarten Bonnema; Gerrit Muller; Lisette Schuddeboom</i>	59–64

Using Systems Engineering for Improving Autonomous Robot Performances	65–70
<i>Stefan Marchlewitz; Jan-Peter Nicklas; Petra Winzer</i>	
Simulation method for multi-machine and multi-task production scheduling in steelmaking-continuous casting process	71–76
<i>Jianyu Long; Zhong Zheng; Xiaoqiang Gao; Kai Chen</i>	
Towards Security Software Engineering the Smart Grid as a System of Systems	77–82
<i>Vanea Chiprianov; Laurent Gallon; Khouloud Salameh; Manuel Munier; Jamal El Hachem</i>	
Basic Study on Evaluation of Navigator’s Mental Workload by Sticking Plaster-type Sensor	83–87
<i>Koji Murai; Yuji Hayashi; Kazusuke Maenaka; Kohei Higuchi</i>	
Uncertainty, elicitation of experts’ opinion, and human failures: Challenges for RAM analysis of ERTMS SoS	88–93
<i>Mohamed Sallak; Walter Schon; Sebastien Destercke; Christophe Simon; Frederic Vanderhaegen; Denis Berdjag</i>	
Improved Hybrid Variable and Fixed Step Size Least Mean Square Adaptive Filter Algorithm with Application to Time Varying System Identification	94–98
<i>Farqad Yasin Farhan; Siddeeq Ameen</i>	
Conceptual Design for Fully Autonomous Aerial and Ground System for Precision Agriculture	99–104
<i>Matthew Joordens; Tom Brodie; Thomas Oberli; Phil Swinsburg</i>	
Tracking Animals to Determine Swarm Behavior	105–110
<i>Benjamin Champion; Matthew Joordens; Blake Allan</i>	
Underwater Swarm Robotics Review	111–116
<i>Benjamin Champion; Matthew Joordens</i>	
A System of Systems Analysis of a Multi-Probe SPM System	117–121
<i>Eyup Cinar; Ferat Sahin</i>	
A Model Based Approach to System of Systems Risk Management	122–127
<i>Andrew Kinder; Michael Henshaw; Carys Siemieniuch</i>	
A Novel System and Technique for Enhancing the Lifetime of an Air Breathing Micro PEM Fuel Cell Based Power Source	128–133
<i>Ramesh P.; Jithesh M.; Varun Devaraj</i>	
Differential Flatness of the Flux-decay Generator Model	146–151
<i>Kevin Wedeward; Lucas Uecker</i>	

A service oriented virtual environment for complex system analysis: Preliminary Report	152–157
<i>Charles E. Dickerson; Stephen Clement; David Webster; David McKee; Jie Xu; David Battersby</i>	
Leveraging Wireless Communication Systems for Aiding Inertial-Based Navigation Systems	158–163
<i>Richard Rivera; Aly El-Osery; Stephen Bruder</i>	
Adaptable Mission Analysis and Decision System	164–169
<i>Paul C. Hershey; Elizabeth Umberger; Roland Chang</i>	
Continuous improvement of technical systems using Design for X	176–181
<i>Christer Elverum; Henrik Vagle Dalsgaard; Torgeir Welo</i>	
Contribution to System of Systems Modeling	182–186
<i>Wissam Khalil; Belkacem Ould Bouamama; Rochdi Merzouki; Blaise Conrard; Ahmad Koubeissi</i>	
Cluster-Based Correlation of Severe Braking Events with Time and Location	187–192
<i>Guoyan Cao; John Michelini; Karolos Grigoriadis; Behrouz Ebrahimi; Matthew Franchek</i>	
Real-Time Neural Inverse Optimal Control for Position Trajectory Tracking of an Induction Motor	193–198
<i>Maria Elena Antonio - Toledo; Edgar N. Sanchez; Alexander Loukianov</i>	
UAF for System of Systems Modeling	199–204
<i>Matthew C Hause; Fatma Dandashi</i>	
Swarm Intelligence for the Control of a Group of Robots	205–207
<i>Sreerenjini Nair; Michael Frye; Erik Coronado; Yong Qin</i>	
On the Study of Human Reliability in Transportation Systems of Systems	208–213
<i>Subeer Rangra; Mohamed Sallak; Walter Schon; Frederic Vanderhaegen</i>	
Towards an Understanding of Emergence in Systems-of-Systems	214–219
<i>Hermann Kopetz; Oliver Höftberger; Bernhard Frömel; Francesco Brancati; Andrea Bon-davalli</i>	
Real-Time Direct Field-Oriented and Second Order Sliding Mode Controllers of Induction Motor for Electric Vehicles Applications	220–225
<i>Eduardo Quintero; Edgar N. Sanchez; Ramón Antonio Félix</i>	
Complex System Governance: Theory to Practice Challenges for System of Systems Engineering	226–231
<i>Charles Keating</i>	

Intelligent Adaptive Cruise Control System Design and Implementation <i>Islam Kilic; Ahmet Yazici; Omur Yıldız; Mustafa Ozcelikors; Atakan Ondogan</i>	232-237
Systems Modeling and Intelligent Control of Meat Drying Process <i>Hong Ma; Simon Yang; Wei Zhang</i>	238-243
SmartPowerchair: A Pervasive System of Systems <i>Paul Whittington; Huseyin Dogan</i>	244-249
Real-time FPGA Decentralized Inverse Optimal Neural Control for a Shrimp Robot <i>Gener Quintal; Edgar N. Sanchez; Alma Y. Alanis</i>	250-255
Distributed Leader-Follower Formation Control for Multiple Quadrotors with Weighted Topology <i>Zhicheng Hou; Isabelle Fantoni</i>	256-261
Multi-agent System of Systems to Monitor Wildfires <i>Mauricio Gomez; Yongho Kim; Maria Tolstykh; Michael Munizzi; Eric Matson</i>	262-267
SLAM based Shape Adaptive Coverage Control using Autonomous Vehicles <i>Junnan Song; Shalabh Gupta</i>	268-273
A Study on Analysis of Characteristics of Ships Navigators' Look-out by Using OZT <i>Jun Kayano</i>	274-279
Bond Graph Modeling of a Class of System of Systems <i>Pushpendra Kumar; Rochdi Merzouki; Belkacem Ould Bouamama; Ahmad Koubeissi</i>	280-285
Real-Time Flocking of Multiple-Quadrotor System of Systems <i>Osamah Saif; Isabelle Fantoni; Arturo Zavala-Rio</i>	286-291
Dual Flexible 7 DoF Arm Robot Learns like a Child to Dance using Q-Learning <i>Ferat Sahin; Sulabh Kumra</i>	292-297
Omnidirectional Rule-Based Free Gait Utilizing Restrictedness <i>Ferat Sahin; Christopher Johnson</i>	298-303
Modeling and Dynamic Control for a Hexapod Robot <i>Ferat Sahin; Brian Stevenson</i>	304-310
Simultaneous Localization and Mapping using a Micro-Particle Swarm Optimization <i>Christopher Monfredo</i>	310-315

An Update on the Framework for a Junior Level Design Course <i>Aly El-Osery; Kevin Wedeward</i>	316–321
Epoch Era Analysis in the Design of the Next Generation Offshore Subsea Construction Vessels <i>Henrique Gaspar</i>	322–327
Simulating SysML Models: Overview and Challenges <i>Mara Nikolaidou; George Dimitrios Kapos; Anargyros Tsadimas; Vassilis Dalakas; Dimosthenis Anagnostopoulos</i>	328–333
Enabling Emergent Behavior in Systems-of-Systems Through Bigraph-based Modeling <i>Dominik Wachholder; Christian Stary</i>	334–339
A low cost velocity control of double sided LSRM by sliding mode control and PIC18F452 <i>Wajdi Zaafrane; Mahir Dursun; Habib Rahaoulia</i>	340–345
A Mission-Oriented Approach for Designing System-of-Systems <i>Eduardo Silva; Thais Batista; Flavio Oquendo</i>	346–351
Abandonment: A Natural Consequence of Autonomy and Belonging in Systems-of-Systems <i>Alejandro Salado</i>	352–357
Bond Graph Model-Based for Fault Tolerance Level Assessment of a Wireless Communication Link in a System of Systems Concept <i>Ahmad Koubeissi; Mohammed Ayache; Rochdi Merzouki; Blaise Conrard</i>	358–363
On the Impacts of Project Based Learning for Workplace Preparedness of Engineering Graduates <i>Seda Senay</i>	364–367
Distributed Super Twisting Controller for Multiple Quadrotors <i>Luis F. Luque-Vega; Bernardino Castillo-Toledo; Alexander Loukianov; Jawhar Ghommam; Maarouf Saad; Luis Gonzalez-Jimenez</i>	368–373
Smart Data-Harnessing for Financial Value in Short-Term Hire Electric Car Schemes <i>Peter Cooper; Tom Crick; Theo Tryfonas</i>	374–379
Behavioral Detection in the Maritime Domain <i>James Scrofani; Murali Tummala; Donna Miller; Deborah Shifflett; John C. McEachen</i>	380–385
Quaternion-based Trajectory Tracking Robust Control for a Quadrotor <i>Carlos Augusto Arellano-Muro; Bernardino Castillo-Toledo; Alexander Loukianov; Luis F. Luque-Vega; Luis Gonzalez-Jimenez</i>	386–391

Design of a Home Multi-Robot System for the Elderly and Disabled <i>Patrick J Benavidez; Mohan Muppidi; Sos Agaian; Mo Jamshidi</i>	392–397
A Fast Map-Reduce Algorithm for Burst Errors in Big Data Cloud Storage <i>Brian T Kelley; Xue Qin; Mahdy Saedy</i>	398–403
Software Interface Design for Home-Based Assistive Multi-Robot System <i>Patrick J Benavidez; Mohan Muppidi; Berat Alper Erol; Sos Agaian; Mo Jamshidi</i>	404–409
Cognitive Interference Avoidance in 4th Generation GPS <i>Brian T Kelley; Gonzalo Delatorre; David Akopian</i>	410–415
Keyboard Control Method for Virtual Reality Micro-robotic Cell Injection Training <i>Syafizwan Faroque; Ben Horan; Matthew Joordens</i>	416–421
SCV2: A Model-based Validation and Verification approach to System-of-Systems Engineering <i>Rami Baddour; Alkiviadis Paspaliaris; Daniel Solis Herrera</i>	422–427
Searching Baxter’s URDF Robot Joint and Link Trees for Active Serial Chains <i>Michael Mortimer; Ben Horan; Matthew Joordens</i>	428–433
Performance Enhancing of Storage System for Point Cloud Geographic Data <i>Marian Svalec; Lubos Takac; Michal Zbovsk</i>	434–438
Noise Level Classification for EEG using Hidden Markov Models <i>Sherif Haggag, Sh; Shady Mohamed; Asim Bhatti; Hussein Haggag; Saeid Nahavandi</i>	439–444
Research directions in SOSE <i>Vernon Ireland</i>	445–450
Data-Centric Development of Architecture Models with the DM2 and MS-SDF <i>Matthew Amissah; Holly Handley</i>	451–456
A Conditional Value-at-Risk Approach to Risk Management in System-of-Systems Architectures <i>Navindran Davendralingam; Dan DeLaurentis; Parth Shah</i>	457–462
A Perspective on Decision-Making Research in System of Systems Context <i>Dan DeLaurentis; Navindran Davendralingam; Michael Jacobs; Datu Agusdinata</i>	463–468
SoS Capability Schedule Prediction <i>Jo Ann Lane; Adrian Pitman; Elizabeth Clark; Angela Tuffley</i>	469–474

The State of Systems of Systems Engineering Knowledge Sources <i>Judith S. Dahmann</i>	475
Modeling an Organizational View of the SoS Towards Managing its Evolution <i>Richard Turner; Alexey Tregubov; Alice E. Smith; Jeffrey Smith; Levent Yilmaz; Donghuang Li; Saicharan Chada</i>	480–485
Low-Latency Software Defined Network for High Performance Clouds <i>Paul Rad; Palden Lama; Rajendra V Boppana; Gilad Berman; Mo Jamshidi</i>	486–491
Image Segmentation by Multi-Level Thresholding based on Fuzzy Entropy and Genetic Algorithm in Cloud <i>Paul Rad; Mohan Muppidi; Sos Aгаian; Mo Jamshidi</i>	492–497
A Wrapper-based feature selection approach using Bees Algorithm for a wood defect classification system <i>Michael Packianather</i>	498–503