

GROUND VEHICLE SYSTEMS ENGINEERING AND TECHNOLOGY SYMPOSIUM

Michigan Chapter  
**NDIA**  
National Defense Industrial Association

**ESD**  
THE ENGINEERING SOCIETY OF DETROIT  
FOUNDED IN 1915

# CALL FOR PAPERS

## 2011 EVENT LOCATION

Hyatt Regency Dearborn  
600 Town Center Drive  
Dearborn, MI 48126

## MAIN SESSION

August 9-10, 2011

## MINI-SYMPOSIA

August 10-11, 2011

3<sup>RD</sup> ANNUAL  
**GVSETS**

GROUND VEHICLE SYSTEMS ENGINEERING AND TECHNOLOGY SYMPOSIUM

## THE 2011 GROUND VEHICLE SYSTEMS ENGINEERING AND TECHNOLOGY SYMPOSIUM (GVSETS)

**SUBMISSION DEADLINE – MARCH 31, 2011**

The Michigan Chapter of the National Defense Industrial Association, in coordination with The Engineering Society of Detroit, is sponsoring the third-annual Ground Vehicle Systems Engineering and Technology Symposium, a three-day event dedicated to the engineering and technology of military ground vehicles.

“GVSETS provides organizations that work with the military vehicle complex with access to expertise and information that will help them set program agendas and leverage R&D resources in ways that best address the tactical needs of our fighting men and women,” announced Dr. Grace Bochenek, Director of the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC).

The main session on Aug. 9-10, 2011, will be devoted to invited speakers followed by submitted talks in six main categories that will be presented in five parallel mini-symposia on Aug. 10-11, 2011.

Scientists and engineers from government, academia and industry are invited to submit abstracts. The Technical Program Committee will select those submissions to be presented in the mini-symposia and/or to be published in the proceedings. One paper will be recognized with the Best Paper Award.

Abstracts of 200 to 300 words should be submitted no later than March 31, 2011, describing the relevance and contents of their proposed papers in support of the mission of the U.S. Army. All papers should be unclassified and releasable to the public.

The abstracts must be submitted after the authors have obtained required local disclosure authorization and security and OPSEC (Operations Security) approvals pertaining to professional conferences open to academia and industry. All papers should be unclassified and releasable to the public. **Submissions imply the intent of at least one author to register for the 2011 GVSETS Mini-Symposium and present the paper.**

Abstracts will be submitted in one of the six areas covered by the mini-symposia shown below. Additional details and forms are provided in the subsequent pages:

- Human Capital Development (HCD)
- Modeling and Simulation, Testing and Validation (MSTV)
- Power and Mobility (P&M)
- Robotic Systems (RS)
- Systems Engineering (SE)
- Vehicle Electronics and Architecture (VEA)

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## HUMAN CAPITAL DEVELOPMENT (HCD)

HCD is one of the most important elements of success in any organization today. Investing in human capital requires creating and cultivating environments in which employees can rapidly learn and apply new ideas, competencies, skills, behaviors and attitudes. The 2011 GVSETS will feature papers on this topic and create a platform of learning on current human capital strategy, research and cutting-edge techniques and tools.

HCD papers will be presented during the five mini-symposia. If your submission is related to a specific mini-symposium topic (see full conference information for mini-symposia details), please indicate the topic on your submission. For multi-disciplinary HCD submissions, the GVSETS Planning Committee will determine the mini-symposium for the paper.

Topics of interest include, but are not limited to, the following:

### WORKFORCE PLANNING AND DEVELOPMENT

- Human Capital Strategic Planning
- Workforce Requirements Forecasting
- Competency Modeling
- Career Progression Mapping
- Succession Planning
- Career Development

### KNOWLEDGE MANAGEMENT

- Instructional System Design
- Curriculum Design
- Multi-Modal Learning
- Experiential Learning
- E-Learning
- Simulations

### TALENT ACQUISITION

- Candidate Sourcing, Recruitment and Selection
- Onboarding
- Retention Strategy
- Performance Management
- Compensation
- Building Capacity — K-12 and University Level (Skills Unique to Defense Industry)

### CULTURE ESTABLISHMENT

- Coaching and Mentoring
- Employee Engagement
- Diversity
- Generational Understanding
- Reward and Recognition
- Work-Life Balance

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## MODELING AND SIMULATION, TESTING AND VALIDATION (MSTV) MINI-SYMPOSIUM

The MSTV Mini-Symposium serves as a technical forum that brings together members of the government, academic and industrial MSTV communities. This mini-symposium will address current developments in M&S technology as well as technological gaps and challenges as applied to military ground vehicles in the following application domains: performance, durability/reliability, mobility, thermal, distributed simulation, optimization, testing, validation and human dimension. MSTV covers both the development of new and novel M&S and testing methodologies and the applications of these existing technologies to military vehicles. Topics of interest for the MSTV Mini-Symposium include, but are not limited to, the following:

### VEHICLE DYNAMICS AND MOBILITY

- Terrain and Soil
- Vehicle/Terrain Interaction
- Tires and Tracks
- Vehicle Ride and Handling
- Active/Semi-active Suspensions and Rollover Mitigation
- Real-Time Dynamics
- Autonomous Vehicle Dynamics

### POWER AND ENERGY

- Hybrid Power Systems
- Powertrain
- Electrical and Hydraulic Systems
- Engines, Generators, Batteries and Auxiliary Power
- Power Management/Duty Cycles
- Operator/Hardware-in-the-Loop
- Fuel Economy/Efficiency
- Alternative Energy
- JP8 or Diesel Fuel

### STRUCTURES

- Vehicle Chassis/Hull
- Fasteners, Welds and Joints
- Optimization
- Space, Weight and Packaging
- Advanced Materials
- Material Properties
- Safety
- Failure Modes and Durability

### HUMAN DIMENSION

- Operator-in-the-Loop
- Cognition and Neuroscience
- Human Performance
- Cognitive Engineering
- Virtual Environments

### THERMAL AND FLUIDS

- Underhood and Crew Cooling
- Cooling Systems
- Detailed Component Models
- Acoustics
- Thermal Management
- Equipment Cooling
- Fire Suppression

### SYSTEM/MULTI-DOMAIN

- Multi-Physics
- Operational/System-of-Systems Performance
- Reduced Order Modeling
- Logistics/Maintainability
- Operator/Hardware-in-the-Loop
- Prognostics and Diagnostics
- Multidisciplinary Optimization and Sensitivity Analysis
- Combat Modeling
- System Level Reliability
- Advanced Concepts

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## POWER AND MOBILITY (P&M) MINI-SYMPOSIUM

The P&M Mini-Symposium will focus on commercial/military ground vehicle technologies, sub-systems, systems and integration that enable:

- Improved Military Vehicle Performance
- A First Step in a Series of Incremental Improvements that will Ultimately Cause Major or Even Revolutionary Capability Improvements
- Increased Efficiency of Military Vehicle Energy Use
- Decreased Logistical Footprint
- System Level Energy Optimization

Areas of interest include:

- Powertrain/Power Pack
- Track and Suspension
- Energy Storage
- Hybrid/Advanced Propulsion
- Non-Primary Power
- Fuel Cell
- Thermal Management

*Note: Papers that describe pathways to major performance improvements through incremental, affordable and moderate risk steps are especially desired.*

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## ROBOTIC SYSTEMS (RS) MINI-SYMPOSIUM

The RS Mini-Symposium will focus on a discussion of or report on robotic technologies that increase the Warfighter operational capability and mature Technology Readiness Levels (TRLs) are preferred. Papers should address either completed research, demonstrated or ongoing projects, application and integration potential in Unmanned Ground Vehicles (UGVs) and/or other service programs.

### LIGHTEN THE LOAD

- Relieving the Burden of Dismounted Soldiers
- Logistics Support for the U.S. Warfighter
- Robotic Mobility in Rough Terrain
- Safe Operations Around Humans

### DUAL-USE TECHNOLOGIES

- Technologies That Could Be Shared Between Commercial and Defense
- Unconventional Partnerships (e.g. Consumer Electronics, Maker Community)
- Automotive Technology Collaboration

### THE FIVE VALIDATED ROBOTICS OPERATIONAL NEEDS STATEMENTS (ONS)

- Robotic Wingman
- Persistent Stare
- Convoy Logistics
- Unmanned IED Detection and Defeat
- Route Clearance

### RELIABLE OPERATIONS AND INTEROPERABILITY

- Fault Tolerance
- Self-Diagnostics and Remote Reporting
- Plug and Play
- Extensible/Expandable Architectures

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## SYSTEMS ENGINEERING (SE) MINI-SYMPOSIUM

The SE Mini-Symposium brings together government, industry and academia to discuss the latest developments and accomplishments in bringing SE concepts, tools, processes and best practices into play during the life-cycle of complex systems. This mini-symposium will highlight the benefits of applying SE to provide a higher probability of program success in terms of speed to the Soldier, quality of the product, reduced schedule variance, reduced life-cycle cost, and overall higher customer satisfaction. Our focus is applying SE within the ground vehicle domain, with a systems perspective and life-cycle considerations, including affordability, while meeting accelerated schedules required by our customers and end-users. Papers are requested in, but not limited to, the following topic areas:

### SE FOUNDATIONS

- Requirements Definition and Allocation
- Functional Analysis and Allocation
- Architecture Synthesis and Performance
- Mission and Operations Analysis
- Integration, Verification and Validation
- Systems Analysis
- Trade Studies, Decision Analysis
- Human-centric Performance
- Risk Management
- Affordability in Systems Trades for Manufacturing and Life-Cycle Sustainment — Design to Cost and Technical Maturity
- Data, Model, Information Sharing
- Model-Based Engineering
- High-Throughput/Automated Development Environments

### SYSTEM-OF-SYSTEMS ENGINEERING

- Net-Centric Operations
- Cloud-Sourcing / Off-Board Resources
- Combat and Operational Effectiveness

### APPLYING SE

- Systems Engineering for Facilitating Systems Integration
- Rapid Fielding
- Manufacturing and Support
- Scalability for Small, Medium and Large Programs
- 2009 Weapon Systems Acquisition Reform Act and Systems Engineering
- Case Studies

### IMPROVING SE

- Best Practices
- Product or Process Improvement Strategies
- Management Considerations for Implementing
- Training and Developing Systems Engineers
- Improvement for Platform, Systems of Systems and Network Integration Challenges

### GAPS, CHALLENGES AND OPPORTUNITIES IN SYSTEMS ENGINEERING AND SYSTEMS INTEGRATION

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## VEHICLE ELECTRONICS AND ARCHITECTURE (VEA) MINI-SYMPOSIUM

The VEA Mini-Symposium addresses ongoing military ground vehicle research, development and acquisition activities related to Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) systems, emerging trends in vehicle hardware architecture design, system integration and test, and the application of diagnostic/prognostic technologies and methods to predict platform, subsystem, and component failures.

### NETWORK AND MISSION COMMAND

- Architecture for Modular C4ISR Integration into Platforms – VICTORY (Vehicular Integration for C4ISR/EW inTerOpeRability)
- On-the-Move, Secure Communications
  - Tactical Cellular
  - Efficient Spectrum Utilization
- Mission Command
  - Mission Planning and Managing UGVs
  - Autonomous Robotics
  - Applications / Software Services
- Sensors for Situational Awareness and Vehicle Protection
- Antenna Enhancements
  - Multifunctional; Affordable; Broadband
  - Embedded; Conformal; Low-Signature

### CONDITION-BASED MAINTENANCE (CBM)

- Reliability Centered Maintenance (RCM)
- Integrating CBM Solutions with Military Ground Vehicle Systems
- Diagnostic/Prognostic Algorithm Development Tools and Techniques
- Data Analysis and Acquisition
- Diagnostic Data Storage and Transfer for Military Vehicles
- Sensor Technologies, Sensor Selection, and Military Vehicle Subsystem Integration
- Data Warehousing and The Enterprise

### EMERGING TRENDS IN SOFTWARE/ HARDWARE ARCHITECTURES FOR MILITARY GROUND VEHICLES

- C4ISR Integration for Current and Future Force Military Ground Vehicles
- Deterministic High-Speed Data Buses for Real-Time Military Ground Vehicle Applications
- Intra-Vehicle Network Hardware, Software and Protocols for Data and Video Distribution
- “Plug-n-Play” Capability for Military Ground Vehicles
- Vehicle Electronics Architectures
- Open Vehicle Electronics Standards
- Reducing SWAP-C of Vehicle Electronics and Enclosures
- Advanced On-Board Computing Technologies for Military Ground Vehicles
- Software Infrastructure Components such as Real-Time Operating Systems, Operating Environments and Middleware, and Software Design for Safety Critical Systems
- System Integration Laboratory Design, Development, Maintenance and Utilization
- Electrical Power Architectures for High- and Lower-Power Management Applications, Power Distribution, and Load Management.
- Reducing SWAP-C of Power Electronics Components
- Approaches for High Power Safety
- Microgrids
- Power Standards and Interfaces
- Replacing Silicon with Silicon Carbide in High- and Low-Power Electronics and Computing Applications

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# SUBMISSION INSTRUCTIONS AND FORM

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## SUBMISSION REQUIREMENTS

**DUE BY MARCH 31, 2011**

An UNCLASSIFIED abstract of 200-300 words that states the paper/presentation objective; outlines the problem requiring solution or the method of approach to research; is explicit with respect to the types of data to be included and summarizes the conclusions that will be made. Submit all abstracts via e-mail to [gvsets@esd.org](mailto:gvsets@esd.org) in a PDF format.

### **SUBMITTED ABSTRACTS WILL BE EVALUATED BASED ON THE FOLLOWING CRITERIA:**

- Relevance/importance to its respective submission category and the U.S. Army
- The effort's potential impact on improved energy efficiency for Soldiers
- Originality and importance to the scientific field or technology
- Sound scientific methodology
- Clarity and readability

### **SUBMITTED ABSTRACTS MUST BE FORMATTED ACCORDINGLY:**

- 12-point Times New Roman font
- 1-inch margins
- Title in capital letters 1 inch from the top of the page
- Title followed by author(s) and their affiliation(s)
- Each line in the heading is centered
- Double space between the heading and beginning of the abstract
- Single space the abstract
- Double space between paragraphs

## ABSTRACT ACCEPTANCE NOTIFICATION

**DUE BY MAY 2, 2011**

Authors of abstracts chosen by the review team will be sent notification via e-mail to the Main Point of Contact listed on the Submission Form and provided with detailed directions for the formatting of final manuscripts. A complete list of all chosen abstracts will be listed on both the NDIA website <http://ndia-mich.org> and ESD website [www.esd.org](http://www.esd.org).

Accepted authors must submit a complete manuscript prior to the conference. Special instructions for preparing final papers for publication in the technical proceedings will be provided by ESD when the author notifications are released.

Authors who are selected to present papers at GVSETS will receive detailed information regarding presentation form. The authors will be responsible for their own registration fee for the symposium.

For more information, please contact Leslie A. Smith, CMP, Senior Director of Programs at (248) 353-0735, ext. 152 or [gvsets@esd.org](mailto:gvsets@esd.org).

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## THE 2011 MICHIGAN CHAPTER NDIA

### GROUND VEHICLE SYSTEMS ENGINEERING AND TECHNOLOGY SYMPOSIUM DUE BY MARCH 31, 2011

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**PLEASE SELECT WHICH MINI-SYMPOSIUM YOUR PAPER IS RELATED TO:**

**HUMAN CAPITAL DEVELOPMENT (HCD)**

- ☐ Workforce Planning and Development
- ☐ Talent Acquisition
- ☐ Knowledge Management
- ☐ Culture Establishment

**MODELING AND SIMULATION, TESTING AND VALIDATION (MSTV)**

- ☐ Vehicle Dynamics and Mobility
- ☐ Power and Energy
- ☐ Structures
- ☐ Human Dimensions
- ☐ Thermal and Fluids
- ☐ System/Multi-Domain

**POWER AND MOBILITY (P&M)**

- ☐ Powertrain
- ☐ Track and Suspension
- ☐ Energy Storage
- ☐ Hybrid/Advanced Propulsion
- ☐ Non-primary Power
- ☐ Fuel Cell
- ☐ Thermal Management

**ROBOTIC SYSTEMS (RS)**

- ☐ Lighten the Load
- ☐ Dual-Use Technologies
- ☐ The Five Validated Robotics Operational Needs Statements (ONS)
- ☐ Reliable Operations and Interoperability

**SYSTEMS ENGINEERING (SE)**

- ☐ SE Foundations
- ☐ System-of-Systems Engineering
- ☐ Applying SE
- ☐ Improving SE
- ☐ Gaps, Challenges and Opportunities in SE and Systems Integration

**VEHICLE ELECTRONICS AND ARCHITECTURE (VEA)**

- ☐ Network and Mission Command
- ☐ Condition-Based Maintenance (CBM)
- ☐ Emerging Trends in Software/Hardware Architectures for Military Ground Vehicles

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Has this paper or presentation been exhibited at other conferences? (if so, please explain):

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**Please complete the entire form before submitting.**