

CALL FOR ABSTRACTS

2018 EVENT LOCATION

The Suburban Collection Showplace
46100 Grand River Avenue
Novi, MI 48374

Main Session

August 7, 2018

Advanced Planning Briefing for Industry

August 8, 2018

Technical Sessions

August 9, 2018

10TH ANNUAL
GVSETS

GROUND VEHICLE SYSTEMS ENGINEERING & TECHNOLOGY SYMPOSIUM
& ADVANCED PLANNING BRIEFING FOR INDUSTRY

THE 10TH ANNUAL GROUND VEHICLE SYSTEMS ENGINEERING AND TECHNOLOGY SYMPOSIUM & ADVANCED PLANNING BRIEFING FOR INDUSTRY

The Michigan Chapter of the National Defense Industrial Association (NDIA), in coordination with The Engineering Society of Detroit (ESD), is sponsoring the 10th annual Ground Vehicle Systems Engineering and Technology Symposium (GVSETS) & Advanced Planning Briefing for Industry (APBI), a three-day event dedicated to the engineering and technology of Military Ground Vehicles. More than 1,000 representatives of government, industry and academia are expected to attend this unique event, which allows in-depth communication between the various groups.

"As GVSETS celebrates its tenth anniversary, we're also celebrating ten years of this extraordinary forum for the integration of thought and idea from government, academia and industry attendees. GVSETS refreshes our partnerships through fostering our engineering and science collaborations, keeping our experts at the top of their game and providing a unique opportunity to exchange ideas with our peers in order to refine solutions that meet military and commercial challenges of today and tomorrow." – Dr. Paul Rogers, U.S. Army TARDEC Director

GVSETS & APBI

The Main Session on August 7, 2018, and the Advanced Planning Briefing for Industry (APBI) on August 8, 2018, will be devoted to invited guest speakers. Submitted technical papers will be presented in six parallel sessions on August 9, 2018.

Submission Requirements:

- Abstract Submission Deadline – February 14, 2018.
- Extended abstracts should be a minimum of 500 words and not exceed two pages.
- Describe the relevance and content of the proposed papers and how they support the mission of the U.S. Army and U.S. Marine Corps (USMC).
- Operations Security (OPSEC) approved: pertaining to professional conferences open to academia and industry. All abstracts should be unclassified and releasable to the public and contain the required "Distribution A" statement and OPSEC review number/date.
- Submissions imply the intent of at least one author to register for the 2018 GVSETS and present the paper.

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

- Autonomous Ground Systems (AGS)
- Materials & Advanced Manufacturing (M&AM)
- Modeling & Simulation, Testing & Validation (MSTV)
- Power and Mobility (P&M)
- Systems Engineering (SE)
- Vehicle Electronics and Architecture (VEA) & Ground Systems Cyber Engineering (GSCE)

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THE 10TH ANNUAL GVSETS & APBI CONTINUED

Scientists and engineers from government, academia and industry are invited to submit abstracts. The Technical Committee will select those submissions to be presented in the Technical Sessions and/or published in the proceedings. The GVSETS & APBI Technical Committee will evaluate submitted papers from each technical session for an overall award of the "Best Paper." This award recognizes the author(s) submitting a paper for the most exceptional merit and will be presented on August 7, 2018.

The selection criteria will include factors such as:

- A) Relevance to the ground systems domain
- B) Clarity of expression
- C) Completeness
- D) Conciseness
- E) Well-stated objectives
- F) Conclusions answer objectives
- G) Findings are applicable and useable by others
- H) References are complete
- I) Ease of reading
- J) Originality of work

Important Dates:

Call for Abstracts	January 8, 2018
Abstract Submission Deadline	February 14, 2018
Abstract Acceptance Notification	March 21, 2018
Draft Papers Deadline	June 1, 2018
Final Papers Deadline	July 3, 2018
Briefing/Presentation Deadline	July 24, 2018
Best Paper Award Presentation	August 7, 2018
GVSETS Technical Sessions	August 9, 2018

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AUTONOMOUS GROUND SYSTEMS TECHNICAL SESSION

Autonomous Ground Systems (AGS) are a significant part of the Department of Defense's (DoD) Third Offset Strategy. There are also substantial efforts within the commercial automobile and technology industries to field self-driving cars and trucks in the near term. Both of these thrusts to mature and field autonomy-enabled vehicles are a boon for those involved in military robotics. Cars and trucks operating on roads and streets have the largest industrial application, while the major focus for DoD; the Army, USMC, USAF & Navy, is a variety of other interests in the autonomous ground systems space. As such, areas of interest for the AGS Technical Session include:

TECHNOLOGY:

- Cost effective and reliable sensors, computing, and controllers
- Interoperability, open architectures, and standards
- Shared control
- Modular payloads
- Connected vehicles
- Heterogeneous teaming
- Perception algorithms
- Machine learning and artificial intelligence
- Manipulation of the environment
- Adaptive mobility

MISSION APPLICATIONS:

- On-road navigation and control
- Multi-domain battlespace
- Driver assist and active safety
- Subterranean environments
- Fuel efficiency through autonomy
- Logistics and warehouse applications
- Combat engineer applications
- Area and route clearance
- Dense urban environments

SYSTEM ASSESSMENT:

- Testing and demonstration
- Verification and validation
- Simulation of autonomous vehicle systems

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MATERIALS & ADVANCED MANUFACTURING TECHNICAL SESSION

The U.S. Army's future force must be more lethal, expeditionary, and agile, with greater capability to conduct operations that are decentralized, distributed, and integrated. Historically, weight has had a positive correlation with combat vehicle survivability; yet high vehicle weight also decreases the fleet's ability to be expeditionary, limits global mobility, increases cost and challenges sustainment. As the Army modernizes its vehicle fleet to maintain a global presence, there is an urgent need to reduce the impacts of vehicle weight on mission performance, and to develop innovative materials and manufacturing processes to reduce vehicle weight and sustainment burden.

The M&AM Technical Session serves as an open technical forum for the exchange of ideas, approaches, and techniques pertaining to development and application of innovative materials and advanced manufacturing methodologies for ground vehicles and watercraft. This forum will bring together researchers, engineers, program managers and scientists from academia, government and industry to address their common focus areas of research in M&AM.

Paper topics can range from advanced research to case studies and applications in the following broad areas, but are not limited to:

LIGHTWEIGHT MATERIALS DEVELOPMENT AND MATURATION:

- Advanced high strength (steel, titanium, aluminum)
- Resin-reinforced composites
- Metal Matrix Composites
- Foams and hybrid structures
- Barriers to weight reduction and adoption
- Operational metrics and impacts of weight reduction
- Other ultra-lightweight alloys (magnesium, etc.)

MULTIMATERIAL JOINING:

- Dissimilar material joining
- Friction stir welding
- Advanced joining and processing (explosive bonding, friction stir, laser)
- Advanced weld wire development and characterization
- Adhesives

ADDITIVE MANUFACTURING (AM):

- AM methods
- Modeling and Simulation (M&S) Tools for AM processes
- Validation of AM parts: qualification and certification
- Powder development for AM
- Innovative part design for AM
- Other applications (cold spray, hot forming)

ENVIRONMENTAL AND CORROSION:

- Corrosion mechanisms, detection under coatings
- Corrosion prevention and mitigation
- Corrosion prediction and modeling tools
- Pretreatments, coatings, finishes: development & performance assessment
- Accelerated corrosion test methods
- Hazardous materials and substitutes

ADVANCED M&AM TOPICS:

- Case studies in military ground vehicles
- Design optimization (topology, shape/size)
- Lifecycle impacts (design for cost)
- Digital image correlation
- Integrated Computational Materials Engineering
- Other (shape memory alloys, electro-hydraulic forming/welding, etc.)

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MODELING & SIMULATION, TESTING & VALIDATION TECHNICAL SESSION

The Modeling & Simulation, Testing & Validation (MSTV) Technical Session serves as a forum that brings together members of the government, academia and industry. This technical session will highlight current developments in MSTV technology, and discuss gaps and challenges that concern Military Ground Vehicles in the following application domains: mobility and autonomy M&S, lightweight materials and structures M&S, testing and validation, and cross-cutting technologies. The MSTV Technical Session covers both the development of advanced and novel MSTV methodologies, and the application of existing technologies to military vehicles. Topics of interest include, but are not limited to, the following:

MOBILITY AND AUTONOMY M&S:

- Amphibious vehicle prediction
- Connected vehicles
- Geospatial terrain modeling
- High-speed land and sea capabilities
- High-speed teleoperation
- Human cognitive modeling
- Intelligent vehicle mobility
- Off-road vehicle mobility
- Terramechanics
- Vehicle designs meeting air drop requirements

LIGHTWEIGHT MATERIALS AND STRUCTURES M&S:

- Active protection systems
- AM testing / part verification
- Computer Aided Engineering modeling of 3D printed parts w/ non homogeneous materials properties
- Modeling methodologies including reduced order and surrogate models
- Multi-functional optimization and lightweighting
- Nano-materials and composites
- Protected mobility

TESTING & VALIDATION:

- Accelerated testing
- Duty cycle testing
- Hardware and operator-in-the-loop testing
- Unmanned vehicle testing
- Verification and validation
- Virtual environments

CROSS-CUTTING TECHNOLOGIES:

- Advanced computing such as HPC and quantum computing
- Agent based modeling
- Augmented reality and synthetic environments
- Big data analysis
- Computational fluid dynamics and signature analysis
- Counter Unmanned Aerial Systems weapon systems and vehicle integration
- Digital Physical Thread for integrated M&S management
- Digital Twin for M&S Product Lifecycle Management
- Modeling / designing swarm behaviors and materiel consumed
- Next generation simulation tools
- Trade space exploration
- Uncertainty treatment
- Vehicle cyber security

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POWER & MOBILITY TECHNICAL SESSION

The Power and Mobility (P&M) Technical Session discusses military ground vehicle mobility challenges and strategies aimed at solving them. Accordingly, the P&M technical committee invites papers addressing power & mobility technology areas specifically relevant to vehicle modernization. The committee also encourages papers providing updates on research and technology that has significantly matured since the first GVSETS P&M session in 2009, especially technology on a transition path to an acquisition or sustainment program of record. Suggested topic areas include but are not limited to the following:

ADVANCED POWER AND ENERGY STORAGE

- Battery power and energy density
- Materials technology (anode, cathode, electrolyte and separator)
- Battery thermal management and control
- Standardized, scalable high-voltage battery modules and packs
- Use of existing, common form-factor military Li-ion technologies
- Parallel intermixing of dissimilar Li-ion 6T batteries

NON-PRIMARY POWER

- Fuel cell development, testing and integration (using both hydrogen and JP-8 as fuel)
- Hydrogen production, distribution, and storage
- Low-cost, heavy-fueled small engine technology (less than 75 kW)
- Acoustic abatement solutions for engine-based Auxiliary Power Units

VEHICLE RUNNING GEAR

- Suspension damping control
- Active suspension
- Ride height management
- Terrain preview sensing to improve off-road mobility
- Track system acoustic characterization, comparison, and signature reduction
- Track component performance, durability, and weight reduction
- Improved elastomer performance in track systems

ADVANCED PROPULSION

- Onboard and export vehicle electrical power (greater than 100 kW)
- Integrated Starter Generators, including engine start-stop and mild hybrids
- Permanent-magnet free or rare-earth magnet free motor and generator design concepts
- Silent operation vehicle propulsion technology
- Electrification of vehicle auxiliary systems
- High-temperature power electronics

POWERTRAIN

- Digital electronic controls
- Compact, low-heat rejection engine technology for combat and tactical vehicles
- Transmission and drivetrain technology for wheeled and tracked vehicles
- Propulsion systems for ultralight or small, autonomous vehicles
- Powertrain thermal management systems

GROUND SYSTEM PERFORMANCE FLUIDS

- Lubricant research and development focused on powertrain performance, durability, and fuel efficiency
- Evolution of products to match advancing hardware technology
- Reduced maintenance through fluids with extended drain intervals
- Multifunctional fluids

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SYSTEMS ENGINEERING TECHNICAL SESSION

The Systems Engineering (SE) Technical Session serves as a technical forum for the exchange of transformative ideas, approaches, techniques, applications, and lessons learned in the systems engineering of ground vehicles. The session will facilitate learning more about the most recent innovations, trends, experiences and issues in Systems Engineering. This forum will bring together members from academia, government and industry to share the latest advances in SE through application, collaboration, and research.

SE METHODOLOGIES & TECHNICAL MANAGEMENT:

- Speeding design iteration through agile methods
- SE lifecycle process development, control, and integration
- Technical review management and criteria
- SE and program management integration
- SE data and tool integration and federation

DIGITAL ENGINEERING/MODEL BASED SYSTEM ENGINEERING (MBSE) & ARCHITECTURE:

- Digital Engineering and MBSE methodologies
- Descriptive and executable modeling
- Model integration, federation, and co-simulation
- Model based applications and tool implementations
- Reference Architecture/Pattern identification, management, and reuse

TRADE SPACE & DECISION ANALYSIS:

- Value analysis and trade space framing
- Multi-Disciplinary Analysis & Optimization
- Critical performance/constraint measures and allocations
- Operational analysis, measuring adaptability and resiliency
- Applications and visualization methods

SE ADVANCED TOPICS:

- Digital Engineering, approach, method and impact
- Digital Transformation, model based implementation and maturity
- Cyber-Physical Systems; modeling hardware/software coupling
- Agent-based methods, modeling, and autonomy
- Industry 4.0, impacts and implications
- Knowledge representation, modeling, and cognition

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VEHICLE ELECTRONICS AND ARCHITECTURE & GROUND SYSTEMS CYBER ENGINEERING TECHNICAL SESSION

The Vehicle Electronics and Architecture & Ground Systems Cyber Engineering (VEA & GSCE) Technical Session addresses ongoing military ground vehicle research, development and acquisition activities related to: vehicle electronics; Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) systems; cyber security, emerging trends in vehicle system architecture design, system integration and testing; and platform standards and applications. Topics of interest include, but are not limited to, the following:

PLATFORM ARCHITECTURES AND APPLICATIONS:

- Vehicular Integration for C4ISR/EW Interoperability (VICTORY)
- Platform integration for electronics, sensors, and C4ISR
- Common operating environments, middleware, and virtualization
- Real-time operating systems, mission and safety critical systems
- Electrical power management
- Open systems architectures
- Vehicle networking architectures and technologies

CYBER SECURITY & INFORMATION ASSURANCE:

- Vehicle cyber-resiliency
- Vehicle databus security
- Holistic vehicle cyber situational awareness
- Vehicle cyber security threats and threat modeling
- Cross-domain guards
- Cyber supply chain risk management
- Cyber security applications and tools
- Vehicle authentication and authorization
- Cyber security metrics development
- Penetration testing tools and techniques

ELECTRICAL POWER:

- Silicon Carbide (SiC) and/or Gallium Nitride (GaN) based power electronics for military application
- High voltage (600VDC) & high temperature (105C) power conversion and distribution
- Connector standards for 600 VDC and low-cost electrical connectors for high and low voltage (28VDC).
- Ground vehicle electrical power quality and safety

ELECTRICAL COMPONENTS AND PACKAGING:

- Processor technology, single board computers,
- Embedded graphics processing boards
- Computer standards and form factors
- Electronics thermal management

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SUBMISSION INSTRUCTIONS AND FORM

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SUBMISSION REQUIREMENTS

DUE BY FEBRUARY 14, 2018

An UNCLASSIFIED and Public Releasable extended abstract is required which does not exceed two pages 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 in PDF format. Submitted extended abstracts will be evaluated based on the following criteria:

- Relevance/importance to its respective submission category and the U.S. Army and U.S. Marine Corps.
- Originality and importance to the scientific field or technology
- Sound scientific methodology
- Clarity and readability

Submitted extended abstracts must be formatted accordingly:

- 12-point Times New Roman font
- 1-inch margins
- Title in capital letters one 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
- Graphical information or imagery is encouraged
- Minimum of 500 words and not to exceed two pages

ABSTRACT ACCEPTANCE NOTIFICATION

SENT BY MARCH 21, 2018

Authors of abstracts chosen by the Technical Committee will be sent notification via e-mail to the main point of contact listed on the submission form and provided detailed directions for formatting final manuscripts. Accepted authors must submit a complete manuscript, which includes acquiring OPSEC review by the deadline prior to the conference. Special instructions for preparing the final papers for publication in the technical proceedings and deadlines will be supplied by ESD when the author notifications are released. Authors selected to present their technical papers during the GVSETS Tech Session Day will receive detailed information regarding presentation format. The authors are 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.

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THE 10TH ANNUAL GVSETS AND APBI TECHNICAL SESSIONS CALL FOR ABSTRACTS

DUE BY FEBRUARY 14, 2018

Title of Abstract: _____

Main Point of Contact: _____ Ph.D.? Yes No

Title: _____

Company/Organization: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

E-mail address: _____

Phone: _____

Paper Presenter's Name: _____ Ph.D.? Yes No

Title: _____

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PLEASE SELECT WHICH TECHNICAL SESSION YOUR PAPER IS MOST CLOSELY RELATED TO:

AUTONOMOUS GROUND SYSTEMS (AGS)

- Technology
- Mission Applications
- Systems Assessment

MATERIALS & ADVANCED MANUFACTURING (M&AM)

- Lightweight Materials Development and Maturation
- Multimaterial Joining
- Additive Manufacturing
- Environmental and Corrosion
- Advanced M&AM Topics

MODELING & SIMULATION, TESTING & VALIDATION (MSTV)

- Mobility and Autonomy M&S
- Lightweight Materials and Structures M&S
- Testing & Validation
- Cross-Cutting Technologies

POWER AND MOBILITY (P&M)

- Advanced Power and Energy Storage
- Non-Primary Power
- Vehicle Running Gear
- Advanced Propulsion
- Powertrain
- Ground Systems Performance Fluids

SYSTEMS ENGINEERING (SE)

- SE Methodologies & Technical Management
- Digital Engineering/MSBE & Architecture
- Trade Space & Decision Analysis
- SE Advanced Topics

VEHICLE ELECTRONICS AND ARCHITECTURE (VEA) & GROUND SYSTEMS CYBER ENGINEERING (GSCE)

- Platform Architectures and Applications
- Cyber Security & Information Assurance
- Electrical Power
- Electrical Component and Packaging

Has this paper or presentation been exhibited at other conferences? If yes, please explain.

Yes No _____

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