ADVANCED MATERIALS & MANUFACTURING

TUESDAY, AUGUST 15, 2023

SILENT SESSION ROOM IN HALL A

SUB-COMMITTEE

Dr. Katherine Sebeck	*U.S. Army GVSC*
Nick Sonnentag	*OshKosh*
Dr. Rob Hart	*U.S. Army GVSC*
Dr. Aaron LaLonde	*U.S. Army GVSC*
Demetrios Tzelepis	*U.S. Army GVSC*

Tuesday, August 15, 2023

8:00 a.m. **Opening of GVSETS and the Technical Sessions in Legacy Ballroom, 2nd Floor**

Jim McManus, GVSETS Chair

Valde Garcia, NDIA Michigan Chapter President

Dr. David Gorsich, Chief Scientist, U.S. Army DEVCOM Ground Vehicle Systems Center (GVSC)

8:20 a.m. **Panel: Ground Vehicle R&D in a Rapidly Developing AI Environment**

Moderator: Dr. Amber Walker, Technical Director, Land Systems, Anduril Industries

Dr. Beshah Ayalew, Professor and VIPR-GS Focus Area Director for Propulsion Systems & Smart Energy, Clemson University

Lucian Slatineanu, Principal Investigator, Hypergiant

COL Jeffrey E. Baker, Ph.D., Acting Director, U.S. Army Artificial Intelligence Integration Center (AI2C)

9:30 a.m. **Exhibitor Break**

10:05 a.m. **Welcome and Introduction to the Advanced Materials & Manufacturing (AMM) Technical Session, Silent Session Room in Hall A**

Dr. Katherine Sebeck, Specialist Research Engineering, U.S. Army GVSC

Nick Sonnentag, Senior Principal Engineer, Oshkosh

10:10 a.m. **Scan Sequence Optimization for Reduced Residual Stress and Distortion in LBPF Additive Manufacturing – An AISI 316L Case Study**

[Paper]

Chuan He, PhD. Candidate, University of Michigan

Dr. Chinedum Okwudire, Professor, University of Michigan

Dr. Nevzat Bugdayci, Postdoctoral Fellow, University of Michigan

10:30 a.m. **3D Printed Ni-based Superalloy Integrated Joint Alignment (consumed by TIG Welding) with Microstructure Analysis**

[Paper]

Tad Steinberg, Additive Manufacturing Business Development/Sales, Siemens Energy

Dr. Ole Geisen, Additive Manufacturing Researcher, Siemens Gas and Power GmbH

10:50 a.m. **Thermally Annealed, High Strength 3D Printed Thermoplastic Battery Bracket for M998**

[Paper]

Dr. Eric Wetzel, Team Leader, US Army Research Lab

Ryan Dunn, AM Engineer, US Army Research Lab

Larry Holmes, Executive Director – Center for Advanced Manufacturing and Materials, Harrisburg University of Science and Technology

Casey Shearrow, Engineering, Harrisburg University of Science and Technology

Kevin Hart, Chief Technology Officer, Prepared for Flight LLC

Dr. Jay Park, Assistant Professor, University of Massachusetts – Lowell

Matthew Ludkey, Polymer Additive Manufacturing Lab Manager, U.S. Army GVSC

11:10 a.m. **Manufacturing, Modeling and Characterizing Thermoplastic Composites for Military Vehicle Applications**

[Paper]

Dr. Evan Patton, Composite Research Engineer, U.S. Army GVSC

Dr. Robert J Hart, Composites Technical Specialist, U.S. Army GVSC

11:30 a.m. **Lightweight Drapable Anti-corrosion Covers**

[Paper]

Dr. David Sharman, Military and Technical Advisor, Transhield USA

Robert Danko, Senior Military Advisor, Force Four Logistics

Bill Scheible, Military Business Development, Transhield USA

11:50 a.m. **Lunch**

1:05 a.m. **Introduction To the AMM Afternoon Session**

Dr. Katherine Sebeck, Specialist Research Engineering, U.S. Army GVSC

Nick Sonnentag, Senior Principal Engineer, Oshkosh

1:10 a.m. **Manufacturing of Carbon Fiber Reinforced Silicon Carbide –Zirconium Diboride Composite Brake Rotors using Electric Field Assisted Sintering**

[Paper]

Clifford Leonard, CEO, Carbon SiC Technologies, Inc.

Kevin Nguyen, Student, University of Southern California

Dr. Steven Nutt, Director of Composites Departments, University of Southern California Jorgen Rufner, Group Lead – Advanced Manufacturing, Idaho National Laboratory

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1:30 p.m. **Panel: Advanced Manufacturing in Practical Spaces**

Moderator: Demetrios Tzelepis, Metals Technical Specialist, U.S. Army GVSC

Nick Sonnentag, Senior Principal Engineer, Oshkosh

Gregory J. Lupton, Deputy Commander, Rock Island Arsenal Joint Manufacturing and Technology Center

Dr. Ken Letcher, Specialist Leader, Supply Chain and Network Operations, Deloitte Consulting LLP

2:20 p.m. **AMM Technical Session Conclusion and Best Paper**

Dr. Katherine Sebeck, Specialist Research Engineering, U.S. Army GVSC

Nick Sonnentag, Senior Principal Engineer, Oshkosh

5:15 p.m. **Networking Reception: GVSETS Cruising Michigan - Outdoor Patio**

5:30 p.m. **Overall Best Paper Announcement**

Dr. David Gorsich, Chief Scientist, U.S. Army GVSC

Dr. Gregg Wildes, Business Development Manager, DornerWorks

AUTONOMY, ARTIFICIAL INTELLIGENCE & ROBOTICS TECHNICAL SESSION

TUESDAY, AUGUST 15, 2023

CORNERSTONE II ROOM

SUB-COMMITTEE

Dr. Oleg Sapunkov	*U.S. Army GVSC*
Joshua Moo	*American Rheinmetall Vehicles*
Dr. David Grabowsky	*U.S. Army GVSC*

Tuesday, August 15, 2023

8:00 a.m. **Opening of GVSETS and the Technical Sessions in Legacy Ballroom, 2nd Floor**

Jim McManus, GVSETS Chair
Valde Garcia, NDIA Michigan Chapter President
Dr. David Gorsich, Chief Scientist, U.S. Army DEVCOM Ground Vehicle Systems Center (GVSC)

8:20 a.m. **Panel: Ground Vehicle R&D in a Rapidly Developing AI Environment**

Moderator: Dr. Amber Walker, Technical Director, Land Systems, Anduril Industries
Dr. Beshah Ayalew, Professor and VIPR-GS Focus Area Director for Propulsion Systems & Smart Energy, Clemson University
Lucian Slatineanu, Principal Investigator, Hypergiant
COL Jeffrey E. Baker, Ph.D., Acting Director, U.S. Army Artificial Intelligence Integration Center (AI2C)

9:30 a.m. **Exhibitor Break**

10:05 a.m. **Welcome and Introduction to the Autonomy, Artificial Intelligence and Robotics (AAIR) Technical Session in Cornerstone II**

Dr. Oleg Sapunkov, Mechanical Engineer / Historian, U.S. Army GVSC

10:10 a.m. **A Low-Power and High-Performance Software Approach to Artificial Intelligence On-Board** Dr. Pablo Ghiglino, CEO and Founder, Klepsydra Technologies

[Paper]

Dr. Mandar Harshe, Senior Developer, Klepsydra Technologies

10:30 a.m. **Extracting Actionable Information from Heterogeneous Sensors in the Field: A Distributed Hybrid AI Approach in Constrained Domains**

[Paper]

Dr. Gregor Pavlin, Senior Scientist and Program Manager, Thales Research and Technology Netherlands
Raphael Boudreault, Senior Researcher, Thales Digital Solutions Canada
Ate Penders, Software Engineer, Thales Research and Technology Netherlands
Maurits de Graaf, R&D Engineer, Thales Research and Technology Netherlands
Daniel Lafond, HFE Specialist, Thales Digital Solutions Canada
Andy Swiebel, Marketing Manager, Thales Research and Technology Netherlands

10:50 a.m. **Cross-View Image Translation Using Conditional GAN for Autonomous Driving**

[Paper]

Dan Zhang, Ph.D. Student, Clemson University
Bradley Sanders, Masters Student, Clemson University
Grayson Byrd, Masters Student, Clemson University
Dr. Feng Luo, Professor, Clemson University
Dr. Venkat Krovi, Professor, Clemson University
Dr. David Gorsich, Chief Scientist, U.S. Army GVSC
Dr. Jonathon Smereka, Research Senior Technical Expert, U.S. Army GVSC
Dr. Mark Brudnak, Senior Technical Expert, U.S. Army GVSC

AAIR Technical Session

11:10 a.m. **A Lightweight Convolutional Neural Network for Target Detection in an Edge Environment**

[Paper]

Dr. Hughes Perreault, AI Scientist, Thales Digital Solutions Canada
Dr. Ola Ahmad, Lead AI Scientist, Thales Digital Solutions Canada
Daniel Czuboka, Engineering Manager, Thales Defense and Security Canada

11:30 a.m. **A Semantically Classified Geo-Spatial 3D Octree Voxel Based System for Geotechnical Site Characterization**

[Paper]

Matthew Richards, Research Computer Scientist, US Army Corps of Engineers (USACE) Engineering Research and Development Center (ERDC) Information Technology Laboratory
Israel Lopez Toledo, Research Computer Engineer, USACE ERDC Construction Engineering Research Laboratory (CERL)
Kevin Murphy, Research Mechanical Engineer, USACE ERDC CERL
Dr. Ahmet Soylemezoglu, Research Systems Engineer, USACE ERDC CERL

11:50 a.m. **Lunch**

1:05 p.m. **Introduction to the AAIR Afternoon Session**

Dr. Oleg Sapunkov, Mechanical Engineer / Historian, U.S. Army GVSC

1:10 p.m. **Artificial Neural Network Based Terrain Reconstruction for Off-Road Autonomous Vehicles Using LIDAR**

[Paper]

Sarang Sutavani, Graduate Research Assistant, Clemson University
Andrew Zheng, Graduate Student, Clemson University
Ajinkya Joglekar, Graduate Research Assistant, Clemson University
Dr. Jonathon Smereka, Research Senior Technical Expert, U.S. Army GVSC
Dr. David Gorsich, Chief Scientist, U.S. Army GVSC
Dr. Venkat Krovi, Professor, Clemson University
Dr. Umesh Vaidya, Professor, Clemson University

1:30 p.m. **Robust Path Planning in the Battlefield**

[Paper]

Thomas Jonsson Damgaard, Software Engineer, Carmenta Geospatial Technologies
Dr. Mikael Rittri, Software Engineer, Carmenta Geospatial Technologies
Patrick Franz, Vice President Customer Success, Carmenta Geospatial Technologies
Anika Halota, Software Engineer, Carmenta Geospatial Technologies

1:50 p.m. **Multi-Criteria Multi-Agent Path Planning in Unstructured Off-Road Environments** Sachet Khatiwada, Graduate Research Assistant, Clemson University

[Paper]

Dr. Pamela Murray-Tuite, Professor, Clemson University
Dr. Matthias Schmid, Research Assistant Professor, Clemson University

2:10 p.m. **Determining a Direction and Position Agnostic Occupancy Probability and Occupancy Ratio from Maps of Obstacle Fields for Ground Vehicle Navigation**

[Paper]

Stephen Harnett, Ph.D. Student, Pennsylvania State University Applied Research Lab (ARL)
Dr. Sean Brennan, Professor, Pennsylvania State University
Dr. Karl Reichard, Associate Research Professor, Pennsylvania State University ARL
Dr. Jesse Pentzer, Assistant Research Professor, Pennsylvania State University ARL

2:30 p.m. **Exhibitor Break**

3:15 p.m. **Introduction to the AAIR Afternoon Session**

Dr. Oleg Sapunkov, Mechanical Engineer / Historian, U.S. Army GVSC

3:20 p.m. **Runtime Monitor for Platform Protection Against Skid-Steer Untripped Rollovers**

[Paper]

Dr. Aurora Schmidt, Principal Research Staff, Johns Hopkins University Applied Physics Laboratory (APL)
Elizabeth Dietrich, Associate Professional Staff, Johns Hopkins APL
Daniel Genin, Senior Professional Staff, Johns Hopkins APL
Gautam Vallabha, Senior Professional Staff, Johns Hopkins APL
Sara Pohland, Graduate Student Researcher, Johns Hopkins APL
Anthony Composto, Robotic Vehicle Integration and Safety Technical Lead, U.S. Army GVSC
Marcus Randolph, Branch Chief, U.S. Army GVSC

3:40 p.m. **Development and Use of Driving Robots for Conducting Unmanned Tests of Off-Road Vehicles**

[Paper]

Dr. Gary Heydinger, Director Vehicle Dynamics, S-E-A, Ltd.
Dr. Scott Zagorski, Senior Research Engineer, S-E-A, Ltd.
Dr. Dale Andreatta, Senior Research Engineer, S-E-A, Ltd.
Meredith Bartholomew, Research Engineer, S-E-A, Ltd.

4:00 p.m. **Physically Cooperating Autonomous Ground Vehicles**

[Paper]

Michiel Ashley, Graduate Research Assistant, Texas A&M University
Davis McMullan, Undergraduate Research Assistant, Texas A&M University
Dr. Swaminathan Gopalswamy, Research Professor, Texas A&M University

4:20 p.m. **Expendable Low-Profile Modular UGVs for Combat Vehicle Underbody Operation**

[Paper]

Anastasya Washington, Student, University of Michigan (U of M) Dearborn
Ryan Schouster, Student, U of M Dearborn
Andrew Stempien, Student, U of M Dearborn
Drew Wilson, Student, U of M Dearborn
Callum Read, Student, U of M Dearborn
Jared Burton, Student, U of M Dearborn
Garret Svoboda, Student, U of M Dearborn
Jacob Pendergrass, Student, U of M Dearborn
Freddie Young, Student, U of M Dearborn
Jacob Bennett, Student, U of M Dearborn
Dr. Oleg Sapunkov, Mechanical Engineer / Historian, U.S. Army GVSC

4:40 p.m. **Bringing Robotic Platforms from Vehicle Testing to Warrior Training**

[Paper]

Meredith Bartholomew, Research Engineer, S-E-A, Ltd.
Dr. Dale Andreatta, Senior Research Engineer, S-E-A, Ltd.
Ponaravind Muthaiah, Research Engineer, S-E-A, Ltd.
Nick Helber, Research Engineer, S-E-A, Ltd.
Dr. Gary Heydinger, Director Vehicle Dynamics, S-E-A, Ltd.
Dr. Scott Zagorski, Senior Research Engineer, S-E-A, Ltd.

5:00 p.m. **AAIR Technical Session Conclusion and Best Paper**

Dr. Oleg Sapunkov, Mechanical Engineer / Historian, U.S. Army GVSC

5:15 p.m. **Networking Reception: GVSETS Cruising Michigan - Outdoor Patio**

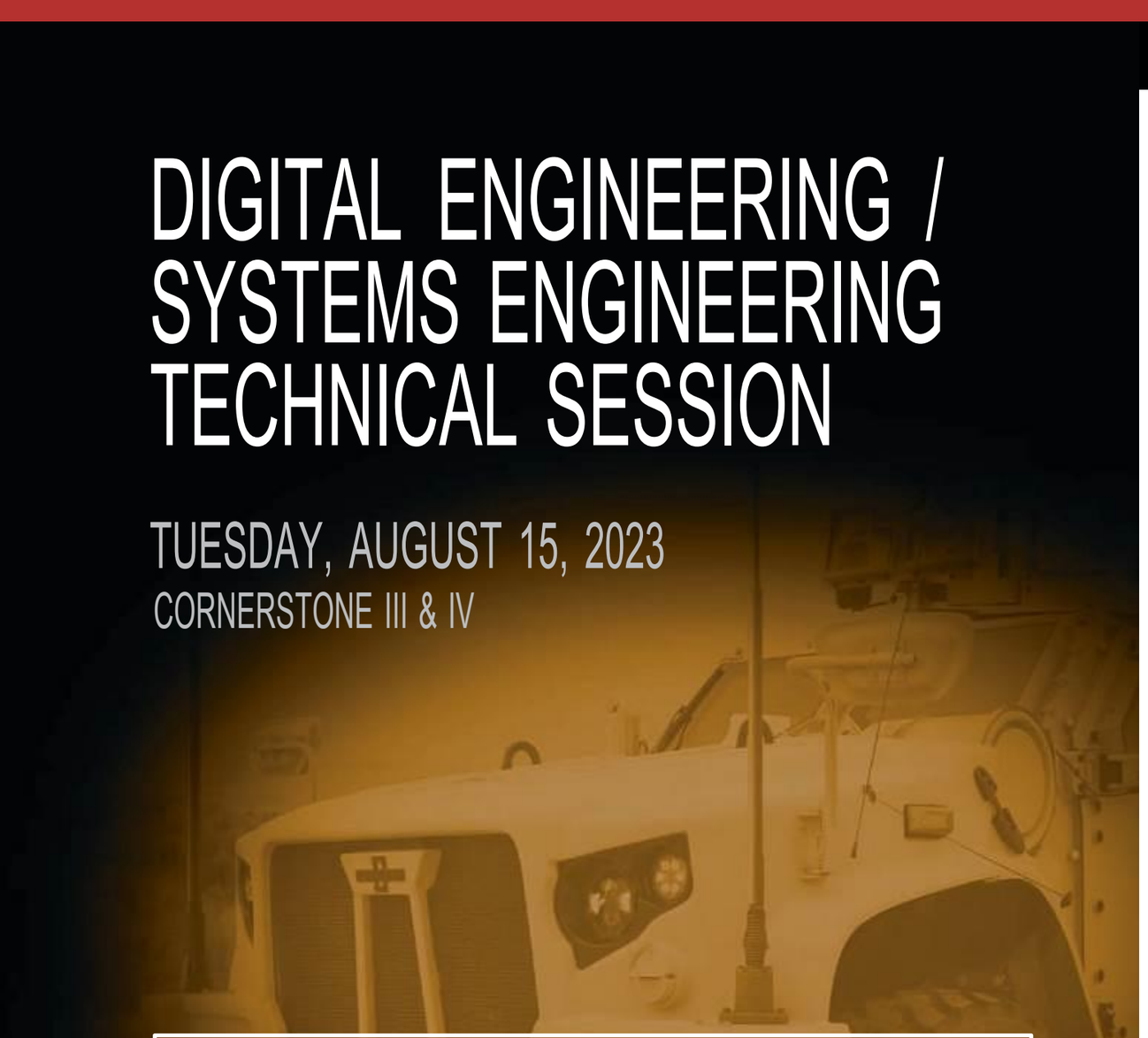
5:30 p.m. **Overall Best Paper Announcement**

Dr. David Gorsich, Chief Scientist, U.S. Army GVSC
Dr. Gregg Wildes, Business Development Manager, DornerWorks

DIGITAL ENGINEERING / SYSTEMS ENGINEERING TECHNICAL SESSION

TUESDAY, AUGUST 15, 2023

CORNERSTONE III & IV



SUB-COMMITTEE

Bill Berklich	*U.S. Army GVSC*
Andy Diepen	*GS Engineering*
Matthew Peterson	*SAIC*
James Ealy	*U.S. Army GVSC*
Cheryl Sutherland	*U.S. Army GVSC*

Tuesday, August 15, 2023

8:00 a.m. **Opening of GVSETS and the Technical Sessions in Legacy Ballroom, 2nd Floor**

Jim McManus, GVSETS Chair

Valde Garcia, NDIA Michigan Chapter President

Dr. David Gorsich, Chief Scientist, U.S. Army DEVCOM Ground Vehicle Systems Center (GVSC)

8:20 a.m. **Panel: Ground Vehicle R&D in a Rapidly Developing AI Environment**

Moderator: Dr. Amber Walker, Technical Director, Land Systems, Anduril Industries Dr.

Beshah Ayalew, Professor and VIPR-GS Focus Area Director for Propulsion Systems & Smart Energy, Clemson University Lucian Slatineanu, Principal Investigator, Hypergiant

COL Jeffrey E. Baker, Ph.D., Acting Director, U.S. Army Artificial Intelligence Integration Center (AI2C)

9:30 a.m. **Exhibitor Break**

10:05 a.m. **Welcome and Introduction to the Digital Engineering/Systems Engineering (DE/SE) Technical Session in Cornerstone III & IV**

Bill Berklich, Technical Specialist, U.S. Army GVSC

10:10 a.m. **Panel: DE Transformation Through Training**

Moderator: Matthew Peterson, Vice President for Engineering in the Innovation Factory, SAIC

Michael F Batarseh, Professor of Systems Engineering, Defense Acquisition University

Andy Diepen, Chief Engineer, GS Engineering

George Halow, Professor of Practice in Aerospace Engineering, University of Michigan

Dr. Greg Mocko, Director of Advanced Manufacturing for Clemson

10:50 a.m. **Translating the Digital Engineering Vision to Reality: A Process for Defining a Suitable Digital Engineering Scope for DoD Acquisition Programs** Sarah Scheithauer, Research Engineer II, Georgia Tech Research Institute (GTRI)

[Paper]

Dr. Craig Arndt, PE, CHFP, USN(R), Principal Research Faculty, GTRI

Gerald Byrd, Digital Engineering Branch Chief, Program Manager Maneuver Combat Systems — Optionally Manned Fighting Vehicle (PM MCS – OMFV)

Lieutenant Colonel Dave Chudy, Army Acquisition Corps, Program Executive Office Ground Combat Systems (PEO GCS)

Brady C. Juelson, Major, Infantry, Executive Officer to the Commanding General, Mission & Installation Contracting Command (MICC)

Dalton Clark, Research Engineer II, GTRI

11:10 a.m. [Paper]
Model-Based Acquisition Kickstart: Lowering the Barrier-to-Entry for Model-Based Deliverables Eric Alexander, Senior Model-Based Systems Engineer, Strategic Technology Consulting
Dr. Jason Kolligs, Senior Model-Based Systems Engineer, Strategic Technology Consulting
Kate Kovalovsky, Senior Model-Based Systems Engineer, Strategic Technology Consulting

11:30 a.m. [Paper]
Implementing Mission Engineering with UAF
Matthew Gagliardi, Principal, System Strategy Inc. Matthew Hause, Principal, System Strategy Inc.

11:50 a.m. **Lunch**

1:05 p.m. **Introduction to the DE/SE Afternoon Session**
Andy Diepen, Chief Engineer, GS Engineering

1:10 p.m. [Paper]
Verification of an Architecture in A System Model Using Domain-Specific Operations Scenarios and Contexts
Dr. Macam Dattathreya, Chief Engineer, U.S. Army PEO GCS

1:30 p.m. [Paper]
Application of the Autonomous Ground Vehicle Reference Architecture to Model Based Systems Engineering (MBSE)
Calvin Cheung, Technical Specialist, U.S. Army GVSC

1:50 p.m. [Paper]
Accelerating The Delivery of the Technology to The Warfighter Using Collaborative Immersive XR Technology Environments & Tools Dr. Alanzo Granville, Digital Engineer Chief, XR Immersive Technology, SAIC

2:10 p.m. [Paper]
Automation of Test Case Generation and Software System Modelling
Dr. Michael Lingg, Principal Research Engineer, Array of Engineers Howard Paul, Chief Operations Officer, Array of Engineers
Sachin Kushwaha, Technical Software Engineering Lead, Array of Engineers
Jaiden Ortiz, Undergraduate Student, Grand Valley State University

2:30 p.m **Exhibitor Break**

3:15 p.m. **Introduction to the DE/SE Afternoon Session**
Matthew Peterson, Vice President for Engineering in the Innovation Factory, SAIC

3:20 p.m. [Paper]
Simulation and Process Data Management in the Digital Thread
Brandon M. Jennings, Modeling and Simulation Offering Manager, SAIC

DE/SE Technical Session

3:40 p.m. [Paper]
Product Line Engineering Within a Digital Engineering / Model-Based Systems Engineering Environment for Ground Vehicle Systems
Robert Kanon, Chief Digital Engineer, SAIC
Michelle Gasbarro, Systems Engineer Chief, SAIC
Nathan Rojas, Senior Systems Engineer, SAIC
Surender Dua, Systems Engineer Principal, SAIC
Kevin Griffin, Systems Engineer Principal, SAIC
Dennis Tuckowski, Systems Engineer Principal, SAIC
Steven Schultz, Associate Director, Systems Engineering Directorate, U.S. Army GVSC

4:00 p.m. [Paper]
Identification and Management of Key Characteristics in Product Development Using Model Based System Engineering
William Ireland, Consultant, Ireland Consulting

4:20 p.m. [Paper]
Application of Artificial Intelligence and Machine Learning in Ground Vehicle System Life Cycle Management
Maxwell Kern, AI Developer, Systecon North America
Arif Cengic, Lead Software Developer, Systecon North America

4:40 p.m. [Paper]
Model-based Reliability, Availability Maintainability & Safety Integration
Jake B. Langton, Engineer, PHM Technology
Sam Hilton, PHM Technology
Presenter: Marlene Haag, Solution Consultant, Siemens

5:00 p.m. **DE/SE Technical Session Conclusion and Best Paper**
Bill Berklich, Technical Specialist, U.S. Army GVSC

5:15 p.m. **Networking Reception: GVSETS Cruising Michigan - Outdoor Patio**

5:30 p.m. **Overall Best Paper Announcement**
Dr. David Gorsich, Chief Scientist, U.S. Army GVSC
Dr. Gregg Wildes, Business Development Manager, DornerWorks

MODELING SIMULATION AND SOFTWARE TECHNICAL SESSION

TUESDAY, AUGUST 15, 2023

CORNERSTONE I ROOM

SUB-COMMITTEE

Dr. Mark Brudnak	*US Army GVSC*
Mark Michel	*Raytheon Technologies*
Dr. Vamshi Korivi	*US Army GVSC*
Dr. Matt Castanier	*US Army GVSC*
Arkady Grunin	*US Army GVSC*
Sarah Hanania	*US Army GVSC*
Dr. Michael McCullough	*BAE Systems*

Tuesday, August 15, 2023

8:00 a.m. **Opening of GVSETS and the Technical Sessions in Legacy Ballroom, 2nd Floor**
Jim McManus, GVSETS Chair
Valde Garcia, NDIA Michigan Chapter President
Dr. David Gorsich, Chief Scientist, U.S. Army DEVCOM Ground Vehicle Systems Center (GVSC)

8:20 a.m. **Panel: Ground Vehicle R&D in a Rapidly Developing AI Environment**
Moderator: Dr. Amber Walker, Technical Director, Land Systems, Anduril Industries
Dr. Beshah Ayalew, Professor and VIPR-GS Focus Area Director for Propulsion Systems & Smart Energy, Clemson University
Lucian Slatineanu, Principal Investigator, Hypergiant
COL Jeffrey E. Baker, Ph.D., Acting Director, U.S. Army Artificial Intelligence Integration Center (AI2C)

0:30 a.m. **Exhibitor Break**

10:05 a.m. **Welcome and Introduction to the Modeling, Simulation and Software (MS2) Technical Session in Cornerstone I**
Mark Michel, Manager Advanced Technologies, Raytheon Technologies
Dr. Mark Brudnak, Senior Technical Expert, U.S. Army GVSC

10:10 a.m. **Adaptation of the Dynamic Mode Decomposition Methodology to High Reynolds Number Flow over a Ground Vehicle: Challenges and Mitigation**
[Paper]
Dr. Mesbah Uddin, Professor, University of North Carolina at Charlotte
Adit Misar, Graduate Student, University of North Carolina at Charlotte
Spencer Nichols, Graduate Student, University of North Carolina at Charlotte
Dr. Vamshi M. Korivi, Technical Expert, U.S. Army GVSC
Dr. Nathan A. Tison, Engineer, U.S. Army GVSC

10:30 a.m. **Augmenting Thermal and Signature Models Using A Fast 3D Fluid Dynamics Simulation For Improved Convection Fidelity**
[Paper]
Joshua Pryor, Senior Engineer, ThermoAnalytics Inc.
Duncan Karnitz, Senior Software Engineer, ThermoAnalytics Inc.
Warren Powers, Senior Developer, ThermoAnalytics Inc.
Douglas Banyai, Senior Developer, ThermoAnalytics Inc.
Pete Rynes, Program Manager, ThermoAnalytics Inc.
Dr. Nathan Tison, Engineer, U.S. Army GVSC
Dr. Vamshi Korivi, Technical Expert, U.S. Army GVSC
Dr. Yeefeng Ruan, Engineer, U.S. Army GVSC

10:50 a.m. **Evaluation of Hash-Seeded Pseudo-Random Number Generators in Parallel Environments**
[Paper]
John Kaniarz, Senior Computer Engineer, U.S. Army GVSC
Dr. Mark Brudnak, Senior Technical Expert, U.S. Army GVSC

11:10 a.m. **Lateral Rollover Simulation of High Mobility Multipurpose Wheeled Vehicle (HMMWV) and Effectiveness of Restraints Systems on Occupant Responses**
[Paper]
Venkatesh Babu, Research Mechanical Engineer, U.S. Army GVSC
Dr. Jian Kang, Research Mechanical Engineer, U.S. Army GVSC
Sanjay Kankanalapalli, Research Mechanical Engineer, U.S. Army GVSC
Dr. Jianping Sheng, Research Mechanical Engineer, U.S. Army GVSC
Madanmohan Vunnam, Branch Chief, U.S. Army GVSC
Dr. Sebastian K. Karwaczynski, Senior Researcher, U.S. Army Program Executive Office Combat Support and Combat Service Systems/Program Manager High Mobility Multipurpose Wheeled Vehicle (HMMWV)
Chris Jessup, Engineering Manager, IMMI
Mike Duncan, Product Manager, IMMI

11:30 a.m. **Vulnerability Assessment of Ground Vehicle Systems Enabled With Active Protection Systems (APS) Through Surrogate Modeling**
[Paper]
Kumar Kulkarni, Technical Specialist, U.S. Army GVSC
Venkatesh Babu, Research Mechanical Engineer, U.S. Army GVSC
Sanjay Kankanalapalli, Mechanical Engineer, U.S. Army GVSC
Aditya Vipradas, Engineer, Hexagon
Dr. Paramsothy Jayakumar, Senior Technical Expert, U.S. Army GVSC
Dr. Ravi Thyagarajan, Professor of Practice Mechanical Engineer, Texas A&M University

11:50 a.m. **Lunch**

1:05 p.m. **Introduction To the MS2 Afternoon Session**
Dr. Mark Brudnak, Senior Technical Expert, U.S. Army GVSC

1:10 p.m. **A Virtual Spectator System for Virtual Experimentation in Multi-User Video Game Environments**
[Paper]
Dr. Wing-Yue Geoffrey Louie, Assistant Professor, Oakland University
Motaz AbuHijleh, Graduate Research Assistant, Oakland University
Sean Dallas, Graduate Research Assistant, Oakland University
Dr. Mark Brudnak, Senior Technical Expert, U.S. Army GVSC
Gregory Pappas, Program Manager, U.S. Army GVSC

1:30 p.m. **A Perspective on GVSC Crewstation Development and Addressing Future Ground Combat Vehicle Needs**
[Paper]
Terrance Tierney, Technical Expert - Crewstation Development, U.S. Army GVSC

1:50 p.m. **Designing an Interactive Mixed Reality Cockpit for Enhanced Soldier-Vehicle Interaction**
[Paper]
Ryan Wood, Computer Scientist, U.S. Army GVSC
Dr. Jeffrey Hansberger, HCI Researcher, Army Research Laboratory
Ty Conner, Developer, University of Alabama at Huntsville
Jayse Hansen, Graphic Artist, University of Alabama at Huntsville
Jacob Nix, Developer, University of Alabama at Huntsville
Marco Torres, 3D Artist, DCS Corporation

MS2 Technical Session

2:10 p.m. **Targeting Simulation for Assessment of Lay Error Under Varying Conditions**
[Paper]
Dr. Nicholas Gans, Principal Research Assistant, University of Texas Arlington Research Institute
Cody Lundberg, Research Scientist 2, University of Texas at Arlington
Jennifer Forsythe, Master Analyst, U.S. Army DEVCOM Analysis Center
Parker Ensing, Graduate Researcher, University of Georgia
Dr. Thirimachos Bourlai, Associate Professor, University of Georgia

2:30 p.m. **Exhibitor Break**

3:15 p.m. **Introduction to the MS2 Afternoon Session**
Arkady Grunin, Mechanical Engineer, U.S. Army GVSC

3:20 p.m. **Scene Adjustment Tools for Autonomy Simulation**
[Paper]
Joseph Auchter, Lead Engineer, Southwest Research Institute (SwRI)
Robert Brothers, Research Engineer, SwRI
Daniel Beer, Research Engineer, SwRI

3:40 p.m. **Dynamic Snowfall Scene Simulations for Autonomous Vehicle Sensor Performance**
[Paper]
Dr. Sergey Vecherin, Research Physicist, U.S. Army Corps of Engineers, Engineering Research and Development Center, Cold Regions Research and Engineering Laboratory (USACE ERDC CRREL)
Molly Tedesche, Research Physicist, USACE ERDC CRREL
Michael Parker, Research Mechanical Engineer, USACE ERDC CRREL

4:00 p.m. **Exploring the Impact of Data Uncertainties in Autonomous Ground Vehicle Platooning**
[Paper]
Dr. Jon C. Calhoun, Assistant Professor, Clemson University
August St. Louis, Research Assistant, Clemson University

4:20 p.m. **Tool Development for Mobility Visualization and Routing Incorporating Vehicle Limitations and Terrain Modeling**
[Paper]
Dr. Eric Pesheck, Senior Engineering Manager, Hexagon Manufacturing Intelligence
Robert Goff, Senior Software Engineer, Hexagon Geosystems
Joseph Little, Consulting Engineer, Hexagon Manufacturing Intelligence
Dr. Paramsothy Jayakumar, Senior Technical Expert, U.S. Army GVSC

4:40 p.m. **Tire-Soil Interaction Study**
[Paper]
Scott Bradley, PE, Director, Keweenaw Research Center (KRC), Michigan Technological University (MTU)
Russ Alger, Research Lead KRC, MTU
Scott Gruenberg, Senior Research Engineer KRC, MTU

5:00 p.m. **MS2 Technical Session Conclusion and Best Paper**
Mark Michel, Manager Advanced Technologies, Raytheon Technologies

5:15 p.m. **Networking Reception: GVSETS Cruising Michigan - Outdoor Patio**

5:30 p.m. **Overall Best Paper Announcement**
Dr. David Gorsich, Chief Scientist, U.S. Army GVSC
Dr. Gregg Wildes, Business Development Manager, DornerWorks

MODULAR OPEN SYSTEMS ARCHITECTURE (MOSA) TECHNICAL SESSION

TUESDAY, AUGUST 15, 2023

CORNERSTONE V & VI

SUB-COMMITTEE

Jeff Klida	*U.S. Army GVSC*
Mag Athnasios	*DCS Corp.*
Eric Bennett	*U.S. Army GVSC*
Andrew Kerbrat	*U.S. Army GVSC*

Tuesday, August 15, 2023

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Lucian Slatineanu, Principal Investigator, Hypergiant
COL Jeffrey E. Baker, Ph.D., Acting Director, U.S. Army Artificial Intelligence Integration Center (AI2C)

9:30 a.m. **Exhibitor Break**

10:05 a.m. **Welcome and Introduction to the Modular Open System Architecture (MOSA) Technical Session in Cornerstone V & VI**
Mag Athnasios, Senior Systems Engineer, DCS Corporation

10:10 a.m. **Deterministic & Modular Architecture for Embedded Vehicle Systems**
[Paper]
Michael Doran, Jr., Embedded Software Engineer III, DornerWorks
Leonard Elliot, Technical Specialist, Embedded Systems and Software, U.S. Army GVSC
Zach Clark, Software Engineer, DornerWorks
Mark Russell, Embedded Systems & Branch Chief, U.S. Army GVSC

10:30 a.m. **Demystifying Selection Criteria for Embedded Military Vetronics Software Achieving Determinism in a MOSA Based *Project Convergence* Environment**
[Paper]
John Warther, Vice President of Government Programs, Green Hills Software
Chuck Brokish, Director of Automotive Safety and Security, Green Hills Software

10:50 a.m. **Ensuring MOSA Success: The Interconnect Technology Beyond the Box**
[Paper]
Jeff Woods, Market Development, Aerospace & Defense, W.L. Gore & Associates, Inc.
Dr. Tammy Yost, Innovation Leader, W.L. Gore & Associates, Inc.
Jennifer Gruce, Vice President of Sales, Aerospace & Defense, W.L. Gore & Associates, Inc.
Tom Sharp, Application Engineer, Aerospace & Defense, W.L. Gore & Associates, Inc.

11:10 a.m. **Development of a Modular Open Systems Approach to Achieve Power Distribution Component Commonality**
[Paper]
Jason Holmstedt, Senior Director, Technology, and Innovation, Intellisense Systems Inc.

11:30 a.m. **Using FACE Technical Standard Features to Address Interoperability Between Ground Vehicle Domain Open Standards**
[Paper]
Mark Snyder, Senior Scientist, L3Harris
Chris Allport, Co-Founder and President, Skayl

11:50 a.m. **Lunch**

1:05 p.m. **Introduction To the MOSA Afternoon Session**
Mag Athnasios, Senior Systems Engineer, DCS Corporation

1:10 p.m. **The Unwritten Truths of Military Ground Vehicle Architecture**
[Paper]
Eric Bennett, Senior Technical Expert, U.S. Army GVSC
Mandel Machart, Technical Specialist, U.S. Army GVSC

1:30 p.m. **Design of a Modular Open System Approach for Ground Vehicle Paired Unmanned Aircraft Systems for the U.S. Army Robotic and Autonomous System's Ground Interoperability Profile**
[Paper]
Spencer Watza, Aerospace Engineer, U.S. Army Combat Capabilities Development Command Aviation & Missile Center
Neil Cooper, Mechanical Engineer, U.S. Army GVSC

1:50 p.m. **Panel: The Impacts of MOSA on Ground Vehicle Integration**
Moderator: Andrew Kerbrat, Associate Director Vehicle Electronics and Architecture, U.S. Army GVSC
Eric Bennett, Senior Technical Expert, U.S. Army GVSC
David Jedynak, Chief Technology Officer, Curtiss-Wright
Tom Aitken CMFF, Principal Engineer, Program Executive Office (PEO) Command Control Communications-Tactical (C3T)
Dr. Macam Dattathreya, CISSP, Chief Engineer, PEO Ground Combat Systems (GCS)

2:30 p.m. **Exhibitor Break**

3:15 p.m. **Introduction to the MOSA Afternoon Session**
Mag Athnasios, Senior Systems Engineer, DCS Corporation

3:20 p.m. **Leveraging Artificial Intelligence (AI) to Enable Decision Superiority**
[Paper]
Timothy Stewart, Director Business Development, Aitech Defense Systems, Inc.
Emil Kheyfets, Director, Mil-Aero Business Development, Aitech Defense Systems, Inc.
David Taylor, President, Thunder Bay Consulting

Modular Open Systems Architecture (MOSA) Technical Session

3:40 p.m. **Electronic Control Unit (ECU) Resiliency with the seL4 Hypervisor**
[Paper]
Alexander Pavey, Embedded Systems Engineer III, DornerWorks Alexander Karpinski, Computer Engineer, U.S. Army GVSC
Taylor Prins, Software Engineer, DornerWorks
Jeff Kubascik, Engineering Project Manager, DornerWorks

4:00 p.m. **CyberUP – A Heavy Vehicle Cybersecurity Solution**
[Paper]
Mark Zachos, President, DG Technologies
Dr. Prakash Kulkarni, Director, Engineering, DG Technologies

4:20 p.m. **Advanced Modular Vehicle Architectures and Cyber Resilience in The Software Defined Vehicle**
[Paper]
Jamey Cates, P.E., Chief Technology Officer, GuardKnox
Karl Nielsen, Technical Specialist, U.S. Army GVSC
Joe Stempnik, Technical Specialist, U.S. Army GVSC

4:40 p.m. **Secure Update Process for Robotic and Autonomous Systems**
[Paper]
Sabrina Pereira, Research Engineer, Southwest Research Institute (SwRI) Dr. Dariusz Mikulski, Lead Research Scientist, U.S. Army GVSC
Cameron Mott, Cyber Physical Systems Section Manager, SwRI

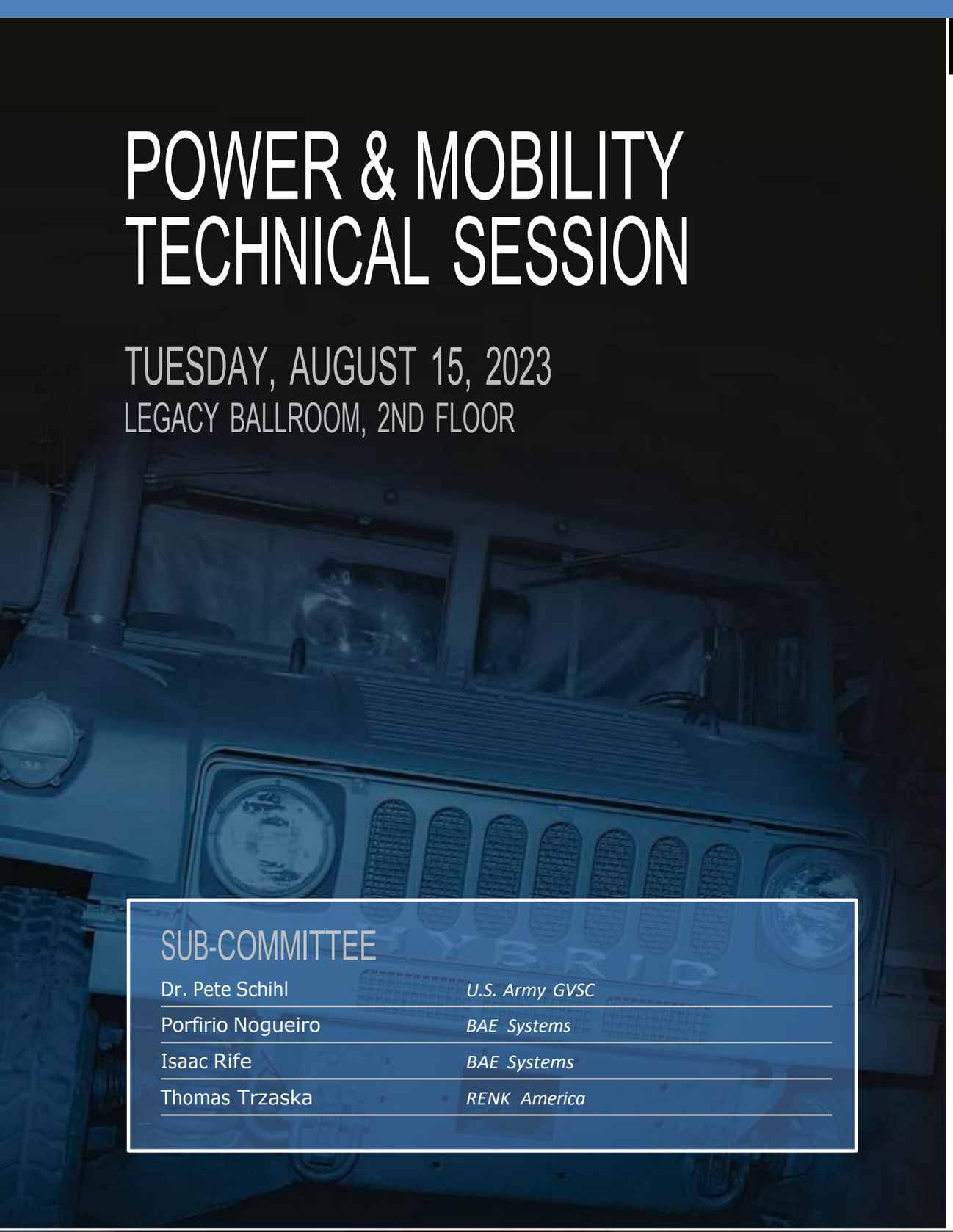
5:00 p.m. **MOSA Technical Session Conclusion and Best Paper**
Mag Athnasios, Senior Systems Engineer, DCS Corporation

5:15 p.m. **Networking Reception: GVSETS Cruising Michigan - Outdoor Patio**

5:30 p.m. **Overall Best Paper Announcement**
Dr. David Gorsich, Chief Scientist, U.S. Army GVSC
Dr. Gregg Wildes, Business Development Manager, DornerWorks

POWER & MOBILITY TECHNICAL SESSION

TUESDAY, AUGUST 15, 2023
LEGACY BALLROOM, 2ND FLOOR



SUB-COMMITTEE

Dr. Pete Schihl	*U.S. Army GVSC*
Porfirio Nogueiro	*BAE Systems*
Isaac Rife	*BAE Systems*
Thomas Trzaska	*RENK America*

Tuesday, August 15, 2023

8:00 a.m. **Opening of GVSETS and the Technical Sessions in Legacy Ballroom, 2nd Floor**
Jim McManus, GVSETS Chair
Valde Garcia, NDIA Michigan Chapter President
Dr. David Gorsich, Chief Scientist, U.S. Army DEVCOM Ground Vehicle Systems Center (GVSC)

8:20 a.m. **Panel: Ground Vehicle R&D in a Rapidly Developing AI Environment**
Moderator: Dr. Amber Walker, Technical Director, Land Systems, Anduril Industries
Dr. Beshah Ayalew, Professor and VIPR-GS Focus Area Director for Propulsion Systems & Smart Energy, Clemson University
Lucian Slatineanu, Principal Investigator, Hypergiant
COL Jeffrey E. Baker, Ph.D., Acting Director, U.S. Army Artificial Intelligence Integration Center (AI2C)

9:30 a.m. **Exhibitor Break**

10:05 a.m. **Welcome and Introduction to the Power and Mobility (P&M) Technical Session in Legacy Ballroom, 2nd Floor**
Dr. Peter Schihl, Senior Research Scientist Ground Vehicle Propulsion and Mobility, U.S. Army GVSC
Porfirio Nogueiro, Technical Fellow – Propulsion & Suspension, Combat Mission Systems, Platforms & Services, BAE Systems

10:10 a.m. **Exploration of Oil Flow and Heat Transfer Phenomenon for Gallery-Cooled Diesel Engine Pistons**
[Paper]
Arkady Grunin, Mechanical Engineer, U.S. Army GVSC
Dr. Vamshi M. Korivi, Technical Expert, U.S. Army GVSC

10:30 a.m. **A Model Predictive Control-Based Operation of Vehicle-Borne Microgrid Considering Battery Degradation**
[Paper]
Saroj Paudel, Graduate Student, Department of Automotive Engineering, Clemson University
Dr. Jiangfeng Zhang, Associate Professor, Department of Automotive Engineering, Clemson University
Dr. Beshah Ayalew, Professor, Department of Automotive Engineering, Clemson University
Dr. Matthew Castanier, Senior Research Mechanical Engineer, U.S. Army GVSC
Dr. Annette Skowronska, System Engineer, RAM Engineering, U.S. Army GVSC

10:50 a.m. **High-Power, Low Temperature Li-Metal Battery Cell for Military Vehicle Applications** Dr. John Hondred, Senior Research Engineer, Cornerstone Research Group
[Paper]
Brian Henslee, Vice President of Power Systems, Cornerstone Research Group
Pasha Nikolaev, Research Engineer, Cornerstone Research Group
Frank Zalar, Vice President of Power and Energy Center, Cornerstone Research Group

11:10 a.m. **Robust, Versatile and Safe Lithium-Ion Batteries for Military Vehicle Applications** Dr. David Ofer, Executive Director, Battery M & ET, CAMX Power Development
[Paper]
Group Joe Bernier, Principal Engineer CAMX Power Electronic Products Group
Edward Siegal, Principal Engineer, CAMX Power CELX Group
Michael Rutberg, Group leader, CAMX Power Electronic Products Group
Sharon Dalton-Castor, Principal Scientist, CAMX Power GEMX Group

11:30 a.m. **Some Insights in Fast Charge Methods for NCA Cells**
[Paper]
Dr. Bapiraju Surampudi, Institute Engineer, Southwest Research Institute (SwRI)
Ian Smith, Manager, Electrified Power Train R&D, SwRI
Dr. Terry Alger, Executive Director, Sustainable Energy and Mobility Directorate, SwRI

11:50 a.m. **Lunch**

1:05 p.m. **Introduction To the P&M Afternoon Session**
Isaac Rife, Program Engineering Manager, Platforms & Services, Combat Mission Systems, BAE Systems

1:10 p.m. **Invited Presentation: Development of a 500-kW Silicon-Carbide Bidirectional AC/DC Inverter for Electric and Hybrid Applications**
Matt Farides, Director of Business Development, Calnetix Technologies

1:30 p.m. **Panel: Vehicle Electrical Architecture Today and in the Future**
Moderator: Isaac Rife, Program Engineering Manager, Platforms & Services, Combat Mission Systems, BAE Systems
Mike Bamford, Principal Engineer, Advanced Products Engineering, General Dynamics Land Systems
Bryan Grider, Vetronics Manager, American Rheinmetall Vehicles
Aric Haynes, Technical Expert, Electrical Power/High Voltage, U.S. Army GVSC
Dr. John Putrus, Electrification Branch Chief, Joint Program Office Joint Light Tactical Vehicle - Systems Engineering, U.S. Army Program Executive Office Combat Support and Combat Service Support
Gordon Wolverton, Director of ePowertrain Technology, Navistar, Inc.

2:30 p.m. **Exhibitor Break**

3:15 p.m. **Introduction to the P&M Afternoon Session**
Thomas Trzaska, Engineering Fellow and Chief Engineer, Transmissions, RENK America

3:20 p.m. **Electrification of Medium Sized Tracked Vehicles - Hydraulic vs Electric Design and Integration**
[Paper]
Jim Aardema, Chief Engineer, Waltonen Engineering
Thomas Laboda, Director, Business Development, Waltonen Engineering

3:40 p.m. **Practical Investigation of a Parallel Through the Road Hybrid Vehicle System: Fuel Economy and Range Testing**
[Paper]
Dan Jakiela, Technology and Innovation Manager, Plasan North America
Anthony Degrote, Software Controls Engineer, Plasan North America

Power & Mobility Technical Session

4:00 p.m. **Modifying Military Tires for Improved Winter Traction**
[Paper]
Cliff Witte, Research Mechanical Engineer, U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Lab (USACE ERDC CRREL)
Dr. Orian Welling, Chief, Force Projection & Sustainment Branch, USACE ERDC CRREL
Michael Parker, Research Mechanical Engineer, USACE ERDC CRREL
Nathan Kamprath, Special Systems & Components Engineer, U.S. Army GVSC

4:20 p.m. **Transient Torque Response of Tracked Vehicle Suspension Rotary Dampers**
[Paper]
Dr. David Ostberg, Research Mechanical Engineer, U.S. Army GVSC
Ken Redner, Senior Consultant, Booz Allen Hamilton
Sam Allen, Mechanical Test Engineer, U.S. Army GVSC

4:40 p.m. **Noise and Vibration on Military Tracked Vehicles**
[Paper]
Ciaran O'Shea, Chief Executive Officer, NPrime Limited

5:00 p.m. **Power and Mobility Technical Session Conclusion and Best Paper**
Dr. Peter Schihl, Senior Research Scientist, Ground Vehicle Propulsion and Mobility, U.S. Army GVSC
Porfirio Nogueiro, Technical Fellow – Propulsion & Suspension, Combat Mission Systems, Platforms & Services, BAE Systems
Thomas Trzaska, Engineering Fellow and Chief Engineer, Transmissions, RENK America
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