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Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std Z39-18
• Short (60-90 sec) P&E video will be shown here to set the stage for the mini-symposium.
Power & Energy Trends

The Challenges

- Battlefield consumption of energy increasing
  - New C4ISR technologies
  - IED Defeat Systems
  - New weapons (EM guns, lasers)

- Energy security problematic
  - Increasing dependence on foreign oil
  - Alternative sources sought – wind, solar, bio-mass, waste to energy

- Operational issues
  - Battery usage & limitations – energy & power density
  - Demand for auxiliary power on-board vehicles
  - Emphasis on silent (“quiet”) watch
  - Unmanned vehicles (air/ground)
  - Unattended sensors
  - Inefficient management/ distribution of power
  - Demand for soldier-wearable power

- Increased emphasis on system power metrics
  (KPPs, low consumption components)

The US: Our Increasing Reliance on Fossil Energy Imports

- U.S. Consumption: 19.8M BPD
- U.S. Production: 9.3M BPD
- Total Imports: 10.5M BPD
- 53% includes 4M BPD Finished Products
- 28.3M BPD
- 2002: 8.6M BPD
- 2015: 19.7M BPD
- 2025: 28.3M BPD

Region of Projected Fuel Consumption

Best Case

Worst Case

Future Wars

Civil War

Korean War

Vietnam War

Desert Storm

Iraq War

WWI

WW II

Civil War

1944

1920

1940

1960

2000

2020

2040

2060

Year

Fuel Consumption per Soldier [gal/soldier/day]
P&E VIP Speakers

• **Mr. Chris Cardine** – General Dynamics Land Systems
  – Chief Scientist for Tank Technologies, Engineering Design and Development

• **Dr. Dana Christensen** – Depart of Energy / Oak Ridge National Laboratory
  – Associate Laboratory Director, Energy & Engineering Sciences

• **Mr. Mark Signorelli** – BAE Systems
  – V.P. and General Manager – New Vehicles and Amphibious Systems

• **Mr. Norb Biderman** – 3M Corporation
  – Business Director – Industrial and Transportation Business

• **Colonel Mike Smith** – MCOE
  – Director, Directorate of Training, Doctrine and Combat Developments
• **Energy Storage**
  - “Assessment of Li-Ion Batteries and Ultracapacitors to Meet EFV Starting Requirements” - Grayson Walker and Peter Prizio - General Dynamics Amphibious Systems
  - “Large Format Lithium Ion Battery Manufacturing“ - Scott Ferguson and Kamen Nechev - Saft America, Inc.
  - “Configurable High Power Energy Storage Supporting Propulsion and Survivability Suites” - Gerald McAlwee - BAE

• **Power & Thermal Management**
  - "Advanced Microchannel Heat Exchangers: Smaller, Lighter and Higher Performance" - Kelly/Becnel - Mezzo
  - “Power Management - An Integrated Approach” - Carrothers/Stanczak - Global ET
  - "Developing a Methodology for the Evaluation of Military Hybrid Electric Vehicle Thermal Management Systems" - Jones/ Mendoza/Frazier/Khalil - SAIC/TARDEC
  - "Cognitive Power Management Strategies" - U of M Dearborn/GDLS
P&E Main Session Speakers

• Primary Power
  – “System Considerations in the Operation and Control of Integrated Starter/Generator” – Brent Brzezinski Ph.D., Mike Marcel Ph. D., Jay Murphree Ph. D. - DRS

• Non-Primary Power
  – "Auxiliary Power Unit (APU) for Military Vehicles“ - GDLS
  – "Robust Control Architecture for Reformer Based PEM APU System" – Battelle
  – “Compact Reliable Robust (CORE) Power System for Auxiliary Power Applications” - Namazian, Lux, Venkataraman, Elder, and Bhalerao – Altex; Maslach and Centeck – TARDEC
  – “Development of a Lightweight, Multi-fuel Capable, 30 kW APU for Non-Primary Power” – David Sykes - Mainstream Engineering
• Dr. Pete Schihl
  – A brief out on the recent Power & Energy Innovation Workshop.