

Power Electronics for Tactical Energy Networks and Mobile Platforms



S&T Campaign: Sciences for Maneuver
Energy and Propulsion

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Research Objective

- Provide enabling technologies and materials that enhance the performance of future Army systems through the efficient utilization and distribution of electrical power across the spectrum of Army vehicles and tactical energy networks.



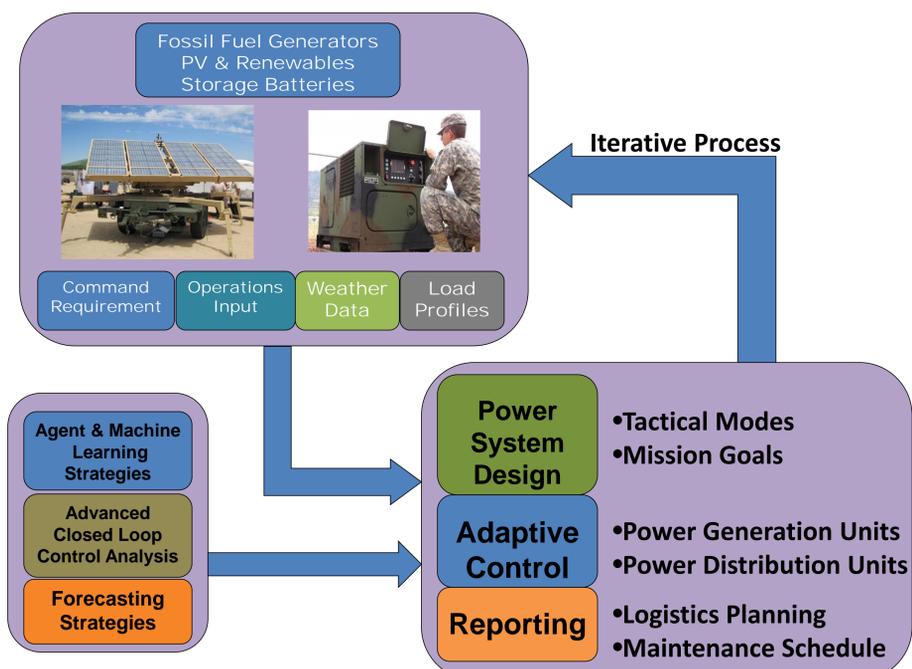
ARL-developed power electronics components supporting next-generation systems.

ARL Facilities and Capabilities Available to Support Collaborative Research

- Terra SAS Photovoltaic Simulator
- Variable AC/DC power sources up to 1 MW
- Programmable loads and Labview control suite
- 250 kW traction drive emulator
- OPAL RT Real Time Digital Simulator powered by Matlab-Simulink
- 150 kVDC High-Pot test system and Syntronics Corona Camera
- Expertise in high voltage AC/DC system design, test and analysis
- Infolytica electro-magnetic simulation suite
- Silvaco Atlas semiconductor device simulation software
- Solidworks and ANSYS thermo-mechanical FEA software
- Expertise in packaging Wide-band Gap devices for use under extreme loading conditions

Challenges

- Utilization of high-voltage energy storage
- Autonomous prognostics, diagnostics and condition-based maintenance in adverse conditions on potentially unknown systems
- Maximize all aspects of power use to minimize the logistics tail of Army systems



Complementary Expertise/ Facilities/Capabilities Sought in Collaboration

- Expertise in power system controls and algorithm development
- Mid to Large AC grid test platforms with multiple generators/sources
- Renewable energy sources for dynamic environments
- Nanocrystalline, soft magnetic ribbon production
- High-voltage, hybrid energy storage technologies for compact systems
- Wide band-gap device fabrication (e.g., SiC, GaN, AlN)