

Power Management Systems for Ground Vehicles

Optimizing mechanical and electrical power for war-fighting operations

Effective power management for military vehicles is more critical today than ever. Modern war-fighting operations require highly sophisticated, power-hungry electronic mission packages — especially those that support C4ISR and network-centric operations. These demands are ever-increasing and affect every platform. Compounding the need are traditional mechanical auxiliary subsystems whose uncoordinated and continuous operations are inherently inefficient. What's more, the waste heat resulting from power use must be exhausted through already overtaxed cooling systems.

BAE Systems' power management capabilities address these demands with greater efficiency, starting with the specific power system architecture of the platform. Each combat platform uses different methods of electrical power generation, distribution, conversion, and storage. Electrical load requirements vary within each platform based on the vehicle's mission equipment and operating mode. Additionally, mechanical accessory packages are implemented differently on each platform. BAE Systems offers flexible and modular power management systems to optimize the customer's logistic support and provisioning requirements and drive down procurement and sustainment costs.

BAE Systems employs fundamental systems engineering practices to efficiently meet power demands. Starting with a clear picture of the platform's power flow, load requirements, and priorities, controllers are designed to process

input from various sensors throughout the vehicle and route power to meet the vehicle's requirements. For example, power flows differently during acceleration, road march, attack/defend mode, and braking. Power can even be provided from an energy storage system to operate in pure electric "stealth" mode, with the engine off to reduce the vehicle's noise signature. The power management system allows the vehicle to switch between modes seamlessly, delivering power where it's needed most to provide the greatest mission effectiveness with maximum efficiency.

Addressing the system as a whole, and finding the optimal level of integration, ensures that energy loss and inefficiency are minimized. In addition, controlling all loads centrally reduces the overall cost, weight, and volume of the platform.

Benefits

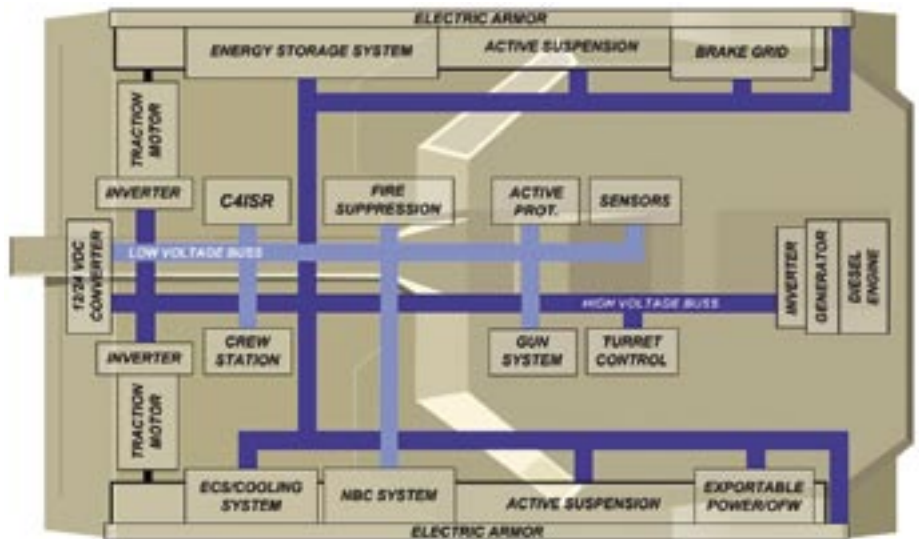
- Improved fuel economy
- On-board power generation
- Reduced need for logistics support
- "Stealth mode" operation
- Improved vehicle performance



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BAE Systems' integrated modular approach to power management:

- **Optimizes system solutions development**—minimizes cost and inefficiencies.
- **Increases hardware commonality between different platforms**—reduces system integration complexity and risk, as well as logistics support and cost, while increasing maintainability and reliability.
- **Improves space utilization**—reduces vehicle weight and size.
- **Provides intelligent fault management**—isolates faults and re-routes power to support healthy critical functions.
- **Enables fully coordinated operations**—increases power availability and flow through advanced and intelligent load requirements prioritizing and management.
- **Provides power routing flexibility**—supports vehicle mission specifics.
- **Improves energy storage utilization**—charges batteries more efficiently and carefully manages them to avoid damage by overcharging and over-discharging. State of charge is monitored to predict “minutes to go” on silent watch.
- **Supports electrification of mechanical accessories**—improves efficiency and vehicle performance by electrifying and managing power-hungry mechanical accessories such as pumps and cooling fans.



Ground combat vehicle power management system



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