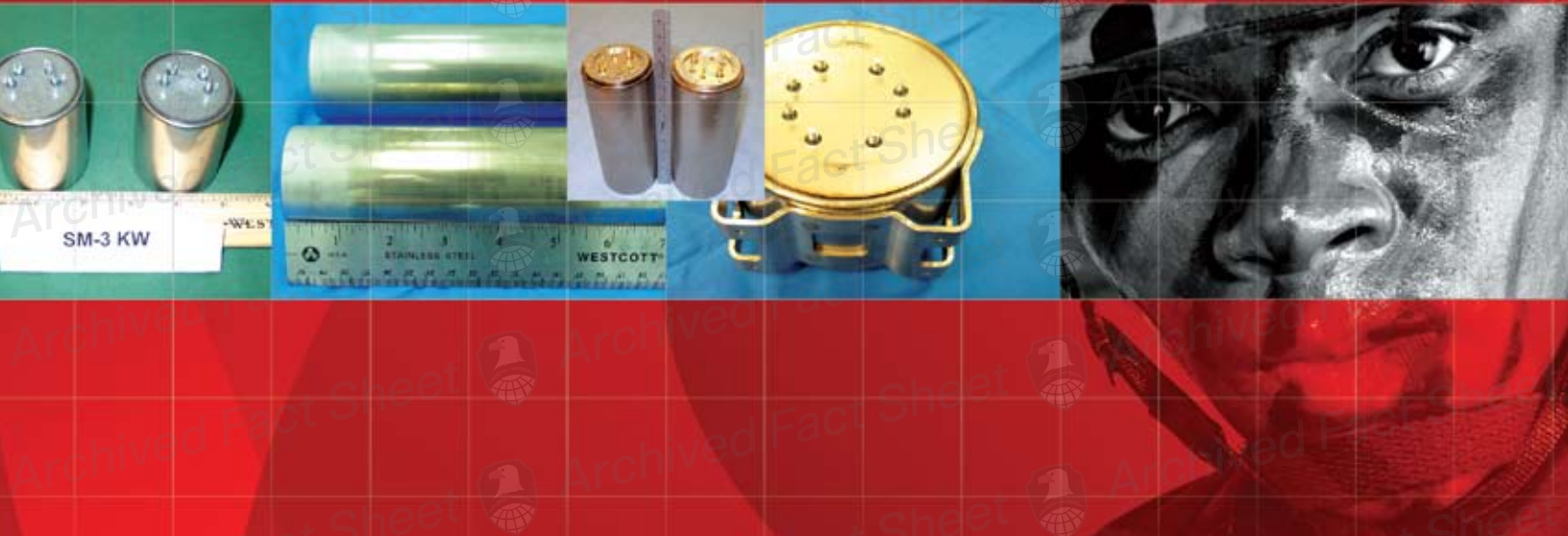




ABT

Advanced Battery Technology



Summary

- Identify and develop higher energy thermal battery chemistries to meet emerging demands
- Develop optimized manufacturing processes to enhance battery performance and increase reliability
- Focus on new or improved ancillary components to maximize overall battery efficiency and mission life
- Validate advanced capability in relevant environments

The Advanced Battery Technology (ABT) program goal is to develop advanced thermal battery technology to support the increased power and energy demands of emerging missile defense weapon systems.

Thermal batteries are a mission-critical component that enables multiple interceptor functions, providing on-demand power for avionics, guidance, navigation, control actuation, and divert and attitude control systems. Thus, thermal batteries are an essential element of virtually every strategic and tactical system. Ongoing missile system enhancements dictate the need for increased power and longer operating life coupled with reduced weight and volume. As missile systems evolve, a technology gap is developing wherein conventional battery technology cannot meet tomorrow's requirements. To address this issue, the ABT program is focusing on a variety of next-generation electrochemical, material and component technologies that are proving critical to the success of numerous DoD systems.

Overview

The U.S. Army Space and Missile Defense Command/Army Forces Strategic Command is pursuing technologies to enable development of new systems that will form the cornerstone of enhanced capabilities to defeat advanced threats. The Advanced Battery Technology (ABT) program is supporting tomorrow's interceptor technologies and systems by providing enhanced power system capabilities that provide higher energy capacity in smaller, lighter packaging. The program addresses critical needs identified by engineering studies based on current and postulated threat capabilities. The program's primary focus is on maturing and delivering technologies to enable development of next generation interceptors approaches.

Benefits for Tomorrow's Defense

The goals of the ABT program are aligned with the recommendations of the Department of Defense Power Sources Working Group published in the report "Technology Roadmap for Power Sources: Requirements Assessment for Primary, Secondary and Reserve Batteries," released on December 1, 2007. The key benefits over the next five years for future strategic and tactical defense applications include:

- Operational life increased by 50%
- Specific Energy increased by 25%
- Volume reduced by 25%
- Cost reduced by 25%

Technical Concept

The ABT program's comprehensive technical approach focuses on optimizing the electrochemistry, key ancillary materials (e.g., electrolyte formulations and high efficiency materials), raw material processing, and battery fabrication and assembly methods. Improvements will be verified in prototype batteries and further validated via acquisition

system demonstrators and flight tests. Key focus areas include:

- (1) Higher Energy Thermal Battery Chemistries
 - Higher energy & higher capacity anode and/or cathode materials
 - Lower impedance electrolyte formulations
 - Manufacture of heat pellets via tape casting (supports conformal shapes)
- (2) New / Optimized Manufacturing Processes
 - Incorporation of automated Statistical Process Control (SPC), including feedback control and automation of key manufacturing processes to increase production rate to meet user demands and to improve quality, while reducing cost
 - Raw material process optimization and control to improve product quality & lower cost
- (3) New Ancillary Materials
 - Flexible, low thermal conductivity advanced insulation materials
 - Fast-cure and lightweight header encapsulation materials
- (4) Technology Validation Under Flight Test Conditions



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