High Power, High Energy Density Lithium-Ion Batteries

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

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Project Overview

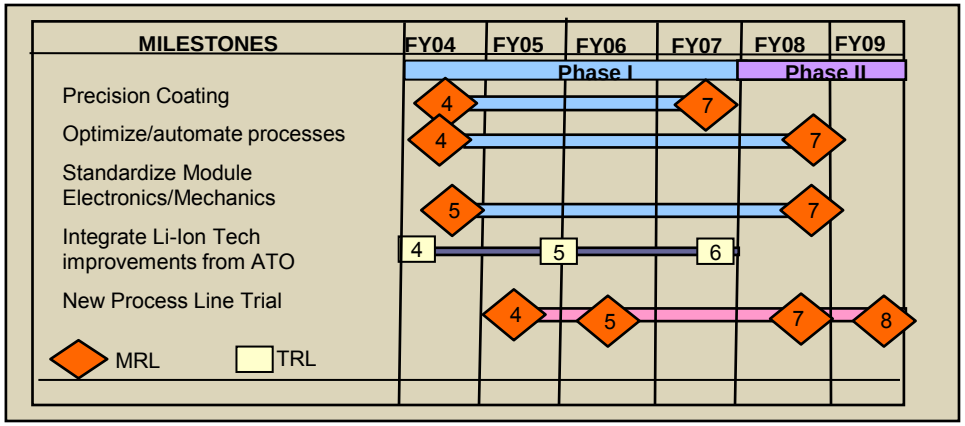
Title of Project

High Power, High Energy Density Lithium-Ion Batteries

Objective

- **To improve the current, limited manufacturing capability of 30 Amp-hr battery cells and to provide affordable Lithium-Ion battery packs for the combat and tactical vehicle systems.**
- **To address the manufacturing processes that will reduce cost of lithium-ion battery packs by one half through the improvement of manufacturing process to enhance production consistency and increase the production yield of high power lithium-ion cells.**

SCHEDULE OF KEY MILESTONES



Improved VL30P design to develop the VL34P;*14% Improvement in Energy Density; 11% Improvement in Weight; 75% Improvement in Power Density; 63% Reduction in Cell Labor Hours*

Automated manufacturing process for lithium-ion batteries

Safety – New lithium-iron phosphate product line developed and reports describing safety and reliability resulting from operating high temps and development of pressure activated circuit breaker and improved battery cooling.

Cost Reduction

Impacted several programs such as: Improved Targeted Acquisition System (ITAS) with Army, and Joint Strike Fighter (JSF) with NAVY/AIRFORCE : Leveraging of technical capabilities, cost reduction, cell design improvements, and manufacturing improvements

Transitioned an automated manufacturing process to produce lithium-ion battery cells and modules to ARMY, NAVY, and Air Force

Start Date: July 2004 **Project Implemented: Dec 2009**
Funding End Date: FY 2010 **Contract End Date: Feb 2011**

Manufacturing Technology Achievement

Description: **The ManTech Program achieved significant milestones in labor reduction, material handling improvements, performance improvements, product safety and cost which developed technology that was implemented across a wide variety of military applications**

Uniqueness & Improvements include:

Labor Reduction: The labor required to produce a cell dropped to a third of the baseline touch time.

- Material Handling Improvements: The distance needed to manufacture a call reduced to half of the baseline. Battery manufacturing achieved a 6 fold reduction in travel distance. These improvements in product handling result in lowered cost and reduced scrap.

- Performance Improvements: The target application achieved a 50% power improvement and 75% volumetric energy density improvement. These improvements far exceeded what the team thought was possible and will allow additional applications for Li-ion technology.

- Product Safety: The program has been able to improve product safety in cell design and in improved electrode processes. These safety improvements have been demonstrated on full system abuse tests.

- Cost: One key program metric was to demonstrate cost reductions at a set production volume. Even in advance of the full production volumes, the program has been able to provide enough savings to pay for the program in deliverable orders for a single program.

- A critical technology requirement or operational need that was addressed was the affordable, automated, domestic supply of safe and reliable batteries for military use.