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| **ENGINEERING RESEARCH &**  **DEVELOPMENT SERVICES**  *1961‐2016 CELEBRATING 55 YEARS OF ENGINEERING EXCELLENCE AND*  *COMMERCIALIZATION SUCCESS* | C:\Projects\Bat Safety\Thumbnail-01.png  The *SafetyCool* System integrates an advanced battery management electronics and thermal management components into an integrated Li-Ion battery system.  The *SafetyCool* System provides:   * Integrated Thermal Management with 7x performance of existing conductive cooling * Advanced monitoring and intervention with Creare’s advance Battery Manager System (BMS) * Substantial increases in energy and power density over legacy Lead-Acid systems with compromising safety |

Accomplishments / Awards:

* Development of Miniature Vacuum Pumps used on the Mars Curiousity Rover
* Development of a Cryogenic Refrigerator for the Hubble Space Telescope
* Development of a Compact Swaging Machine for on-ship replacement of arresting gear purchase cables.

DoN SBIR/STTR Transition Program

A Multi-Tiered Lithium-Ion Battery Thermal Fault Mitigation Architecture:

**Technology Developed**: SafetyCool battery system, which combines a high performance passive thermal anagement system capable of 7x the cooling performance of traditional conductive cooling concepts with an advanced BMS that is capable of identifying and mitigating common faults observed in Li-Ion battery systems.

**Warfighter Value**: The primary value of the SafetyCool system to America's Warfighter is improved safety. Li-Ion batteries, while having substantially better electrical performance and weight than traditional lead-acid battery packs, come with a substantial added risk resulting from the much higher energy density in these systems. Cooler cells increase the operating margin before reaching thermal runaway thresholds. The ability to sense and detect emergent thermal faults before runaway, coupled with the ability to isolate unhealthy cells, minimizes the probability for thermal runaway and catastrophic failures which put the warfighter at risk

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**Technology Transition and Commercialization**

Technology commercialization has been a key part of Creare’s mission since our founding in 1961, resulting in the founding of several independent product firms. Since the advent of the Small Business Innovation Research (SBIR) program in 1982, Creare has been highly successful in commercializing the results of our SBIR projects through licensing of our technology to other firms, creation of spin‐off organizations and new ventures, and sales of custom or specialized products. A few of the many examples of our SBIR successes include a cryocooler for the Hubble Space Telescope, a spin‐off dedicated to micromachining, licensing of Envelop® protective coverings, and delivery of specialized equipment for aircraft carrier catapults

An Overview of Our Customers:

Creare has served hundreds of industrial clients ranging from Fortune 500 companies to fledgling small businesses. Below are a selected few:

* Lockheed Martin Corporation
* Northrop Grumman Corporation
* Intel Corporation
* IBM Corporation
* Northrop Grumman Corporation
* Shell Oil Company
* Honeywell International, Inc.
* Westinghouse Electric Corp.
* General Electric Company

Creare has worked for a broad spectrum of

federal agencies. Below are a selected few:

* Defense Advanced Research Projects Agency
* Missile Defense Agency
* Defense Special Weapons Agency
* Defense Threat Reduction AgencyPension
* Air Force Research Laboratories (AFRL)
* Air Force Rome Research Site
* Army Aviation & Missile Command
* Army Space and Missile Defense Command
* Army TACOM ‐ ARDEC
* Naval Air Warfare Center
* Naval Sea Systems Command
* Naval Surface Warfare Center
* Naval Undersea Warfare Center
* Office of Naval Research
* Space & Naval Warfare Systems Command
* Department of Energy
* Department of Homeland Security
* National Aeronautics & Space Administration
* National Science Foundation

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Corporate Overview

*Since 1961 Creare continues to provide engineering services to a diverse customer base within industry ranging from aerospace to biomedical to energy to semiconductors.and government on the frontiers of product and process technology. Our services span applied research, technology development, analysis and modeling, laboratory and field testing, prototype fabrication, and software development. Our approach to technology infuses sophisticated scientific, mathematical, computational, and experimental methods with an appreciation of the art of the possibility with professional judgment bringing a reputation for skill and creativity in the solution of difficult problems; resulting in a holistic team process. Our approach emphasizes a clear perception of all the critical parameters of a problem. We consider not only the technical dimensions, but also our client’s management objectives, the needs of the marketplace, and the constraints of time and money.*

**Technology Areas**,

Much of our work requires us to draw on expertise in several disciplines, and many of our projects do not easily fit in general categories. As a guide, we have identified the following technology areas:

* Fluid & Thermal Systems
* Cryogenics
* Sensors & Controls
* Biomedical & Human Systems
* Advanced Manufacturing
* Power Systems