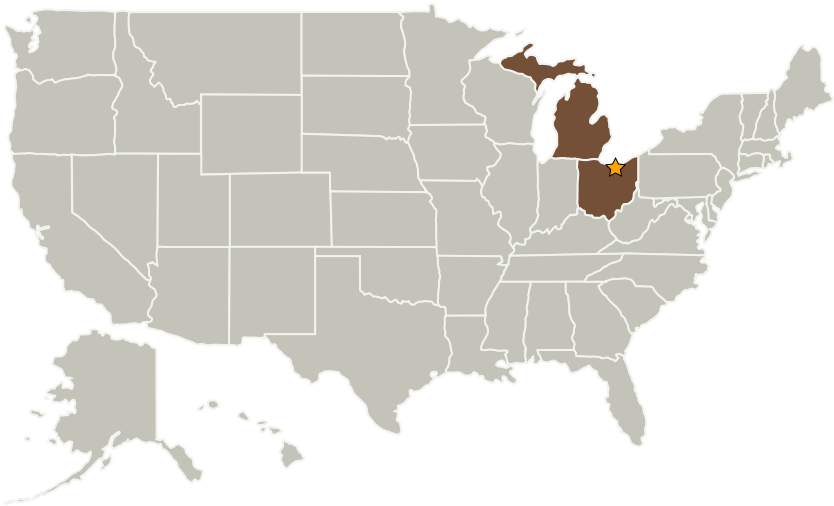
High Energy Density Capacitors, Phase II

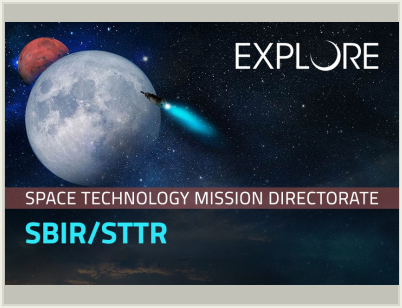
Completed Technology Project (2004 - 2006)

Project Introduction

Capacitor size and reliability are often limiting factors in pulse power, high speed switching, and power management and distribution (PMAD) systems. T/J Technologies is addressing these limitations through the development of nanocomposite polypropylene films with enhanced dielectric strength, dielectric coefficient and thermal stability. These improvements translate to better performance, including higher energy density, higher volumetric efficiency, and increased working temperature. During phase I of this program, T/J Technologies demonstrated novel nanocomposite dielectric films with a >100% increase in dielectric strength as compared with conventional polypropylene materials, while also realizing modest improvements in dielectric constant. Future work in phase II will focus on transitioning this new film into a higher volumetric efficiency power filter capacitor technology that will reduce the size and enhance the reliability of NASA PMAD subsystems. The major target for Phase II is to develop and demonstrate an ultra-thin capacitor film with high volumetric efficiency (>50% improvement over State-of-the-art polypropylene capacitors), high temperature (>125?aC), low dissipation factor, and excellent mechanical properties (windability). This research will enable the development of lighter, more reliable PMAD subsystems for NASA space missions. Other commercial and defense applications include pulse power conditioning for high power electronics and high voltage AC systems.

Primary U.S. Work Locations and Key Partners





High Energy Density Capacitors, Phase II

Table of Contents

Project Introduction 1
Primary U.S. Work Locations and Key Partners 1
Organizational Responsibility 1
Project Management 2
Technology Areas 2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

High Energy Density Capacitors, Phase II

Completed Technology Project (2004 - 2006)

Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
T/J Technologies, Inc.	Supporting Organization	Industry	Ann Arbor, Michigan

Primary U.S. Work Locations	
Michigan	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  └ TX08.1 Remote Sensing Instruments/Sensors
    └ TX08.1.1 Detectors and Focal Planes