

**DOE SBIR and STTR  
FISCAL YEAR 2009 PHASE I GRANT APPLICATION AWARDS  
BY STATE**

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**ALABAMA**

<b>Company</b>	<b>Title</b>
Plasma Processes, Inc. 4914 Moores Mill Huntsville, AL 35811	High Temperature Bond and Thermal Road Barrier Coatings
<b>Summary</b>	
To improve coal power plant efficiency and reduce greenhouse gas emissions, higher combustion temperatures are needed. Thermal protection systems used in rocket engines will provide the necessary corrosion and thermal protection to power generation turbine compon.	

<b>Company</b>	<b>Title</b>
Renewable Oil International, LLC 3115 Northington Court Florence, AL 35630	Development of Cost Effective, Small Scale Transportable Fast Pyrolysis Plants
<b>Summary</b>	
Declining petroleum resources, combined with increased demand for petroleum by emerging economies, as well as political and environmental concerns about fossil fuels, are causing our society to search for new sources of liquid fuels. This project will develop a method for conversion of biomass into liquid fuels at a small scale called fast pyrolysis—a process whereby biomass is rapidly converted into a liquid biocrude which can be used for fuel oil or upgraded into gasoline and diesel fuels.	

<b>Company</b>	<b>Title</b>
Streamline Automation, LLC 3100 Fresh Way SW Huntsville, AL 35805	High-Efficiency Microalgae Biofuel Harvest and Extraction Using Ionic Liquids
<b>Summary</b>	
To propel America's Strategic Energy Policy, this project will develop efficient, cost-competitive, and largescale production methods for biofuels derived from microalgae using a new class of green chemistry ionic liquid solvents. This technology will free America from foreign oil employing carbon-capturing, non-food sources of energy.	

**ARIZONA**

<b>Company</b>	<b>Title</b>
AdValue Photonics Inc 4585 S. Palo Verde Road, Suite 405 Tucson, AZ 85714	Long-Wave Infrared Transmitting Single Mode Fiber
<b>Summary</b>	
This project will develop a new class of advanced infrared transparent single mode fiber to meet Department of Energy's demand on new fibers for remote sensing systems currently under development. The remote sensing program has been a cornerstone in the national capability for the detection of proliferation facilities and activities for decades. Such a fiber can also be used for chemical monitoring and deliver IR power for medical application.	

<b>Company</b> AJJER, LLC 4541 East Fort Lowell Road Tucson, AZ 85712-1108	<b>Title</b> High Refractive Index Encapsulants Technology for LEDs
<b>Summary</b> This effort proposes novel encapsulants for light emitting diodes (LEDs) that have the potential to improve the light extraction efficiency by 30% over current technology. This will have a significant favorable impact on DOE's goals to achieve solid state lighting which calls for highly efficient lamp products delivering 200 lumens/watt at an attractive price.	

<b>STTR Project</b>	
<b>Company</b> Burge Environmental, Inc. 6100 South Maple Avenue, Suite 114 Tempe, AZ 85283-2872	<b>Title</b> In-Situ Monitoring of Iodine-129 in Groundwater Using a Minicolumn
<b>Summary</b> This project will develop a field-deployable monitoring system for the cost-effective and rapid determination of radioactive substances in the groundwater at federal sites, such as Hanford Site, Washington. The development of the system will decrease the future cost of site remediation.	

<b>Company</b> Earth Knowledge, Inc. 500 N Tucson Blvd., Suite 150 Tucson, AZ 85716	<b>Title</b> Web-Based Knowledge Portal and Collaboration Environment
<b>Summary</b> This project will develop a "Knowledge Portal" that incorporates internet based tools and services that support on-line collaboration, community discussion, and broad public dissemination of earth and environmental science information. The system will be built for general users and scientists and is designed using Google Earth and Google Maps.	

<b>Company</b> TIPD, LLC 9030 S. Rita Road, Suite 120 Tucson, AZ 85747-9102	<b>Title</b> Energy Saving Manufacturing Process for Fuel Nozzles
<b>Summary</b> This project will develop a new low-cost fabrication technology for fuel nozzles results in improved materials and fuel economy and lower environmental pollution.	

## CALIFORNIA

<b>Company</b> Accelergy Corporation 111 N. Market Street, Suite 910 San Jose, CA 95113	<b>Title</b> Modeling Studies of CO2 Utilization Routes in Integrated Coal-to-Liquids Processes
<b>Summary</b> Through a combination of high efficiency conversion and efficient CO2 utilization, this project will provide transportation fuels at lower cost and reduced GHG footprint. Because the U.S. has inexpensive and abundant supplies of coal, commercialization of this technology would stimulate economic growth and increase national security while lowering overall US GHG emission.	

<b>Company</b> Aegis Technology Inc. 3300 A Westminster Avenue Santa Ana, CA 92703	<b>Title</b> A Reliable High-Temperature Sealing Technology for Gas Separation Devices
<b>Summary</b> A reliable sealing of ceramic membranes used in high temperature gas separation to the underlying ceramic or metallic support structures is a critical technology essential for high-efficiency, low emission fossil energy conversion systems. The development of the proposed technology will result in a high temperature sealing with long-term stability essential to achieve the potential being anticipated.	

<b>Company</b> Aegis Technology Inc. 3300 A Westminster Avenue Santa Ana, CA 92703	<b>Title</b> Nanoparticle-Sized, High-voltage Cathode Materials for Use in Advanced Lithium-Ion Cells
<b>Summary</b> The successful development and application of high-power, reliable Li-ion batteries for future PHEV will significantly improve energy efficiency, reduce the emission and dependence on petroleum, and improve the competitiveness of U.S. manufacturing in global market of HEVs. The development of advanced nanomaterials for positive electrodes is an essential step to achieve these benefits.	

<b>STTR Project</b>	
<b>Company</b> Aegis Technology Inc. 3300 A Westminster Avenue Santa Ana, CA 92703	<b>Title</b> Nanotube-Enhanced Bulk TE Nanocomposite for High-Efficiency Waste Heat Recovery for Electricity Generation
<b>Summary</b> This project will develop low-cost, high-efficiency thermoelectric devices and systems for waste heat recovery which will significantly reduce the consumption of energy, and reduce emission and pollution to the environment. The development of the high-ZT bulk TE nanocomposites provides a commercially viable approach to achieve these objectives.	

<b>Company</b> Allopartis Biotechnologies 1700 4th Street, 218C Byers Hall San Francisco, CA 94158	<b>Title</b> Pre-Treated Lignocellulosic Biomass High-Throughput Cellulase Evolution Against
<b>Summary</b> To compete with petroleum fuels, biofuels from renewable cellulose sources such as switchgrass must be produced at lower cost. Conversion costs will be reduced by using technology to create improved enzymes that convert cellulose to sugar that in turn is used to create ethanol and other biofuels.	

<b>Company</b> Argo Science Corporation 71 Cypress Way Rolling Hills Estates, CA 90274-3416	<b>Title</b> Hybrid Intrusion Detection System Integrating Anomaly and Signature Detection Methods
<b>Summary</b> This novel and unique hybrid intrusion detection system will provide a much needed architecture suitable for defense against cyber-terrorism in ultra-high-speed computer networks. This system will guarantee rapid detection and accurate isolation of attacks with low false alarm rates in large-scale governmental and commercial networks.	

<b>Company</b> Berkion Technology 109 Columbine Drive Hercules, CA 94547-1004	<b>Title</b> Ultra-Compact Electronic Gamma Source
<b>Summary</b> This project will develop a compact, high energy, nonradiological gamma generator to be used in research, well logging for oil exploration and medical applications. This development will improve our homeland security and bring in more research funding and business opportunity to the Contra Costa and San Francisco County Districts of California.	

<b>Company</b> Calabazas Creek Research, Inc. 690 Port Drive San Mateo, CA 94404-1010	<b>Title</b> 10 MW L-Band Klystron for Accelerators
<b>Summary</b> This project will develop a 10 MW, 1.3 GHz annular beam klystron. The advanced design of the ABK is offers system costs that are significantly lower than those possible with conventional klystrons. The ABK will be useful for research and medical accelerators, and national defense and commercial applications.	

<b>Company</b> Calabazas Creek Research, Inc. 690 Port Drive San Mateo, CA 94404-1010	<b>Title</b> A 200 MHz 35 MW Multiple Beam Klystron for Accelerator Applications
<b>Summary</b> Successful development of a high power multiple beam klystron would provide an RF source for powering several accelerator systems desired at frequencies around 200 MHz. The proposed source would find applications in the United States, Europe, and Asia.	

<b>Company</b> Calabazas Creek Research, Inc. 690 Port Drive San Mateo, CA 94404-1010	<b>Title</b> An Advanced Simulation Code for Modeling Inductive Output Tubes
<b>Summary</b> This project will develop a new design tools for inductive output tubes. This will provide higher efficiency RF sources for driving high energy accelerators.	

<b>STTR Project</b>	
<b>Company</b> Calabazas Creek Research, Inc. 690 Port Drive San Mateo, CA 94404-1010	<b>Title</b> Analysis Code for High Gradient Dielectric Insulator Surface Breakdown
<b>Summary</b> This project will allow analysis of electrical breakdown on dielectric surface that increases the cost and reduce reliability of high power devices for high energy physics, defense, medical, and industrial applications. Successful development will allow design of more cost effective high power devices with increased reliability.	

<b>Company</b> Calabazas Creek Research, Inc. 690 Port Drive San Mateo, CA 94404-1010	<b>Title</b> Development of a 2 MW CW Waterload for Electron Cyclotron Heating Systems
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**Summary**

High power waterload are necessary to meet the U.S. obligation to the ITER program for fusion energy research. This project will satisfy the ITER requirement and provide a waterload for other fusion facilities around the world.

**STTR Project****Company**

Calabazas Creek Research, Inc.  
690 Port Drive  
San Mateo, CA 94404-1010

**Title**

Improved Space Charge Modeling of Photoinjectors

**Summary**

This project will develop an advanced simulation code for photoinjectors that will help improve high-energy accelerator light-source performance benefiting applied research in biology, materials science and defense/security.

**Company**

ChromoLogic, LLC  
133 N. Altadena Drive, #307  
Pasadena, CA 91107

**Title**

Label-Free In-Situ Biofilm Analysis (LIBA) System

**Summary**

This project will develop an instrument that will revolutionize our understanding of biofilms – leading to their management to better protect our national infrastructure and the engineering of novel biofilms that could reduce global warming (carbon sequestration) and heal our environment (soil remediation).

**Company**

Creative Electron, Inc.  
310 Via Vera Cruz, Suite 107  
San Marcos, CA 92078

**Title**

Sintered Conductive Adhesives for High Temperature Packaging

**Summary**

In order to reduce the cost of Hybrid electric vehicles (HEVs) and future Plug-In Hybrid Electric Vehicles (PHEVs) this project will develop a lead-free and RoHS compliant transient liquid phase sintered adhesive suitable for automotive thermal management. This will improve the design of motor and power electronics for hybrid and plug-in electric vehicles.

**Company**

CyboSoft, General Cybernation Group, Inc.  
2868 Prospect Park Drive, Suite 300  
Rancho Cordova, CA 95670

**Title**

Intelligent Industrial Furnace Control Using Model-Free Adaptive Control Technology

**Summary**

This project will result in an intelligent control solution for controlling industrial furnaces that can significantly improve energy efficiency and cost-effectively reduce carbon emissions in the near term. This solution can help the U.S. strengthen its energy security, economic health, and movement towards a cleaner environment.

**Company**

DULY Research Inc.  
1912 MacArthur Street  
Rancho Palos Verdes, CA 90275-1111

**Title**

RF Coupler Controllable with a Fluid Circuit

**Summary**

This project will develop a fluid controlled, tunable RF coupler for both normal conducting and superconducting RF cavities. This is an important innovation in the fields of RF accelerators and power sources.

<b>Company</b> Ebert Composites Corporation 651 Anita Street, Suite B8 Chula Vista, CA 91911	<b>Title</b> Tapered Composite Wind Turbine Tower Utilizing CNC-Machined Pultruded Lineals
<b>Summary</b> This project seeks to lower the cost of wind energy installations by developing wind turbine support structures from composite materials. These lightweight, durable, and corrosion resistant materials will reduce the overall cost per kilowatt produced and open additional wind resources in locations previously deemed inaccessible or uneconomical.	

<b>Company</b> Energent Corporation 2321 S. Pullman Street Santa Ana, CA 92705	<b>Title</b> Research and Development of an Advanced Turbo Vapor Compression System
<b>Summary</b> The project will develop a new air conditioning system that can reduce power costs by as much as 10-30%. The new system, the T-VAC system will enable the economic use of new refrigerants that reduce greenhouse gas emissions that cause Global Warming.	

<b>Company</b> EVOGH, Inc. 1876 Braeburn RD Altadena, CA 91001	<b>Title</b> EVO-HD: A Globally Scalable Standards-based Full-HD Environment for Immersive Collaboration
<b>Summary</b> This project will develop EVO-HD, a low cost, extensible, globally scalable High Definition (HD) standards based multimedia collaboration system to work over existing and future generation networks, which will be packaged for widespread corporate, research, and in-home use.	

<b>Company</b> FAR-TECH, Inc. 3550 General Atomics Court Building 15, Suite 155 San Diego, CA 92121	<b>Title</b> An Energy-Efficient Klystron Upgrade for the Jefferson Laboratory CEBAF Linac
<b>Summary</b> High-power radio frequency (RF) sources are used to power the majority of particle accelerators used research, military, industrial and medical applications. This project will provide a high-efficiency RF source for Thomas Jefferson National Accelerator Laboratory, with the basic technology also usable for many other future projects.	

<b>Company</b> FAR-TECH, Inc. 3550 General Atomics Court Building 15, Suite 155 San Diego, CA 92121	<b>Title</b> Modeling Tool for Optimizing Electron Beam Ion Sources
<b>Summary</b> This project will develop a sophisticated, numerical modeling tool that will decrease the cost of building and operating sources of highly charged ions that are used in nuclear physics research as well as industrial applications.	

<b>Company</b> FAR-TECH, Inc. 3550 General Atomics Court, Building 15, Suite 155 San Diego, CA 92121	<b>Title</b> Model for Heating of Electron Cyclotron Resonance Ion Sources
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**Summary**

This project will develop a sophisticated, numerical modeling tool that will decrease the cost of building and operating sources of highly charged ions that are used in nuclear physics research as well as industrial applications.

**Company**

FAR-TECH, Inc.  
3550 General Atomics Court  
Building 15, Suite 155  
San Diego, CA 92121

**Title**

New 3D Electromagnetic Hybrid Kinetic Adaptive Meshless PICOP Code for Petascale Computer Systems

**Summary**

Petascale computing, will eventually impact all scientific and engineering applications, but to reach its full potential, the problems of both hardware and software must be addressed. This project will develop new codes to take advantage of this new level of computing power.

**Company**

Farasis Energy, Inc.  
23575 Cabot Blvd., Suite 206  
Hayward, CA 94545

**Title**

Novel, High Performance Li-Ion Cell

**Summary**

This project will develop a novel approach to increasing the performance and capacity of Li-ion cells. Use of the technology could accelerate the adoption of efficient distributed power systems and EVs by greatly increasing the life of the battery systems.

**Company**

Global Nanosystems, Inc.  
10327 Missouri Avenue, 202  
Los Angeles, CA 90025-6902

**Title**

Development of High Power IGBTs for High Level RF Accelerator Systems

**Summary**

The innovation is to develop high-power IGBTs for high power modulators and power supplies with proposed novel concept that combines with a field-control-punch-through structure for collector, an enhanced-trench-gate cell for emitter, and an equal-potential-line design for termination.

**STTR Project****Company**

Go AI Services  
1088 Dartmouth Lane  
Los Altos, CA 94024

**Title**

Lattice Element Error Solver for Modeling of Accelerators, Storage Rings, Transport Systems and Insertion Devices

**Summary**

Analytical tools that can be used to efficiently resolve accelerator errors in U.S. synchrotron light sources (or high-brightness X-ray laboratories) will increase the up-time of those complex facilities which currently serve thousands of users from all scientific and engineering fields. This project will develop a tool that is based on a new method to solve complex equations in a simplified way. The developed tool also has many commercial applications, e.g., as a math-solution software toolkit and as a solver for complex engineering systems.

**Company**

HyPerComp Inc.  
2629 Townsgate Road, Suite 105  
Westlake Village, CA 91361

**Title**

Integrated Modeling of Transport Phenomena in Fusion Liquid Metal Flows

**Summary**

In liquid metal breeding blankets, fluid flows, heat and mass transfer are tightly coupled. The present effort are directed at developing of multiphase flow codes and supporting physical models capable of addressing the most critical blanket issues, associated with tritium transport and corrosion of structural materials.

**STTR Project****Company**

InnoSense, LLC  
2531 West 237th Street, Suite 127  
Torrance, CA 90505

**Title**

Direct Conversion of Carbon Dioxide to Methanol

**Summary**

A novel fiber optic chemical sensor with anticipated higher sensitivity and lower cost than those of existing ones will be developed. As a process control device, such a probe could significantly increase the energy efficiency of the chemical and petrochemical industries.

**Company**

Innovative Technology, Inc.  
(dba) Inovati  
P.O. Box 60007  
Santa Barbara, CA 93160

**Title**

Kinetic Metallization of Corrosion Resistant Coatings for Molten Salt Heat Exchanger Components on NGNP (IV)

**Summary**

Next Generation Nuclear Plants using Advanced Gas Cooler Reactors require advanced materials to accommodate high operating temperatures and corrosive molten salt environments. This project will develop protective coatings using the Kinetic Metallization process for application to molten salt heat exchanger components that will extend the life of these structures and reduce the maintenance cost for these power and hydrogen generation plants.

**STTR Project****Company**

Intelligent Fiber Optic Systems Corporation  
2363 Calle Del Mundo  
Santa Clara, CA 95054-1008

**Title**

Fiber-Optic Defect and Damage Locator System for Wind Turbine

**Summary**

Increased harnessing of wind power benefits the planet by providing a renewable energy source reducing our reliance on fossil fuels. This novel sensing system will detect defects in wind turbine blades optimizing their performance and preventing costly turbine shut downs due to predictable blade failures.

**Company**

Intelligent Optical Systems, Inc.  
2520 W. 237th Street  
Torrance, CA 90505-5217

**Title**

Broadband Infrared Optical Fiber Architecture

**Summary**

This optical fiber structure will transport high power optical radiation in the mid infrared region of the spectrum. Traditional silica fibers do not work in this region because they absorb the radiation and overheat, and fail. The proposed fiber will dramatically improve remote sensing instruments.

**Company**

Intelligent Optical Systems, Inc.  
2520 W. 237th Street  
Torrance, CA 90505-5217

**Title**

In-line Inspection of Welds used for Wind Turbine Tower Assembly



**Summary**

This project will determine the feasibility of applying non-contact laser-based techniques for inspecting the welds used in wind turbine tower assembly. In-line inspection will speed the weld process and reduce costs and energy consumption.

**Company**

Los Gatos Research  
67 East Evelyn Avenue, Suite 3  
Mountain View, CA 94041

**Title**

Novel Sensor for Industrial Process Monitoring

**Summary**

This project will support the development and demonstration of a novel instrument with unprecedented speed, specificity and reliability for monitoring and control of combustion emissions and of power plants and industrial processes; and for measurements of atmospheric pollutants, trace gases and greenhouse gases.

**Company**

Makel Engineering, Inc.  
1585 Marauder Street  
Chico, CA 95973

**Title**

Standardized Sensor Packaging for Harsh Environment

**Summary**

This project seeks to develop a standard package that will enable the use of advanced chemical sensors in harsh environments, such as present in emerging clean coal technology power systems. The standardized package will enable quick implementation of newly developed sensors.

**Company**

MATECH / GSM  
31304 Via Colinas, Suite 102  
Westlake Village, CA 91362

**Title**

Advanced Technologies for the Assessment and Mitigation of Materials Degradation for Light Water Reactor System and Components

**Summary**

This project seeks to demonstrate USA's first low cost, domestic ceramic fibers for use in existing nuclear reactor fuel rods. Improving the performance and efficiency of conventional nuclear power plants is the most expeditious pathway for simultaneously reducing America's reliance on foreign sources of energy and the formation of greenhouse gases.

**Company**

Membrane Technology and Research, Inc.  
1360 Willow Road, Suite 103  
Menlo Park, CA 94025

**Title**

Acetic Acid Recovery Using Membranes

**Summary**

Large amounts of acetic acid (in dilute aqueous streams) are lost by U.S. producers and users of this important chemical. This project will develop a process that will allow acetic acid to be more economically recovered for reuse. Compared to conventional distillation alone, the proposed technology will lower the energy costs of acetic acid recovery from acetic acid/water streams by more than 60%.

**Company**

Novawave Technologies, Inc.  
900 Island Drive, Suite 101  
Redwood City, CA 94065

**Title**

Isotope Sensor for Carbon Sequestration Monitoring

**Summary**

Carbon isotope measurements provide a direct method to discriminate between man-made and natural sources of carbon dioxide, which will be used to detect leaks at carbon sequestration sites. The proposed instrument offers a real-time, autonomous approach to long term monitoring of carbon storage sites.

<b>Company</b> Novawave Technologies, Inc. 900 Island Drive, Suite 101 Redwood City, CA 94065	<b>Title</b> Nanoparticle Enhanced Resonator Sensor for Trace Radionuclide Detection
<b>Summary</b> This project will develop a real-time metal enhanced fluorescence detection system that has the potential to impact significantly the ability scientists to track sub-surface radionuclide and metal migration to prevent widespread ecological contamination from aging radiological stores. In addition, the technology can be adapted for homeland security applications, particularly safe buildings where office buildings, hospitals, hotels, malls, and schools can be monitored with a distributed sensor network.	

<b>Company</b> Novawave Technologies, Inc. 900 Island Drive, Suite 101 Redwood City, CA 94065	<b>Title</b> Real-Time Ambient Nitrous Oxide Sensor
<b>Summary</b> The proposed instrument will enable nitrous oxide levels to be monitored with high precision and accuracy. Nitrous oxide is the third most important greenhouse gas behind carbon dioxide and methane. The ability to obtain these measurements using low cost, rugged hardware is essential for obtaining a greater understanding of global warming and climate change.	

<b>STTR Project</b>	
<b>Company</b> Opto-Knowledge Systems, Inc. (OKSI) 19805 Hamilton Avenue Torrance, CA 90502	<b>Title</b> Single Mode Hollow Core Waveguides for Long-Wave Infrared (LWIR) Lasers
<b>Summary</b> This project will develop a new line of fiber optics that can improve the utility and effectiveness of laser systems used to detect specific chemical compounds and molecules. Such improvements are important in efforts to prevent the proliferation of weapons of mass destruction (WMD).	

<b>Company</b> Particle Beam Lasers, Inc. 18925 Dearborn Street Northridge, CA 91324-2807	<b>Title</b> Design of a Demonstration of Magnetic Insulation and Study of its Application to Ionization Cooling for a Muon Collider
<b>Summary</b> This project will design the first experiment to observe the novel concept of radio-frequency magnetic insulation, allowing vacuum radio-frequency acceleration in magnetic fields without damage. This is essential for producing intense cold muon beams for use in a Muon Collider. Commercial applications might include muon radiography for medical and homeland security applications, intense sources of muons for condensed matter studies, and nanotechnology.	

<b>Company</b> Physical Optics Corporation 20600 Gramercy Place, Bldg 100 Torrance, CA 90501-1821	<b>Title</b> Cascade Particle Detector
<b>Summary</b> This project will develop a cascade particle detector will provide real-time information about particle size distribution in ambient aerosols, which is critical for describing both direct and indirect radiative forcing by aerosols present in the atmosphere.	

<b>Company</b> Physical Optics Corporation 20600 Gramercy Place, Bldg 100 Torrance, CA 90501-1821	<b>Title</b> Composite Energy Storage Capacitor
<b>Summary</b> The problem with existing pulsed high electric energy density storages is that high capacity is achievable at low voltage and vice versa. The proposed multi-component nanocomposite allows achieving high electric capacity at high voltage.	

<b>Company</b> Physical Optics Corporation 20600 Gramercy Place, Bldg 100 Torrance, CA 90501-1821	<b>Title</b> Fiber Optic High Temperature Seismic Sensor
<b>Summary</b> This project will develop an innovative seismic sensor based on fiber optics to monitor geothermal wells. This sensor not only endures high temperature (300oC for over 5000 hrs) but also outperforms all conventional devices in terms of temperature endurance and fast response.	

<b>Company</b> Picarro, Inc. 480 Oakmead Parkway Sunnyvale, CA 94085	<b>Title</b> Hand-Held, Battery Operated Trace Gas Analyzer for Measuring GHG Sources
<b>Summary</b> Measurement of methane from landfills provide critical information related to greenhouse gases and global warming as well as much needed information to help regulate emissions from landfills and for assigning a cost for the carbon emission (or conversely a credit for its recovery).	

<b>STTR Project</b>	
<b>Company</b> Plasma Technology Inc. 1754 Crenshaw Blvd. Torrance, CA 90501	<b>Title</b> Novel Thermally-Sprayed Architectures for High Temperature Thermal Barrier Coating Systems
<b>Summary</b> This project will develop advanced thermal barrier coating solutions for improving Integrated Gasification Combined Cycle (IGCC) power plants efficiency.	

<b>Company</b> Poole Ventura, Inc. P.O. Box 5023 Oxnard, CA 93031-5023	<b>Title</b> Device for In-Situ Coating of Long, Small Diameter Tubes
<b>Summary</b> Electron clouds in existing accelerators limit machine performance through dynamical instabilities and/or associated vacuum pressure increases. This proposal will develop a plasma deposition technique for in-situ coating of long, small diameter tubes with copper and titanium nitride to mitigate the problems of electron clouds and wall resistivity in the BNL RHIC accelerator.	

<b>Company</b> RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	<b>Title</b> A 10 MHz Pulsed Laser Wire Scanner for Longitudinal and Transverse Measurements of 100-mA Class Electron Beams
<b>Summary</b> This project is a cost-effective approach to develop a vital diagnostic device, the laser wire scanner (LWS), for high current electron accelerators. A potential benefit of LWS development will be improved design and operation of next generation light sources, as well as high energy accelerators designed to advance the frontier of the fundamental science.	

<b>Company</b> RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	<b>Title</b> A High-Resolution Transverse Diagnostic Based on Fiber Optics
<b>Summary</b> This project will develop a new means of measuring the properties of state-of-the-art electron beams with radiation hardened fiber optics. Knowledge of these properties is critical to successful operation of the facilities that produce these beams. These facilities are widely used to probe the nature of matter in virtually all fields of science and technology.	

<b>Company</b> RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	<b>Title</b> An Inexpensive High Brightness Photoinjector using Solid Freeform Fabrication (SFF)
<b>Summary</b> This project will develop a high average power electron gun to be manufactured with innovative, cost cutting, techniques. This promises to be a key enabling technology for imaging and analysis applications of interest to homeland security as well as industrial and academic programs.	

<b>Company</b> RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	<b>Title</b> Compact, Electronic Blood Irradiator
<b>Summary</b> The National Research Council has recommended to congress the elimination of Cs-137 blood irradiators in the US, in order to prevent their use in a "dirty bomb." This project will develop a safe, compact, electronic irradiator to effectively replace such irradiators.	

<b>Company</b> RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	<b>Title</b> Development of a CW NCRF Photoinjector Using Solid Freeform Fabrication (SFF)
<b>Summary</b> This project will develop a high average power electron gun manufactured with innovative, cost cutting, techniques. This promises to be a key enabling technology for imaging and analysis applications of interest to homeland security as well as industrial and academic programs.	

<b>Company</b> RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	<b>Title</b> Ultra-High Gradient, Compact S-Band Accelerating Structure for Laboratory and Industrial Applications
<b>Summary</b> This project will develop an industrially available accelerator, which can achieve higher gradient than competing technologies. Such a device will find numerous applications in the areas of medicine, industry, homeland security, and basic research.	

<b>Company</b> Redwood Systems 46665 Fremont Blvd. Fremont, CA 94538-6410	<b>Title</b> Auto-Commissioning and Auto-Discovery Control System for Solid State Lighting
<b>Summary</b> This project will develop a new, energy efficient LED lighting system that revolutionizes how lighting is powered and controlled. It will also create a lighting network that is intelligent, automated, scalable, and can potentially save 50% to 75% of the energy used to light a commercial office space.	

<b>Company</b> Romny Scientific Incorporated 865 Marina Bay Parkway, Suite 42 Richmond, CA 94804	<b>Title</b> Automotive Waste Heat Recovery by High Efficiency Thermoelectric Generators
<b>Summary</b> This project will develop technology that converts waste heat into useful electrical energy, allowing the automotive and other industries to become significantly more energy efficient. The successful deployment of this technology will improve reduce the use of fossil fuels and positively impact the environment and economy.	

<b>Company</b> Searchlight Sensors, Inc. 1100 N. Tustin Avenue, Suite G Santa Ana, CA 92705-3509	<b>Title</b> Low Cost Balloon-Borne Carbon Dioxide Sensor
<b>Summary</b> This project will develop a low cost carbon dioxide sensor that can be operated by battery on weather balloon. This sensor will help to understand the global warming process much more quantitatively and in global scale.	

<b>Company</b> Shakti Technologies, Inc. 728 Garland Drive Palo Alto, CA 94303-3603	<b>Title</b> Development of Novel Sorbents for CO2 Capture
<b>Summary</b> This project is developing novel sorbents that can help mitigate the effects of global warming by developing a low cost, highly efficient carbon dioxide removal process. This will allow our utility companies to utilize domestic coal reserves while minimizing global warming.	

<b>Company</b> Sora, Inc. 485 Pine Avenue Goleta, CA 93117	<b>Title</b> Development of Fabrication Techniques for High Extraction Efficiency Bulk-GaN-Based LEDs
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**Summary**

This project will develop novel manufacturing techniques for next-generation gallium nitride (GaN) –based light-emitting diodes (LEDs), enabling for the first time high-brightness LEDs across the visible spectrum which can be implemented into future energy efficient white lighting solutions.

**Company**

Space Computer Corporation  
12121 Wilshire Boulevard, Suite 910  
Los Angeles, CA 90025-1123

**Title**

Spectrally-Assisted Tracking of Moving Vehicles

**Summary**

Automated tracking of a moving target is problematic when the target is obscured from view or is in close proximity to other similar vehicles. This project will improve tracking performance by using data from an imaging hyperspectral sensor to form higher-confidence matches with future candidate target observations by comparing spectral signatures.

**Company**

Sun Energy Resources, LLC  
863 Mitten Road - Suite 101  
Burlingame, CA 94010

**Title**

Novel Enzymes for the Production of Biofuels from Cellulosic Biomass

**Summary**

To address the growing need for alternative sources of energy, this project is developing novel enzymes for the efficient production of biofuels from complex cellulose.

**Company**

SVV Technology Innovations, Inc.  
5022 Bailey Loop, Suite 120  
McClellan, CA 95652

**Title**

Concentrator PV Receiver Based on Crystalline Si Cells

**Summary**

This project will develop and demonstrate a new approach for making inexpensive modular systems for generating electricity from sunlight. It will make viable the large-scale, distributed energy production from renewables and help meet the national goals of energy independence, reduction of carbon emissions and fostering the job growth and economic progress.

**Company**

Tanner Research, Inc.  
825 S. Myrtle Avenue  
Monrovia, CA 91016

**Title**

Disposable MEMS-based Raman Micro-Spectrometer for Improved Characterization of Waste in Tanks and Ancillary Piping

**Summary**

As a legacy of the Cold War, toxic waste from nuclear munitions fabrication has been buried in now aging tanks in dozens of locations across the US. This project will develop a novel miniature chemical sensor to enable safe and successful remediation of this environmental calamity.

**Company**

Telescent Inc.  
2118 Wilshire Blvd. #1001  
Santa Monica, CA 90403-5704

**Title**

Physical Layer Network Management Tools Based on Automated Fiber Optic Patch-Panels

**Summary**

This project will develop an advanced fiber optic switching technology that automates the provisioning and testing of fiber optic communications networks. This technology automatically reconfigures, monitors and maps all physical interconnections through network management software, reducing operating costs while improving network efficiency, agility and reliability.

**Company**

Telescent Inc.  
2118 Wilshire Blvd. #1001  
Santa Monica, CA 90403-5704

**Title**

RFID Overlay Network for Automated Discovery at the Physical Network Layer

**Summary**

This project will develop an RFID overlay network that automates the discovery of the physical network layer forming the foundation of all communication networks. Fiber optic connections are automatically monitored and mapped through software, reducing the operating cost and downtime, while accelerating service provisioning and improving security and disaster recovery.

**Company**

Ultramet  
12173 Montague Street  
Pacoima, CA 91331

**Title**

Boron-Tungsten Mesh Plasma Facing Components

**Summary**

For nuclear fusion to be viable for energy generation, materials must be developed that can withstand the demanding fusion reactor environment. This project will produce a boron-tungsten mesh chamber wall material that will allow high-performance plasma operation in tokamak reactors.

**Company**

Ultramet  
12173 Montague Street  
Pacoima, CA 91331

**Title**

Dendritic Engineered Refractory Armor for Fusion Energy Applications

**Summary**

Fusion energy is an ideal alternative to fossil fuel energy, providing a greater quantity of environmentally friendly energy than wind, solar, and geothermal sources. Practical application of fusion for efficient electric energy generation requires the development of materials and structures that can withstand the intense radiation resulting from the fusion event within the reactor.

**Company**

Ultramet  
12173 Montague Street  
Pacoima, CA 91331

**Title**

Economical Manufacture of Seamless High-Purity Niobium

**Summary**

This project will develop an efficient, cost-effective means of fabricating solid ultrahigh-purity niobium superconducting radio frequency cavities that will be suitable for particle accelerators with broad applications ranging from medical treatment to high-energy physics.

**Company**

Ultramet  
12173 Montague Street  
Pacoima, CA 91331

**Title**

Foam Core Structure for Protective Gas Film Formation in High-Power Mercury Spallation Targets

**Summary**

By adapting advanced rocket thruster technology, this project will create a representative mercury spallation target that will help enable full power use of the SNS at Oak Ridge National Laboratory. The research then made possible by the fully functioning SNS will spur considerable advancements in materials science, medicine, and industry.

**Company**

Ultramet  
12173 Montague Street  
Pacoima, CA 91331

**Title**

Optimization and Simulated Testing of Flow Channel Inserts for Dual-Coolant ITER Test Blanket Modules

**Summary**

Nuclear fusion offers a viable means of generating energy sufficient for current consumption levels in a manner consistent with environmental preservation. Existing alternatives to fossil fuels (e.g. wind, solar, geothermal) cannot generate sufficient energy to meet current needs. Practical application of fusion requires the development of materials and structures that allow reliable operation under the demanding reactor environment.

**Company**

Ultramet  
12173 Montague Street  
Pacoima, CA 91331

**Title**

Transpiration-Cooled Turbine Components for High Temperature IGCC Turbines

**Summary**

With global demand for electricity increasing and natural resources decreasing, efficient electricity generation is imperative. This project will adapt rocket thrust chamber technology for use in gas turbines to improve the thermal efficiency of power plants by at least 50% in 10 years.

**Company**

Viresco Energy LLC  
1451 Research Park Drive Suite 200  
Riverside, CA 92507

**Title**

Application of Steam Hydrogasification Reaction Process to the Production of Methane Rich Fuel Gas from Coal and Coal/Biomass Mixtures

**Summary**

The new thermo-chemical process developed in this project can produce methane rich gas from carbonaceous feedstocks in an effective and environmentally friendly manner. This gas from abundant domestic resources not only produces electricity or liquid fuels, but also replaces a considerable amount of energy import.

**Company**

Wang NMR Inc.  
550 North Canyons Parkway  
Livermore, CA 94551-9472

**Title**

Development of a 5 Tesla Vector Magnetometer for Synchrotron Radiation Experiments

**Summary**

A novel soft x-ray superconducting vector magnetometer is proposed to study the magnetic nanostructure to advance the future information technology.

**Company**

XIA, LLC  
31057 Genstar Road  
Hayward, CA 94544

**Title**

Electronics for Large Superconducting Tunnel Junction Detector Arrays for Synchrotron Soft X-ray Research

**Summary**

This project will develop low cost digital electronics to support large arrays of cryogenic detectors used to detect and measure the energy of very low energy x-rays. These detectors will be used at the nation's synchrotron x-ray facilities to support research in materials science, biology, geology and environmental research.



<b>Company</b> XIA, LLC 31057 Genstar Road Hayward, CA 94544	<b>Title</b> Improved Energy Resolution in CsI Scintillator Material
<b>Summary</b> Scintillation detectors are widely used in nuclear physics, medical imaging, and homeland security applications. This project will improve the energy resolution of the common bright scintillator CsI by a factor of 3, vastly extending its detection sensitivity and utility in these areas.	

## COLORADO

<b>Company</b> ADA Technologies, Inc. 8100 Shaffer Parkway, Suite 130 Littleton, CO 80127-4107	<b>Title</b> Nanostructured High Voltage Cathode Materials for Advanced Lithium-ion Batteries
<b>Summary</b> High performance and long lifetime energy storage devices are critical for zero-emission advanced transportation technologies. This project proposes to develop high performance electrode materials and combine them with environmentally benign electrolytes to develop advanced lithium-ion batteries to fulfill this requirement.	

<b>Company</b> Boulder Precision Electro-Optics 3049 Redstone Lane Boulder, CO 80305	<b>Title</b> A Laser Power-Build-Up System for H Atom Ionization
<b>Summary</b> A resonant cavity multiplies up light power in a recycling process to a power level at which it can efficiently promote Hydrogen atoms into excited states. The purpose of this is to allow subsequent removal of the electron so the proton can be injected into a proton accelerator.	

<b>Company</b> Composite Technology Development, Inc. 2600 Campus Drive, Suite D Lafayette, CO 8002-3359	<b>Title</b> Advanced Composite Materials for Tidal Turbine Blades
<b>Summary</b> Marine current energy is a form of renewable energy that holds substantial promise in meeting the future energy needs of the United States. Reliability of these systems including the tidal turbine blades is of paramount importance to enabling their economic and performance feasibility.	

<b>Company</b> Eltron Research & Development Inc. 4600 Nautilus Court South Boulder, CO 80301-3241	<b>Title</b> An Approach for Enhancement of In-Gasifier Production of Methane
<b>Summary</b> Integrated gasification combined cycle technology utilizing solid oxide fuel cells (SOFC's) are very promising, but require methane to ensure fuel cell stability and energy content of the fuel. This project will develop technology that will increase the methane content of gasifier effluent.	

<b>Company</b> Eltron Research & Development Inc. 4600 Nautilus Court South Boulder, CO 80301-3241	<b>Title</b> First Principles Identification of New Cathode Electrocatalysts for Fuel Cells
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**Summary**

This project will develop new cathode electrocatalysts for solid oxide fuel cells (SOFCs). Since this component generally limits fuel cell performance, development of new materials has the potential to dramatically improve the prospects for SOFCs.

**Company**

Eltron Research & Development Inc.  
4600 Nautilus Court South  
Boulder, CO 80301-3241

**Title**

Molecular Separations Using Micro-Defect Free Ultra Thin Films

**Summary**

Successful development of thin film molecular sieve technology will make the separation of different kinds of molecules much cheaper. This will be of great use to pharmaceutical and chemical industries in addition to energy industries.

**Company**

Eltron Research & Development Inc.  
4600 Nautilus Court South  
Boulder, CO 80301-3241

**Title**

Perovskite Adsorbents for Warm-Gas Arsenic and Phosphorus Removal

**Summary**

This project will develop means for removing arsenic and other poisons emitted from gasified coal to acceptable levels. Impurity control will enable use of coal in the next generation of non-polluting and more efficient electric power plants, enable sequestration of carbon dioxide and aid production of synthetic fuels.

**Company**

Eltron Research & Development Inc.  
4600 Nautilus Court South  
Boulder, CO 80301-3241

**Title**

Polymer-Zeolite Membrane for Air Separation

**Summary**

This project will design novel hybrid membranes enabling commercially viable, large-scale air separation providing >95% pure oxygen for coal gasification; this will make synthesis gas economically more feasible as feedstock for power generation, transportation fuels, hydrogen and chemicals production. Membrane separation technologies offer great potential in many other industrial applications.

**Company**

Eltron Research & Development Inc.  
4600 Nautilus Court South  
Boulder, CO 80301-3241

**Title**

Unconventional High Temperature Nanofiltration for Produced Water Treatment

**Summary**

This project will develop unconventional high temperature nanofiltration technology that will enable more economic treatment of produced water originating from domestic oil and gas production resulting in greater utilization of domestic fuel reserves.

**STTR Project****Company**

Kapteyn-Murnane Laboratories, Inc.  
1855 South 57th Court  
Boulder, CO 80301

**Title**

Convert 1 $\mu$ m Ultrafast Fiber Laser to 2 $\mu$ m, and Pulses Less than 100Fs

**Summary**

This project solves difficult problem on a critical piece of equipment for the next generation of free electron lasers. These systems are crucial to generating high brightness light sources for studies in chemistry, biology, and medicine.

<b>Company</b> Kapteyn-Murnane Laboratories, Inc. 1855 South 57th Court Boulder, CO 80301	<b>Title</b> Cryogenically-Cooled High Average Power Picosecond Ytterbium Lasers
<b>Summary</b> This project seeks to develop a laser system for use to generate electrons that will be accelerated to high energy in modern accelerators. The required specifications exceed the current state-of-the-art for laser technology, and thus the technology developed will also find use in applications such as spectroscopy and precision micromachining.	

<b>Company</b> Noqsi Aerospace, Ltd 2822 S. Nova Rd Pine, CO 80470	<b>Title</b> A Streaming Data Reduction Appliance for High Energy Physics based on FPGA Technology
<b>Summary</b> This project will investigate the use of two existing and readily available technologies, Field Programmable Gate Arrays (FPGA) and Graphical Processing Units (GPU), in concert to increase the computing power for real-time data acquisition and analysis. The proposal is targeted for the application of image processing for two large astronomical cameras—Dark Energy Survey (DES) and the Large Synoptic Survey Telescope (LSST).	

<b>Company</b> ReflecTech 18200 West Highway 72 Arvada, CO 80007	<b>Title</b> Low-Cost, Durable, High-Performance Reflectors for Utility-Scale Solar Thermal Energy Collection
<b>Summary</b> Parabolic trough solar power plants traditionally use imported glass mirrors to focus sunlight. The proposed project marries two domestic technologies—ReflecTech® Silvered Mirror Film, and fabricated optical aluminum panels—to replace the fragile glass mirrors and become the new global industry standard.	

<b>Company</b> TDA Research, Inc. 12345 W. 52nd Avenue Wheat Ridge, CO 80033-1916	<b>Title</b> A New Three-Part Architecture for Efficient and Stable Bulk Heterojunction OPV Devices
<b>Summary</b> Solar cells from organic materials can potentially be made at very low cost relative to cells made from silicon. This project will use a new combination of materials that will simultaneously increase the efficiency and stability of solar cells so that they become suitable for commercialization.	

<b>Company</b> TDA Research, Inc. 12345 W. 52nd Avenue Wheat Ridge, CO 80033-1916	<b>Title</b> Liquid Salt Redox Couples for Utility Scale Flow Batteries
<b>Summary</b> This project will develop new materials for extremely large installations of redoxflow batteries for battery electricity energy storage (BESS). The materials will allow more energy storage, last longer and thus lower cost.	

<b>Company</b> TDA Research, Inc. 12345 W. 52nd Avenue Wheat Ridge, CO 80033-1916	<b>Title</b> Low-cost Hydrodeoxygenation Process for Converting Algae-derived Oil into Aviation Fuels
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**Summary**

Algae can convert water, carbon dioxide (a greenhouse gas) and sunlight into a vegetable oil that can be used to make fuels for cars, trucks or airplanes. This project will develop a process to produce aviation fuel from the oil extracted from algae that is grown using the CO<sub>2</sub> emitted from coal fired power plants.

**Company**

TDA Research, Inc.  
12345 W. 52nd Avenue  
Wheat Ridge, CO 80033-1916

**Title**

Low-Cost Polymer Flocculant for Algae Production

**Summary**

This project will develop a new low-cost polymer flocculant that will make it less expensive to harvest algae cells from large-scale farms. Algae is the only renewable feedstock that can offset more than 50% of the domestic petroleum diesel market, but the cost of growing algae must be reduced.

**Company**

TDA Research, Inc.  
12345 W. 52nd Avenue  
Wheat Ridge, CO 80033-1916

**Title**

Novel Catalytic Alkane Oxidation Process

**Summary**

Ethanol is a versatile chemical that is used as a chemical solvent, sterilizer, antifreeze, chemical intermediate, and an oxygenate in fuels. TDA's new catalytic process produces ethanol more cheaply than current synthetic processes and can be used in existing petrochemical plants.

**Company**

TDA Research, Inc.  
12345 W. 52nd Avenue  
Wheat Ridge, CO 80033-1916

**Title**

Self-Assembled Rare Earth Doped Nanostructured Metal Aluminate Phosphors

**Summary**

Solid state lighting will reduce electrical consumption and its environmental impact and have a positive economic impact on the U.S. (\$115 billion annual savings). The new phosphors developed in this Phase I project are an enabling technology for white light production from blue- and UV-emitting LEDs.

**Company**

TDA Research, Inc.  
12345 W. 52nd Avenue  
Wheat Ridge, CO 80033-1916

**Title**

Sorbents for Warm Temperature Removal of Arsenic and Phosphorous from Coal-Derived Synthesis Gas

**Summary**

The use of advanced, highly efficient and environmentally responsible coal-based power generation processes is hindered by the presence of a wide spectrum trace contaminants. This project will develop sorbents to remove these contaminants in a cost-effective way to support the widespread utilization of coal.

**Company**

Tech-X Corporation  
5621 Arapahoe Avenue, Suite A  
Boulder, CO 80303-1379

**Title**

Design and Fabrication of Three-Dimensional Photonic Crystal Accelerator Structures

**Summary**

Future generations of high-energy particle accelerators, used to study the fundamental nature of matter, will likely be powered with lasers. This project will develop component designs to enable the integration of multiple accelerator components in a single microfabricated structure—an "accelerator on a chip."

<b>Company</b> Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	<b>Title</b> Design of Meter-Scale Laser Wakefield Accelerators
<b>Summary</b> Future generation high-energy particle accelerators, used to study the fundamental nature of matter, will likely include plasma-based components. Existing software is being enhanced to enable the accurate simulation and design of such devices in less than 1/100th the time.	

<b>Company</b> Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	<b>Title</b> Efficient Multiscale Algorithms for Modeling Coherent Synchrotron Radiation
<b>Summary</b> A physical process called coherent synchrotron radiation can seriously limit performance of existing and future DOE-operated particle-accelerator-based facilities. This project will develop computational tools that will allow DOE- and DoD-funded scientists to accurately model and more efficiently mitigate the adverse effects of coherent synchrotron radiation.	

<b>Company</b> Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	<b>Title</b> Extending Chombo with PETSc
<b>Summary</b> The most challenging computational physics problems require Adaptive Mesh Refinement (AMR) to resolve fine scale phenomena. This project will extend the leading (AMR) package, Chombo, with the PETSc library, which offers the most comprehensive catalog of sparse matrix solvers.	

<b>Company</b> Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	<b>Title</b> Fully Implicit, Jacobian-Free, Newton-Krylov Methods in Production Level MHD Fusion Codes
<b>Summary</b> The DOE's research program on fusion energy depends on computer simulations that can answer research questions at a much lower cost than laboratory experiments. This project will expand the usefulness of these computer simulation tools so that new insights into fusion energy can be obtained at reduced costs.	

<b>Company</b> Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	<b>Title</b> High-Fidelity Modulator Simulations of Coherent Electron Cooling Systems
<b>Summary</b> The Relativistic Heavy Ion Collider at Brookhaven National Laboratory is colliding gold ions to create conditions similar to what existed after the big bang. A novel 3-D simulation code is being developed to assist Department of Energy scientists in the design of an electron cooling section that will improve the performance of this premier nuclear physics facility.	

<b>Company</b>	<b>Title</b>
Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	High Fidelity Simulation of Low-Energy Ion Chopping for the Spallation Neutron Source
<b>Summary</b>	
Commercial software will be used and further enhanced in order to reduce risk and cost for planned experiments at Oak Ridge National Lab, which are part of the planned upgrade to the Spallation Neutron Source, an important DOE user facility for a wide range of research and development efforts.	

<b>Company</b>	<b>Title</b>
Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Magnetic Insulation and the Effects of External Magnetic Fields on RF Cavity Operation in Muon Accelerators
<b>Summary</b>	
Muon colliders require high-gradient RF cavities operating in strong magnetic fields, a condition which focuses damaging surface-emitted electrons to small areas on the cavity surface. This project will develop simulation tools to assist in designing RF cavities for operation in strong magnetic fields with reduced surface damage and breakdown.	

<b>Company</b>	<b>Title</b>
Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Parallel Validation Tools for Fusion Simulations
<b>Summary</b>	
This project will develop software that will standardize and facilitate fusion code validation against experiments. ITER and other fusion experiments will benefit from this work.	

<b>Company</b>	<b>Title</b>
Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Plasma Jet Modeling for MIF
<b>Summary</b>	
This project will validate and extend tools developed for use in modeling innovative fusion devices for clean, emission free, power generation.	

<b>Company</b>	<b>Title</b>
Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	QuAI - A Quality Assurance Infrastructure for Data-Centric Applications
<b>Summary</b>	
The proposed system will develop a customizable infrastructure that provides quality assurance in distributed data processing for large HEP and NP experiments and NASA missions.	

<b>Company</b>	<b>Title</b>
Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Rapid Prediction of Long Range Wakefields for Beam Impedance and Power Loading in Complex Accelerator Structures
<b>Summary</b>	
Design and operation of nuclear physics accelerators is constrained by deleterious effects of extraneous electromagnetic signals (wakefields) within the cavity structures, and these signals are extremely challenging to predict with existing design tools.	

<b>Company</b> Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	<b>Title</b> Simulations of Alpha Wall Load in ITER
<b>Summary</b> In the \$10B International Thermonuclear Experimental Reactor, 100 MW of fusion power is expected to become alpha particle kinetic energy. This project will develop improved simulation software to predict to what extent harmful, residual high-energy alpha particles will reach and strike the reactor wall.	

<b>Company</b> Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	<b>Title</b> Simulation of Direct-Drive Magneto-Inertial Fusion
<b>Summary</b> The success of DOE-funded magneto-inertial fusion research projects depend on benchmarking computational prediction against experiments. This project will develop numerical models to improve the accuracy of laserdriven magnetic-ux compression simulations.	

<b>Company</b> Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	<b>Title</b> Simulation of Short-Range Wakefields in Accelerating Structures for X-Ray Sources
<b>Summary</b> Significant scientific discovery is enabled by particle accelerator-based sources of X-rays. Existing software is being enhanced to enable the efficient, accurate design of critical components, leading to improved capabilities and reduced costs.	

<b>Company</b> Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	<b>Title</b> Virtual Cavity Prototyping with VORPAL
<b>Summary</b> Giving the designers of superconducting radio frequency accelerator cavities the ability to test their designs before they build physical prototypes will save both and time and money. This project will develop software that will allow the testing of cavity designs in a virtual environment.	

## CONNECTICUT

<b>STTR Project</b> <b>Company</b> Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	<b>Title</b> Anti-Breakdown Coatings for High-Gradient Accelerator Structures
<b>Summary</b> Progress in elementary particle high-energy physics depends on the evolution of technology to enable future machines to operate at higher energies than can be reached at present. The high-gradient cavities to be developed in this project are to allow structures to sustain higher electric fields without breakdown, thus enabling operation at higher energy, and also opening up commercial applications with improved clinical accelerators.	

<b>Company</b> Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	<b>Title</b> Coaxial Two-Channel Dielectric Wake Field Accelerator
<b>Summary</b> Progress in elementary particle high-energy physics depends on the evolution of technology to enable future machines to operate at higher energies than can be reached at present. This project will develop high-gradient cavities to allow structures to sustain higher electric fields without breakdown, thus enabling operation at higher energy, and also opening up commercial applications with improved clinical accelerators.	

<b>Company</b> Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	<b>Title</b> Electron Gun and Beam Collector for a FOR A 10-MW, 1.3-GHz, Low-Voltage, Multi-Beam Klystron
<b>Summary</b> Progress in elementary particle high-energy physics depends on the evolution of technology to enable future machines to operate at higher energies than can be reached at present. The high-power multi-beam klystrons to be developed should lower cost and complexity for a future electron-positron collider.	

<b>Company</b> Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	<b>Title</b> Fast Ferroelectric L-Band Tuner for Superconducting Cavities
<b>Summary</b> Progress in nuclear physics and elementary particle high-energy physics depends on the evolution of technology to enable future machines to operate at higher particle fluxes and higher energies than can be reached at present. The fast ferroelectric tuners to be developed in this project are to allow accelerator cavities to sustain high accelerating fields despite uncontrolled mechanical vibrations that would otherwise detune the cavities and degrade the accelerator performance.	

<b>Company</b> Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	<b>Title</b> Multi-Mode Cavity Design for Raising RF Breakdown Threshold in a Two-Beam High-Gradient Accelerator
<b>Summary</b> This project will develop high-gradient cavities to allow structures to sustain higher electric fields without breakdown, thus enabling operation at higher energy, and also opening up commercial applications with improved clinical accelerators.	

<b>Company</b> Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	<b>Title</b> RF Cavity Chain and Magnetic Circuit for a 10-MW, 1.3-GHz, Low-Voltage, Multi-Beam Klystron
<b>Summary</b> This project will develop high-power multi-beam klystrons that should lower cost and complexity for a future electron-positron collider, and also open up commercial applications with improved clinical accelerators and industrial processors.	



<b>Company</b> Proton Energy Systems 10 Technology Drive Wallingford, CT 06492-1955	<b>Title</b> Application of Rapid Throughput Measurement Techniques to Quantify Catalyst Distribution in Electrolysis MEAs Through Measurement of MEA Thickness Variation
<b>Summary</b> The manufacture of hydrogen generation systems, which can be integrated with renewable energy sources to generate hydrogen fuel, produces a minimal carbon footprint. This project aims to reduce the cost of this technology through development of improved quality control systems for reduced scrap and higher manufacturing throughput.	

<b>Company</b> Proton Energy Systems 10 Technology Drive Wallingford, CT 06492-1955	<b>Title</b> Hydrogen by Wire- Home Fueling System
<b>Summary</b> One of the most attractive ways to implement a home hydrogen fueling station is the proton exchange membrane (PEM) water electrolysis hydrogen generator. PEM technology can generate the hydrogen fuel from renewable electricity and directly fill a vehicle at home in the user's garage	

<b>Company</b> R&D Dynamics Corporation 15 Barber Pond Road Bloomfield, CT 06002	<b>Title</b> High Efficiency R744 Centrifugal Chiller
<b>Summary</b> A carbon dioxide (R744) centrifugal chiller cycle is proposed which is highly efficient and uses a refrigerant having zero GWP (Global Warming Potential). The new chiller cycle will use 60% less power than current R744 cycles in the case of 150 ton capacity chillers.	

<b>Company</b> SupraMagnetics, Inc. 214 Canal Street Plantsville, CT 06479	<b>Title</b> A Multifilament PIT V3Ga Conductor for FUSION Magnet Applications
<b>Summary</b> This project will establish the feasibility of a multifilament V3Ga PIT conductor will improve magnet technology for fusion reactors, high energy physics research, MRI and NMR machines for the general public benefit.	

<b>Company</b> SupraMagnetics, Inc. 214 Canal Street Plantsville, CT 06479	<b>Title</b> A Multifilament PIT V3Ga Conductor for HEP Magnet Applications
<b>Summary</b> The High Energy Physics (HEP) research field employs high energy particle colliders to verify quantum theory, the existence of proposed subatomic particles, and theories of the origin of our universe. This project will develop and demonstrate an effective multifilament V3Ga conductor by the multi-filament powder-in-tube process to achieve higher, more consistent critical current density (JC) in higher magnetic fields (15T - 20T) and increased strain resilience.	

<b>Company</b> SupraMagnetics, Inc. 214 Canal Street Plantsville, CT 06479	<b>Title</b> A Novel Quaternary Low-Cost PIT Nb <sub>3</sub> Sn Conductor for HEP Magnet Applications at 15 Tesla and Beyond
<b>Summary</b> A new economical Nb <sub>3</sub> Sn superconductor with advanced performance will be developed for high field magnets utilized in high energy physics research, fusion machines, and MRI and NMR instruments for the general benefit of the public.	

<b>Company</b> SupraMagnetics, Inc. 214 Canal Street Plantsville, CT 06479	<b>Title</b> Extrudable NbTi Superconductor with Ferromagnetic Pins for Undulator Magnets
<b>Summary</b> A new economical NbTi superconductor with advanced performance will be developed for undulator magnets, MRI, and NMR instruments for the general benefit of the public.	

<b>Company</b> Sustainable Innovations, LLC 160 Oak St., Unit 410 Glastonbury, CT 06033-2336	<b>Title</b> Development of an Electrochemical Separator + Compressor
<b>Summary</b> This project will develop a highly efficient electrochemical hydrogen separator and compressor to provide high purity, high pressure hydrogen for industrial and vehicular fueling applications.	

<b>Company</b> Yardney Technical Products, Inc. 82 Mechanic Street Pawcatuck, CT 06379	<b>Title</b> Reciprocal Lithium-ion Cell with Novel Lithium-Free Cathode and Pre-Lithiated Carbonaceous Anode
<b>Summary</b> This project will develop an inexpensive and environmentally benign lithium-ion cell with novel cathode and pre-lithiated carbon anode. The essential feature of the developing cell is that it is in charged state being just assembled while the traditional lithium-ion cell must pass a so-called "formation step" (few charge-discharge cycles lasting about a week) after assembling.	

## DELAWARE

<b>Company</b> Applied Diamond, Inc. 3825 Lancaster Pike Wilmington, DE 19805	<b>Title</b> A New Approach to Diamond-Based High Heat Load Monochromators
<b>Summary</b> This project will make monochromators of diamond for use in the new generation of synchrotrons at DOE laboratories. These diamond monochromators will reduce the operating expense and increase the capacity of these high power facilities accelerating advances in the materials and biological sciences.	

<b>Company</b> Compact Membrane Systems, Inc. 335 Water Street Newport, DE 19804-2410	<b>Title</b> New Fabrication Technique for Ultrathin Membranes
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**Summary**

This project will improve productivity and separation capability of gas separation membranes. This will have large impact on capital and energy costs for supplying industrial gases to the chemical process industry.

**Company**

Compact Membrane Systems, Inc.  
335 Water Street  
Newport, DE 19804-2410

**Title**

New Membrane Structure for Gas Separations

**Summary**

This project will result in the development of a new membrane system specifically focused to increasing the value of poor natural gas reserves by removing unwanted components. This technology may also find use in other carbon dioxide removal processes.

**Company**

Compact Membrane Systems, Inc.  
335 Water Street  
Newport, DE 19804-2410

**Title**

Novel Ethanol Dehydration Membranes

**Summary**

This project seeks to lower the cost of production by use of membrane water separation systems to produce high quality fuel grade ethanol or other biofuels.

**Company**

Compact Membrane Systems, Inc.  
335 Water Street  
Newport, DE 19804-2410

**Title**

Novel Membranes for Enhancing Value of Bio-Oil

**Summary**

This project will develop a product to remove water and oxygen from biofuels and other organic end products resulting in increased stability and alleviating storage problems reducing waste and increasing the value of the manufactured product.

**Company**

ELCRITON  
15 Innovation Way, #288  
Newark, DE 19711

**Title**

Enhancing Site-Specific Chromosomal Integration in Clostridia

**Summary**

Clostridia are anaerobic bacteria that can significantly advance our nation's efforts towards securing renewable biofuels from green technologies. This project will develop new tools for genetically modifying these bacteria, such that superior biofuel producing organisms can be realized in the very near future.

**FLORIDA****Company**

Accellogic, LLC  
609 Spinnaker  
Weston, FL 33326

**Title**

Direct Sparse Linear Solver Suite for Maximal Performance FPGA/CPU Heterogeneous Supercomputing – An Enhancement to the Sca/LAPACKrc Library

**Summary**

To attain DOE's stated scientific priorities, quantum increases in large-scale computing and simulation speeds are needed. This project will accelerate critical scientific software by providing breakthrough low-cost technology (Extremely-Fast FPGA-Based Direct Sparse Linear Solvers) that can reduce computational times from months to hours, and days to seconds, thus revolutionizing entire industrial design cycles and the way we do science in general.

<b>Company</b> Florida Turbine Technologies, Inc. 1701 Military Trail, Suite 110 Jupiter, FL 33458-7887	<b>Title</b> Application of Advanced Refractory Metals in Revolutionary Turbine Airfoils
<b>Summary</b> This project will develop an innovative concept for turbine airfoil designs, which enables the use of high-temperature refractory metal alloys and coating systems. Such designs facilitate revolutionary advances in power plant durability, performance, efficiency and clean operation. The use of the alloys and coatings evaluated in this program will enable the power industry to retrofit the existing fleet of gas turbines with more efficient designs, leading to a natural gas savings of 480 trillion BTU/year.	

<b>Company</b> Florida Turbine Technologies, Inc. 1701 Military Trail, Suite 110 Jupiter, FL 33458-7887	<b>Title</b> Development of Innovative Cooling Approaches for Robust Design
<b>Summary</b> This project will develop innovative new cooling approaches for robust turbine design to facilitate revolutionary advances of power plant durability, performance, efficiency and clean operation. Such technology could be readily retrofit into existing gas turbine power plants, which make up approximately 14% of our nation's electric power.	

<b>Company</b> MicroMaterials, Inc 13302 Telecom Drive Tampa, FL 33637	<b>Title</b> SERS Raman Sensor Based on Diameter-Modulated Sapphire Fiber
<b>Summary</b> A novel fiber optic chemical sensor with anticipated higher sensitivity and lower cost than those of existing ones will be developed. As a process control device, such a probe could significantly increase the energy efficiency of the chemical and petrochemical industries.	

## GEORGIA

<b>Company</b> American Maglev Technologies of Florida, Inc. 30 South Park Square Suite 201 Marietta, GA 30060	<b>Title</b> Magnetic Gears? The Key to Efficient Ocean Current Energy Recovery
<b>Summary</b> This project will explore new green, cost effective energy recovery technology for applications in the ocean's tides, the world's slow moving rivers, and wind energy. This new technology is primarily based in the replacement of mechanical gearboxes with new magnetic gears.	

<b>Company</b> Cermet, Inc. 1015 Collier Road, Bldg H Atlanta, GA 30318	<b>Title</b> Nonpolar Green LEDs Based on InGaN
<b>Summary</b> This project will develop a green light emitting diode that produces the most amount of green light with the least possible input power. This technology can be coupled with other lighting technology to produce light sources that are highly energy efficient.	

<b>Company</b> nGimat Co. 5315 Peachtree Boulevard Atlanta, GA 30341-2107	<b>Title</b> High Voltage Lithium-Ion Nano-Cathodes
<b>Summary</b> The goal of this project is to develop a critical component of Lithium-ion batteries that will power Plug-in Hybrid Electric Vehicles. Automobiles powered by batteries containing this component will reduce our dependence on foreign oil, while also reducing harmful automobile emissions and strengthening global competitiveness of the U.S. automobile industry.	

<b>STTR Project</b> <b>Company</b> Polymer Aging Concepts, Inc. 372 River Drive Dahlonega, GA 30533	<b>Title</b> Nanotechnology-Based Condition Monitoring Sensors for Generation Electrical Insulation Systems
<b>Summary</b> A new method to detecting aging of electrical insulation will significantly improve availability and lower costs of nuclear power plants by providing sensors that detect degradation of electric insulation in harsh environments, allowing component replacement before failure. This technology also has health-monitoring applications in automotive, wind turbine and aerospace technologies.	

<b>Company</b> Virkaz Technologies 7305 Weber Street Atlanta, GA 30349-7919	<b>Title</b> CloudSpan: Enabling Scientific Computing Across Cloud and Grid Platforms
<b>Summary</b> Grid computing has been established within the Nuclear Physics community as paradigm for data sharing and computational analysis on a massive scale. Cloud computing has recently emerged as a paradigm in which users lease the resources required to maintain and create virtual storage and computational elements in shared hosting environment. This project will develop an infrastructure that allows users to execute their scientific applications seamlessly in either environment.	

## HAWAII

<b>Company</b> Makai Ocean Engineering, Inc. P.O. Box 1206 Kailua, HI 96734	<b>Title</b> Electrical Transmission Cable to Shore for a 100MW Floating OTEC Electrical Power Plant
<b>Summary</b> Ocean Thermal Energy Conversion (OTEC) can supply renewable and firm electrical energy to tropical areas (Hawaii, Guam, Puerto Rico, DOD bases). A critical marine component does not exist today: a submarine high voltage power cable system for dynamic, deep ocean OTEC conditions.	

<b>STTR Project</b> <b>Company</b> Technical Research Associates, Inc. 2800 Woodlawn Drive, Suite 149 Honolulu, HI 96822	<b>Title</b> Spectral Assisted Moving Vehicle Tracking
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**Summary**

Current approaches in the automatically tracking moving vehicles from an overhead platform use techniques that rely on spatial-temporal characteristics coupled with moving object maps and tracking techniques. This project will investigate methods where the spectral observable of the moving vehicles can be useful to improve the efficacy of tracking.

**ILLINOIS****Company**

Aries Design Automation, LLC  
6157 N. Sheridan Road, Suite 16M  
Chicago, IL 60660

**Title**

Formal Methods for Robustness Checking of Radiation-Hardened-by-Design Microelectronics

**Summary**

The project will develop efficient and scalable mathematically based methods for evaluation of the robustness of radiation-hardened circuits, and automatic generation of recommendations for radiation hardening of specific parts of a circuit. The resulting technology will be of benefit to the DOE, the DOD, all semiconductor companies, as well as companies that develop aerospace electronics, including NASA.

**Company**

Aries Design Automation, LLC  
6157 N. Sheridan Road, Suite 16M  
Chicago, IL 60660

**Title**

Insider Threat Detection and Response Using Formal Methods

**Summary**

The project will result in a powerful model for analysis and detection of insider threats in computer networks. The resulting technology will be of benefit to the DOE, the DOD, as well as all organizations that have to protect high-value information, such as the banking industry, high-tech companies developing expensive Intellectual Property, and civilian government infrastructures.

**Company**

EPIR Technologies, Inc.  
590 Territorial Drive, Suite B  
Bolingbrook, IL 60440

**Title**

HgTe/CdTe Superlattice FTIR Detectors Optimized for the 300-to-1000 cm-a Region

**Summary**

This project will use unique new methods in a new technology to develop the first sensitive, high resolution focal plane arrays to image in the very long wavelength infrared, which is necessary for the reliable remote sensing of weapons of mass destruction and of chemical and biological agents.

**STTR Project****Company**

I.C.Gomes Consulting & Investment Inc.  
1728 Killdeer Dr  
Naperville, IL 60565

**Title**

Development of Thin Refractory Actinide Plates for High Power RIB Targets

**Summary**

This project will develop fabrication techniques of high density, fast release thin plates of refractory actinides to be used in targets for advanced nuclear physics studies at rare isotope beam facilities. These plates will allow the construction of targets to produce beams of short lived isotopes due to its fast release characteristic increasing the range of application for rare isotope facilities and also they can be used in other applications such as radioisotope production for medical and other applications.

<b>Company</b>	<b>Title</b>
MicroLink Devices 6457 West Howard St Niles, IL 60714	Backside Contact Multijunction Solar Cells for Concentrator Applications
<b>Summary</b>	
This project will develop new solar cell device technologies that enable solar power generation with lower cost and higher efficiency. Multijunction solar cells with backside contacts are being developed that will enable significant improvements in the performance of concentrating solar power systems.	

<b>Company</b>	<b>Title</b>
Muons, Inc. 552 N. Batavia Avenue Batavia, IL 60510	Beam Pipe HOM Absorber for 750 MHz RF Cavity Systems
<b>Summary</b>	
Superconducting RF cavity systems will be improved by developing better designs and materials for the absorption of unwanted higher order mode (HOM) frequencies that lead to beam instabilities in synchrotron light sources.	

<b>STTR Project</b>	
<b>Company</b>	<b>Title</b>
Muons, Inc. 552 N. Batavia Avenue Batavia, IL 60510	H-Ion Sources for High Intensity Proton Drivers
<b>Summary</b>	
A device to produce H- ions, which are each made up of a proton and two electrons, is being developed to enable higher intensity beams with better reliability and improved efficiency for many powerful particle accelerators used in science, industry, and homeland defense.	

<b>STTR Project</b>	
<b>Company</b>	<b>Title</b>
Muons, Inc. 552 N. Batavia Avenue Batavia, IL 60510	High Field YBCO Magnet Technology for Muon Cooling
<b>Summary</b>	
High-temperature superconducting wire is being developed to operate at low temperature for extremely high field magnets for particle accelerators and Nuclear Magnetic Resonance.	

<b>STTR Project</b>	
<b>Company</b>	<b>Title</b>
Muons, Inc. 552 N. Batavia Avenue Batavia, IL 60510	High Power Co-Axial SRF Coupler
<b>Summary</b>	
Co-axial window technology is being improved with new materials and techniques in order to transfer RF power from sources to RF cavities at very high levels to satisfy the demands of intense light sources used for science and industry.	

<b>STTR Project</b>	
<b>Company</b>	<b>Title</b>
Muons, Inc. 552 N. Batavia Avenue Batavia, IL 60510	Improved DC Gun Insulator Assembly

**Summary**

Ceramics with specific changes in resistivity throughout their volume will be developed and manufactured to improve very high voltage gradients in DC guns used for accelerator research and industrial applications.

**STTR Project****Company**

Muons, Inc.  
552 N. Batavia Avenue  
Batavia, IL 60510

**Title**

Phase and Frequency Locked Magnetrans for SRF Sources

**Summary**

Highly efficient and inexpensive magnetrons, such as those used in kitchen microwave ovens, are being developed to provide the lowest cost microwave sources for a number of diverse applications, including particle accelerators, phased array radars, and sputtering systems.

**Company**

Muons, Inc.  
552 N. Batavia Avenue  
Batavia, IL 60510

**Title**

Quasi-Isochronous Muon Collection Channels

**Summary**

Beams of muons would have many commercial and scientific uses if the disadvantage of their short lifetime can be overcome. New ways to collect large numbers of muons and to form them rapidly into bright beams are being developed for many applications, including a muon collider at the energy frontier.

**Company**

Particle Accelerator Corporation  
809 Pottawatomie Trail  
Batavia, IL 60515-2609

**Title**

Non-Scaling H-FFAG Accelerator for HEP and Medical Applications

**Summary**

The development of broad, highly-accurate accelerator models with powerful optimization tools and user-friendly interfaces will enhance not only the HEP program but also benefit established and future applications of accelerators in science, technology, and medicine ranging from treatment of cancers, radiopharmaceuticals, and medical isotope production to secondary production beams for material science and basic research in nuclear physics.

**Company**

QuesTek Innovations LLC  
1820 Ridge Avenue  
Evanston, IL 60201-3621

**Title**

Computational Design of Cost-Effective Oxidation- and Creep-Resistant Alloys for Coal-Fired Power Plants

**Summary**

Higher operating temperatures at coal-fired power plants can increase efficiency and reduce CO<sub>2</sub> emission while also enhancing national security, domestic employment, balance of trade and U.S. GDP. This project will utilize a fundamental computational approach to design and develop improved cost-effective oxidation-and creep-resistant alloys for coal-fired power plants.

**Company**

QuesTek Innovations LLC  
1820 Ridge Avenue  
Evanston, IL 60201-3621

**Title**

Computational Design of Oxidation and Creep-Resistant Niobium Superalloys for High Temperature Turbine Applications



**Summary**

This project will develop a new class of materials that can withstand extremely high temperatures (>1300C), which will enable the development of turbines for high-efficiency, zero-emission, coal-fired power plants, and also enable the development of advanced aerospace engines representing revolutionary performance increase and cost savings to the aerospace industry.

**KANSAS****Company**

KalScott Engineering Inc.  
P.O. Box 3426  
Lawrence, KS 66046

**Title**

Stabilized Platform for Airborne Instrumentation

**Summary**

This project will result in the development and demonstration of stabilized platforms for airborne instrumentation, which will enable highly accurate measurements of atmospheric radiation, which are vital for supporting a strategy of sustainable and pollution-free energy development for the future.

**MARYLAND****Company**

Acadia Optronics, LLC  
1395 Piccard Drive, Suite 210  
Rockville, MD 20850

**Title**

FPGA-Based End-Station Security for High-Performance Networking

**Summary**

This project will develop and deploy a high-performance cyber-security platform designed to significantly enhance the security of next-generation networked computing.

**Company**

Acadia Optronics, LLC  
1395 Piccard Drive, Suite 210  
Rockville, MD 20850

**Title**

Multi-Protocol File Transfer Application for High Performance Networks

**Summary**

This project will develop an easy-to-use, high-performance file transfer application suitable for next-generation networks.

**Company**

Acadia Optronics, LLC  
1395 Piccard Drive, Suite 210  
Rockville, MD 20850

**Title**

Software Management, Distribution, and Support for ESnet Network Provisioning Tools

**Summary**

This project will provide a management, distribution, and support infrastructure for network provisioning tools.

**Company**

Acadia Optronics, LLC  
1395 Piccard Drive, Suite 210  
Rockville, MD 20850

**Title**

Web 2.0 Based Federated Network Management Environment

**Summary**

This project will develop a Web 2.0 based network management environment that will enable efficient collaboration between users and network operators.

<b>Company</b> Active Signal Technologies 611 North Hammonds Ferry Rd Linthicum, MD 21090-1322	<b>Title</b> High-Temperature Capacitors for Geothermal Applications
<b>Summary</b> This project will develop dielectrics and compact capacitors to aid drilling instrumentation for more efficient and reliable geothermal energy harvesting. This research will help the U.S. geothermal industry and ultimately contribute to our nation's energy security.	

<b>Company</b> Array Information Technology, Inc. 7474 Greenway Center Drive, Suite 600 Greenbelt, MD 20770	<b>Title</b> Tools for Digitization of Historic Seismograms
<b>Summary</b> Wide-scale digital recording of earthquakes began in the early 1980s. This project will enable the seismological community to more fully evaluate earthquake source characteristics for large damaging events that were recorded with analog instrumentation starting in the early 1900's, thereby doubling or tripling the current catalog of digital seismograms.	

<b>Company</b> Dynaflow, Inc. 10621-J Iron Bridge Rd Jessup, MD 20794	<b>Title</b> Combined Harvesting of Algae and Extraction of Oil using DynaJets Cavitating Jets
<b>Summary</b> Specially designed cavitating jets will be used to release the oil from algae that have been grown as biodiesel feedstock. This technology will reduce production costs and make algae biodiesel more competitive with petroleum diesel.	

<b>Company</b> Intelligent Automation, Inc. 15400 Calhoun Drive, Suite 400 Rockville, MD 20855	<b>Title</b> A Secure Wireless AE Sensor Network with Advanced Diagnostic and Prognostic Algorithms for Structural Health Monitoring
<b>Summary</b> This project will develop a novel structural health monitoring (SHM) system using state-of-art wireless AE sensor network techniques to prevent the catastrophic failure of critical equipment and components in advanced power plants.	

<b>Company</b> Intelligent Automation, Inc. 15400 Calhoun Drive, Suite 400 Rockville, MD 20855	<b>Title</b> Distributed Mining Tool for Large-Scale DOE Science and Technical Information
<b>Summary</b> This project will develop an innovative distributed data mining tool, namely DSTMiner (Distributed Science and Technology Miner), for large-scale science and technical information data. The proposed tool will benefit the knowledge management and access of NIH's PubMed, US patent examination, FDA and CDC's document and data analysis.	

**STTR Project****Company**

Ionova Technologies, Inc.  
182 Thomas Johnson Drive, Suite 204L  
Frederick, MD 21702

**Title**

3-D Nanofilm Asymmetric Ultracapacitor

**Summary**

This project will apply advances in nanotechnology to create a new type of ultracapacitor energy storage device. Resulting ultracapacitors will be capable of storing significantly greater amounts of energy than commercially available devices while providing dramatic improvements in safety, cost, safety, environmental impact and in other important metrics.

**Company**

LightSpin Technologies, Inc.  
4407 Elm Street  
Chevy Chase, MD 20815

**Title**

Radiation Hard GaAs Photomultiplier Chip(TM)

**Summary**

This project will develop a new camera able to see every last photon of light. It will help doctors peer into the body to find cancer early, emergency responders find radioactive materials, and physicists probe the composition of matter.

**Company**

Techno-Sciences, Inc.  
11750 Beltsville Drive  
Beltsville, MD 20705

**Title**

Techno-Sciences, Inc. Non-Destructive Condition Monitoring for Power Plants

**Summary**

Structural failures in power systems may lead to forced outage and loss of plant availability, which is extremely costly. A non-destructive condition monitoring system will be developed for real-time analysis and monitoring of structural damage that may be observed at several plant locations.

**Company**

Technology Assessment & Transfer, Inc.  
133 Defense Highway, Suite 212  
Annapolis, MD 21401

**Title**

Joining Plasma Resistant Lanthana Doped W and CuCrZr Alloy Heat Sinks for use in Nuclear Fusion Applications

**Summary**

This project will use cutting edge materials engineering techniques to create nano-structured copper-tungsten joints which reduce the effects the harsh thermal environment seen inside of the ITER fusion reactor on vital components. Using this technology, clean, safe and efficient fusion reactors are closer to being a realized.

**Company**

WebLib, LLC  
5101 River Road, Apt. 1918  
Bethesda, MD 20816-1574

**Title**

A Scalable Distributed Client Based Meta Search and Discovery Infrastructure

**Summary**

This project will explore the development of browser-based meta-search software that will allow tens of millions of users (e. g. students) to access vast numbers of high quality scientific and technical information resources without costly infrastructure investments.

<b>Company</b> Zymetis, Inc. 387 Technology Drive College Park, MD 20742-0001	<b>Title</b> Optimal Substrate-Specific Hemicellulase Enzyme Mixtures
<b>Summary</b> To enable production of biofuel from biomass, this project aims to use the genetic systems of an unusual marine bacterium to identify the essential enzymes removing protective polymers from the core cellulose of biomass and then use this information to assemble optimized enzyme mixtures for converting the biomass to fuel.	

## MASSACHUSETTS

<b>STTR Project</b>	
<b>Company</b> Aerodyne Research, Inc. 45 Manning Road Billerica, MA 01821-3976	<b>Title</b> An Absolute CO2 Monitor with Extremely High Accuracy
<b>Summary</b> To better understand global climate change, carbon dioxide needs to be measured globally and accurately. This project will design a novel, commercial monitor with unsurpassed accuracy and unique capability to be deployed worldwide.	

<b>Company</b> Aerodyne Research, Inc. 45 Manning Road Billerica, MA 01821-3976	<b>Title</b> Development and Characterization of a Compact Aerosol Chemical Speciation Monitor (ACSM)
<b>Summary</b> Small airborne particles generated from energy-related activities can adversely impact global climate, human health, and visibility. This project will develop an instrument with unique capabilities for identifying and measuring the mass loading and chemical speciation of aerosol particles, leading to a better understanding of the sources, transformations and fates of atmospheric particulate matter.	

<b>Company</b> Aerodyne Research, Inc. 45 Manning Road Billerica, MA 01821-3976	<b>Title</b> High Precision COS Monitor to Constrain the Partitioning of CO2 Fluxes
<b>Summary</b> To better understand global climate change, carbon dioxide uptake by vegetation needs to be measured globally. This project will design a novel instrument for carbonyl sulfide which can be used to assess global budgets for CO2 uptake by plants.	

<b>Company</b> Aerodyne Research, Inc. 45 Manning Road Billerica, MA 01821-3976	<b>Title</b> Volatility-Resolved Measurements of Total Gas-Phase Organic Compounds by High Resolution Electron Impact Mass Spectrometry
<b>Summary</b> This project will develop an instrument with unique capabilities for identifying and measuring the organic precursors of aerosol particles, leading to a better understanding of the sources, transformations and fates of atmospheric particulate matter.	

<b>Company</b> Agiltron, Inc. 15 Cabot Road Woburn, MA 01801-1003	<b>Title</b> Long-Wave Infrared Photonic Band-Gap Fiber
<b>Summary</b> Infrared optical fibers are a long sought goal of optical technology, useful for a broad range of military and commercial applications ranging from antimissile countermeasures to laser surgery. The proposed research will lead to the first practical, manufacturable low loss infrared optical fiber for the wavelength band of greatest importance.	

<b>Company</b> Aspen Aerogels, Incorporated 30 Forbes Road, Bldg B Northborough, MA 01532	<b>Title</b> Aerogel Derived Nanostructured Thermoelectric Materials
<b>Summary</b> This project will develop the materials required to fabricate refrigerators and air conditioners that do not require a refrigeration gas for operation. They will be more efficient, lighter, quieter, more compact, and more durable while costing less than conventional refrigeration technologies.	

<b>Company</b> Aspen Aerogels, Incorporated 30 Forbes Road, Bldg B Northborough, MA 01532	<b>Title</b> Transparent Aerogel Insulation for Solar Heat Concentration Elements
<b>Summary</b> This project will develop a new insulation technology to improve the cost efficiency of generating electricity with solar power. The insulation will be applied to the pipe lines that are heated by concentrating sunlight on the pipes using arrays of parabolic mirror troughs.	

<b>Company</b> Aspen Products Group, Inc. 186 Cedar Hill Street Marlborough, MA 01752	<b>Title</b> Novel Materials for Energy Efficient Production of High Purity Oxygen from Air
<b>Summary</b> A technology that is able to generate high purity oxygen from air with reduced electrical power consumption relative to current technologies will be developed. The technology will be used to reduce the cost of coal-based electricity generation, reduce emissions from coal power plants, and reduce the cost of producing oxygen for industrial and medical purposes.	

<b>Company</b> Beam Power Technology, Inc. 5 Rolling Green Lane Wave Chelmsford, MA 01824	<b>Title</b> Design Studies of Megawatt-Class Continuous- Elliptic-Beam Inductive Output Tubes
<b>Summary</b> This project will develop megawatts-class highpower, high-efficiency elliptic-beam inductive output tubes (EBIOTs) for accelerator applications.	

<b>Company</b> Beam Power Technology, Inc. 5 Rolling Green Lane Wave Chelmsford, MA 01824	<b>Title</b> Development of a 100 kW 2.815 GHz Continuous-Wave Elliptic Beam Klystron with Two Output Windows
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**Summary**

This project will develop a high-efficiency, low-voltage elliptic-beam klystron to reduce costs of operating accelerators for basic energy science research.

**Company**

Beam Power Technology, Inc.  
5 Rolling Green Lane Wave  
Chelmsford, MA 01824

**Title**

Development of a Pulsed, 10% Duty 140kW, 402.5 MHz  
Elliptic-Beam Inductive Output Tube

**Summary**

This project will develop a new class of energy efficient, higher power, lower cost inductive output tubes. IOTs are used in areas such as leading edge scientific research and digital TV broadcasting where high power rf amplification is required.

**Company**

Boston Applied Technologies, Inc.  
6F Gill Street  
Woburn, MA 01801-1721

**Title**

High Efficiency Multiple Wavelength Upconverting  
Nanophosphors

**Summary**

Since lighting accounted for approximately 9% of household electricity usage in the United States, developmental of this technology would significantly reduce energy consumption, reduce the usage of environmentally unfriendly mercury. The energy saving and commercial potential of this proposed technology is tremendous. This project will develop technology that would affect almost everyone's life and the country's economy.

**STTR Project****Company**

Boston Applied Technologies, Inc.  
6F Gill Street  
Woburn, MA 01801-1721

**Title**

Novel Wireless NDE Sensors for Continuous  
Monitoring of Thermal Power Plant Components

**Summary**

A novel wireless NDE technology for continuous monitoring of thermal power plant components will find broad applications in both government and commercial markets. The success of this project will have great impacts not only to many current DOE sponsored R&D and commercial programs, but also to the NDE industry at large.

**STTR Project****Company**

EIC Laboratories, Inc.  
111 Downey Street  
Norwood, MA 02062

**Title**

An Integrated In Situ Raman and Turbidity Sensor for  
High Level Waste Tanks

**Summary**

This project will develop an integrated Raman/turbidity sensor for *in situ* characterization of nuclear waste. The sensor will provide chemical characterization of the waste and yield information concerning the amount of suspended particles in the waste.

**Company**

EIC Laboratories, Inc.  
111 Downey Street  
Norwood, MA 02062

**Title**

Fiber Optically Coupled Raman Telescope for the In Situ  
Standoff Characterization of Residual Wastes

**Summary**

This project will develop a fiber optically coupled Raman probe telescope that will be able to detect and identify chemicals at a standoff distance. The telescope Raman probe will be used as a characterization tool for residual wastes in nuclear waste storage tanks.

<b>Company</b> EIC Laboratories, Inc. 111 Downey Street Norwood, MA 02062	<b>Title</b> Flameproof Additives for Automotive Li Ion Batteries
<b>Summary</b> This project will develop liquid additives to large lithium-ion batteries to be used in electric vehicles. The additives will suppress flammability that may be brought about by an accident or electrical failures.	

<b>Company</b> ElectroChem, Inc. 400 West Cummings Park Woburn, MA 01801	<b>Title</b> Advanced PEM Based Hydrogen Home Refueling Appliance
<b>Summary</b> This project will develop a small appliance for refueling hydrogen vehicles by the homeowner that is low cost and uses inexpensive off-peak electricity to produce hydrogen from water. This appliance will reduce the infrastructure cost for development of the hydrogen vehicle market in both the near and long term.	

<b>Company</b> FloDesign Inc. 380 Main Street Wilbraham, MA 01095	<b>Title</b> MECT, The Next Generation Current Turbine
<b>Summary</b> MECT is an innovative saltwater or freshwater turbine design that will produce more energy at lower cost than any device that is currently under development. This project is committed to the potential to develop and manufacture the device.	

<b>Company</b> Fraivillig Technologies Company 98 Charles Street Boston, MA 02114	<b>Title</b> Innovating Insulation for Wind-and-React Superconductor Magnets
<b>Summary</b> This project will develop an insulation system that enables the employment of new superconductors in practical devices.	

<b>Company</b> Giner Electrochemical Systems, LLC 89 Rumford Avenue Newton, MA 02466-1311	<b>Title</b> Anti-Fouling Reverse Osmosis Desalination System
<b>Summary</b> It is estimated that 14 billion barrels of produced water were generated by onshore exploration and production (E&P) in 2002 alone. This project converts produced water to clean water for drinking and irrigation that will minimize the environmental impact of oil and natural gas production.	

<b>Company</b> Giner Electrochemical Systems, LLC 89 Rumford Avenue Newton, MA 02466-1311	<b>Title</b> High Performance Membrane for Chlor-Alkali Electrolysis
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**Summary**

Currently, chlor-alkali and other electrolytic processes consume >6% of the total US electrical generating capacity. If the concept of employing DSM in membrane electrolyzers is proven successful, energy savings of the order of hundreds of billions of watt-hours per year can be realized without changing existing hardware or operating schemes.

**Company**

Giner Electrochemical Systems, LLC  
89 Rumford Avenue  
Newton, MA 02466-1311

**Title**

Unitized Design for Home Refueling Appliance for Hydrogen Generation to 5000 psi

**Summary**

To enable the transition to a hydrogen economy, the successful implementation of a “unitized” electrolyzer design that can be used as a home refueling appliance will result in a safe, high-efficiency, low capital cost system that will provide competitively-priced hydrogen for fuel-cell vehicles.

**STTR Project****Company**

Incom Inc.  
P.O. Box G  
Southbridge, MA 01550-0528

**Title**

Development of Photonic Band Gap Structures for Particle Acceleration

**Summary**

To probe deeper into the most fundamental structure of matter, high-energy physics needs shorter wavelengths and higher energies at much lower cost. The miniature photonic-bandgap accelerator has the potential to increase power and performance drastically at a fraction of the cost of conventional systems. This revolutionary generation of accelerators will spawn breakthroughs in many fields including high-energy physics, industrial measurement and technology, and medical research and diagnostics.

**Company**

MagiQ Technologies  
11 Ward Street  
Somerville, MA 02143

**Title**

High-Temperature Optical Seismic Sensor

**Summary**

This project will apply ultra-sensitive optical measurement techniques from their quantum information processing system to help geologists to map micro-scale tremors of the rocks to harness geothermal energy.

**Company**

MagiQ Technologies  
11 Ward Street  
Somerville, MA 02143

**Title**

Real Time Optical Network for Pulsed-Accelerator Control

**Summary**

This project will develop a fiber optic-based synchronization and communication system for control of extgeneration pulsed accelerators. MagiQ’s existing product, a quantum key distribution system, will be modified and further developed for this and other advanced applications.

**Company**

Micro Magnetics, Inc.  
421 Currant Road  
Fall River, MA 02720-4711

**Title**

Magnetic Tunnel Junction Nanoprobe Compatible with an Atomic Force Microscope



**Summary**

This project will develop a new kind of magnetic sensor which measures tiny magnetic fields, such as those created by the microscopic electrical currents in computers and cell phones. This sensor will allow engineers and scientists to better understand magnetic materials and to visualize the behavior of electrical devices.

**Company**

MicroContinuum, Inc.  
57 Smith Place  
Cambridge, MA 02138

**Title**

Low-Cost Terabyte and Petabyte Data Storage System

**Summary**

Data storage requirements for government agencies, national labs, medical organizations, and businesses are growing at an unprecedented rate. This project will provide a more cost effective, reliable, and energy-efficient means of meeting the growing demand for high capacity permanent storage for these organizations.

**Company**

MicroContinuum, Inc.  
57 Smith Place  
Cambridge, MA 02138

**Title**

Roll-To-Roll Process for Transparent Metal Electrodes  
in OLED Manufacturing

**Summary**

A new generation of products made possible by light-emitting polymers on thin flexible films will open many new markets, such as roll-up lighting, TVs and displays. The technology being advanced under this SBIR will provide breakthrough manufacturing technology that can reducing costs and improve the performance of these devices.

**STTR Project****Company**

NEMOmetrics Corporation  
28 Constitution Road  
Boston, MA 02129

**Title**

Lighting with No Watt Left Behind

**Summary**

This project will create a new technology to simplify and reduce the cost of monitoring unnecessary lighting and to ensure that unoccupied and under occupied areas do not have excessive, unnecessary lighting.

**STTR Project****Company**

Physical Sciences Inc.  
20 New England Business Center  
Andover, MA 01810

**Title**

Development of a Fieldable Soil Carbon Monitor

**Summary**

This project will develop a small, rugged and fieldable monitor for soil carbon. The overall goal of the program is to establish feasibility of a detector that will help assess management strategies for the sequestration of carbon dioxide in soil.

**Company**

Physical Sciences Inc.  
20 New England Business Center  
Andover, MA 01810

**Title**

Field Worthy Sensor for Measurements of the Stable  
Isotope Ratio of CO<sub>2</sub>

**Summary**

Predictions of global climate change rely on models incorporating precise knowledge of the sources and sinks of important greenhouse gases such as CO<sub>2</sub>. Measurements using the high sensitivity instrument for monitoring the major stable isotopes of CO<sub>2</sub> that this project will develop and demonstrate can be used to decrease the uncertainties that still remain.

<b>Company</b>	<b>Title</b>
Physical Sciences Inc. 20 New England Business Center Andover, MA 01810	Highly Compact CO2 Sensor for Balloon Deployment
<b>Summary</b>	
Policy decisions relating to energy utilization are based on predictions from models of global climate change, which in turn rely on the accuracy of measurements of various trace species in the atmosphere. This project will develop and demonstrate a sensor for routine monitoring of CO2 from balloons.	

<b>STTR Project</b>	
<b>Company</b>	<b>Title</b>
Physical Sciences Inc. 20 New England Business Center Andover, MA 01810	Networked Sensors for Sequestration MVA
<b>Summary</b>	
This project will develop, test, and evaluate laser-based sensors for use as tools to monitor the integrity of carbon dioxide sequestration sites and pipelines. These tools will reduce the cost of site operation and verify that sequestration performs the intended function of reducing greenhouse gas emissions.	

<b>Company</b>	<b>Title</b>
Physical Sciences Inc. 20 New England Business Center Andover, MA 01810	Non-Fracturing, High Performance NiMH Negative Electrode
<b>Summary</b>	
The technology from this project will improve nickel metal hydride (NiMH) batteries with higher performance at a lower cost. These advancements make NiMH competitive for energy storage for utility applications.	

<b>Company</b>	<b>Title</b>
Q-Peak, Incorporated 135 South Road Bedford, MA 01730-2307	100W Green Laser as a Photoinjector Drive Laser
<b>Summary</b>	
This project will develop a laser that will be one of the key components needed to advance accelerator technology particularly for energy recovery linear accelerators (ERLs) and free-electron lasers (FELs). The laser will also find application in micro machining, two photon microscopy and stereo lithography.	

<b>Company</b>	<b>Title</b>
Q-Peak, Incorporated 135 South Road Bedford, MA 01730-2307	Temporal Pulse Shaping Techniques for Photoinjector Lasers
<b>Summary</b>	
Fundamental studies in biology, materials science, chemistry, and physics will greatly benefit from the next generation of linear accelerators and free-electron lasers. Our program will make a significant advance in a key laser technology needed for these next-generation systems.	

<b>Company</b> Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	<b>Title</b> Bright Quantum Dot Scintillator for High Frame Rate Imaging
<b>Summary</b> This project will develop a scintillator that will allow exploitation of the potential of current state-of-the-art Xray detectors used for synchrotron applications, medical imaging, X-ray scanning equipment at airports and border control and detectors for homeland security, and in small animal research, which is so important for the development of new drugs in a rapid and cost-effective manner.	

<b>Company</b> Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	<b>Title</b> Dual Modality Small Animal Imaging
<b>Summary</b> This project will investigate a promising detector technology, which will have major impact in scientific studies, health care, homeland defense, oil exploration as well as industrial applications.	

<b>Company</b> Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	<b>Title</b> Bright Selenium Based Quantum Dot Scintillators
<b>Summary</b> This project will develop the scintillator that will allow the exploitation of the potential of current state-of-the-art X-ray/gamma-ray detectors used for nuclear physics studies, synchrotron applications, medical imaging, Xray scanning equipment at airports and border control and detectors for homeland security, and in small animal research, which is so important for the development of new drugs in a rapid and cost-effective manner.	

<b>Company</b> Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	<b>Title</b> Fast, Photon Counting Detector Arrays with Internal Gain
<b>Summary</b> This project aims to investigate a new detector design that will have far reaching implications in fundamental scientific studies as well as commercial applications. It will be useful in diverse fields such as materials studies, health care and space research.	

<b>Company</b> Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	<b>Title</b> High Bandwidth Optical Detector for Scanning Probe Microscopy
<b>Summary</b> Nanoscience is a rapidly advancing field that holds great promise for many areas of scientific study including renewable energy, cancer detection and environmental cleanup. This project will overcome current technological limitations and result in a unique instrument that can be used to help characterize and manipulate nano-scale materials.	

<b>Company</b> Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	<b>Title</b> High Performance, Low Cost Scintillators for PET
<b>Summary</b> This project will investigate promising nuclear detector materials that will have major impact in medical imaging, physics, homeland security, scientific studies as well as commercial applications.	

<b>Company</b> Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	<b>Title</b> Low Cost, High Speed, High Sensitivity Detector for Material Science Studies
<b>Summary</b> This project will develop a detector that will allow full exploitation of the outstanding advanced photon sources in which the nation has already invested billions of dollars. In addition to unveiling basic functions of biological systems, this development will have a direct impact on such important applications as baggage scanning and homeland security.	

<b>Company</b> Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	<b>Title</b> Low Cost Large Volume Lanthanide Halide Scintillators
<b>Summary</b> This project will permit the rapid and economical manufacturing of spectroscopic quality radiation detector materials that are so critical to addressing the immediate needs of national laboratories and homeland security in rapid and reliable radioisotope identification. Furthermore, the proposed developments will have a profound impact on civilian sector applications such as X-ray/gamma ray detection in medical diagnostics and small animal research, which is so important to healthcare and new drug development.	

<b>Company</b> Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	<b>Title</b> New Detectors for Small Animal SPECT
<b>Summary</b> This project will investigate a promising nuclear detector material which will have major impact in scientific studies, medical imaging, homeland defense, oil exploration as well as industrial applications.	

<b>Company</b> Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	<b>Title</b> Next Generation SPECT Detectors
<b>Summary</b> This project will investigate a novel detector technology that will be very useful in medical imaging. It will also be useful in other scientific studies (such as high energy physics and space research) as well as commercial applications (such as oil exploration, medical imaging, and non-destructive evaluation).	

<b>Company</b> Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	<b>Title</b> Novel Photon Counting Detector for Animal SPECT/MRI
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**Summary**

A small animal SPECT/MRI scanner using the proposed detector technology will have far better performance than current dual-modality techniques in use, and will bring the power of non-invasive functional imaging to detailed studies of the mouse and rat. Such a tool will be of great importance in understanding biological functions and facilitate rapid progress in new drug developments.

**Company**

Radiation Monitoring Devices, Inc.  
44 Hunt Street  
Watertown, MA 02472-4699

**Title**

Sesquioxide Laser Hosts for Electron Accelerators

**Summary**

New, efficient ceramic laser materials, which can provide ultrashort pulses and high power delivery, will be explored to advance accelerator technology. These lasers will replace the current systems, which are highly energy inefficient.

**Company**

Radiation Monitoring Devices, Inc.  
44 Hunt Street  
Watertown, MA 02472-4699

**Title**

Ultra-Fast, Bright Scintillators for PET

**Summary**

This project will investigate a novel detector technology that will be very useful in medical imaging systems. It will also be useful in other scientific studies (such as particle and high energy physics and space research) as well as other applications (such as oil exploration and nuclear non-proliferation).

**Company**

Reactive Innovations, LLC  
2 Park Drive, Unit 4  
Westford, MA 01886

**Title**

Electrocatalytic Conversion of Carbon Dioxide to Commercial Products

**Summary**

This project will develop a process to convert carbon dioxide gas into commercial products.

**Company**

Reactive Innovations, LLC  
2 Park Drive, Unit 4  
Westford, MA 01886

**Title**

On-Line Measurement of PEM Electrolyzer Stacks

**Summary**

This project will develop a sensor to assess the quality of membrane and electrode assemblies before they are incorporated into higher-value electrolyzers. The success of this product innovation will help lower the manufacturing cost for water electrolyzers targeted by the Department of Energy to generate hydrogen for transportation and stationary applications.

**Company**

ReMetAl, LLC  
150 Kuniholm Drive  
Holliston, MA 01746

**Title**

Drastic Reduction of the Non-Recoverable Loss of Aluminum and Electric Energy through Development of Agile Technology for Production of Ferroaluminum for Steel Deoxidation

**Summary**

Realization of the project would enable economical manufacturing of ferroaluminum—a substitute for aluminum which is lost in deoxidizing of steel. Avoided non-recoverable loss of aluminum would result in a hundreds of millions of dollars savings of this commodity and electric energy needed for its' production annually.

<b>Company</b> Resolute Marine Energy, Inc. 126 Summer Street Watertown, MA 02472	<b>Title</b> Advanced Water Power Technology Development Wave and Current Energy Technologies
<b>Summary</b> This project will investigate innovations related to the improved performance of ocean wave energy converters. Ocean waves are a clean and abundant source of renewable energy that can make a significant contribution to U.S. electric power requirements.	

<b>Company</b> SatCon Technology Corporation 27 Drydock Avenue Boston, MA 02210-2377	<b>Title</b> High-Power-Density, Non-Permanent-Magnet, Electric Motor Development for Hybrid, Plug-in Hybrid, and Fuel Cell Vehicles
<b>Summary</b> This project will develop improved induction machines using cast copper rotors suitable for vehicle and industrial applications including hybrid, plug-in, and fuel cell vehicles as well as mobile power systems for both military and civilian use.	

<b>Company</b> SatCon Technology Corporation 27 Drydock Avenue Boston, MA 02210-2377	<b>Title</b> Improvement of Eddy Current Rotor Loss Prediction Techniques
<b>Summary</b> This project will develop improved efficiency Permanent Magnet (PM) motor analysis and prediction techniques suitable for vehicle and industrial applications including hybrid, plug-in, and fuel cell vehicles as well as mobile power systems for both military and civilian use.	

<b>Company</b> Scientific Solutions, Inc. 55 Middlesex Street, Unit 210 North Chelmsford, MA 01863-1561	<b>Title</b> FABSOAR -- A Fabry-Perot Spectrometer for Oxygen A-Band Research
<b>Summary</b> This project will develop an high-resolution spectrometer to analyze light from the sky to determine the degree to which solar radiation is being absorbed by clouds and other aerosols. Since this radiation is an important driver of many atmospheric processes, understanding it thoroughly is crucial to climate knowledge.	

<b>Company</b> Spectral Sciences, Inc. 4 Fourth Avenue Burlington, MA 01803-3304	<b>Title</b> Structured Emission Thermometry Sensor for Burner Control
<b>Summary</b> This project will produce an optical sensor that will enable glass furnace and other industrial natural gas burners to automatically adjust and optimize their flames. The smart burner technology promises to make gas-fired industrial furnaces cleaner and more fuel efficient.	

<b>Company</b> Supercon, Inc. 830 Boston Turnpike Shrewsbury, MA 01545-3386	<b>Title</b> A Modified Internal Tin Tube Nb <sub>3</sub> Sn Conductor for Higher Non-Copper Critical Current Density
<b>Summary</b> This project will attempt to increase the performance, of Nb <sub>3</sub> Sn conductors in order to attain the required high magnetic fields utilizing a novel materials.	

<b>Company</b> Supercon, Inc. 830 Boston Turnpike Shrewsbury, MA 01545-3386	<b>Title</b> High Performance Nb <sub>3</sub> Sn Conductor Fabricated by the Internal Tin Tube Method with NbTi Island Doping to Assist in Filament Reaction
<b>Summary</b> A superconducting wire will be developed for use in magnets for high energy physics accelerators. This wire will also find use in high frequency nuclear magnetic resonance imaging systems used in cutting edge chemical applications.	

<b>Company</b> Tech-Etch, Inc. 45 Aldrin Road Plymouth, MA 02360-4803	<b>Title</b> Commercial and Cost Effective Production of Two Dimensional Read-Out Board for Subatomic Particle Detectors
<b>Summary</b> Readout boards are used in the detection of subatomic particles. Advancements are necessary to further discoveries of the subatomic universe, and to develop techniques for medical imaging, nuclear nonproliferation and homeland security applications.	

<b>Company</b> TelAztec, LLC 15 A Street Burlington, MA 01803	<b>Title</b> Microstructure-Based Anti-Reflection Treatment for Long-Wave Infrared Transmitting Optical Fiber
<b>Summary</b> This project will develop a novel, nanotechnology based, series of microstructures that can be designed for control of reflectance or for optical wavelength filtering. The designed microstructures can eliminate the need for fragile thin film type dielectric coatings with a rugged and durable microstructure built directly into the bulk material.	

<b>Company</b> TIAX, LLC 15 Acorn Park Cambridge, MA 02140-2301	<b>Title</b> Enabled VOC Sensor for Energy-Efficient Building Ventilation
<b>Summary</b> This project will develop a sensor technology that allows for efficient management of building ventilation, while maintaining a healthy environment for occupants. With widespread adoption, it has the potential to save billions in energy costs with a relatively short payback period.	
<b>Company</b> TIAX, LLC 15 Acorn Park Cambridge, MA 02140-2301	<b>Title</b> Implantation, Activation, Characterization and Prevention/Mitigation of Internal Short Circuits in Lithium-Ion Cells
<b>Summary</b> This project will develop technology to improve safety of batteries for PHEVs and HEVs, making these vehicle technologies more commercially viable, and thus increasing likelihood that they will yield their potential environmental, economic and political benefits.	

<b>Company</b> TIAX, LLC 15 Acorn Park Cambridge, MA 02140-2301	<b>Title</b> Modeling of Hydrogen Dispensing Options for Advanced Storage
<b>Summary</b> On-board vehicle hydrogen storage volumetric and gravimetric targets have not been achieved with 35 MPa compressed hydrogen storage. Five promising advanced storage categories have been identified by the DOE; and this project will develop hydrogen dispensing configurations and cost estimates for each storage option	

<b>Company</b> TIAX, LLC 15 Acorn Park Cambridge, MA 02140-2301	<b>Title</b> Use of Algae for Fuels Production Concepts for Extracting Oil from Algae
<b>Summary</b> Microalgae are a renewable energy source to help reduce U.S. foreign oil dependency. This project will investigate a novel continuous, scalable extractor to release oil from wet algae for biofuel use, offering efficient, sustainable and secure routes to transportation fuels vital to the U.S. economy.	

<b>Company</b> Weston Geophysical Corp. 181 Bedford St., Suite 1 Lexington, MA 02420	<b>Title</b> A Software Toolbox for Systematic Evaluation of Seismometer-Digitizer System Responses
<b>Summary</b> This project will develop a capability to calibrate and improve United States seismic systems used for monitoring foreign nuclear explosive tests.	

## MICHIGAN

<b>STTR Project</b>	
<b>Company</b> Niowave, Inc. 1012 N. Walnut Street Lansing, MI 48906	<b>Title</b> Development of a 400 MHz Superconducting RF Crabbing Cavity
<b>Summary</b> This project will develop superconducting crabbing cavities. The goal of this research is to develop a cavity that will satisfy the requirements of the Large Hadron Collider luminosity upgrade.	

<b>STTR Project</b>	
<b>Company</b> Niowave, Inc. 1012 N. Walnut Street Lansing, MI 48906	<b>Title</b> Development of a 499 MHz Superconducting RF Deflecting Cavity
<b>Summary</b> This project will develop superconducting deflecting cavities. The goal of this research is to develop a cavity that will satisfy the requirements of Jefferson Laboratory's electron beam upgrade.	



<b>Company</b> Niowave, Inc. 1012 N. Walnut Street Lansing, MI 48906	<b>Title</b> Development of a Tunable 28 MHz Superconducting RF Cavity for RHIC
<b>Summary</b> This project will develop a tunable 28 MHz superconducting accelerating system that would have immediate use in existing nuclear physics research facilities.	

<b>Company</b> Niowave, Inc. 1012 N. Walnut Street Lansing, MI 48906	<b>Title</b> Fabrication of Niobium Cavities Directly from Large Grain Ingot
<b>Summary</b> This project will develop a new fabrication method to form superconducting linear accelerator components directly from niobium large grain ingot to greatly reduce the material and fabrication costs. This research would lead to broader use of superconducting linear accelerator technology.	

<b>Company</b> OG Technologies, Inc. 4300 Varsity Drive, Suite C Ann Arbor, MI 48108	<b>Title</b> SICS: A Sensor-Based In-Line Control System for the Surfaces of Continuously Cast Slabs
<b>Summary</b> With the challenges in the current continuous casting practices, a new product will be developed with innovations in the areas of in-line inspection and advanced process control. The expected benefits include energy savings, improved yields, simplified processes, and reduced carbon dioxide release in the steel industry.	

<b>Company</b> Quantum Signal, LLC 3741 Plaza Drive Ann Arbor, MI 48108	<b>Title</b> Spectral Assisted Moving Vehicle Tracking
<b>Summary</b> This project involves understanding non-visible (infraredband) signatures of vehicles and leveraging that information to allow enhanced, robust surveillance from fixed locations, UAVs, and more. The result of this research will be software that will be incorporated into surveillance systems (both military and commercial) that will enhance the safety and security of the United States and its Citizens.	

<b>Company</b> REB Research & Consulting 12851 Capital Street Oak Park, MI 48237	<b>Title</b> Ti2AlNb-Coated Refractory Alloys for Generation IV Nuclear Reactor Construction
<b>Summary</b> This project will develop a new, high temperature composite material with properties that are attractive for use in new, Generation IV nuclear reactors.	

<b>Company</b> Technova Corporation 3927 Dobie Road Okemos, MI 48864-3480	<b>Title</b> Nanostructuring of Heat Sink Surfaces for Improved Cooling Efficiency
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**Summary**

Recent advances in the field of nanotechnology will be adapted to address critical thermal management needs in the emerging alternative energy and electronic markets.

**MINNESOTA****Company**

Advanced Research Corporation  
4459 White Bear Parkway  
White Bear Lake, MN 55110

**Title**

Scanning Probe Microscopy

**Summary**

This project will develop a sensor and technique for measuring high frequency magnetic fields associated with nano-scale structures. This will advance the state of the art ability to quantify and understand electric and magnetic properties on this scale.

**Company**

Hysitron, Inc.  
10025 Valley View Road  
Minneapolis, MN 55344

**Title**

Fast-Scanning Nanoindenter

**Summary**

The proposed fast-scanning nanoindenter promises to be a novel materials characterization tool for highthroughput nanoscale measurements. It can be a powerful tool for quality inspection in manufacturing processes and can contribute to improving product quality for industries suffering from spatial variations in materials properties.

**Company**

SarTec Corporation  
617 Pierce Street  
Anoka, MN 55303

**Title**

A Novel System for the Sequestration and Conversion of Carbon Dioxide to useful Products using Stable Metal Oxide Catalysts

**Summary**

The capture of carbon dioxide and its reuse in fuels and other industrially useful chemicals is important to U.S. national security. Our proposal describes a fast, easy, and technically feasible method to trap and convert carbon dioxide into valuable chemicals that will help serve the needs of the country.

**Company**

SVT Associates, Inc.  
7620 Executive Drive  
Eden Prairie, MN 55344

**Title**

Advanced Coating Technology for Enhanced Performance of Microchannel Plates for High-Efficiency UV and Cherenkov Light Detection

**Summary**

This project will develop an advanced coating technology to enhance performance of MCP based UV detectors for next generation Cherenkov detectors in nuclear physics application.

**Company**

SVT Associates, Inc.  
7620 Executive Drive  
Eden Prairie, MN 55344

**Title**

High-Detectivity Very-Long-Wavelength Strain-Compensated Type II Superlattice Infrared Photo Detectors

**Summary**

This project will produce a strain-compensated type II superlattice structure to improve very-long-wavelength infrared (VLWIR) detection and atomic Hydrogen enhanced growth and surface preparation technique for high performance type II very-long-wavelength photo detectors.

<b>Company</b> SVT Associates, Inc. 7620 Executive Drive Eden Prairie, MN 55344	<b>Title</b> Robust GaN-Based Photocathodes for High-Current RF Electron Injectors
<b>Summary</b> Advanced high-intensity electron guns, used as injectors in electron accelerators, utilize photocathodes as electron source. There is an immediate need for the development of high efficiency photocathodes capable of robust operation at high emission currents. This project is directed toward the development of a GaN-based long-life photocathode for application in high-current electron guns.	

## MISSOURI

<b>Company</b> Freight Pipeline Company 2601 Maguire Boulevard Columbia, MO 65201	<b>Title</b> Machine to Densify Biomass into Tablets
<b>Summary</b> The project will test and develop a special machine for compacting biomass materials (farm residues and forest wastes) to produce dense fuel and feedstock for bio-refineries, in order to reduce the transportation and storage cost for such materials, and to improve the overall cost effectiveness of biomass fuel used in a number of applications.	

<b>Company</b> MO-SCI Corporation 4040 Hy Point North Rolla, MO 65401-8277	<b>Title</b> High-Temperature Viscous Sealing Glasses for Solid Oxide Fuel Cells
<b>Summary</b> The proposed project is to develop a reliable, thermally stable, hermetic sealing system for solid oxide fuel cells and thus this work should improve the operation of solid oxide fuel cells and accelerate the practical use of this alternative energy device.	

<b>Company</b> Sci-Eng Solutions, LLC 3304 Lake Town Drive Columbia, MO 65203-6719	<b>Title</b> Neutron Transmutation Doped Silicon Carbide Switches
<b>Summary</b> This project will develop and deploy fast solid state switches that will address current and future problems requisite to the International Linear Collider kicker systems. Variations on these solid state switches will address numerous other crucial military and commercial applications; such as directed energy weapons, particle beam accelerators, high speed rail systems, lasers, and advanced radars.	

<b>Company</b> Titanova, Inc 12724 Pennridge Drive Bridgeton, MO 63304	<b>Title</b> In Situ Diode Laser Cladding of Erosion Resistant Alloys for Repair of Light Water Reactor Systems and Components
<b>Summary</b> This project will develop portable diode laser cladding systems for purpose of repairing nuclear power plant systems and components. This program will create high skill jobs, extending the life of the nations 104 nuclear power plants, which provides over 20 percent of the current U.S. electricity supply without carbon emissions.	

## MONTANA

Company	Title
Resodyn Corporation 130 North Main, Suite 600 Butte, MT 59701	An Advanced Vibrothermography Approach for Wind Turbine Applications
<b>Summary</b>	
A reliable, portable, instrumentation deployment system that can be utilized during wind turbine composite members manufacturing, during installation, and throughout the lifetime of wind turbine systems will be developed. This project will develop technology that has the potential to dramatically reduce the yearly wind turbine maintenance costs, resulting in reduced consumer power costs.	

Company	Title
Resodyn Corporation 130 North Main, Suite 600 Butte, MT 59701	Low Cost Optrodes for Chemical Sensor Development of Tethered PET-Fluorophores
<b>Summary</b>	
This project will produce a novel sensor technology that enables the production of a low-cost optical sensor to determine the level of acidity or alkalinity (pH) over a broad range for industrial, military, and environmental applications. Expected benefits include improved performance, energy savings, enhanced efficiency, and security.	

## NEVADA

Company	Title
Multi-Phase Technologies, LLC 310 Rebecca Drive Sparks, NV 89441	Determining Spectral Properties of Rocks and Sediments from Broadband Electrical/Electromagnetic Data Processing
<b>Summary</b>	
This project will design a method which can characterize subsurface conditions (i.e. permeability) of environmental remediation sites in order to better design remediation systems.	

Company	Title
Multi-Phase Technologies, LLC 310 Rebecca Drive Sparks, NV 89441	Wireless Electrical Resistivity Tomography System for CO2 Sequestration Monitoring
<b>Summary</b>	
This project will develop a cost-effective method of monitoring CO2 sequestration reservoirs for potential leakage pathways and for reservoir integrity using a geophysical method, Electrical Resistance Tomography (ERT).	

## NEW JERSEY

Company	Title
Exelus, Inc. 110 Dorsa Avenue Livingston, NJ 07039	Catalytic Processing of Biomass to Liquid Fuels
<b>Summary</b>	
This project will develop a new, cost-effective method for converting non-food biomass into gasoline-like motor fuels. It uses original reactor designs and catalysts to produce high quality liquid fuels.	

Company	Title
Exelus, Inc. 110 Dorsa Avenue Livingston, NJ 07039	Jet Fuel from Bio-Diesel

**Summary**

This project will develop a new, cost-effective method for converting algal oil into aviation fuel. It uses new chemistry and catalysts to produce clean, renewable jet fuel of identical quality to conventional fuels.

**Company**

HJC Enterprise, LLC  
5 Badgley Drive  
New Providence, NJ 07974-2501

**Title**

Alloy Composition Optimization for High Critical Density of (Nb,Ta,Ti)<sub>3</sub>Sn Superconductor

**Summary**

High field magnet is an essential component for a number of advanced fields of science such as NMR and ICR (widely used in drug discovery), magnetic fusion (searching everlasting energy), and particle accelerator used for high energy physics. This study is to improve the performance of Nb<sub>3</sub>Sn, a superconducting material widely used in such magnet.

**Company**

NEI Corporation  
400 Apgar Drive, Suite E  
Somerset, NJ 08873

**Title**

A Low Cost Utility-Scale Flow Battery with a New Chemistry

**Summary**

This project will develop a new chemistry for Flow Batteries so that it is highly efficient, has long cycle life, and is low cost and non-toxic. The flow batteries can be used by utilities, in conjunction with green power generation, such as solar, wind turbine and fuel cell.

**Company**

NEI Corporation  
400 Apgar Drive, Suite E  
Somerset, NJ 08873

**Title**

Functionally Graded Tungsten-Copper Composites for Plasma Facing Components

**Summary**

This project will develop advanced materials for use as the internal wall of a fusion power reactor is expected to enable fusion power to be developed as a sustainable source of energy.

**Company**

NEI Corporation  
400 Apgar Drive, Suite E  
Somerset, NJ 08873

**Title**

Nanocomposite High Voltage Cathode Materials for Li-Ion Cells

**Summary**

This project will develop and implement a new class of 5V high voltage Li-ion battery cathode material for next generation plug in hybrid electric vehicles (PHEVs).

**Company**

Princeton Power Systems, Inc.  
501 Forrester Road, Suite 211  
Princeton, NJ 08540

**Title**

High-Voltage, Highly-Efficient, Power-Dense Electronic Converter Using Silicon Carbide and AC-link

**Summary**

This project will develop a hydro and ocean power conversion systems that will significantly reduce the cost of these generation sources and make them more efficient and more compatible with the existing electric grid. This will displace polluting, fossil fuel-burning power generators with a clean, renewable energy source.

**STTR Project****Company**

Structured Materials Industries  
201 Circle Drive North, Unit 102  
Piscataway, NJ 20878

**Title**

Low-Cost Route to Single Crystal CVD Diamond Detectors

**Summary**

Diamond is the ideal material for detectors used in medical radiotherapy, nuclear security and high energy physics. However, the high cost of natural and man-made diamond precludes its use in many of these applications. This project will develop radiation detectors with the high performance of diamond, at substantially lower cost.

**Company**

Structured Materials Industries  
201 Circle Drive North, Unit 102  
Piscataway, NJ 20878

**Title**

NanoEngineered High ZT Solid State Nanocomposite Thermoelectric (ssnTE) Manufacturing for Multiple Energy Generation Applications

**Summary**

Thermoelectrics, a technology for the direct conversion of heat into electrical energy, is a mature technology that is, however, undergoing a revolution in capability and applicability with the introduction of nanotechnology. This program will apply new nano-enabled techniques to produce dramatically improved operational efficiencies and thus realize cost savings and improved energy utilization.

**Company**

Structured Materials Industries  
201 Circle Drive North, Unit 102  
Piscataway, NJ 20878

**Title**

Optimization of Ultra-Efficient YBCO Tape Production Tool

**Summary**

High temperature superconductors are essential to fusion power development. This project will develop technology to make high-performance superconducting materials cheaper and more readily available, for DOE programs in fusion power, as well as a variety of other scientific, military and commercial applications.

**Company**

TreadStone Technologies, Inc.  
201 Washington Road  
Princeton, NJ 08540

**Title**

High Temperature Dense Membrane for Hydrogen Separation

**Summary**

This project will demonstrate a novel high temperature, durable, and contaminant tolerant membrane reactor that can consolidate the WGS reaction and hydrogen separation process to produce hydrogen through coal gasification process at low cost.

**Company**

Universal Display Corporation  
375 Phillips Blvd.  
Ewing, NJ 08618

**Title**

Novel High Performance Permeation Barrier for Long Lifetime Flexible OLED Lighting

**Summary**

This project will establish the feasibility of increasing capacity and efficacy of Grid-Independent Photovoltaic (PV) Solid State Lighting (SSL) systems while at the same time reducing operating costs and risks for largescale applications, such as roadway, parking lot and temporary/emergency illumination.

<b>Company</b> Universal Display Corporation 375 Phillips Blvd. Ewing, NJ 08618	<b>Title</b> Ultra High Efficiency Phosphorescent OLED Lighting
<b>Summary</b> This project will increase the conversion efficiency of electrical energy into light of organic-light emitting devices and thereby enable replacement of inefficient incandescent bulbs, which consume over 8% of the electricity produced in the United States. Our portfolio of technical expertise will enable the development of high-efficiency, environment-friendly, solid-state, white-lighting sources.	

## NEW MEXICO

<b>Company</b> Deep Web Technologies, LLC 301 North Guadalupe, Suite 201 Santa Fe, NM 87501	<b>Title</b> An Analysis of the Performance Bottlenecks in the Federated Search Information Flow
<b>Summary</b> Federated search technology enables information discovery across many information sources in parallel and helps to accelerate knowledge diffusion. This project will identify and attempt to reduce and eliminate bottlenecks that limit the benefits of federated search technology.	

<b>Company</b> Electrodynamic 4909 Paseo Del Norte D Albuquerque, NM 97113-1527	<b>Title</b> Pulse Resonance for Photoelectron Acceleration
<b>Summary</b> Accelerator system performance is limited by the high power requirements, low duty cycle, and low repetition rate, of electron guns that can produce a brief electron pulse in a 10-100MV/m environment. This project will create a novel electron gun combining this pulse resonator technology with laser and photocathode technologies.	

<b>STTR Project</b>	
<b>Company</b> Gratings, Inc. 2655A Pan American Freeway Albuquerque, NM 87107-1639	<b>Title</b> Microstructured Crystalline Silicon Thin- Film Solar Cells
<b>Summary</b> This project aims at reducing photovoltaic energy generating cost through fabrication of several solar cells from a single wafer in contrast with existing technology of creating a single solar cell from a single substrate.	

<b>Company</b> Retriever Technology, LP 104 1/2 Calle La Pena Santa Fe, NM 87505	<b>Title</b> Use of Raster to Vector Image Analysis Technology to Rapidly and Accurately Digitize Historical Seismograms
<b>Summary</b> This project will develop software tools to automatically extract data from historic seismograms. By automating this process it will allow for large repositories of archived data to be analyzed using modern computer-based techniques, providing invaluable assistance to seismic, non-proliferation and mineral extraction studies.	

<b>Company</b> Rocky Mountain Geophysics, LLC 167 Piedra Loop Los Alamos, NM 87544	<b>Title</b> Development of Software to Digitize Historic Hardcopy Seismograms from Nuclear Explosions
<b>Summary</b> Nuclear explosion monitoring operations need to be prepared to provide forensic information for potential future nuclear explosions tested away from known nuclear test sites. This project will develop a software package geared towards the automatic digitization of hardcopy seismograms from historic nuclear explosions detonated under a variety of geophysical conditions.	

<b>Company</b> Southwest Sciences, Inc. 1570 Pacheco Street, Suite E-11 Santa Fe, NM 87505-3993	<b>Title</b> Differential Absorption DIAL Apparatus for CO2 Flux Measurement
<b>Summary</b> This project will investigate a compact, rugged laser source for quantifying the uptake of carbon dioxide by forests and other ecosystems.	

<b>Company</b> Southwest Sciences, Inc. 1570 Pacheco Street, Suite E-11 Santa Fe, NM 87505-3993	<b>Title</b> NDE of Gas Turbine Thermal Barrier Coatings
<b>Summary</b> This project will develop a method for inspecting power plant and aircraft engine turbine parts that are coated with advanced ceramic materials known as thermal barrier coatings. These coating will greatly improve the performance, life and safety the turbines.	

<b>Company</b> TPL, Incorporated 3921 Academy Parkway North NE Albuquerque, NM 87109	<b>Title</b> Nanocomposite Film Capacitors for High Energy Accelerators
<b>Summary</b> This project will reduce the size of energy storage devices used in high power electronics. Successful results could benefit applications in the defense, energy, and power electronics industries.	

## NEW YORK

<b>Company</b> ACENT Laboratories LLC 3 Scott Lane Manorville, NY 11949	<b>Title</b> A High Efficiency Integrated Syngas Purification and Hydrogen Separation and Storage System
<b>Summary</b> A high-efficiency approach to separating hydrogen from the products of coal gasification will be developed based on aerospace-derived technologies. Aerodynamic gas separation is combined with process that results in hydrogen stored in a safe liquid substance, ready for transportation, distribution and hydrogen release on demand.	

<b>Company</b> Advanced Energy Systems, Inc. 27 Industrial Blvd. Unit E Medford, NY 11763-2286	<b>Title</b> Advanced High-Brightness Electron Source
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**Summary**

This project will develop an advanced electron source suitable for driving the next generation of light sources for research, imaging and industrial processing, that will keep the US at the forefront of the important science that will be performed and the spin-off applications that will be developed from that science.

**Company**

Advanced Energy Systems, Inc.  
27 Industrial Blvd. Unit E  
Medford, NY 11763-2286

**Title**

Prototype 800MHz Crab Cavity Development

**Summary**

At the collision point for most high energy physics colliding beam accelerators, some fraction of the particles do not collide with particles in the oncoming bunch due to the relative angle of the bunches at the collision point. Crab cavities "twist" the beam, increasing the number of particles which collide.

**Company**

Advanced Energy Conversion, LLC  
Suite 500, 10 Hermes Road  
Malta, NY 12020

**Title**

Hydroelectric Energy from Wastewater

**Summary**

The effluent stream of a wastewater treatment facility contains substantial energy that can be harnessed to offset its power demand. This project will develop and demonstrate a full-scale system that can be replicated at municipal wastewater facilities around the country, and the world.

**Company**

C2 Biotechnologies, LLC  
4663 Route 9G  
Germantown, NY 12526

**Title**

Cellulosic Fusion Enzyme Development

**Summary**

To facilitate the direct conversion of plant biomass to fermentable sugar and reduce the cost for cellulosic hydrolysis, this project proposes protein engineering single enzymes that have multiple activities, fusion enzymes.

**Company**

Dimension Technologies, Inc.  
315 Mt. Read Blvd.  
Rochester, NY 14611

**Title**

Large Autostereoscopic Multiview 2D/3D Switchable Desktop Display

**Summary**

This project will investigate and model a desktop display that can produce high resolution 3D images which can be viewed without 3D glasses by groups of scientists viewing complex multi dimensional data sets or simulations. These displays could also be used in conference rooms and eventually the home.

**Company**

H2 Pump, LLC  
11 Northway Lane North  
Albany, NY 12110

**Title**

Hydrogen Production Process Intensification Technology

**Summary**

Hydrogen production from natural gas, biomass, etc., requires efficient and cost effective methods to separate the hydrogen for use in membrane fuel cells. The electrochemical pump can meet this requirement and will facilitate the transition of hydrogen as a transportation fuel, thereby reducing the nation's dependency on foreign energy sources.

<b>Company</b> Kitware, Inc. 28 Corporate Drive Clifton Park, NY 12065-8688	<b>Title</b> Management and Comparative Analysis of Dataset Ensembles
<b>Summary</b> This project will develop advanced software tools for the visual analysis of large data. These tools allow rapid evaluation and management of the thousands of computer simulations or experimental measurements used to create new products and technologies.	

<b>Company</b> Kitware, Inc. 28 Corporate Drive Clifton Park, NY 12065	<b>Title</b> Multi-Resolution Streaming for Remote Scalable Visualization
<b>Summary</b> This project will develop advanced software tools for the visual analysis of large data. These tools enable remote viewing of large data stores, thereby eliminating the need to move data between computer systems, and allowing users to access geographically remote computing centers.	

<b>Company</b> MesoScribe Technologies, Inc. 25 Health Sciences Drive Stony Brook, NY 11790	<b>Title</b> Development of Packaging and Integration of Sensors for On-Line Use in Harsh Environments
<b>Summary</b> This project will develop improved sensor packaging techniques for use in advanced power systems. The technology will enable steam turbines, boilers and other critical components to be monitored and operated efficiently to prevent unforced shutdowns, reduce maintenance costs, and reduce emissions.	

<b>Company</b> Simmetrix, Inc. 10 Halfmoon Executive Park Drive Clifton Park, NY 12065-5630	<b>Title</b> Interoperable Components to Support Unstructured Mesh Simulations on Massively Parallel Computers
<b>Summary</b> This project will support the reliable automatic generation and control of the computer representations used by software to perform complex physical simulations. These tools will execute automatically in seconds to minutes of computer time thus eliminating the hours to months of time of experts currently spend on such processes.	

<b>Company</b> Novomer, Inc. 950 Danby Road, Suite 198 Ithaca, NY 14850	<b>Title</b> Novel Catalytic Process for Synthesizing Polyols from CO2 Feedstock
<b>Summary</b> Finding value-added uses for captured CO2 will significantly increase the economic viability of capturing CO2 from power plants. This project will develop a novel process for developing low molecular weight polycarbonates from captured CO2.	

<b>Company</b> Underground Systems, Inc. 84 Business Park Drive, Suite 109 Armonk, NY 10504	<b>Title</b> Adaptive Predictive Algorithms for Renewables Integration
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**Summary**

The availability of a robust software algorithm that monitors conditions in real-time and that uses historical statistical data to predict behavior under various future conditions could release additional capacity, and improve the reliability and economic efficiency of the nation's transmission and distribution corridors. This project will develop a software package that receives data from line sensors, and use credible contingency scenarios to predict ampacity one, two and four hours into the future assigning probabilities to the outcomes.

**NORTH CAROLINA****Company**

3TEX, Inc.  
109 MacKenan Drive  
Cary, NC 27511

**Title**

Advanced Heat Exchanger based on 3D Woven Metal Wires

**Summary**

Heat exchangers find application in a multitude of consumer products, transportation systems, and industrial processes. Published research on 3-D woven Al wire heat exchangers demonstrated heat transfer rates exceeding the performance of state-of-the art fin structures. This project will demonstrate the concept's feasibility by the design, fabrication, and testing of a prototype heat exchanger. Data from the testing will provide both characterization of the heat transfer and flow restrictions of the 3-D woven structure and provide a direct comparison to a standard structure.

**Company**

3TEX, Inc.  
109 MacKenan Drive  
Cary, NC 27511

**Title**

Improved Joints Based on 3D Fiber Architecture Preforms

**Summary**

The labor-intensive manufacture of wind blades with numerous heavily bonded joints generates high installation and operating costs for wind turbines used to generate electricity. This project will develop wind blades based on 3-D fiber architectures that will lead to not only stronger joints, but a more robust, less costly manufacturing process. Installation costs of the turbines will be reduced by the lower cost wind blades and operating costs will be reduced by the lower number of wind blade defects and failures.

**Company**

Rivis, Inc.  
8100 Brownleigh Drive, Suite 120  
Raleigh, NC 27617

**Title**

Back-Gate Field Emission-Based Cathode RF Electron Gun

**Summary**

This project will develop high electron current sources for the Department of Energy. The use of high frequency radio waves to extract the electrons allows the electron sources to be incorporated into electron guns that are needed for high energy accelerators used by the DOE for basic research and electron microscopes to image the materials at near atomic resolution, for example.

**STTR Project****Company**

Signatech Systems  
P.O. Box 614  
Matthews, NC 28106

**Title**

Visualization Technologies for Distribution Systems

**Summary**

Expensive outages of the electricity system occur because the distribution operator is not able to digest the vast amounts of data in a timely manner. Operators have desired a more pictorial view but these efforts have been stymied by the lack of proper tools and fast computational methods. This project will develop visualization tools that can provide such capabilities.

## OHIO

<b>Company</b> Energy Focus, Inc. 32000 Aurora Road Solon, OH 44139	<b>Title</b> Increasing Efficiency in Traditional Lighting Technologies High Intensity Discharge Lamps- Arc Tube Coating System for metal Halide Color Consistency
<b>Summary</b> Tremendous energy savings could be achieved by replacing inefficient incandescent lighting with efficient alternatives. The special needs of the accent lighting and commercial spot lighting markets for consistent color and high quality light are not met by today's alternative lighting technologies. This project will enable a low-cost efficient and color-consistent alternative light source to be manufactured in the US for these crucial lighting markets.	

<b>Company</b>	<b>Title</b> A Compact Electronics Module for the Small Accelerator Facility: a Measurement System Charge, Position, and RF Phase
<b>Summary</b> This project will design and test a multifunction electronic readout unit that will allow measurement of particle beam position, intensity and phase. The unit will be inexpensive enough to be used at small accelerator facilities.	

<b>Company</b> Euclid TechLabs, LLC 5900 Harper Road #102 Solon, OH 44139	<b>Title</b> A New Quarter-Wave Coaxial Coupler for 1.3 GHZ Superconducting Cavity
<b>Summary</b> This project will develop new and more efficient techniques for providing energy to a superconducting accelerator.	

<b>Company</b> Euclid TechLabs, LLC 5900 Harper Road #102 Solon, OH 44139	<b>Title</b> Ferroelectric Based High Power Components for L-Band Accelerator Applications
<b>Summary</b> This project will develop a new electronic device to optimize the power in particle accelerators. The key component is a bar of a "smart" material that changes its properties with an applied electric field.	

<b>Company</b> Euclid TechLabs, LLC 5900 Harper Road #102 Solon, OH 44139	<b>Title</b> Nonlinear Ferroelectric Development for L-Band Accelerator Applications
<b>Summary</b> This project will develop a new electronic device to control the power in particle accelerators. The key component is a ring of a "smart" material that changes its properties with an applied electric field.	

<b>Company</b> Euclid TechLabs, LLC 5900 Harper Road #102 Solon, OH 44139	<b>Title</b> Numerical Algorithms for Dispersive, Active, and Nonlinear Media with Applications to the Paser
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**Summary**

This project will develop advanced computational techniques for microwave and optical materials. This project will allow improved modeling of a class of new particle acceleration techniques.

**Company**

Faraday Technology, Inc.  
315 Huls Drive  
Clayton, OH 45315

**Title**

Electrically Mediated Deposition of Niobium for  
Coating Copper Elliptical Cavities

**Summary**

There is a need for an innovative process that is capable of coating niobium metal onto the interior surface of copper cavities used in superconducting particle accelerators. Continued support of research in the area of super conducting radio frequency applications could lead to new commercial applications in the medical, energy and national security industries.

**STTR Project****Company**

Faraday Technology, Inc.  
315 Huls Drive  
Clayton, OH 45315

**Title**

Electrodeposited Mn-Co Alloy Coatings for Solid Oxide  
Fuel Cell Interconnects

**Summary**

The realization of solid oxide fuel cells as an alternative energy source could decrease the United States dependence on foreign oil and reduce emissions such as SO<sub>x</sub>, NO<sub>x</sub> and CO<sub>2</sub>, that negatively impact the environment. This project will develop an inexpensive manufacturing process for conductive interconnect coatings that would contribute toward lowering manufacturing costs of solid oxide fuel cells, bringing them one step closer to being a commercially viable alternative energy source.

**Company**

Faraday Technology, Inc.  
315 Huls Drive  
Clayton, OH 45315

**Title**

Faradayic Desalination for Produced Water Treatment

**Summary**

This project will address the Department of Energy's need for development treatment technology for the cost effective removal of salinity from produced water. The proposed technology will enable reuse of the proposed water through enhanced ionic removal and reductions in power requirements and membrane fouling tendencies.

**Company**

Global Research and Development  
1275 Kinnear Road  
Columbus, OH 43212

**Title**

High Count Restacks Nb<sub>3</sub>Sn using Subelements with  
Over 3000 A/mm<sup>2</sup> Non-Cu Jc at 12T and 4.2K

**Summary**

This project will develop a much improved Nb<sub>3</sub>Sn superconductor wire for next generation High Energy Physics accelerator magnets.

**Company**

Hyper Tech Research, Inc.  
1275 Kinnear Road  
Columbus, OH 43212

**Title**

Development of MgB<sub>2</sub> Current Distribution Systems for  
High Energy Particle Colliders

**Summary**

This project will develop an affordable, high-quality magnesium diboride superconductor for next generation High Energy Physics accelerator magnets and components.

<b>Company</b> Hyper Tech Research, Inc. 1275 Kinnear Road Columbus, OH 43212	<b>Title</b> High Jc, Low AC Loss Nb3Sn Superconductor for 14-20T Fusion Application
<b>Summary</b> This project will develop a much improved lower cost Nb3Sn superconductor wire for DOE advanced Fusion Program.	

<b>Company</b> Hyper Tech Research, Inc. 1275 Kinnear Road Columbus, OH 43212	<b>Title</b> Internal-Tin Nb/Sn Strand with Distributed Barrier that will not Leak Sn during Heat Treatment
<b>Summary</b> This project will develop a much improved Nb3Sn superconductor wire for next generation High Energy Physics accelerator magnets.	

<b>Company</b> Lambda Research, Inc. 5521 Fair Lane Cincinnati, OH 45227	<b>Title</b> Stress Corrosion Cracking Mitigation and Fatigue Strength Improvement of Light Water Reactor Components Using Low Plasticity Burnishing (LPB)
<b>Summary</b> A novel method of introducing compressive residual stresses into nuclear reactor components using low plasticity burnishing (LPB) is proposed. Material degradation caused by SCC and corrosion fatigue can be dramatically reduced or even eliminated in critical nuclear components through the implementation of LPB.	

<b>Company</b> MesoCoat, Inc. 24112 Rockwell Drive Euclid, OH 44117-1252	<b>Title</b> Fused Nanocomposite Claddings for Oil and Energy Applications
<b>Summary</b> This project will demonstrate low cost, large area application technology and nanoengineered coatings to protect metal structures against wear and corrosion.	

<b>Company</b> Metamateria Partners, LLC 1275 Kinnear Road Columbus, OH 43212	<b>Title</b> Nanocomposite Positive Electrode for Asymmetric Electrochemical Capacitors
<b>Summary</b> Nanostructured positive electrode will be developed for energy storage devices materials for HEV and PHEV. These will improve energy and power density of supercapacitors and may lead to commercialization of electric vehicles.	

<b>Company</b> Nanotek Instruments, Inc. 1240 McCook Avenue Dayton, OH 45404-1059	<b>Title</b> High-Capacity Nano Graphene Materials for Asymmetric Electrochemical Capacitors
<b>Summary</b> A new class of nano material-based supercapacitor technologies will be developed and commercialized, creating new high-paying job opportunities in Ohio and the Nation.	

<b>Company</b>	<b>Title</b>
NexTech Materials, Ltd. 404 Enterprise Drive Lewis Center, OH 43035-9423	Manufacturing Analysis of SOFC Interconnect Coating Processes
<b>Summary</b>	
Solid Oxide Fuel Cells offer a route for more efficient use of fossil fuels, bio-fuels, and biomass, with less pollution compared to combustion approaches. This project will develop new manufacturing techniques for coating metals in order to lower the cost and improve the longterm durability of solid oxide fuel cells.	

<b>Company</b>	<b>Title</b>
Powdermet, Inc. 24112 Rockwell Drive Euclid, OH 44117	Multilayer Tape Casting of Water-Gas-Shift Membranes for H2 Separation
<b>Summary</b>	
Evaluation of a low cost hydrogen purification membrane for improved cost effectiveness of converting coal to hydrogen for the new hydrogen economy will be investigated. By lowering material cost and using robust proven manufacturing technology this new membrane can cost effectively improve hydrogen production.	

<b>Company</b>	<b>Title</b>
Precision Energy and Technology 2000 Composite Drive Kettering, OH 45420	Novel Energy Storage in a Hybrid Electrochemical Cell
<b>Summary</b>	
This project explores a novel electrochemical method of storing electrical energy generated during off-peak periods so that it can be used to offset electrical demand during peak-use periods on an electrical grid.	

<b>Company</b>	<b>Title</b>
RNET Technologies, Inc. 240 West Elmwood Drive, Suite 2010 Dayton, OH 45459	Enhancement of GridFTP Performance Through GMPLS Integration and Hardware Offloading
<b>Summary</b>	
Data-transfer applications cannot effectively utilize high-performance optical networks. TheGridFTP application improves file-transfer performance, crucial to research projects like the DOE/HEP Large Hadron Collider Computing Grid; this project will implement several improvements; including hardware acceleration and integration of scheduling services to better utilize emerging networks.	

<b>Company</b>	<b>Title</b>
RNET Technologies, Inc. 240 West Elmwood Drive, Suite 2010 Dayton, OH 45459	NIC-Based Ultra-High-Speed Intrusion Detection System (IDS)
<b>Summary</b>	
Wind turbine blade failure has severe consequences—damage to other blades, the tower, mechanical systems, other wind turbines, and workers—as well as loss of revenue and negative public relations. SCAN monitors and assesses the condition of wind turbine blades, and provides early damage warning.	

<b>Company</b> RNET Technologies, Inc. 240 West Elmwood Drive, Suite 2010 Dayton, OH 45459	<b>Title</b> Optimization of the PETSc Library for Clusters of MultiCore Processors
<b>Summary</b> Many science applications rely on libraries such as PETSc. Emerging supercomputers require modifications to these applications and libraries to fully utilize these supercomputers. The tools developed by this project would provide a cost effective mechanism to perform these modifications for a wide range of commercial and government applications.	

<b>Company</b> UES, Inc. 4401 Dayton-Xenia Road Dayton, OH 45432-1894	<b>Title</b> YBCO Fibers from Solution Approach -A New Concept
<b>Summary</b> A revolutionary approach for superconductor fiber development is proposed for High Temperature Superconductor (HTS) cable fabrication using cost effective solution approach. Advantages of extremely low AC loss and high Je are expected for multifilament cable fabrication, which will lead to a revolution in HTS industries.	

## OREGON

<b>Company</b> Galois, Inc. 421 SW Sixth Avenue, Suite 300 Portland, OR 97204	<b>Title</b> Grid 2.0: Collaboration and Sharing on the Grid
<b>Summary</b> This project will implement a Web 2.0 collaboration system based on Grid technologies. Galois' system will allow dispersed scientific teams to collaborate effectively on large amounts of data produced by collections of networked computers.	

<b>Company</b> Voxel, Inc. 12725 SW Millikan Way, Suite 230 Beaverton, OR 97005	<b>Title</b> High-Dynamic-Range, Rad-Hard, Time-Resolved, Correlated X-ray Photon Detector
<b>Summary</b> This project will enable the study and development of new nanoscale materials. The benefits of the innovation are significant; currently, insight into the dynamical phenomena of condensed matter occurring on lengths shorter than can be reached in light scattering is necessary, but currently the potential of the latest generation of synchrotrons is limited by available detector technology.	

<b>Company</b> Voxel, Inc. 12725 SW Millikan Way, Suite 230 Beaverton, OR 97005	<b>Title</b> Rad-Hard SOI CMOS Active Pixel Sensor for Charged Particle Detection
<b>Summary</b> This project will enable planned Nuclear Physics science by developing and demonstrating a SOI (silicon-on-insulator) CMOS direct conversion particle detector. Development of this technology will allow production of radiation-hardened pixel sensors which are thin (<15- $\mu$ m), have excellent and well controlled charge collection using fully depleted devices, and can use full CMOS readout without parasitic charge collection.	



## PENNSYLVANIA

<b>Company</b>	<b>Title</b>
Advanced Cooling Technologies, Inc. 1046 New Holland Avenue Lancaster, PA 17601	Nanofluids Enhanced Twisted Tape Heat Exchanger
<b>Summary</b> Effectively increasing thermal performance of conventional heat exchangers will reduce size, weight, pumping power and cost of the heat exchanger. This project will develop advanced heat exchanger with twisted tape inserts and newly innovated nanofluids as a working fluid to achieve higher efficiency.	

<b>STTR Project</b>	
<b>Company</b>	<b>Title</b>
Advanced Cooling Technologies, Inc. 1046 New Holland Avenue Lancaster, PA 17601	Stabilization of Nanofluids Using Self Assembled Monolayers
<b>Summary</b> Heat transfer is an important part of many energy intensive processes. More efficient heat transfer leads to more efficient use of fuel. Nanofluids have the capability of increasing heat transfer efficiency in many current heat exchangers by improving the heat transfer properties inherent to current coolants.	

<b>Company</b>	<b>Title</b>
Strategic Polymer Sciences, Inc. 200 Innovation Blvd, Suite 237 State College, PA 16803-6602	Novel Pulsed Power Film Capacitors with Ultrahigh Energy Density and High Reliability
<b>Summary</b> This project will develop high performance energy storage film capacitors with ultrahigh energy density, high reliability, and low cost. The advanced capacitors can be used in military pulsed power weapon systems, medical defibrillators, and hybrid electric vehicles.	

<b>Company</b>	<b>Title</b>
Visual Composites, LLC 5451 Merwin Lane Erie, PA 16510	Intermediate Heat Exchanger for Framatome High Temperature Reactor
<b>Summary</b> A high temperature silicon carbide heat exchanger will be tested as an option for the very high temperature Framatome-ANP nuclear reactor concept. This novel component is a key element in the success of generating electricity and hydrogen without making harmful green-house gases.	

<b>Company</b>	<b>Title</b>
WavesinSolids, LLC 2134 Sandy Drive, Suite 14 State College, PA 16803-2292	Continuous Health Monitoring of Coal Power Plant Components using Acoustic Emission Technology
<b>Summary</b> This project will develop a nonintrusive, acoustic emission based continuous health monitoring technology for improving coal power plant components' safety and reliability, and provide condition-based maintenance of these components, thereby, avoiding plant shutdowns and unnecessary loss of millions of dollars.	

## SOUTH CAROLINA

### STTR Project

**Company**

Agri-Tech Products, LLC  
116 Wildewood Club Court  
Columbia, SC 29223-3135

**Title**

Developing a Mobile Torrefaction Machine

**Summary**

There are major economic and logistical challenges in getting woody biomass out of the forest or off the farm in a manner, which justifies the costs of harvesting and transportation. This project proposes to commercialize innovation developed by North Carolina State University (NCSU) into a mobile torrefaction machine, which can go to where cellulosic biomass is harvested, increase its energy density, add value to and enhance the characteristics of the biomass, so that it may be more cost-effectively be transported to and utilized by the end-user.

**Company**

LuminOF, LLC  
1800 West Buchanan Drive  
Columbia, SC 29206

**Title**

New Phosphors for UV LED Solid-State Lighting for Solid State Lighting Core Technology for Light Emitting Diodes (LEDs)

**Summary**

This project will further develop a new and proprietary family of phosphors for use with UV LEDs that is less expensive to manufacture than currently available photoluminescent materials. Additionally, these phosphors can be tailored to match the emissions of various solid-state lighting devices, allowing for the production of LEDs with exquisite light quality and color rendering.

## TENNESSEE

**Company**

Analysis and Measurement Services Corporation  
9111 Cross Park Drive, Bldg A  
Knoxville, TN 37923

**Title**

Advanced Techniques for On-Line Condition Monitoring and Diagnostics of Digital Rod Position Indication Systems for Existing and Next Generation Nuclear Power Plants

**Summary**

This project will enhance the Digital Rod Position Indication (DRPI) systems of existing and new AP1000 reactors with diagnostic capabilities to provide better rod position information, DRPI coil health, and automated rod drop time measurements. This can reduce reactor trips and reduce refueling outage time.

**Company**

Analysis and Measurement Services Corporation  
9111 Cross Park Drive, Bldg A  
Knoxville, TN 37923

**Title**

On-Line Monitoring Technology for Aging Management and Life Extension of the Advanced Test Reactor (ATR) at INL

**Summary**

Predictive maintenance and condition monitoring technologies are used in industrial processes to prioritize maintenance activities and focus the maintenance resources to areas where they are most needed. This project will reduce maintenance costs and improve productivity, safety and reliability, by determining the feasibility of existing predictive maintenance and condition monitoring technologies for the Advanced Test Reactor (ATR) at the Idaho National Laboratory (INL).

**Company**

Electrochemical Systems, Inc.  
9052 High Bridge Drive  
Knoxville, TN 37922

**Title**

Development of High Energy, Low Temperature Rechargeable Battery for Load Leveling Application

**Summary**

This project will develop high energy battery. This battery will store energy from various sources of energy including renewable sources of energy more economically and reliably than presently available systems.

<b>Company</b> Information International Associates, Inc. 1055 Commerce Park Drive, Suite 110 Oak Ridge, TN 37830-8028	<b>Title</b> International Science Education Federated Search Engine
<b>Summary</b> This project will create a system to identify English language-based international science education web based resources. Once resources are identified, the project will create a federated search engine to make these resources available via a standard web search paradigm.	

<b>Company</b> Information International Associates, Inc. 1055 Commerce Park Drive, Suite 110 Oak Ridge, TN 37830-8028	<b>Title</b> Web Metrics Analysis for Digital Libraries Based on Scientific and Technical Information
<b>Summary</b> This project will create a system that will assist scientific and technical information data curators in managing data more efficiently by using an encompassing Web metrics architecture.	
<b>Company</b> PHDs Co. 777 Emory Valley Road, Suite B Oak Ridge, TN 37830	<b>Title</b> Segmented Rectifying and Blocking Contacts on Germanium Planar Detectors
<b>Summary</b> The Department of Energy Office of Nuclear Physics has a fundamental need for more sensitive, reliable, and cost effective instruments for the detection of gamma rays in Nuclear Physics experiments. This project will develop detector fabrication techniques that will provide the basis for these detectors.	

<b>Company</b> Multi-Phase Services, Inc. 2111 RiverSound Dr. Knoxville, TN 37922	<b>Title</b> Computer-Aided Development of Ductile Ferritic Steels with High Strengths for Ultra-Supercritical Steam-Turbine Applications
<b>Summary</b> A new type of ductile ferritic steels with high strengths is proposed to overcome its limitation for the application to steam-turbine components operating at temperatures higher than 700°. Phase I will combine the thermodynamics calculations and focused experiments to demonstrate the feasibility of this alloy-design approach and provide critical material properties.	

<b>Company</b> ProteoGenesis, LLC 2109 W. Market Street Johnson City, TN 37604	<b>Title</b> Recombinant Expression and Characterization of Novel Cellulases for Switchgrass Ethanol Production
<b>Summary</b> The United States is in need of a renewable and clean energy supply. This project will develop novel enzymes that could make the process of converting switchgrass into ethanol a commercially viable source of renewable energy and create a new energy sector and agricultural job base in America.	

## TEXAS

<b>Company</b>	<b>Title</b>
Applied Nanotech, Inc. 3006 Longhorn Blvd., #107 Austin, TX 78758-7518	Carbon Stripper Foil for the Next Generation Rare Isotope Beam Facility
<b>Summary</b> This project will develop a large-area, low-cost stripper foil, a key component needed for the next generation of the Rare Isotope Accelerator. Experiments from this accelerator will lead to a comprehensive description of nuclei and establish the scientific foundation for innovative applications of nuclear science to society.	

<b>Company</b>	<b>Title</b>
Applied Nanotech, Inc. 3006 Longhorn Blvd., #107 Austin, TX 78758-7518	CNT-Based Electrostatic Atomizing Fuel Injector Promoting Fuel Combustion Efficiency
<b>Summary</b> This project will develop an electronic CNT atomizing fuel injector, a novel fuel efficient device needed for the next generation of internal combustion engines, leading to a remarkable improvement in automotive performance and fuel economy.	

<b>Company</b>	<b>Title</b>
Applied Nanotech, Inc. 3006 Longhorn Blvd., #107 Austin, TX 78758-7518	Sintered Copper Ink as a Low Cost Replacement for High Temperature Solders
<b>Summary</b> This project will develop copper nanoparticle ink that can be used as a bonding material in electronics. This is a direct replacement of traditional and lead-free solders that fatigue in demanding applications, e.g., hybrid electric vehicles power electronics.	

<b>Company</b>	<b>Title</b>
Benz Airborne Systems 2400 Handley-Ederville Road Fort Worth, TX 76118	High Temperature Sensors for Geothermal Applications
<b>Summary</b> Geothermal work in the United States presents an opportunity to improve American energy independence by increasing domestic production of competitive, sustainable energy. Amplified, high temperature pressure transducers are an essential component in monitoring and developing geothermal reservoirs.	

<b>Company</b>	<b>Title</b>
Blue Sky Electronics, LLC 401 Studewood, Ste 203 Houston, TX 77007-2733	Electronics for Fast Vertex Position Measurement
<b>Summary</b> This project will result in new electronics to quickly measure, process and distribute extremely fast timing measurements. It will increase the efficiency of particle collider experiments and provide an important building block for advanced instruments used in the life sciences, medical imaging, manufacturing, and environmental monitoring.	

<b>Company</b> Crossfield Technology, LLC 4505 Spicewood Springs Rd, Ste 360 Austin, TX 78759	<b>Title</b> Novel Wireless Sensor Integration in Process Control
<b>Summary</b> This project seeks to develop a standard package that will enable the use of advanced chemical sensors in harsh environments, such as present in emerging clean coal technology power systems. The standardized package will enable quick implementation of newly developed sensors.	

<b>Company</b> Integrated Micro Sensors, Inc. 10814 Atwell Drive Houston, TX 77096-4834	<b>Title</b> Photo-Enhanced Hardened Flat Cold Cathodes Based on III Nitrides for Pulsed and Ultra-Fast Electron Sources
<b>Summary</b> Current field emission cathodes based on micro-tip arrays are reliable electron sources used in electron microscopy and other related applications, however, some drawbacks include instability and short lifetime. This project will develop ultrahigh speed, high-stability, high current density photon-enhanced planar cold cathodes based on avalanche photon/electron emission diodes fabricated from III-Nitride semiconductor materials which should alleviate the current drawbacks.	

<b>Company</b> Lynntech, Inc. 7610 Eastmark Drive College Station, TX 77840	<b>Title</b> Design, Optimization and Fabrication of a Home Hydrogen Fueling System
<b>Summary</b> This project will identify infrastructure problems and system requirements to design and fabricate an affordable, safe and energy efficient home hydrogen fueling appliance. It is targeted to meet hydrogen refueling needs of the average US traveler on a daily basis and has potential application as backup power source in emergencies.	

<b>Company</b> Lynntech, Inc. 7610 Eastmark Drive College Station, TX 77840	<b>Title</b> Magnetic Harvesting of Algae
<b>Summary</b> Magnet harvesting of algae offers the prospect of a significant reduction in the cost of harvesting high oil content algae for biofuel use. Combined with algae's high fuel per acre yield, this can increase the availability of cost effective biofuels.	

<b>Company</b> Lynntech, Inc. 7610 Eastmark Drive College Station, TX 77840	<b>Title</b> Non-Thermal Plasma Cracking of Algae-Derived Biodiesel into Jet Flue
<b>Summary</b> This project will develop technology that will produce aviation fuels from algae-derived biodiesel, which has significant energy density to be used an alternative transportation fuel source.	

<b>Company</b> Lynnntech, Inc. 7610 Eastmark Drive College Station, TX 77840	<b>Title</b> Novel Electrochemical Process for Microalgae Harvesting
<b>Summary</b> This project will develop a new method for harvesting algae containing bio-oils for biofuel production. This process will enable cost-effective production of advanced biofuels such as biodiesel, green diesel, green gasoline, and green jet fuel reducing our nation's dependence on foreign oil.	

<b>Company</b> Metal Oxide Technologies Inc. 8807 Emmott Rd., Suite 100 Houston, TX 77040	<b>Title</b> High-Field YBCO Superconductors for High Energy Particle Colliders
<b>Summary</b> A reliable, commercially viable superconducting wire which operates without electrical loss will benefit not only high energy physics fundamental research, but also: industry development and economic growth; the environment by reducing the consumption of politically unstable fossil fuel; and government and military mission critical programs.	

<b>Company</b> Nanohmics, Inc. 6201 E. Oltorf Street #400 Austin, TX 78741	<b>Title</b> Vacuum Microelectronic Thermoelectric Cooler
<b>Summary</b> To address the ever expanding need for compact, highly efficient refrigeration, Nanohmics, Inc. is developing a solid state thermoelectric cooler based on cold cathode technology. The vacuum microelectronic cooler promises to be rugged, inexpensive, and suitable for a variety of refrigeration needs.	

<b>Company</b> QuickFlex, Inc. 8401 N. New Braunfels, Suite 324 San Antonio, TX 78209	<b>Title</b> QuickHydra Network Security System
<b>Summary</b> This project will provide secure reconfigurable acceleration for Sentinel Security's Hydra to protect applications and data in high-performance computing and networks.	

<b>Company</b> Saxet Surface Science 3913 Todd Lane, Suite 303 Austin, TX 78744	<b>Title</b> Improved Ion Resistance for III-V Photocathodes in High Current Guns
<b>Summary</b> Many of the next generation of physics accelerators will require high average electron currents, a potential issue for electron sources. This project will test the possibility for a chemically stabilized surface layer to also inhibit charged particle induced deterioration of these electron sources.	

<b>Company</b> Shear Form, Inc. 207 Dellwood Road Bryan, TX 77801	<b>Title</b> Engineered Dual NbTa Barriers for Higher Jc Nb3Sn Superconductors
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**Summary**

In order to achieve a higher current carrying capacity in Nb<sub>3</sub>Sn superconductors, it is advantageous to incorporate a highly deformable tantalum layer to protect adjacent stabilizing copper from tin contamination. Improved properties in the tantalum are realized by using fine grained tantalum backed by fine-grained ductile niobium. This project will demonstrate improved ductility in specially fabricated dual niobium-tantalum layer for use in advanced Nb<sub>3</sub>Sn superconductors. This work will lead to higher field and lower cost superconducting magnets for high energy physics applications, than are currently possible.

**STTR Project****Company**

Solarno Incorporated  
153 Hollywood Drive  
Coppell, TX 75019

**Title**

Bright White Tandem OLED with Carbon Nanotube  
Hole Injecting Interlayer

**Summary**

This project will develop innovative nanotechnology for manufacturing of high efficiency and brightness organic light emitting diodes (OLEDs). Furthermore, the proposed technology is cost-effective and resolves limitations in device lifetime. The commercial applications includes displays, residential and commercial lighting.

**UTAH****Company**

Materials and Systems Research, Inc.  
5395 West 700 South  
Salt Lake City, UT 84104

**Title**

Development of a "4-in-1" Device for Cost Effective and  
Efficient Production of Hydrogen

**Summary**

This project will lead to the development of an economical means to intensify hydrogen production processes for various applications such as transportation, petroleum refinery, military and residential use.

**STTR Project****Company**

Materials and Systems Research, Inc.  
5395 West 700 South  
Salt Lake City, UT 84104

**Title**

Development of a Hydrogen Home Fueling System

**Summary**

This project provides a technical and economic means for development of hydrogen home fueling systems featuring hydrogen, power and heat tri-generation.

**Company**

Materials and Systems Research, Inc.  
5395 West 700 South  
Salt Lake City, UT 84104

**Title**

Novel SOFC Anodes with Enhanced Tolerance to Coal  
Contaminants

**Summary**

This project will contribute to the development of a coal-based fuel cell combined power generation system.

**Company**

Process Instruments, Inc.  
825 North, 300 West, Suite 225  
Salt Lake City, UT 84103

**Title**

Raman Scattering Sensor for On-Line Monitoring of  
Amines and Acid Gases

**Summary**

This project will develop improved control technology for enhancing the scrubbing of H<sub>2</sub>S and CO<sub>2</sub> (acid gases) from hydrocarbon streams, natural gas lines and power plant effluent. This technology incorporates fiberoptic techniques to monitor amine solutions used in industry. This control technology will result in saving energy, time and money.

**VERMONT****Company**

Concepts NREC  
217 Billings Farm Road  
White River Junction, VT 05001

**Title**

Development of a Self-Adaptive Air Turbine for Wave Energy Conversion using an Oscillating Water Column (OWC) Air System

**Summary**

The utilization of the world's ocean as a renewable energy resource can be made more economically viable if a re-design of the turbine-generator sub-systems is performed to enable the energy recovery of more wave energies. An improvement as high as 40% has been projected using theoretical performance models of the energy recovery systems if proposed redesigns are implemented.

**Company**

Green Mountain Radio Research Company  
77 Vermont Avenue  
Colchester, VT 05446

**Title**

Development of High-Efficiency Power Amplifiers for 50 - 350 MHz

**Summary**

This project will develop high-efficiency power amplifiers that will significantly reduce electricity consumption, thus reducing operating costs, importation of foreign petroleum, pollution, and greenhouse-gas emissions.

**Company**

Green Mountain Radio Research Company  
77 Vermont Avenue  
Colchester, VT 05446

**Title**

Development of High-Efficiency Power Amplifiers for 350 - 500 MHz

**Summary**

Accelerators used by DOE for nuclear-physics research require huge amounts of electrical power. The project will develop high-efficiency power amplifiers that will significantly reduce electricity consumption, thus reducing operating costs, importation of foreign petroleum, pollution, and greenhouse-gas emissions.

**Company**

Green Mountain Radio Research Company  
77 Vermont Avenue  
Colchester, VT 05446

**Title**

Development of High-Efficiency Power Amplifiers for 704 MHz

**Summary**

Accelerators used by DOE for nuclear-physics research require huge amounts of electrical power. This project will develop high-efficiency power amplifiers that will significantly reduce electricity consumption, thus reducing operating costs, importation of foreign petroleum, pollution, and greenhouse-gas emissions.

**Company**

New England Research, Inc.  
331 Olcott Drive, Suite L1  
White River Junction, VT 05001

**Title**

Geophysical Monitoring of Multiple Phase Saturation of Rocks: Applications to CO<sub>2</sub> Sequestration



**Summary**

The world is increasingly concerned about global warming from the greenhouse effect; and the voluminous CO<sub>2</sub> emissions from human activities are a significant contribution to this problem. This project will develop quantitative monitoring and verification methods essential for successful sequestration of CO<sub>2</sub> in underground storage reservoirs.

**VIRGINIA****Company**

3 H Company  
297 Creek Avenue  
Hampton, VA 23669

**Title**

Regeneration Study of Phase Transitional Absorption for CO<sub>2</sub> Capture from Post Combustion Flue Gas

**Summary**

CO<sub>2</sub> is one of the major components that cause global warming. Current technologies for CO<sub>2</sub> separation are too expensive, especially for CO<sub>2</sub> capture from post combustion flue gas. This project will perfect Phase Transitional Absorption, a CO<sub>2</sub> capture process for post combustion flue gas. By comparing with industrial benchmark MEA process, Phase Transitional Absorption is able to cut the operation cost by 80 %.

**STTR Project****Company**

Black Laboratories, LLC  
12050 Jefferson Avenue, Suite 240  
Newport News, VA 23606-4385

**Title**

Multilayer ALD Films for SRF Cavities

**Summary**

Advanced, higher performance particle accelerators are needed to explore the frontiers of nuclear physics and to gain more widespread use for industrial sciences. This project will develop technology that will allow these to be produced with great gains in efficiency and major reductions in cost.

**Company**

David Wojcik  
391 Flickertail Lane  
Star Tannery, VA 22654-1908

**Title**

Deployable Concepts for Discovery of Web Based STEM Education Content and Resources

**Summary**

The Federal scientific community is producing vast amounts of educational material that teachers and students cannot find. This project will develop search strategies and new tools to find and collect science education content on the Web.

**Company**

Directed Vapor Technologies International, Inc.  
2 Boars Head Lane  
Charlottesville, VA 22903

**Title**

Novel Coating Methods for Unique TBC/Bond Coat Architectures for Elevated Temperature Operation

**Summary**

Higher operating temperatures are required to improve the efficiency of clean, coal derived power generation turbine engines. This project will develop high temperature capable thermal barrier coatings to protect metallic turbine engine components during increased temperature operation.

**Company**

Directed Vapor Technologies International, Inc.  
2 Boars Head Lane  
Charlottesville, VA 22903

**Title**

Surface Modification of Alloys for Ultra-Supercritical Coal-Fired Boilers via Directed Vapor Deposition

**Summary**

Advanced coatings are being developed to enable the incorporation of ultra-supercritical coal fired boilers for power production. The result will be significant improvements in the efficiency and cleanliness of converting coal to electricity.

**Company**

Electrical Distribution Design, Inc.  
311 Cherokee Drive  
Blacksburg, VA 24060

**Title**

Graph Trace Analysis Based Multidiscipline, Multi-Fidelity, Integrated System Design, Monitoring and Control Analysis and Information Management

**Summary**

This project will use Dew software based Graph Trace Analysis (GTA) to develop generation plant modeling for integrated power system design, operations and control. GTA and Dew are currently used by leading utility, academic and government research groups to develop model-based analysis for systems that contain millions of components.

**Company**

Electrical Distribution Design, Inc.  
311 Cherokee Drive  
Blacksburg, VA 24060

**Title**

Model-Based Renewable Resource Risk Assessment Analysis and Simulation

**Summary**

This project will use Graph Trace Analysis and Dew software to develop simulation based risk analysis for operation of renewable resources. Dew is currently being used by leading utility, academic and government research groups to develop next generation design and real-time supervisory control for systems that contain millions of components.

**Company**

FM Technologies, Inc.  
4431-H Brookfield Corporate Drive  
Chantilly, VA 20151-1691

**Title**

Chemical Free Surface Processing for High Gradient Superconducting RF Cavities

**Summary**

This project will develop a new process that will enhance quality of the superconducting radio-frequency cavities and allow acceleration of charged particles to much higher energies. The process also will improve the cavity manufacturing and result in substantial cost reduction of superconducting radio-frequency high-energy particle accelerators.

**Company**

GeneSiC Semiconductor Inc.  
43670 Trade Center Place, Suite 155  
Dulles, VA 20166

**Title**

Development of an Accelerated Life Test for Wide-Bandgap (SiC) HEV/PHEV Power Conversion Modules

**Summary**

A strong interest is expressed by major automobile manufacturers to develop high frequency power circuits for use in emerging Plug-in hybrid electric vehicle applications. This project will develop a Silicon Carbide JFET and rectifier technology, the performance and life-testing of these power modules is critical towards transferring of power from batteries to drive motors, and vice-versa.

**Company**

HyperV Technologies Corporation  
13935 Willard Road  
Chantilly, VA 20151

**Title**

Plasma Jet Liner Formation

**Summary**

This project will develop a novel technology for creating high velocity plasma jets. These jets have many practical applications such as fusion energy, pulsed power, defense, materials science, and space propulsion.

<b>Company</b> Isocore Corporation 12359 Sunrise Valley Drive, Suite 100 Reston, VA 20191-3462	<b>Title</b> Developing a Unified MPLS-GMPLS Services Provisioning Tool
<b>Summary</b> The unified MPLS-GMPLS provisioning tool built as part of this effort would simplify on-demand creation of optical light paths across multi-domain MPLS-GMPLS network.	

<b>Company</b> Luna Innovations Incorporated 1 Riverside Circle, Suite 400 Roanoke, VA 24016	<b>Title</b> Asymmetric Electrochemical Capacitors for Hybrid Vehicle Technology
<b>Summary</b> This project will develop high energy and high power capacitors suitable for use in hybrid electric vehicles. Novel carbon nanomaterials will be used to advance capacitor technology in order to implement these energy storage devices in commercial vehicles.	

<b>Company</b> Luna Innovations Incorporated 1 Riverside Circle, Suite 400 Roanoke, VA 24016	<b>Title</b> Fiber Optic Reflector Health Monitoring System
<b>Summary</b> This project will develop a technique for in-line health monitoring of nuclear reactor's structural components to support the Gen-IV and Nuclear Hydrogen Initiatives. This system will enable safe operation of these reactors, which in turn will reduce the U.S. dependency on foreign oil while simultaneously reducing emission of greenhouse gasses.	

<b>Company</b> Luna Innovations Incorporated 1 Riverside Circle, Suite 400 Roanoke, VA 24016	<b>Title</b> Harsh Environment Sensor Packaging (Sensor Pack)
<b>Summary</b> Housing of fiber optic harsh environment sensors is proposed for universal power generation compatibility. These sensors, once applied to the power industry will enable US energy independence by enabling efficient clean coal and by improving other fossil fuel based power production efficiency.	

<b>Company</b> Luna Innovations Incorporated 1 Riverside Circle, Suite 400 Roanoke, VA 24016	<b>Title</b> Highly Efficient Organic Solar Cells Using Low Band Gap Polymers and Novel Acceptor Materials
<b>Summary</b> This project will combine low band gap polymers and novel acceptor materials to improve the efficiency of flexible organic solar cells. Using nanotechnology, these newly developed materials give improved efficiency compared to current technology.	

<b>Company</b> Luna Innovations Incorporated 1 Riverside Circle Suite 400 Roanoke, VA 24016	<b>Title</b> Ultrasonic In-Situ Characterization of Tank Waste
<b>Summary</b> This project will develop ultrasonic measurement technologies to enable the clean-up of liquid waste stored in underground tanks for the DOE without the generation of secondary waste by existing technologies.	

<b>Company</b> Materials Modification, Inc. 2721-D Merrilee Drive Fairfax, VA 22031	<b>Title</b> Nanostructured Cathode for Magnesium Ion Batteries
<b>Summary</b> Magnesium batteries show promise as an eco-friendly replacement to lead acid batteries and a cost-efficient alternative to lithium ion batteries. This project will develop a nanostructured cathode material that will have good magnesium ion mobility and electronic conductivity, thereby rendering magnesium ion batteries practical.	

<b>Company</b> Materials Modification, Inc. 2721-D Merrilee Drive Fairfax, VA 22031	<b>Title</b> Novel Technique for Extraction of Algal Oil for Biodiesel
<b>Summary</b> Certain forms of algae have recently been found to be a promising source of biodiesel as they require less area to cultivate than most crops that are used to produce biodiesel and can generate more oil than conventional sources. While there have been many studies to standardize biodiesel production from crop sources, there are no optimized processes for their synthesis from algal extracts. This project will develop an efficient process for the extraction of oil from algae that will bring algal biofuel closer to reality.	

<b>Company</b> Mikro Systems, Inc. 1180 Seminole Trail, Suite 220 Charlottesville, VA 22901-5713	<b>Title</b> Advanced Cooling for IGCC Turbine Blades
<b>Summary</b> This project is applying its patented Tomo Lithographic Molding process to enable improved cooling of turbine engines used in power generation and in aircraft. This will allow turbine to operate at higher temperatures and will result in improved performance and fuel efficiency.	

<b>Company</b> NanoSonic, Inc. 1485 South Main Street Blacksburg, VA 24073	<b>Title</b> Low-Cost Solar Coatings for Improved Thermal Performance of Components in Concentrating Solar Power Systems
<b>Summary</b> This project would design, develop and construct prototypes of new, low-cost and energy efficient coatings for the surfaces of receiver piping used in solar power generation systems. This project will develop technology that can be transitioned to solar thermal field installation and long-term, "green energy" production through our partnership with the Solar Power Technology group within Lockheed Martin Corporation, partnered with Starwood energy Group.	

<b>Company</b> NanoSonic, Inc. 1485 South Main Street Blacksburg, VA 24073	<b>Title</b> Ultra High Temperature Environmentally Robust Nanocomposite Thermal Barrier Coatings for Nickel Super Alloy IGCC Turbine Components
<b>Summary</b> This project will develop nanocomposite coatings that will significantly enhance efficiency and reduce maintenance requirements for IGCC turbine components. Marketability will be ensured by dynamic applicability to multiple commercial and consumer markets, combined with low materials and application costs.	

<b>Company</b> NBE Technologies, LLC 2200 Kraft Drive, Suite 1425 Blacksburg, VA 24060	<b>Title</b> High-temperature Packaging of Planar Power Modules by Low-Temperature Sintering of Nanoscale Silver Paste
<b>Summary</b> This program provides a great growth opportunity for the small business to market its nanomaterial product to the automobile industry. The superior technology solution enabled by the nanomaterial would strengthen the U.S. automakers' competitiveness for making fuel-efficient vehicles that reduce the nation's reliance on petroleum imports and decrease carbon emissions.	

<b>Company</b> Virginia Diodes, Inc. 979 Second Street SE Charlottesville, VA 22902-6172	<b>Title</b> Multi-Band Power Source for ITER Reflectometry
<b>Summary</b> This project will develop a new generation of millimeter-wave sources with unprecedented output power and frequency agility. These sources will be optimized for use as a diagnostic instrument on ITER, a joint international research and development project that will demonstrate the feasibility of clean and inexpensive fusion energy.	

## WASHINGTON

<b>Company</b> Eagle Harbor Technologies, Inc. Suite D3, #179 Bainbridge Island, WA 98110	<b>Title</b> A Robust Modular IGBT Power Supply for Innovative Confinement Concepts
<b>Summary</b> This project will develop a robust, cost effective, configurable, solid state power supply that would provide a significant increase in capabilities of currently available power supplies.	

<b>Company</b> Forest Concepts, LLC 3320 West Valley Highway N, Suite D110 Auburn, WA 98001	<b>Title</b> Low Energy Particle Size Reduction for Biomass Feedstocks
<b>Summary</b> The results of the proposed project reduce the cost and energy for comminution of biomass and are likely to increase the conversion efficiency for second generation biofuels producers. Thus, the combination of these benefits enhances the financial viability of planned and existing bioenergy firms.	

<b>Company</b> Hummingbird Scientific, LLC 8300 28th Court NE, Unit 200 Lacey, WA 98516	<b>Title</b> A High Applied Field Magnetizing Holder for the TEM
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**Summary**

Scientists can use electron microscopes to see the internal structure of materials, and to probe the interrelationships between the structure, processing and properties of materials. This project will result in hardware that allows researchers to explore how magnetic materials respond internally to the application of high magnetic fields, and can be expected to lead to new insights and the creation of improved functional magnetic devices.

**Company**

Hummingbird Scientific, LLC  
8300 28th Court NE, Unit 200  
Lacey, WA 98516

**Title**

An Integrated Environmental Holder for the TEM

**Summary**

Exposure of materials to reactive environments can allow exploration of material synthesis from vapor or an improved understanding of the structure and electronic behavior during catalyzed reactions. This project will yield hardware that will allow scientists to more completely characterize such materials in a transmission electron microscope in the presence of gas or liquid at temperature.

**Company**

InnovaTek, Inc.  
350 Hills Street, Suite 104  
Richland, WA 99354-5511

**Title**

Integrated Membrane Water Gas Shift Reactor for Hydrogen Production

**Summary**

This project will develop advanced membrane reactor technology for the production of clean hydrogen that can result in economic, energy, and environmental benefits by opening new avenues for energy production, reducing energy consumption, increasing capital productivity, and reducing waste and pollutants.

**Company**

Jerry L. Berndt DBA, JB Enterprises  
234 N. 38th Avenue  
Yakima, WA 98902

**Title**

Oxygen A-Band Spectrometer

**Summary**

This project will improve our understanding of cloud-radiation interaction, and further improve weather and climate forecasts.

**Company**

Luxel Corporation  
515 Tucker Avenue  
P.O. Box 1879  
Friday Harbor, WA 98250-8040

**Title**

Wet Sample Holder for Synchrotron-Based X-ray Microscopy

**Summary**

This project will develop a sample holder that will permit the study of wet samples in the dry vacuum environment of a synchrotron beamline. The new sample holder will increase efficiency of synchrotron-based microscopy experiments saving time while enabling more sensitive measurements of materials like: landfill soils, experimental concrete mixtures that lessen environmental impact, and living cells.

**Company**

Modumetal, Inc.  
1443 N. Northlake Way Ste 2B  
Seattle, WA 98103-8994

**Title**

Advanced Ceramic Materials for High Temperature Nuclear Applications

**Summary**

In order to achieve the President-elect's anticipated energy policy, which may involve the elimination of greenhouse gas-producing power sources by 2040, nuclear power and in particular Generation IV (Gen IV) nuclear power is expected to play an important role. The current goal of the Gen IV Nuclear Energy Systems Initiative is to address the fundamental research and development, including advanced materials needs, of this industry to enable a rich and viable future for the United States' nuclear industry. This project will demonstrate the feasibility a scalable and cost effective process for production of advanced ceramics, which will enable intimate control of the composite.

**Company**

Modumetal, Inc.  
1443 N. Northlake Way Ste 2B  
Seattle, WA 98103-8994

**Title**

Functionally Graded Laminated Metal-Ceramic Thermal Barrier Systems by Low-Cost Electrochemical Processing

**Summary**

This project seeks to develop coatings combining the toughness of metals with the high temperature resistance and chemical resistance of ceramics.

**Company**

MSNW, LLC  
8551 154th Avenue  
Redmond, WA 98052

**Title**

Macron Formed Liner Compression as a NE Practical Method for Enabling Magneto-Inertial Fusion

**Summary**

A method for creating fusion conditions in a small-scale device is proposed with the potential of greatly simplifying the generation of fusion energy. The results from this research will have broad application to high energy density physics, as well as nuclear waste transmutation and alternate fission fuel cycles.

**Company**

NorthWest Research Associates, Inc.  
4118 148 Avenue NE  
Redmond, WA 98052

**Title**

Dissemination of Climate Model Output to the Public and Commercial Sector

**Summary**

The National Weather Service (NWS) provides weather forecasts (extended for several days into the future) and an entire industry has grown based on taking NWS forecasts, and repackaging, interpolating, and providing other processing services for their customers. This project will take the latest state of the art climatological model forecasts, and perform a similar value-added processing, and deliver them to the general public in their preferred format.

**Company**

Visual Editor Consultants  
87 Sibert St.  
Richland, WA 99354

**Title**

Graphical User Interface for Simplified Neutron Transport Calculations

**Summary**

With the nuclear threats facing this country, it is essential that analysts have the ability to perform simplified neutron transport calculations. A growing need exists in this country for users that do not have expert knowledge for the specific transport codes being used to have access to the power of a monte carlo analysis to obtain accurate results. This project will create a simple neutron transport calculation tool that can provide fast and accurate source-shield-detector calculations.

## WEST VIRGINIA

Company	Title
Touchstone Research Laboratory, Ltd. The Millennium Centre 1142 Middle Creek Road Syngas Triadelphia, WV 26059-9707	Hybrid Atmospheric Fluidized Bed Gasifier for High Methane Content
<b>Summary</b>	
This project furthers the development of a hybrid gasification technology that can produce a high methane content syngas from coal or coal/biomass mixtures. A proof-of-concept scale unit will be built and tested using coal to demonstrate feasibility.	

## WISCONSIN

Company	Title
Dynatronix, Inc. 462 Griffin Blvd. Amery, WI 54001	Voltage and Waveform Control For Improved Selectivity in Electrodeposition in Low Background Species
<b>Summary</b>	
This project will create ultra-pure copper used in military radiation detection systems with opportunities to expand into the semiconductor, medical, and nanotechnology industries.	

Company	Title
Simulation Technology and Applied Research, Inc. 11520 N. Port Washington Rd, Ste 201 Mequon, WI 53092-3432	An Improved 2D Eigensolver for RF Cavity Design
<b>Summary</b>	
This project will develop software that will allow for more rapid evaluation and design iteration for components in next generation light sources and particle colliders, reducing the cost of these components.	

Company	Title
Simulation Technology and Applied Research, Inc. 11520 N. Port Washington Rd, Ste 201 Mequon, WI 53092-3432	Robust and Efficient Dark Current Modeling on Finite-Element Meshes
<b>Summary</b>	
Improved software for dark current modeling will lower development costs of components for next-generation accelerators such as the International Linear Collider. Better software will also enable more rapid design of high-power microwave tubes, helping the U.S. microwave tube industry compete in a worldwide marketplace.	

## WYOMING

Company	Title
Square One Systems Design, Inc. PO Box 10520 Jackson, WY 83002-1050	An Energy Tunable X-ray Delay Device
<b>Summary</b>	
This project will develop an advanced opto-mechanical device capable of manipulating the pulse structure of an experimental X-ray beam.	