

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

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ALABAMA

Company	Title
Plasma Processes, Inc. 4914 Moores Mill Huntsville, AL 35811	High Temperature Bond and Thermal Road Barrier Coatings
Summary	
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.	

Company	Title
Renewable Oil International, LLC 3115 Northington Court Florence, AL 35630	Development of Cost Effective, Small Scale Transportable Fast Pyrolysis Plants
Summary	
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.	

Company	Title
Streamline Automation, LLC 3100 Fresh Way SW Huntsville, AL 35805	High-Efficiency Microalgae Biofuel Harvest and Extraction Using Ionic Liquids
Summary	
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

Company	Title
AdValue Photonics Inc 4585 S. Palo Verde Road, Suite 405 Tucson, AZ 85714	Long-Wave Infrared Transmitting Single Mode Fiber
Summary	
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.	

Company AJJER, LLC 4541 East Fort Lowell Road Tucson, AZ 85712-1108	Title High Refractive Index Encapsulants Technology for LEDs
Summary 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.	

STTR Project	
Company Burge Environmental, Inc. 6100 South Maple Avenue, Suite 114 Tempe, AZ 85283-2872	Title In-Situ Monitoring of Iodine-129 in Groundwater Using a Minicolumn
Summary 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.	

Company Earth Knowledge, Inc. 500 N Tucson Blvd., Suite 150 Tucson, AZ 85716	Title Web-Based Knowledge Portal and Collaboration Environment
Summary 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.	

Company TIPD, LLC 9030 S. Rita Road, Suite 120 Tucson, AZ 85747-9102	Title Energy Saving Manufacturing Process for Fuel Nozzles
Summary 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

Company Accelergy Corporation 111 N. Market Street, Suite 910 San Jose, CA 95113	Title Modeling Studies of CO2 Utilization Routes in Integrated Coal-to-Liquids Processes
Summary 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.	

Company Aegis Technology Inc. 3300 A Westminster Avenue Santa Ana, CA 92703	Title A Reliable High-Temperature Sealing Technology for Gas Separation Devices
Summary 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.	

Company Aegis Technology Inc. 3300 A Westminster Avenue Santa Ana, CA 92703	Title Nanoparticle-Sized, High-voltage Cathode Materials for Use in Advanced Lithium-Ion Cells
Summary 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.	

STTR Project	
Company Aegis Technology Inc. 3300 A Westminster Avenue Santa Ana, CA 92703	Title Nanotube-Enhanced Bulk TE Nanocomposite for High-Efficiency Waste Heat Recovery for Electricity Generation
Summary 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.	

Company Allopartis Biotechnologies 1700 4th Street, 218C Byers Hall San Francisco, CA 94158	Title Pre-Treated Lignocellulosic Biomass High-Throughput Cellulase Evolution Against
Summary 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.	

Company Argo Science Corporation 71 Cypress Way Rolling Hills Estates, CA 90274-3416	Title Hybrid Intrusion Detection System Integrating Anomaly and Signature Detection Methods
Summary 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.	

Company Berkion Technology 109 Columbine Drive Hercules, CA 94547-1004	Title Ultra-Compact Electronic Gamma Source
Summary 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.	

Company Calabazas Creek Research, Inc. 690 Port Drive San Mateo, CA 94404-1010	Title 10 MW L-Band Klystron for Accelerators
Summary 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.	

Company Calabazas Creek Research, Inc. 690 Port Drive San Mateo, CA 94404-1010	Title A 200 MHz 35 MW Multiple Beam Klystron for Accelerator Applications
Summary 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.	

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

STTR Project Company Calabazas Creek Research, Inc. 690 Port Drive San Mateo, CA 94404-1010	Title Analysis Code for High Gradient Dielectric Insulator Surface Breakdown
Summary 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.	

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

Company Ebert Composites Corporation 651 Anita Street, Suite B8 Chula Vista, CA 91911	Title Tapered Composite Wind Turbine Tower Utilizing CNC-Machined Pultruded Lineals
Summary 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.	

Company Energent Corporation 2321 S. Pullman Street Santa Ana, CA 92705	Title Research and Development of an Advanced Turbo Vapor Compression System
Summary 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.	

Company EVOGH, Inc. 1876 Braeburn RD Altadena, CA 91001	Title EVO-HD: A Globally Scalable Standards-based Full-HD Environment for Immersive Collaboration
Summary 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.	

Company FAR-TECH, Inc. 3550 General Atomics Court Building 15, Suite 155 San Diego, CA 92121	Title An Energy-Efficient Klystron Upgrade for the Jefferson Laboratory CEBAF Linac
Summary 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.	

Company FAR-TECH, Inc. 3550 General Atomics Court Building 15, Suite 155 San Diego, CA 92121	Title Modeling Tool for Optimizing Electron Beam Ion Sources
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 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.

Company	Title
Novawave Technologies, Inc. 900 Island Drive, Suite 101 Redwood City, CA 94065	Nanoparticle Enhanced Resonator Sensor for Trace Radionuclide Detection
Summary	
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.	

Company	Title
Novawave Technologies, Inc. 900 Island Drive, Suite 101 Redwood City, CA 94065	Real-Time Ambient Nitrous Oxide Sensor
Summary	
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.	

STTR Project	
Company	Title
Opto-Knowledge Systems, Inc. (OKSI) 19805 Hamilton Avenue Torrance, CA 90502	Single Mode Hollow Core Waveguides for Long-Wave Infrared (LWIR) Lasers
Summary	
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).	

Company	Title
Particle Beam Lasers, Inc. 18925 Dearborn Street Northridge, CA 91324-2807	Design of a Demonstration of Magnetic Insulation and Study of its Application to Ionization Cooling for a Muon Collider
Summary	
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.	

Company	Title
Physical Optics Corporation 20600 Gramercy Place, Bldg 100 Torrance, CA 90501-1821	Cascade Particle Detector
Summary	
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.	

Company Physical Optics Corporation 20600 Gramercy Place, Bldg 100 Torrance, CA 90501-1821	Title Composite Energy Storage Capacitor
Summary 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.	

Company Physical Optics Corporation 20600 Gramercy Place, Bldg 100 Torrance, CA 90501-1821	Title Fiber Optic High Temperature Seismic Sensor
Summary 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.	

Company Picarro, Inc. 480 Oakmead Parkway Sunnyvale, CA 94085	Title Hand-Held, Battery Operated Trace Gas Analyzer for Measuring GHG Sources
Summary 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).	

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

Company Poole Ventura, Inc. P.O. Box 5023 Oxnard, CA 93031-5023	Title Device for In-Situ Coating of Long, Small Diameter Tubes
Summary 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.	

Company RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	Title A 10 MHz Pulsed Laser Wire Scanner for Longitudinal and Transverse Measurements of 100-mA Class Electron Beams
Summary 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.	

Company RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	Title A High-Resolution Transverse Diagnostic Based on Fiber Optics
Summary 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.	

Company RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	Title An Inexpensive High Brightness Photoinjector using Solid Freeform Fabrication (SFF)
Summary 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.	

Company RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	Title Compact, Electronic Blood Irradiator
Summary 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.	

Company RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	Title Development of a CW NCRF Photoinjector Using Solid Freeform Fabrication (SFF)
Summary 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.	

Company RadiaBeam Technologies, LLC 13428 Beach Avenue Marina Del Rey, CA 90292-5624	Title Ultra-High Gradient, Compact S-Band Accelerating Structure for Laboratory and Industrial Applications
Summary 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.	

Company Redwood Systems 46665 Fremont Blvd. Fremont, CA 94538-6410	Title Auto-Commissioning and Auto-Discovery Control System for Solid State Lighting
Summary 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.	

Company Romny Scientific Incorporated 865 Marina Bay Parkway, Suite 42 Richmond, CA 94804	Title Automotive Waste Heat Recovery by High Efficiency Thermoelectric Generators
Summary 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.	

Company Searchlight Sensors, Inc. 1100 N. Tustin Avenue, Suite G Santa Ana, CA 92705-3509	Title Low Cost Balloon-Borne Carbon Dioxide Sensor
Summary 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.	

Company Shakti Technologies, Inc. 728 Garland Drive Palo Alto, CA 94303-3603	Title Development of Novel Sorbents for CO2 Capture
Summary 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.	

Company Sora, Inc. 485 Pine Avenue Goleta, CA 93117	Title 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.

Company XIA, LLC 31057 Genstar Road Hayward, CA 94544	Title Improved Energy Resolution in CsI Scintillator Material
Summary 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

Company ADA Technologies, Inc. 8100 Shaffer Parkway, Suite 130 Littleton, CO 80127-4107	Title Nanostructured High Voltage Cathode Materials for Advanced Lithium-ion Batteries
Summary 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.	

Company Boulder Precision Electro-Optics 3049 Redstone Lane Boulder, CO 80305	Title A Laser Power-Build-Up System for H Atom Ionization
Summary 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.	

Company Composite Technology Development, Inc. 2600 Campus Drive, Suite D Lafayette, CO 8002-3359	Title Advanced Composite Materials for Tidal Turbine Blades
Summary 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.	

Company Eltron Research & Development Inc. 4600 Nautilus Court South Boulder, CO 80301-3241	Title An Approach for Enhancement of In-Gasifier Production of Methane
Summary 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.	

Company Eltron Research & Development Inc. 4600 Nautilus Court South Boulder, CO 80301-3241	Title 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 μ m Ultrafast Fiber Laser to 2 μ 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.

Company Kapteyn-Murnane Laboratories, Inc. 1855 South 57th Court Boulder, CO 80301	Title Cryogenically-Cooled High Average Power Picosecond Ytterbium Lasers
Summary 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.	

Company Noqsi Aerospace, Ltd 2822 S. Nova Rd Pine, CO 80470	Title A Streaming Data Reduction Appliance for High Energy Physics based on FPGA Technology
Summary 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).	

Company ReflecTech 18200 West Highway 72 Arvada, CO 80007	Title Low-Cost, Durable, High-Performance Reflectors for Utility-Scale Solar Thermal Energy Collection
Summary 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.	

Company TDA Research, Inc. 12345 W. 52nd Avenue Wheat Ridge, CO 80033-1916	Title A New Three-Part Architecture for Efficient and Stable Bulk Heterojunction OPV Devices
Summary 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.	

Company TDA Research, Inc. 12345 W. 52nd Avenue Wheat Ridge, CO 80033-1916	Title Liquid Salt Redox Couples for Utility Scale Flow Batteries
Summary 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.	

Company TDA Research, Inc. 12345 W. 52nd Avenue Wheat Ridge, CO 80033-1916	Title 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 CO₂ 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."

Company Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Title Design of Meter-Scale Laser Wakefield Accelerators
Summary 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.	

Company Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Title Efficient Multiscale Algorithms for Modeling Coherent Synchrotron Radiation
Summary 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.	

Company Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Title Extending Chombo with PETSc
Summary 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.	

Company Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Title Fully Implicit, Jacobian-Free, Newton-Krylov Methods in Production Level MHD Fusion Codes
Summary 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.	

Company Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Title High-Fidelity Modulator Simulations of Coherent Electron Cooling Systems
Summary 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.	

Company	Title
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
Summary	
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.	

Company	Title
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
Summary	
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.	

Company	Title
Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Parallel Validation Tools for Fusion Simulations
Summary	
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.	

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

Company	Title
Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	QuAI - A Quality Assurance Infrastructure for Data-Centric Applications
Summary	
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.	

Company	Title
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
Summary	
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.	

Company Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Title Simulations of Alpha Wall Load in ITER
Summary 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.	

Company Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Title Simulation of Direct-Drive Magneto-Inertial Fusion
Summary 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.	

Company Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Title Simulation of Short-Range Wakefields in Accelerating Structures for X-Ray Sources
Summary 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.	

Company Tech-X Corporation 5621 Arapahoe Avenue, Suite A Boulder, CO 80303-1379	Title Virtual Cavity Prototyping with VORPAL
Summary 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

STTR Project Company Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	Title Anti-Breakdown Coatings for High-Gradient Accelerator Structures
Summary 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.	

Company Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	Title Coaxial Two-Channel Dielectric Wake Field Accelerator
Summary 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.	

Company Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	Title Electron Gun and Beam Collector for a FOR A 10-MW, 1.3-GHz, Low-Voltage, Multi-Beam Klystron
Summary 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.	

Company Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	Title Fast Ferroelectric L-Band Tuner for Superconducting Cavities
Summary 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.	

Company Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	Title Multi-Mode Cavity Design for Raising RF Breakdown Threshold in a Two-Beam High-Gradient Accelerator
Summary 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.	

Company Omega-P, Inc. 258 Bradley Street New Haven, CT 06510-1106	Title RF Cavity Chain and Magnetic Circuit for a 10-MW, 1.3-GHz, Low-Voltage, Multi-Beam Klystron
Summary 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.	

Company	Title
Proton Energy Systems 10 Technology Drive Wallingford, CT 06492-1955	Application of Rapid Throughput Measurement Techniques to Quantify Catalyst Distribution in Electrolysis MEAs Through Measurement of MEA Thickness Variation
Summary	
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.	

Company	Title
Proton Energy Systems 10 Technology Drive Wallingford, CT 06492-1955	Hydrogen by Wire- Home Fueling System
Summary	
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	

Company	Title
R&D Dynamics Corporation 15 Barber Pond Road Bloomfield, CT 06002	High Efficiency R744 Centrifugal Chiller
Summary	
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.	

Company	Title
SupraMagnetics, Inc. 214 Canal Street Plantsville, CT 06479	A Multifilament PIT V3Ga Conductor for FUSION Magnet Applications
Summary	
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.	

Company	Title
SupraMagnetics, Inc. 214 Canal Street Plantsville, CT 06479	A Multifilament PIT V3Ga Conductor for HEP Magnet Applications
Summary	
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.	

Company SupraMagnetics, Inc. 214 Canal Street Plantsville, CT 06479	Title A Novel Quaternary Low-Cost PIT Nb ₃ Sn Conductor for HEP Magnet Applications at 15 Tesla and Beyond
Summary A new economical Nb ₃ 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.	

Company SupraMagnetics, Inc. 214 Canal Street Plantsville, CT 06479	Title Extrudable NbTi Superconductor with Ferromagnetic Pins for Undulator Magnets
Summary 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.	

Company Sustainable Innovations, LLC 160 Oak St., Unit 410 Glastonbury, CT 06033-2336	Title Development of an Electrochemical Separator + Compressor
Summary 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.	

Company Yardney Technical Products, Inc. 82 Mechanic Street Pawcatuck, CT 06379	Title Reciprocal Lithium-ion Cell with Novel Lithium-Free Cathode and Pre-Lithiated Carbonaceous Anode
Summary 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

Company Applied Diamond, Inc. 3825 Lancaster Pike Wilmington, DE 19805	Title A New Approach to Diamond-Based High Heat Load Monochromators
Summary 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.	

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

Company Florida Turbine Technologies, Inc. 1701 Military Trail, Suite 110 Jupiter, FL 33458-7887	Title Application of Advanced Refractory Metals in Revolutionary Turbine Airfoils
Summary 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.	

Company Florida Turbine Technologies, Inc. 1701 Military Trail, Suite 110 Jupiter, FL 33458-7887	Title Development of Innovative Cooling Approaches for Robust Design
Summary 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.	

Company MicroMaterials, Inc 13302 Telecom Drive Tampa, FL 33637	Title SERS Raman Sensor Based on Diameter-Modulated Sapphire Fiber
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.	

GEORGIA

Company American Maglev Technologies of Florida, Inc. 30 South Park Square Suite 201 Marietta, GA 30060	Title Magnetic Gears? The Key to Efficient Ocean Current Energy Recovery
Summary 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.	

Company Cermet, Inc. 1015 Collier Road, Bldg H Atlanta, GA 30318	Title Nonpolar Green LEDs Based on InGaN
Summary 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.	

Company nGimat Co. 5315 Peachtree Boulevard Atlanta, GA 30341-2107	Title High Voltage Lithium-Ion Nano-Cathodes
Summary 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.	

STTR Project Company Polymer Aging Concepts, Inc. 372 River Drive Dahlonega, GA 30533	Title Nanotechnology-Based Condition Monitoring Sensors for Generation Electrical Insulation Systems
Summary 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.	

Company Virkaz Technologies 7305 Weber Street Atlanta, GA 30349-7919	Title CloudSpan: Enabling Scientific Computing Across Cloud and Grid Platforms
Summary 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

Company Makai Ocean Engineering, Inc. P.O. Box 1206 Kailua, HI 96734	Title Electrical Transmission Cable to Shore for a 100MW Floating OTEC Electrical Power Plant
Summary 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.	

STTR Project Company Technical Research Associates, Inc. 2800 Woodlawn Drive, Suite 149 Honolulu, HI 96822	Title 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.

Company	Title
MicroLink Devices 6457 West Howard St Niles, IL 60714	Backside Contact Multijunction Solar Cells for Concentrator Applications
Summary	
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.	

Company	Title
Muons, Inc. 552 N. Batavia Avenue Batavia, IL 60510	Beam Pipe HOM Absorber for 750 MHz RF Cavity Systems
Summary	
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.	

STTR Project	
Company	Title
Muons, Inc. 552 N. Batavia Avenue Batavia, IL 60510	H-Ion Sources for High Intensity Proton Drivers
Summary	
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.	

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

STTR Project	
Company	Title
Muons, Inc. 552 N. Batavia Avenue Batavia, IL 60510	High Power Co-Axial SRF Coupler
Summary	
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.	

STTR Project	
Company	Title
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 CO₂ 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.

Company Active Signal Technologies 611 North Hammonds Ferry Rd Linthicum, MD 21090-1322	Title High-Temperature Capacitors for Geothermal Applications
Summary 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.	

Company Array Information Technology, Inc. 7474 Greenway Center Drive, Suite 600 Greenbelt, MD 20770	Title Tools for Digitization of Historic Seismograms
Summary 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.	

Company Dynaflow, Inc. 10621-J Iron Bridge Rd Jessup, MD 20794	Title Combined Harvesting of Algae and Extraction of Oil using DynaJets Cavitating Jets
Summary 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.	

Company Intelligent Automation, Inc. 15400 Calhoun Drive, Suite 400 Rockville, MD 20855	Title A Secure Wireless AE Sensor Network with Advanced Diagnostic and Prognostic Algorithms for Structural Health Monitoring
Summary 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.	

Company Intelligent Automation, Inc. 15400 Calhoun Drive, Suite 400 Rockville, MD 20855	Title Distributed Mining Tool for Large-Scale DOE Science and Technical Information
Summary 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.

Company Zymetis, Inc. 387 Technology Drive College Park, MD 20742-0001	Title Optimal Substrate-Specific Hemicellulase Enzyme Mixtures
Summary 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

STTR Project	
Company Aerodyne Research, Inc. 45 Manning Road Billerica, MA 01821-3976	Title An Absolute CO2 Monitor with Extremely High Accuracy
Summary 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.	

Company Aerodyne Research, Inc. 45 Manning Road Billerica, MA 01821-3976	Title Development and Characterization of a Compact Aerosol Chemical Speciation Monitor (ACSM)
Summary 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.	

Company Aerodyne Research, Inc. 45 Manning Road Billerica, MA 01821-3976	Title High Precision COS Monitor to Constrain the Partitioning of CO2 Fluxes
Summary 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.	

Company Aerodyne Research, Inc. 45 Manning Road Billerica, MA 01821-3976	Title Volatility-Resolved Measurements of Total Gas-Phase Organic Compounds by High Resolution Electron Impact Mass Spectrometry
Summary 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.	

Company Agiltron, Inc. 15 Cabot Road Woburn, MA 01801-1003	Title Long-Wave Infrared Photonic Band-Gap Fiber
Summary 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.	

Company Aspen Aerogels, Incorporated 30 Forbes Road, Bldg B Northborough, MA 01532	Title Aerogel Derived Nanostructured Thermoelectric Materials
Summary 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.	

Company Aspen Aerogels, Incorporated 30 Forbes Road, Bldg B Northborough, MA 01532	Title Transparent Aerogel Insulation for Solar Heat Concentration Elements
Summary 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.	

Company Aspen Products Group, Inc. 186 Cedar Hill Street Marlborough, MA 01752	Title Novel Materials for Energy Efficient Production of High Purity Oxygen from Air
Summary 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.	

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

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

Company EIC Laboratories, Inc. 111 Downey Street Norwood, MA 02062	Title Flameproof Additives for Automotive Li Ion Batteries
Summary 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.	

Company ElectroChem, Inc. 400 West Cummings Park Woburn, MA 01801	Title Advanced PEM Based Hydrogen Home Refueling Appliance
Summary 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.	

Company FloDesign Inc. 380 Main Street Wilbraham, MA 01095	Title MECT, The Next Generation Current Turbine
Summary 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.	

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

Company Giner Electrochemical Systems, LLC 89 Rumford Avenue Newton, MA 02466-1311	Title Anti-Fouling Reverse Osmosis Desalination System
Summary 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.	

Company Giner Electrochemical Systems, LLC 89 Rumford Avenue Newton, MA 02466-1311	Title 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 CO₂

Summary

Predictions of global climate change rely on models incorporating precise knowledge of the sources and sinks of important greenhouse gases such as CO₂. Measurements using the high sensitivity instrument for monitoring the major stable isotopes of CO₂ that this project will develop and demonstrate can be used to decrease the uncertainties that still remain.

Company	Title
Physical Sciences Inc. 20 New England Business Center Andover, MA 01810	Highly Compact CO2 Sensor for Balloon Deployment
Summary	
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.	

STTR Project	
Company	Title
Physical Sciences Inc. 20 New England Business Center Andover, MA 01810	Networked Sensors for Sequestration MVA
Summary	
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.	

Company	Title
Physical Sciences Inc. 20 New England Business Center Andover, MA 01810	Non-Fracturing, High Performance NiMH Negative Electrode
Summary	
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.	

Company	Title
Q-Peak, Incorporated 135 South Road Bedford, MA 01730-2307	100W Green Laser as a Photoinjector Drive Laser
Summary	
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.	

Company	Title
Q-Peak, Incorporated 135 South Road Bedford, MA 01730-2307	Temporal Pulse Shaping Techniques for Photoinjector Lasers
Summary	
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.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title Bright Quantum Dot Scintillator for High Frame Rate Imaging
Summary 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.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title Dual Modality Small Animal Imaging
Summary 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.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title Bright Selenium Based Quantum Dot Scintillators
Summary 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.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title Fast, Photon Counting Detector Arrays with Internal Gain
Summary 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.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title High Bandwidth Optical Detector for Scanning Probe Microscopy
Summary 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.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title High Performance, Low Cost Scintillators for PET
Summary 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.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title Low Cost, High Speed, High Sensitivity Detector for Material Science Studies
Summary 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.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title Low Cost Large Volume Lanthanide Halide Scintillators
Summary 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.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title New Detectors for Small Animal SPECT
Summary 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.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title Next Generation SPECT Detectors
Summary 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).	

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

Company Resolute Marine Energy, Inc. 126 Summer Street Watertown, MA 02472	Title Advanced Water Power Technology Development Wave and Current Energy Technologies
Summary 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.	

Company SatCon Technology Corporation 27 Drydock Avenue Boston, MA 02210-2377	Title High-Power-Density, Non-Permanent-Magnet, Electric Motor Development for Hybrid, Plug-in Hybrid, and Fuel Cell Vehicles
Summary 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.	

Company SatCon Technology Corporation 27 Drydock Avenue Boston, MA 02210-2377	Title Improvement of Eddy Current Rotor Loss Prediction Techniques
Summary 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.	

Company Scientific Solutions, Inc. 55 Middlesex Street, Unit 210 North Chelmsford, MA 01863-1561	Title FABSOAR -- A Fabry-Perot Spectrometer for Oxygen A-Band Research
Summary 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.	

Company Spectral Sciences, Inc. 4 Fourth Avenue Burlington, MA 01803-3304	Title Structured Emission Thermometry Sensor for Burner Control
Summary 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.	

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

Company Supercon, Inc. 830 Boston Turnpike Shrewsbury, MA 01545-3386	Title High Performance Nb ₃ Sn Conductor Fabricated by the Internal Tin Tube Method with NbTi Island Doping to Assist in Filament Reaction
Summary 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.	

Company Tech-Etch, Inc. 45 Aldrin Road Plymouth, MA 02360-4803	Title Commercial and Cost Effective Production of Two Dimensional Read-Out Board for Subatomic Particle Detectors
Summary 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.	

Company TelAztec, LLC 15 A Street Burlington, MA 01803	Title Microstructure-Based Anti-Reflection Treatment for Long-Wave Infrared Transmitting Optical Fiber
Summary 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.	

Company TIAX, LLC 15 Acorn Park Cambridge, MA 02140-2301	Title Enabled VOC Sensor for Energy-Efficient Building Ventilation
Summary 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.	
Company TIAX, LLC 15 Acorn Park Cambridge, MA 02140-2301	Title Implantation, Activation, Characterization and Prevention/Mitigation of Internal Short Circuits in Lithium-Ion Cells
Summary 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.	

Company TIAX, LLC 15 Acorn Park Cambridge, MA 02140-2301	Title Modeling of Hydrogen Dispensing Options for Advanced Storage
Summary 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	

Company TIAX, LLC 15 Acorn Park Cambridge, MA 02140-2301	Title Use of Algae for Fuels Production Concepts for Extracting Oil from Algae
Summary 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.	

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

MICHIGAN

STTR Project	
Company Niowave, Inc. 1012 N. Walnut Street Lansing, MI 48906	Title Development of a 400 MHz Superconducting RF Crabbing Cavity
Summary 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.	

STTR Project	
Company Niowave, Inc. 1012 N. Walnut Street Lansing, MI 48906	Title Development of a 499 MHz Superconducting RF Deflecting Cavity
Summary 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.	

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

Company Niowave, Inc. 1012 N. Walnut Street Lansing, MI 48906	Title Fabrication of Niobium Cavities Directly from Large Grain Ingot
Summary 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.	

Company OG Technologies, Inc. 4300 Varsity Drive, Suite C Ann Arbor, MI 48108	Title SICS: A Sensor-Based In-Line Control System for the Surfaces of Continuously Cast Slabs
Summary 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.	

Company Quantum Signal, LLC 3741 Plaza Drive Ann Arbor, MI 48108	Title Spectral Assisted Moving Vehicle Tracking
Summary 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.	

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

Company Technova Corporation 3927 Dobie Road Okemos, MI 48864-3480	Title 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.

Company SVT Associates, Inc. 7620 Executive Drive Eden Prairie, MN 55344	Title Robust GaN-Based Photocathodes for High-Current RF Electron Injectors
Summary 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

Company Freight Pipeline Company 2601 Maguire Boulevard Columbia, MO 65201	Title Machine to Densify Biomass into Tablets
Summary 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.	

Company MO-SCI Corporation 4040 Hy Point North Rolla, MO 65401-8277	Title High-Temperature Viscous Sealing Glasses for Solid Oxide Fuel Cells
Summary 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.	

Company Sci-Eng Solutions, LLC 3304 Lake Town Drive Columbia, MO 65203-6719	Title Neutron Transmutation Doped Silicon Carbide Switches
Summary 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.	

Company Titanova, Inc 12724 Pennridge Drive Bridgeton, MO 63304	Title In Situ Diode Laser Cladding of Erosion Resistant Alloys for Repair of Light Water Reactor Systems and Components
Summary 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
Summary 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
Summary 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
Summary 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
Summary 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
Summary 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)₃Sn 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 Nb₃Sn, 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.

Company Universal Display Corporation 375 Phillips Blvd. Ewing, NJ 08618	Title Ultra High Efficiency Phosphorescent OLED Lighting
Summary 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

Company Deep Web Technologies, LLC 301 North Guadalupe, Suite 201 Santa Fe, NM 87501	Title An Analysis of the Performance Bottlenecks in the Federated Search Information Flow
Summary 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.	

Company Electrodynamic 4909 Paseo Del Norte D Albuquerque, NM 97113-1527	Title Pulse Resonance for Photoelectron Acceleration
Summary 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.	

STTR Project	
Company Gratings, Inc. 2655A Pan American Freeway Albuquerque, NM 87107-1639	Title Microstructured Crystalline Silicon Thin- Film Solar Cells
Summary 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.	

Company Retriever Technology, LP 104 1/2 Calle La Pena Santa Fe, NM 87505	Title Use of Raster to Vector Image Analysis Technology to Rapidly and Accurately Digitize Historical Seismograms
Summary 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.	

Company Rocky Mountain Geophysics, LLC 167 Piedra Loop Los Alamos, NM 87544	Title Development of Software to Digitize Historic Hardcopy Seismograms from Nuclear Explosions
Summary 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.	

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

Company Southwest Sciences, Inc. 1570 Pacheco Street, Suite E-11 Santa Fe, NM 87505-3993	Title NDE of Gas Turbine Thermal Barrier Coatings
Summary 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.	

Company TPL, Incorporated 3921 Academy Parkway North NE Albuquerque, NM 87109	Title Nanocomposite Film Capacitors for High Energy Accelerators
Summary 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

Company ACENT Laboratories LLC 3 Scott Lane Manorville, NY 11949	Title A High Efficiency Integrated Syngas Purification and Hydrogen Separation and Storage System
Summary 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.	

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

Company Kitware, Inc. 28 Corporate Drive Clifton Park, NY 12065-8688	Title Management and Comparative Analysis of Dataset Ensembles
Summary 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.	

Company Kitware, Inc. 28 Corporate Drive Clifton Park, NY 12065	Title Multi-Resolution Streaming for Remote Scalable Visualization
Summary 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.	

Company MesoScribe Technologies, Inc. 25 Health Sciences Drive Stony Brook, NY 11790	Title Development of Packaging and Integration of Sensors for On-Line Use in Harsh Environments
Summary 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.	

Company Simmetrix, Inc. 10 Halfmoon Executive Park Drive Clifton Park, NY 12065-5630	Title Interoperable Components to Support Unstructured Mesh Simulations on Massively Parallel Computers
Summary 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.	

Company Novomer, Inc. 950 Danby Road, Suite 198 Ithaca, NY 14850	Title Novel Catalytic Process for Synthesizing Polyols from CO2 Feedstock
Summary 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.	

Company Underground Systems, Inc. 84 Business Park Drive, Suite 109 Armonk, NY 10504	Title 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

Company Energy Focus, Inc. 32000 Aurora Road Solon, OH 44139	Title Increasing Efficiency in Traditional Lighting Technologies High Intensity Discharge Lamps- Arc Tube Coating System for metal Halide Color Consistency
Summary 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.	

Company	Title A Compact Electronics Module for the Small Accelerator Facility: a Measurement System Charge, Position, and RF Phase
Summary 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.	

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

Company Euclid TechLabs, LLC 5900 Harper Road #102 Solon, OH 44139	Title Ferroelectric Based High Power Components for L-Band Accelerator Applications
Summary 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.	

Company Euclid TechLabs, LLC 5900 Harper Road #102 Solon, OH 44139	Title Nonlinear Ferroelectric Development for L-Band Accelerator Applications
Summary 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.	

Company Euclid TechLabs, LLC 5900 Harper Road #102 Solon, OH 44139	Title 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_x, NO_x and CO₂, 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 Nb₃Sn using Subelements with
Over 3000 A/mm² Non-Cu Jc at 12T and 4.2K

Summary

This project will develop a much improved Nb₃Sn superconductor wire for next generation High Energy Physics accelerator magnets.

Company

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

Title

Development of MgB₂ 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.

Company Hyper Tech Research, Inc. 1275 Kinnear Road Columbus, OH 43212	Title High Jc, Low AC Loss Nb ₃ Sn Superconductor for 14-20T Fusion Application
Summary This project will develop a much improved lower cost Nb ₃ Sn superconductor wire for DOE advanced Fusion Program.	

Company Hyper Tech Research, Inc. 1275 Kinnear Road Columbus, OH 43212	Title Internal-Tin Nb/Sn Strand with Distributed Barrier that will not Leak Sn during Heat Treatment
Summary This project will develop a much improved Nb ₃ Sn superconductor wire for next generation High Energy Physics accelerator magnets.	

Company Lambda Research, Inc. 5521 Fair Lane Cincinnati, OH 45227	Title Stress Corrosion Cracking Mitigation and Fatigue Strength Improvement of Light Water Reactor Components Using Low Plasticity Burnishing (LPB)
Summary 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.	

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

Company Metamateria Partners, LLC 1275 Kinnear Road Columbus, OH 43212	Title Nanocomposite Positive Electrode for Asymmetric Electrochemical Capacitors
Summary 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.	

Company Nanotek Instruments, Inc. 1240 McCook Avenue Dayton, OH 45404-1059	Title High-Capacity Nano Graphene Materials for Asymmetric Electrochemical Capacitors
Summary 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.	

Company	Title
NexTech Materials, Ltd. 404 Enterprise Drive Lewis Center, OH 43035-9423	Manufacturing Analysis of SOFC Interconnect Coating Processes
Summary	
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.	

Company	Title
Powdermet, Inc. 24112 Rockwell Drive Euclid, OH 44117	Multilayer Tape Casting of Water-Gas-Shift Membranes for H2 Separation
Summary	
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.	

Company	Title
Precision Energy and Technology 2000 Composite Drive Kettering, OH 45420	Novel Energy Storage in a Hybrid Electrochemical Cell
Summary	
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.	

Company	Title
RNET Technologies, Inc. 240 West Elmwood Drive, Suite 2010 Dayton, OH 45459	Enhancement of GridFTP Performance Through GMPLS Integration and Hardware Offloading
Summary	
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.	

Company	Title
RNET Technologies, Inc. 240 West Elmwood Drive, Suite 2010 Dayton, OH 45459	NIC-Based Ultra-High-Speed Intrusion Detection System (IDS)
Summary	
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.	

Company RNET Technologies, Inc. 240 West Elmwood Drive, Suite 2010 Dayton, OH 45459	Title Optimization of the PETSc Library for Clusters of MultiCore Processors
Summary 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.	

Company UES, Inc. 4401 Dayton-Xenia Road Dayton, OH 45432-1894	Title YBCO Fibers from Solution Approach -A New Concept
Summary 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

Company Galois, Inc. 421 SW Sixth Avenue, Suite 300 Portland, OR 97204	Title Grid 2.0: Collaboration and Sharing on the Grid
Summary 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.	

Company Voxel, Inc. 12725 SW Millikan Way, Suite 230 Beaverton, OR 97005	Title High-Dynamic-Range, Rad-Hard, Time-Resolved, Correlated X-ray Photon Detector
Summary 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.	

Company Voxel, Inc. 12725 SW Millikan Way, Suite 230 Beaverton, OR 97005	Title Rad-Hard SOI CMOS Active Pixel Sensor for Charged Particle Detection
Summary 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- μ m), have excellent and well controlled charge collection using fully depleted devices, and can use full CMOS readout without parasitic charge collection.	

PENNSYLVANIA

Company	Title
Advanced Cooling Technologies, Inc. 1046 New Holland Avenue Lancaster, PA 17601	Nanofluids Enhanced Twisted Tape Heat Exchanger
Summary 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.	

STTR Project	
Company	Title
Advanced Cooling Technologies, Inc. 1046 New Holland Avenue Lancaster, PA 17601	Stabilization of Nanofluids Using Self Assembled Monolayers
Summary 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.	

Company	Title
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
Summary 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.	

Company	Title
Visual Composites, LLC 5451 Merwin Lane Erie, PA 16510	Intermediate Heat Exchanger for Framatome High Temperature Reactor
Summary 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.	

Company	Title
WavesinSolids, LLC 2134 Sandy Drive, Suite 14 State College, PA 16803-2292	Continuous Health Monitoring of Coal Power Plant Components using Acoustic Emission Technology
Summary 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.

Company Information International Associates, Inc. 1055 Commerce Park Drive, Suite 110 Oak Ridge, TN 37830-8028	Title International Science Education Federated Search Engine
Summary 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.	

Company Information International Associates, Inc. 1055 Commerce Park Drive, Suite 110 Oak Ridge, TN 37830-8028	Title Web Metrics Analysis for Digital Libraries Based on Scientific and Technical Information
Summary 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.	
Company PHDs Co. 777 Emory Valley Road, Suite B Oak Ridge, TN 37830	Title Segmented Rectifying and Blocking Contacts on Germanium Planar Detectors
Summary 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.	

Company Multi-Phase Services, Inc. 2111 RiverSound Dr. Knoxville, TN 37922	Title Computer-Aided Development of Ductile Ferritic Steels with High Strengths for Ultra-Supercritical Steam-Turbine Applications
Summary 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.	

Company ProteoGenesis, LLC 2109 W. Market Street Johnson City, TN 37604	Title Recombinant Expression and Characterization of Novel Cellulases for Switchgrass Ethanol Production
Summary 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

Company	Title
Applied Nanotech, Inc. 3006 Longhorn Blvd., #107 Austin, TX 78758-7518	Carbon Stripper Foil for the Next Generation Rare Isotope Beam Facility
Summary 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.	

Company	Title
Applied Nanotech, Inc. 3006 Longhorn Blvd., #107 Austin, TX 78758-7518	CNT-Based Electrostatic Atomizing Fuel Injector Promoting Fuel Combustion Efficiency
Summary 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.	

Company	Title
Applied Nanotech, Inc. 3006 Longhorn Blvd., #107 Austin, TX 78758-7518	Sintered Copper Ink as a Low Cost Replacement for High Temperature Solders
Summary 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.	

Company	Title
Benz Airborne Systems 2400 Handley-Ederville Road Fort Worth, TX 76118	High Temperature Sensors for Geothermal Applications
Summary 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.	

Company	Title
Blue Sky Electronics, LLC 401 Studewood, Ste 203 Houston, TX 77007-2733	Electronics for Fast Vertex Position Measurement
Summary 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.	

Company Crossfield Technology, LLC 4505 Spicewood Springs Rd, Ste 360 Austin, TX 78759	Title Novel Wireless Sensor Integration in Process Control
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 Integrated Micro Sensors, Inc. 10814 Atwell Drive Houston, TX 77096-4834	Title Photo-Enhanced Hardened Flat Cold Cathodes Based on III Nitrides for Pulsed and Ultra-Fast Electron Sources
Summary 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.	

Company Lynntech, Inc. 7610 Eastmark Drive College Station, TX 77840	Title Design, Optimization and Fabrication of a Home Hydrogen Fueling System
Summary 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.	

Company Lynntech, Inc. 7610 Eastmark Drive College Station, TX 77840	Title Magnetic Harvesting of Algae
Summary 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.	

Company Lynntech, Inc. 7610 Eastmark Drive College Station, TX 77840	Title Non-Thermal Plasma Cracking of Algae-Derived Biodiesel into Jet Flue
Summary 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.	

Company Lynnntech, Inc. 7610 Eastmark Drive College Station, TX 77840	Title Novel Electrochemical Process for Microalgae Harvesting
Summary 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.	

Company Metal Oxide Technologies Inc. 8807 Emmott Rd., Suite 100 Houston, TX 77040	Title High-Field YBCO Superconductors for High Energy Particle Colliders
Summary 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.	

Company Nanohmics, Inc. 6201 E. Oltorf Street #400 Austin, TX 78741	Title Vacuum Microelectronic Thermoelectric Cooler
Summary 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.	

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

Company Saxet Surface Science 3913 Todd Lane, Suite 303 Austin, TX 78744	Title Improved Ion Resistance for III-V Photocathodes in High Current Guns
Summary 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.	

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

In order to achieve a higher current carrying capacity in Nb₃Sn 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 Nb₃Sn 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 H₂S and CO₂ (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 CO₂ Sequestration

Summary

The world is increasingly concerned about global warming from the greenhouse effect; and the voluminous CO₂ 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 CO₂ in underground storage reservoirs.

VIRGINIA**Company**

3 H Company
297 Creek Avenue
Hampton, VA 23669

Title

Regeneration Study of Phase Transitional Absorption for CO₂ Capture from Post Combustion Flue Gas

Summary

CO₂ is one of the major components that cause global warming. Current technologies for CO₂ separation are too expensive, especially for CO₂ capture from post combustion flue gas. This project will perfect Phase Transitional Absorption, a CO₂ 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.

Company Isocore Corporation 12359 Sunrise Valley Drive, Suite 100 Reston, VA 20191-3462	Title Developing a Unified MPLS-GMPLS Services Provisioning Tool
Summary 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.	

Company Luna Innovations Incorporated 1 Riverside Circle, Suite 400 Roanoke, VA 24016	Title Asymmetric Electrochemical Capacitors for Hybrid Vehicle Technology
Summary 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.	

Company Luna Innovations Incorporated 1 Riverside Circle, Suite 400 Roanoke, VA 24016	Title Fiber Optic Reflector Health Monitoring System
Summary 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.	

Company Luna Innovations Incorporated 1 Riverside Circle, Suite 400 Roanoke, VA 24016	Title Harsh Environment Sensor Packaging (Sensor Pack)
Summary 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.	

Company Luna Innovations Incorporated 1 Riverside Circle, Suite 400 Roanoke, VA 24016	Title Highly Efficient Organic Solar Cells Using Low Band Gap Polymers and Novel Acceptor Materials
Summary 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.	

Company Luna Innovations Incorporated 1 Riverside Circle Suite 400 Roanoke, VA 24016	Title Ultrasonic In-Situ Characterization of Tank Waste
Summary 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.	

Company Materials Modification, Inc. 2721-D Merrilee Drive Fairfax, VA 22031	Title Nanostructured Cathode for Magnesium Ion Batteries
Summary 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.	

Company Materials Modification, Inc. 2721-D Merrilee Drive Fairfax, VA 22031	Title Novel Technique for Extraction of Algal Oil for Biodiesel
Summary 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.	

Company Mikro Systems, Inc. 1180 Seminole Trail, Suite 220 Charlottesville, VA 22901-5713	Title Advanced Cooling for IGCC Turbine Blades
Summary 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.	

Company NanoSonic, Inc. 1485 South Main Street Blacksburg, VA 24073	Title Low-Cost Solar Coatings for Improved Thermal Performance of Components in Concentrating Solar Power Systems
Summary 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.	

Company NanoSonic, Inc. 1485 South Main Street Blacksburg, VA 24073	Title Ultra High Temperature Environmentally Robust Nanocomposite Thermal Barrier Coatings for Nickel Super Alloy IGCC Turbine Components
Summary 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.	

Company NBE Technologies, LLC 2200 Kraft Drive, Suite 1425 Blacksburg, VA 24060	Title High-temperature Packaging of Planar Power Modules by Low-Temperature Sintering of Nanoscale Silver Paste
Summary 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.	

Company Virginia Diodes, Inc. 979 Second Street SE Charlottesville, VA 22902-6172	Title Multi-Band Power Source for ITER Reflectometry
Summary 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

Company Eagle Harbor Technologies, Inc. Suite D3, #179 Bainbridge Island, WA 98110	Title A Robust Modular IGBT Power Supply for Innovative Confinement Concepts
Summary 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.	

Company Forest Concepts, LLC 3320 West Valley Highway N, Suite D110 Auburn, WA 98001	Title Low Energy Particle Size Reduction for Biomass Feedstocks
Summary 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.	

Company Hummingbird Scientific, LLC 8300 28th Court NE, Unit 200 Lacey, WA 98516	Title 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
Summary	
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
Summary	
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
Summary	
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
Summary	
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
Summary	
This project will develop an advanced opto-mechanical device capable of manipulating the pulse structure of an experimental X-ray beam.	