

DEPARTMENT OF ENERGY
SMALL BUSINESS INNOVATION RESEARCH/
SMALL BUSINESS TECHNOLOGY TRANSFER PROGRAMS
GRANT APPLICATIONS SELECTED FOR FY 2010 AWARDS

ALABAMA

525 Solutions, Inc.
32 Audubon Place
Tuscaloosa, AL 35401-1902

Catalytic Fractionation of Biomass
In Ionic Liquids

This project will develop a novel method for lignocellulosic biomass fractionation utilizing IL technology. Clean fractionation of the three major components of biomass will lead to low cost, efficient processes that will provide clean lignin, cellulose, and hemicellulose feedstocks from virtually any lignocellulosic biomass and which can be input directly in biomass to chemicals and fuel technologies.

CFD Research Corporation
215 Wynn Drive, NW, 5th Floor
Huntsville, AL 35805-1944

Quantum Mechanic Based Reactive Potentials for
Rapid and Reliable Prediction of Material
Properties or Advanced Fossil Energy Systems

The development of novel materials for advanced fossil energy systems remains slow because it is driven by trial-and-error experimental approach and lacks a rational design approach. This project will develop database of Quantum Mechanic-based reactive interatomic potentials for predictive modeling of properties of novel materials for advanced fossil energy systems such as slagging gasifier and ultrasupercritical steam plant in advance of fabrication.

Plasma Processes, Inc.
4914 Moores Mill Road
Huntsville, AL 35811-1558

Advanced ICRF Antennas for Fusion
Energy Devices

Advanced coating techniques will be developed enabling the fabrication of more reliable, higher performance components for fusion energy devices.

ARIZONA

Amsen Technologies, LLC
1684 S. Research Loop, Suite 518
Tucson, AZ 85710-6740

Low-Cost, High-Performance Hybrid
Membranes for Redox Flow Batteries

This project will develop a low-cost, high performance hybrid membrane for redox flow batteries, which is a technology of significant potential for stationary electrical energy storage to be used with wind or solar power generation.

ColnaTec, LLC
1230 E. Baseline Road, Suite 103-315

Self Cleaning Process Control Sensor
for Thin Film Solar Cell Manufacturing

Mesa, AZ 85204-6706

This project will develop a state-of-the-art processing sensor for the manufacture of thin film solar cells. This new sensor will eliminate many of the defects in existing technology and offer significant cost savings in solar cell production.

Creative Power Solutions (USA), Inc.
11010 N. Saguaro Blvd., Suite 206
Fountain Hills, AZ 85268-5562

A Novel Concept for Preferential
Production of Methane Rich Syngas
from Coal Gasification

This project will develop a gasifier that will combine coal and a renewable waste to produce methane rich syngas in a cost effective manner. This technology will reduce the cost of power generation, enhance lifetime of fossil fuel resources, and provide a cost effective method to reduce emission of greenhouse gases from coal based power plants.

Energy Derived LLC
P.O. Box 1130
Queen Creek, AZ 85142-1824

Drying and Moisture Management of
Microalgae Biomass

This project will develop multiple technologies for the development of algae biomass as a potential solution to America's dependence on foreign based petroleum products. This research will address the drying and moisture management of algae biomass by utilizing waste heat energy as the primary source of energy for the process.

MER Corporation (Materials and
Electrochemical Research)
7960 South Kolb Road
Tucson, AZ 85756-9237

A Low Cost Continuous Process to
Produce Magnet Alloys

Reducing the cost of a critical component leading to expanded use of electrical vehicles, reduces pollution and the necessity to import oil which benefits the whole Nation. Neodymiumiron magnets have many uses in addition to electrical vehicles such as in mining for separations and all processes utilizing a magnetic field including wind generation of electricity.

Physics, Materials, and Applied
Mathematics Research, LLC
1665 E. 18th Street, Suite 112
Tucson, AZ 85719-6808

Development of Filament-Based
Laser-Induced Breakdown Spectroscopy
for the Standoff Detection of
Radiological Materials

This project will develop a robust, versatile and highly sensitive sensor capable of detecting nuclear and other sensitive materials at long range. This sensor can be used to increase national security and reduce risk to military personnel deployed on site.

Ridgetop Group, Inc.
6595 N Oracle Rd
Tucson, AZ 85704-5645

Uptime Improvements for Photovoltaic
Power Inverters

This project will design a modular, condition monitoring subsystem with accurate reliability prediction and capability for solar power systems, which improves state-of-the-art degradation diagnostics and reliability prediction methods for field-deployed inverters.

CALIFORNIA

STTR Project

Adelphi Technology, Inc.
2003 East Bayshore Road
Redwood City, CA 94063-4121

Development of Superconducting
Wollaston Prisms

Neutron beams are a powerful materials science probe that provides unique information about the structure of matter. This project increases the signal available and the range of structure sizes that can be seen using neutrons, enabling the understanding and development of new industrial and biological materials.

Advanced Science and Novel
Technology Company
27 Via Porto Grande
Rancho Palos Verdes, CA 90275-7848

Readout SerDes System for
Number-Mode Photon Counting Arrays
Operating at 4K

This project will develop an advanced multi-chip readout system with a proprietary low-complexity serial interface for a pixilated Visible Light Photon Counter sensor with a significantly higher efficiency than a photomultiplier tube. Technical and economic benefits of this project will occur in many scientific and commercial domains including nuclear and high energy physics, military and commercial imaging systems, etc.

STTR Project

Aerosol Dynamics, Inc.
935 Grayson Street
Berkeley, CA 94710-2640

Extending Measurements of
Atmospheric Nano-Particle
Chemistry to 2 nm

Understanding sources and global concentrations of particles that nucleate cloud formation is a critical component to evaluating anthropogenic influences on global climate. This project will help illuminate one of the important sources of these particles, namely newly formed particles. More specifically, it will enable the study of the chemical constituents that play an important role in the dynamics of these particles.

Aerosol Dynamics, Inc.
935 Grayson Street
Berkeley, CA 94710-2640

To Separate Particulate and Gaseous
Constituents of Atmospheric Aerosols

Understanding sources and global concentrations of particles is a critical component to evaluating anthropogenic influences on global climate. This project will enable the more accurate measurement of one component of these particles, namely semi-volatile organic compounds which contribute to particle formation in the atmosphere, and may play a significant role in production of those particles that seed the formation of clouds.

Alameda Applied Sciences Corporation

Films of Mo₃Re to Improve the

3077 Teagarden St
San Leandro, CA 94577-5720

Performance of Existing Superconducting
Radiofrequency Accelerator Cavities

This project will develop the next generation of superconducting radiofrequency accelerator cavities. The long term goal is to produce a cavity that is economically viable in difficult economic times while advancing the goals of DOE's nuclear physics program.

Alers Photovoltaics
N239 King Road, Room 178
Advanced Studies Laboratory
Moffet Field, CA 94035-0001

Cell Reliability in Solar Modules
Measured with an Active Shading
Screen

This project will develop a new apparatus is developed that can measure the performance parameters of individual components in a solar panel without taking apart the panel. These parameters can now be tracked to improve both manufacturing and reliability of solar panels that will provide clean energy.

STTR Project

Algorithmica LLC
7204 Via Vico
San Jose, CA 95129-3536

Verification of CO₂ Storage in
Coal Beds

This project will develop the capture and injection of industrial CO₂ emissions in un-minable coal seams has been proposed to reduce their impact on global warming. The acceptance of this strategy depends on effective seismic monitoring and verification procedures, as proposed herein, to prevent leakage, ensure safety, and ensure compliance with government policies.

Applied Spectra, Inc.
46661 Fremont Blvd
Fremont, CA 94538-6410

In Situ Monitoring of Toxic Metals
and Chlorinated Solvent Plumes using
a Portable, Dual Sensor LIBS/Raman Device

This project will develop an instrument that is an environmentally-friendly laser device used to quickly detect the presence of radionuclides and other contaminants in the environment which will allow public officials the ability to make informed decisions about public health issues.

Cadtrak Engineering, LLC
31 Santa Barbara Ave.
San Anselmo, CA 94960-1653

Algae Filtration and Oil Extraction
Device

This project involves the development of a device to harvest and extract oil from algae for the production of biofuels. Algae-based biofuels have the potential to alleviate the problem of CO₂ emissions from fossil fuels and to lower U.S. reliance on foreign sources of energy.

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

Development of a 402.5 MHz 140 kW
Inductive Output Tube

This project will conduct a successful demonstration of a 400 MHz inductive output tube will provide a high efficiency RF source for driving proton accelerators and muon colliders. IOTs will significantly reduce the cost of these systems.

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

Development of a 100 kW, 2.815 GHz
Klystron

This project will use an innovative, patented elliptic beam technology to develop a new class of energy efficient, higher power, lower cost inductive output tubes (IOTs). IOTs are used in areas such as leading edge scientific research and digital TV broadcasting.

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

High Current Density Long Life
Cathodes for High Power RF Sources

This project will develop extension of controlled porosity, reservoir cathodes that will allow development of higher power RF sources at reduced cost. This will decrease the cost of future accelerator and collider systems while providing higher performance.

STTR Project

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

High Power RF Windows for
Accelerator Applications

This project will investigate improved methods for protecting RF windows from catastrophic failures that result in significant costs for the microwave power and high energy physics community. This will increase the power capability of a critical component in these devices.

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

Integration of Heat Transfer and
Particle Trajectory Simulation

This project will develop a single software package to analyze high energy electron beams and obtain detailed thermal characteristics for a wide variety of applications. It will provide a user friendly graphical user interface and will greatly simplify the design process, produce more accurate results, and reduce costs and development time.

STTR Project

CFX Battery, Inc
1300 W Optical Drive Suite 300
Azusa, CA 91702-3251

High Energy Density Battery with
Multi-Electron Redox Couple

This project will develop a fluoride ion rechargeable battery technology that has significantly higher energy storage capability than the current lithium-ion systems and, since it's a lithium free technology, the safety will be considerably improved compared to the existing batteries. This technology will reduce dependence on foreign oil, diminish environmental pollutions, and revolutionize the way automobiles are powered.

Chemat Technology Inc.
9036 Winnetka Avenue
Northridge, CA 91324-3235

The Sol-Gel Derived Novel High
Capacity Cathode Materials for
Li-ion Batteries

This project will develop novel high capacity cathode materials for Li-ion batteries to achieve high power and high energy densities, due to rigorous weight and volume constraints of HEV and PHEV. The new cathode materials will be based on the multi-electron redox mechanism and fabricated by the sol-gel nano process. The chemical precursors and processing conditions will be determined and the special functional nano-coatings will be applied to the nanomaterials for Li-ion cathodes. The resulted materials are expected to have high energy, low cost, green and long cycle life.

ChemEOR, Inc.
841 E. San Bernardino Road
Covina, CA 91723-1417

Novel Self-Thickening Chemicals for
Improved Conformance Control

This project will develop a cost-effective, improved chemical technology to increase oil production from mature fields in the U.S. This technology also has the environmental benefit of decreasing the volume of water co-produced with the oil.

cPacket Networks Inc.
2061 Landings Drive
Mountain View, CA 94043-0827

Cybersecurity and Networking: NIDS
Front-End for Load Balancing at 100
Gigabits

This project will explore conceptual design and implementation of 100 Gbps front-end-load-balancing for effective Network Intrusion Detection System (NIDS) clusters for mission critical networks. The goal is closing the technology gap between CPUs computing power to the demands of cyber security at high speed networks.

Exquadrum, Inc.
12130 Rancho Road
Adelanto, CA 92301-2703

Ocean CAES (OCAES)

This project will conduct a research and development program, entitled *Ocean CAES (OCAES)*. This technology overcomes the challenges associated with storing energy generated by renewable sources by means of Compressed Air Energy Storage vessels stationed out of sight on the bottom of the ocean.

STTR Project

FAR-TECH, Inc.
3550 General Atomics Ct
Building 15 Suite 155
San Diego, CA 92121-1122

Diagnostic for Rapid
Characterization of TRISO Fuel
Pellets Using Soft X-Rays

This project will develop an apparatus that uses X-rays to perform rapid quality control and quality assurance testing on fuel for the next generation of nuclear reactors. This technology would enable all of the fuel going into a reactor core to be inspected, rather than just a random sample.

FAR-TECH, Inc.
3550 General Atomics Ct
Building 15 Suite 155
San Diego, CA 92121-1122

Disruption Simulation Code for
Tokamaks and ITER Applications

This project will provide a breakthrough in the acquisition of scientific understanding needed to predict, avoid, and mitigate disruptions, which is arguably the most important issue in the successful development of tokamak-based magnetic fusion.

FAR-TECH, Inc.
3550 General Atomics Ct
Building 15 Suite 155
San Diego, CA 92121-1122

High Sensitivity Beam Position
Monitors for 1300 MHz Croyomodules

This project will develop a beam profile monitor with high precision for the International Linear Collider. The International Linear Collider promises to provide new information on fundamental physics processes.

FAR-TECH, Inc.
3550 General Atomics Ct
Building 15 Suite 155
San Diego, CA 92121-1122

Quasi-3D Model of an Electron
Cyclotron Resonance Ion Source

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.

Haimson Research Corporation
3350 Scott Boulevard, Bldg 60
Santa Clara, CA 95054-3104

A 17 GHz High Gradient Linac having
Molybdenum Surfaces in the Peak Electric Field,
Dark Current Interception Regions of the Structure

This project will develop a gradient hardened accelerating structure that will represent a significant advance in radio-frequency linear accelerator technology and will have a positive impact on the design of future linear collider systems as well as on the continuing miniaturization of commercial accelerators for medical, industrial radiographic and homeland security applications.

HyPerComp, Inc.
2629 Townsgate Road, Suite 105
Westlake Village, CA 91361-2981

Practical CAD-Centric Modeling of
Transport Phenomena in Liquid
Breeder Blankets

This project will provide engineering estimates of the performance of the power producing elements of proposed fusion reactors. Calculations such as these will help determine and maximize their safety, efficiency and reliability using a relatively low budget.

Hyper-Therm High-Temperature
Composites, Inc.
18411 Gothard Street, Unit B
Huntington Beach, CA 92648-1208

Design Validation of Gen IV
Composite Control Rod Sheaths

Test methods must be developed and standardized to validate the design and use of new materials within nuclear reactors. This project will develop Gen IV high temperature gas reactors that offer the production of lower cost electricity due to their high efficiency achieved by high temperature operation. However, the use of new materials, such as ceramic composites, is required to meet the temperature requirements of these reactors.

InnoSense LLC
2531 W. 237th Street, Suite 127
Torrance, CA 90505-5245

Carbon Aerogels - Hot Catchers for
Exotic Isotopes and/or Molecular
Species

This project will develop and demonstrate refractory carbon aerogels as catchers for the efficient production of rare isotopes of single-species molecular vapors. This project will support the DOE-FRIB Program objectives to promote understanding how stars explode or how elements from iron to uranium are created.

STTR Project
InnoSense LLC
2531 W. 237th Street, Suite 127
Torrance, CA 90505-5245

Coated Aerogel Electrodes for
Photoelectrochemical Methanol
Formation

This project will develop alternative energy sources to fossil fuels. This initiative is designed to mitigate the domestic reliance on foreign oil. Here methanol will be produced by conversion of carbon dioxide, a green house gas, directly to methanol through the use of sunlight.

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

Highly Multiplexed, Low Cost
Fiber-Optic Sensor Array for
Underground Cables Condition
Monitoring

A changing supply mix in the U.S. power grid, expanding power quality needs, and continuing demand growth are stressing an aging, congested electricity infrastructure, and thus challenging system reliability. Condition monitoring technologies can optimize the utilization of transmission and distribution (T&D) assets and improve their operational efficiencies through a smart-gridenabled infrastructure.

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

On-Line Monitoring of
Flow-Accelerated Corrosion for
Nuclear Power Plants

Safely harnessing the power of nuclear energy and economically and efficiently converting this can benefit the planet by reducing reliance on fossil fuels. This project will develop a robust fiber-opticsensor-based measurement tool to monitor key NPP stressors, extend the life of legacy LWRs, and provide greatly improved safety margins against potentially catastrophic pipe failures.

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

Robust and Self-Contained
Fiber-Optic Gyroscope for
Measurement While Drilling in Harsh
Downhole Environment

Increased efficiency and cost effectiveness of oil and gas well drilling reduce the overall cost of fossil and unconventional fuel production in the US. This project will develop a highly efficient sensing system to provide feedback for optimizing directional drilling processes, lowering carbon footprint, and enhancing energy security of the nation.

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

Distributed Sensors for Dissolved
Carbon Dioxide

This project will develop reliable and cost-effective monitoring that is important to making gas sequestration an acceptable method of carbon dioxide control. Distributed sensors are proposed for large-scale detection and quantification of the effects of carbon dioxide leaks into shallow water of storage locations.

Jema Science, Inc
1530 Grand Ave.
Piedmont, CA 94611-4330

Smart Combinatorial Research Equipment
(SmartCoRE) for Automated Sample Analysis
and Environmental Control on Synchrotron
Beamlines

This project will develop an innovative device for economically accelerating the discovery of energy critical materials.

Leyden Energy
46840 Lakeview Blvd
Fremont, CA 94538-6543

New Electrolytes for Lithium-ion
Cells

This project will develop a new electrolyte that will significantly improve the performance and safety of conventional lithium-ion batteries. These improved batteries are required for applications with severe operating conditions, including automotive: hybrid, plug-in hybrid and electric vehicles.

Los Gatos Research
67 East Evelyn Avenue, Suite 3
Mountain View, CA 94041-1529

Lab-on-a-chip Technology for in-situ
Mercury Speciation Characterization

New technologies are urgently needed for long-term and continuous monitoring of contaminants in the subsurface environment. This project will develop a novel technology that provides the required sensitivity and selectivity, thus provides just such a means to accomplish this goal.

Luminit, LLC
1850 W. 205 Street
Torrance, CA 90501-1526

Holographic A-band Multi-Channel
Substrate Guided Wave-Based System

This project will develop stable, compact, low-cost spectrometer for atmospheric oxygen A-band spectrometry based on substrate-guided wave-based holographic gratings. Global warming can be studied more effectively with this high precision, robust, and stable device.

STTR Project

MulticoreWare, Inc.
21536 Saratoga heights drive
Saratoga, CA 95070-5757

Metagenomics Using
Graphics Processing Units

This project will develop software for DNA sequence processing from DOE projects which runs on the graphics processing units available in modern computers. This software should accelerate the processing of DNA sequence enough to replace supercomputers used for this purpose with ordinary, much cheaper computers.

Particle Beam Lasers, Inc.
18925 Dearborn Street
Northridge, CA 91324-2807

Study of a Muon Collider Dipole
Magnet System to Reduce Detector
Background and Heating

High-temperature superconductor (HTS) magnet technology should improve the energy efficiency of future elementary particle accelerators and make them more tolerant of energy deposition. This project will conduct a feasibility study to develop an HTS open-midplane dipole magnet for a muon collider.

Paulsson, Inc.
PO Box 8819
Brea, CA 92822-5819

Development of a 1,000 level
Borehole Seismic Receiver Array for
Characterization of CO₂ Repositories

This project will develop Borehole seismic 3D imaging using ultra long borehole seismic receiver arrays designed and built to withstand the severe environment in boreholes used for the sequestration of CO₂ is the only geophysical technique that can map and monitor in high resolution if a geologic formation is suitable for CO₂ storage.

Physical Optics Corporation
20600 Gramercy Place, Bldg. 100
Torrance, CA 90501-1821

Large-Format Autostereo Volume
Integrating Synthetic Holographic 3D
Visualization System

This project will develop advanced scientific visualization systems, a multiuser viewable wall-size 3D display system for collaborative data analysis and visualization of scientific data produced by computer simulations and experiments.

Physical Optics Corporation
20600 Gramercy Place, Bldg. 100
Torrance, CA 90501-1821

Millimeter Wave Inspection Tool for
Wind Turbine Components

The Department of Energy is seeking an improved method to inspect wind turbine component for defects during and after manufacturing. This research addresses the problem by developing a novel inspection tool that rapidly scans the turbine blades, provides their images, and finds defects that lie beneath the surface.

Physical Optics Corporation
20600 Gramercy Place, Bldg. 100
Torrance, CA 90501-1821

Wireless Seebeck Power

This project will support wireless sensors monitoring power plants, a new class of power-harvesting systems is required. A new nanomaterial-based thermoelectric device is proposed that will be capable of converting waste heat to power at a low cost, and will be more reliable and easier to manufacture than current technology.

PolarOnyx, Inc.
470 Lakeside Drive, Suite F
Sunnyvale, CA 94085-4720

Compact 2 micron High Power
Femtosecond Fiber Laser

This project will develop a femtosecond fiber laser system for next generation HEP accelerator application. It will enable high repetition rate, high quality, compact, and low cost high energy study.

Polymath Research Inc.
827 Bonde Court
Pleasanton, CA 94566-7505

Spike Trains of Uneven Duration and
Delay Optimally Designed for HEDLP
and IFE

Spike Trains of Uneven Duration and Delay or a STUD pulse is a new concept in laser design for inertial fusion energy which will control the runaway growth of laser-plasma instabilities and may usher in the era of clean, Carbon emission free, and proliferation resistant, endless nuclear energy for the future of mankind.

RadiaBeam Technologies LLC
1717 Stewart Street
Santa Monica, CA 90404-4021

Gated Field Emission Cathode RF Gun

This project will develop a new type of electron gun based on advances in nanotechnology. The gun would have applications in research, cancer therapy, cargo inspection, and industrial irradiation.

RadiaBeam Technologies LLC
1717 Stewart Street
Santa Monica, CA 90404-4021

Novel RING Resonator for Laser Ion
Stripping

This project will develop a new way of producing intense charged particle beams, proton beams, using lasers. These beams are at the heart of projects such as the Spallation Neutron Source (SNS). The SNS, and sources like it, provide a new window into materials and material properties that are critical to our nation's competitiveness.

RadiaBeam Technologies LLC
1717 Stewart Street
Santa Monica, CA 90404-4021

Periodic Structures for High
Gradient Dielectric Wakefield
Acceleration Experiments

This project will design a novel acceleration scheme for charge particle bunches using a dielectric wakefield structure. Accessing frequency regimes out to terahertz, such a device will find numerous applications in the areas of medicine, industry, homeland security, and basic research.

RadiaBeam Technologies LLC
1717 Stewart Street
Santa Monica, CA 90404-4021

Ultrafast Mid-IR Laser System

This project will develop a novel laser system capable of producing intense ultrashort infrared laser pulses. Such a laser system is of great benefit to accelerator facilities such as Stanford Linear Accelerator Collider (SLAC). The SLAC, and facilities like it, provide a new window into materials and material properties that are critical to our nation's competitiveness.

RadiaBeam Technologies LLC
1717 Stewart Street
Santa Monica, CA 90404-4021

Ultrashort, high-brightness bunch
length diagnostic with
sub-femtosecond resolution

This project will develop an ultrafast diagnostic with an unprecedented timing resolution of subfemtoseconds, the natural time-scale of atomic motion. Such a device will find numerous applications in the areas of medicine, industry, homeland security, and basic research.

Scientific Solutions, Inc.
11619 Chippenham Way
San Diego, CA 92128-4281

Miniature Electron-Cyclotron
Resonance (ECR) Ion Source for
Industrial Applications and Research

The purpose of this project is to develop a miniaturized electron-cyclotron resonance (ECR) ion source. The smaller size and reduced complexity is an enabling technology for portable accelerators used for border security and detection of explosives and special nuclear materials.

Searchlight Sensors, Inc.
1100 N. Tustin Ave., Suite G
Santa Ana, CA 92705-3509

High Precision Optical Carbon
Dioxide Sensor

This project will develop a low cost high precision optical carbon dioxide sensor. This sensor will help to understand the global warming process much more quantitatively and provide real time high sensitivity measurements.

Shakti Technologies, Inc.
728 Garland Drive
Palo Alto, CA 94303-3603

Novel Nanosorbents for Air CO₂
Capture

This project will develop a process for removal of carbon dioxide from air, to mitigate the harmful effects of global warming on future generations.

SHEETA Global Technology Corporation
1036 Countryside Drive
Walnut, CA 91789-4393

Subsurface Monitor for Dissolved
Inorganic Carbon at Geological
Sequestration Site

This project will develop the competitive technology for U.S. leadership in the MVA of CO₂ at geological sequestration site, creating green energy jobs, and create new business and technology.

Wireless Sensor Technologies, LLC
1020 Glen Arbor Drive

Self Powered Wireless Sensor System
for Power Generation Applications

Encinitas, CA 92024-2443

This project will develop and demonstrate a high reliability waste heat-enabled power supply and wireless sensor system for power generation applications. The system will consist of networked sensor nodes containing pressure and temperature sensors that may be used in the hot sections of turbine engines and mounted on rotating components enabling condition-based maintenance for a power generation plant.

XIA, LLC
31057 Genstar Road
Hayward, CA 94544-7831

Silicon Drift Detectors for High
Resolution Radioxenon Measurements

This project will develop a more sensitive, easier to use method to detect this xenon, the instrument will support and improve national and international efforts to detect, confirm, and deter tests of nuclear weapons.

COLORADO

Atmospheric Observing Systems, Inc.
1930 Central Avenue, Suite A
Boulder, CO 80301-2895

The Photo-Pneumatic CO2 Analyzer for
Robotic Platforms

This project will develop a new technology platform that is intended to provide global three dimensional monitoring of carbon dioxide from ground level to the top of the atmosphere.

Composite Technology Development, Inc.
2600 Campus Drive, Suite D
Lafayette, CO 80026-3359

Insulation Materials and Processes
for Helium Penetrations

Materials and processes will be developed to provide electrical insulation for the helium penetrations and electrical terminations for magnets in the ITER fusion device. These areas of the system are non-uniform in shape, and specific processes must be developed to ensure the overall reliability of the system.

STTR Project
Droplet Measurement Technologies
2545 Central Avenue
Boulder, CO 80301-2865

Mobile Ice Nucleus Counter

Clouds are a critical component of the hydrologic cycle and the role of clouds in climate is equally as critical. This proposal is for the development of a commercial Ice Nucleus (IN) counter which will provide for additional progress in the understanding of ice cloud formation.

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

A Compact Integrated System for Air
Capture of Atmospheric CO2

Although CO₂ is considered an undesirable emittant from power plants and other facilities, developing the ability to exploit it first requires its capture. This project addresses the capture of atmospheric levels of CO₂ with concomitant electrochemical reduction.

Engineering, Procurement &
Construction, LLC
12211 W Alameda Parkway, Suite 105
Lakewood, CO 80228-2825

Hydrogen Fueling Station Cost Reduction;
Study of a Cryogenic Liquid Phase Pump
as an Alternative to Gas Compression

This project will develop a database of hydrogen refueling costs, and create a methodology to evaluate technology lifecycle cost reduction. Hydrogen compression costs which currently account for a substantial portion for the total costs of hydrogen fueling infrastructure must be reduced for low cost dispensing to become commercially viable.

STTR Project
Extreme Diagnostics, Inc.
6960 Firerock Court
Boulder, CO 80301-3814

Ultra Low-Power and Embeddable
Blade-Condition Monitor

Wind turbine blade failure has severe consequences—lengthy and confidence-destroying down times, as well as collateral damage. EASE monitors and assesses the condition of wind turbine blades, and provides early damage warning.

Plasma Controls, LLC
1180 La Eda Lane
Fort Collins, CO 80526-4415

A Thin-film Thermoelectric Generator
will be Developed Using a Novel
Manufacturing Approach

This project will investigate a novel manufacturing approach to fabricate high-efficiency thermoelectric generator modules. These modules can be used to generate electricity from the waste heat of engines and help lower fuel consumption.

Reaction Systems, LLC
19039 E. Plaza Dr., Suite 290
Parker, CO 80134-8704

A Novel Process for Improved
Hydrogen Separation and Recovery

This project will develop a technology that will allow hydrogen to be produced more economically facilitating the increased use of fuel cells, which will reduce our energy consumption.

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

Inexpensive Carbon Matrix for High
Performance Lithium Sulfur Batteries

This project will develop new electrode materials for lithium-sulfur batteries resulting in capacities at least twice that of state of the art lithium-ion batteries. Patented carbon technology will be use to make conductive containment for the sulfur active materials.

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

Method for Co-Feeding Biomass and
Coal for Gasification

This project will develop a method to pre-process and co-feed biomass with coal for gasification without the penalties associated with the low energy density, handling or feeding problems associated with whole biomass. This will significantly increase the use of renewable resources for fuels and power production, while proportionately reducing the carbon footprint of coal utilization

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

Novel Method for Conversion of
Biomass to Fuel

Ethanol is a versatile chemical that is used as a chemical solvent, sterilizer, antifreeze, chemical intermediate, and an oxygenate in fuels. This project will develop a new catalytic process produces ethanol more cheaply than current synthetic processes and uses a renewable feedstock as a raw material.

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

Poison Resistant Water-Gas-Shift
Catalyst for Biomass and Coal
Gasification

This project will develop a new catalyst that will allow more efficient fuels production from coal and biomass while minimizing the number of steps involved.

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

Poison-Tolerant WGS Catalyst for
Biomass-Coal Co-Gasification Systems

This project will develop an enabling technology for Coal-Biomass-to-Liquids (CBTL) processes. The CBTL system uses domestic feedstock and will have a greenhouse gas footprint better than conventional coal or petroleum fuels allowing a highly efficient and environmentally responsible utilization of coal.

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

Post-SOFC Residual Fuel Oxidizer for
CO₂ Capture

This project will capture CO₂ produced when using a solid oxide fuel cell to make power from coal derived syntheses gas. It is an extremely efficient low cost process that will increase energy security by using domestic energy resources (coal) for power production while reducing environmental impacts, including atmospheric CO₂ emissions.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Accelerating Large-Scale Beam
Dynamics Simulations with GPUs

Accelerator-based light sources are among the largest and most advanced scientific instruments used by the DOE-funded researchers. This project will develop GPU-accelerated computational modeling tools that will

significantly reduce the time and cost of producing optimal designs for the new, or upgrading the existing, light sources in the DOE portfolio.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Accelerating PETSc through
Next-Generation Heterogeneous
Supercomputing

This project will develop a next-generation super-computing facility for scientific computation. Successful completion of this project will ensure that these resources can be used by the most general scientific audience.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Capillary Discharge Modeling to
Improve High Gradient Advanced
Accelerators

This project will develop new, advanced plasma modeling tools to improve the accelerators that rely on capillary discharge plasma sources.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Computational and Data Analysis System for
Multi-Technique Rapid Tomography
and Reconstruction Quantification Processing

This project will develop a toolkit that will enable rapid image processing and 3D reconstruction at largescale neutron and x-ray facilities to enhance our ability to understand drug development, biological processes, and environmental sciences.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Extending BOUT++ for Solution of
Edge Plasma Equations for Use in
Whole Device Simulation of Tokamaks

Robust and accurate computational methods will be developed for understanding results from international thermonuclear reactor, ITER.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

GPU Acceleration of Spin Tracking in
Colliding Beam Accelerators

Fundamental advances in experimental nuclear physics will require cost-efficient acceleration of intense polarized particle beams. Well-tested software is being enhanced to enable quantitative simulation and design of these next-generation particle accelerators.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Gyrotron Design and Evaluation using
New Particle-in-Cell Capability

Gyrotrons provide power to heat the ITER fusion experiment, but suffer from a poorly understood oscillation phenomenon that: a) disturbs their monitoring diagnostics, and b) could limit performance of more advanced

designs. A recent breakthrough in one area of electromagnetic modeling can provide exactly the tool needed to investigate this problem with a more advanced technique.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Integrating Scientific, Grid, and
Cloud Computing Infrastructures

The Grid Cloud Computing Service provides an effective alternative approach for utilizing our national computing infrastructures more efficiently by providing custom complex scientific application execution environments.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Modeling and Optimization of
Electron Emission from Diamond
Amplifiers

Novel high-current, high-brightness, low emittance electron sources are required for major up-grades of existing particle accelerators in order to further advance the field of experimental nuclear physics. High-fidelity software is being developed to enable new capabilities to design advanced, diamond-amplified, electron sources.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Modeling of Diamond Based Devices
for Beam Diagnostics

Advanced high photon ux diagnostic devices are need for the operation and upgrade of 3rd generation light sources and for development of X-ray Free Electron Lasers. This project will develop High fidelity software to enable new capabilities to design advanced, diamond-based beam monitors for next-generation high photon ux diagnostics.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Rapid Low-Noise Simulation of
Ultra-bright 10 GeV Electron Bunches
in Laser Plasma Accelerators

Future generation high-energy particle accelerators, used to study the fundamental nature of matter, will likely include plasma-based components. This project will enhance existing software to enable the accurate simulation and design of such devices.

Tech-X Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Self-Consistent Numerical Design and
Modeling of Radio Frequency Power
Sources

The success of DOE-funded next generation accelerator facility depends on accurate prototype and test of RF power source. This project will develop numerical models and diagnostics to improve the effectiveness of RF power source design and analysis.

Tech-X Corporation
5621 Arapahoe Ave

Serving Climate Data to Industry
End-users

Boulder, CO 80303-1379

This project will develop software that will provide the solar power industry and water management authorities estimates for available solar energy, precipitation and snow distribution based on available climate computer model data.

CONNECTICUT

FuelCell Energy, Inc.
3 Great Pasture Rd.
Danbury, CT 06813-1305

Thermochemically Integrated Solid
State Hydrogen Separator and
Compressor

This project focuses on the development of a thermally integrated solid-state hydrogen separator and compressor to produce high pressure, high purity hydrogen to meet future hydrogen refueling infrastructure needs.

Omega-P, Inc.
258 Bradley St., 2nd fl.
New Haven, CT 06510-1106

High Current Cold Cathode Employing
Diamond and Related Materials

Vacuum electronics devices used to power particle accelerators for discovery science and industrial applications, but also television transmitters and radar tubes, almost always employ thermionic cathodes, having limited current capability and requiring ancillary heating power. This project will develop cold cathodes that appear to offer higher current density, without need for heating power, thus improving device performance with lower operating cost.

Omega-P, Inc.
258 Bradley St., 2nd fl.
New Haven, CT 06510-1106

High-Gradient Two-Beam Electron
Accelerator

A high-energy electron-positron collider is believed by members of the scientific community to be one of the next "big science" projects requiring intellectual and financial support from governments on an international scale. Technical improvements in this project have the potential to reduce the cost and complexity of a future collider, thus making it more appealing to those responsible government bodies.

Omega-P, Inc.
258 Bradley St., 2nd fl.
New Haven, CT 06510-1106

Modified Magnicon For High-Gradient
Accelerator R&D

This project will improve performance for the unique millimeter wave amplifier that is a key element in an R&D program towards developing a future high-gradient particle accelerator will broaden the scope of research that can be accomplished. This work could help position U.S. science to play a more dominant role in future large international research projects, and could introduce new technology for the U.S. microwave tube industry to make their products more competitive.

Omega-P, Inc.

Short-Period RF Undulator for a SASE

258 Bradley St., 2nd fl.
New Haven, CT 06510-1106

Nanometer Source

A compact microwave-driven device will be developed that will cause an energetic electron beam to wobble as it travels along. This can be the basis for a source of short wavelength light for research and medical applications that would be smaller and less expensive than otherwise possible.

Precision Combustion, Inc.
410 Sackett Point Road
North Haven, CT 06473-3106

Downhole Oxyfuel Steam/CO₂ Generator
for Production of Gas from Hydrates

This project will demonstrate a novel oxyfuel downhole steam generator aimed at providing an enabling tool to efficiently recover gas from methane hydrate deposits and simultaneously reduce emissions with potential CO₂ sequestration. Success will lead to commercialization of a downhole combustor for natural gas production.

Proton Energy Systems
10 Technology Drive
Wallingford, CT 06492-1955

Low Cost Large Scale PEM
Electrolysis for Renewable Energy
Storage

This company manufactures hydrogen generation systems which can be integrated with renewable energy sources to generate hydrogen fuel while producing minimal carbon footprint. This project aims to reduce the cost of this technology through development of improved membrane technology designed to reduce raw material cost and improve electrical efficiency.

DELAWARE

STTR Project

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

Energy Efficient Process for
Solvent Extraction of Oil from
Microalgae using Green Solvents

Algae oil is an attractive source of renewable energy. This project will reduce the cost and develop a safer process for recovery of algae oil.

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

Improved Hydrogen Purification

This project will develop high performance and robust membranes for the purification of hydrogen in petrochemical and oil refining industries. The results of this project will facilitate the U.S. movement to the hydrogen economy and have quantifiable contributions to energy independence and carbon sequestration.

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

Novel Membranes for Olefin/Paraffin
Separation

This project will result in a process that will reduce the cost of ethylene and propylene, two widely used chemicals in the plastics industry, by 27% with an additional energy cost savings of 22% or 26 trillion BTU/yr.

FLORIDA

Accelerated Data Works, Inc.
2831-A NW 41st Street
Gainesville, FL 32606-6690

Energy Tracking Software Platform

This project will create an interactive energy tracking and visualization platform that supports decreasing electric, water, and gas usage. Homeowners will be able to track their improvement as they make home efficiency upgrades and compete within social groups to lower utility bills while reducing their environmental footprint.

Accelogic LLC
1830 Main Street, Suite 204
Weston, FL 33326-3684

Maximal-Performance Scalable FFT
Library for Accelerator-Enhanced
Petascale Computing

This project will develop a breakthrough, low-cost technology that reduces computational times from months to hours to seconds, thus revolutionizing entire industrial design cycles and the way science, in general, is performed.

FieldMetrics Inc.
13352 82nd Avenue
Seminole, FL 33776-3126

Smart Grid Sag and Temperature
Monitor for Overhead Power Lines

This project will develop a new, low cost conductor sag and temperature sensors retrofitted to existing transmission infrastructure will improve system reliability, increase the carrying capacity of the current power grid, and reduce costs associated with connecting renewable energy sources to the grid.

Mainstream Engineering Corporation
200 Yellow Place
Rockledge, FL 32955-5327

Development of an Active, Man-Portable, Cooling
System with Dehumidification Capabilities for
Personal Protective Clothing/Equipment

This project will develop an active cooling system that can provide a cool/dry environment to workers in enclosed personal protective clothing/equipment. The technology will be lightweight, the size of a small backpack, and will improve working conditions so that heat stress is no longer a cause of concern.

STTR Project

Mainstream Engineering Corporation
200 Yellow Place
Rockledge, FL 32955-5327

Nickel-Based Amorphous Metal
Membranes for Water Gas Shift
Reactors

A clean, sustainable future hydrogen economy can only emerge if cost-effective technologies for high-volume hydrogen production are developed. This company has developed a critical, enabling patentable technology, which moves the U.S. significantly closer to the goal. This project will demonstrate a new cost effective and

practical approach to hydrogen production that more efficiently extracts hydrogen from natural gas, coal, and biomass resources. This effort represents a major step towards America's energy independence.

STTR Project

Sinmat Inc.
2153 SE Hawthorne Road, Ste 124 (Box 2)
Gainesville, FL 32641-7553

Defect Free, Ultra-Rapid Thinning/Polishing of
Diamond Crystal Radiator Targets (20m) or
Highly Linearly Polarized Photon Beams

This project will develop a novel technology to produce special diamond crystals that can be used in nuclear reactors, and next generation computer devices.

STTR Project

Sinmat Inc.
2153 SE Hawthorne Road, Ste 124 (Box 2)
Gainesville, FL 32641-7553

Low Cost, Scalable Manufacturing
of Microlens Engineered Substrates (MLES)
for Enhanced Light Extraction in OLED Devices

Lighting consumes >20% of the total electricity generated in the U.S. and nearly 30% of electricity used in commercial and residential buildings. This project will lead to three fold increase in the efficiency of organic light emitting diodes, resulting in substantial energy saving and environmental benefits to the nation.

UltraHiNet LLC
709 SW 80th Blvd
Gainesville, FL 32607-6523

Computational Particle Dynamic
Simulations on Multicore Processors
(CPDMu)

This project will scale the applications that employ simulation and analysis applications that need to be implemented on high-performance computers to petascale computers that are clusters of multicore processors, so as to obtain the performance promise of petascale computing.

GEORGIA

STTR Project

nGimat Co.
5315 Peachtree Boulevard
Atlanta, GA 30341-2107

Thin Robust Electrical Insulator
High Field HTS Magnets

This project addresses stability and high magnetic field enhanced thermal coating of high temperature superconductors. Thin, nanoceramic-based coatings will be applied to conductor strands for electrical resistance and to improve thermal conduction. The technology is proposed to help increase minimum quench energy while enhancing quench detection, thus improving superconducting efficiency.

HAWAII

Hawaii Hydrogen Carriers, LLC
531 Cooke Street
Honolulu, HI 96813-5235

Low Cost Metal Hydride Hydrogen
Storage System for Forklift
Applications

This project will develop a low cost metal hydride hydrogen storage solution for fork lift trucks thus to enable widespread consumer uptake of hydrogen fuel cell powered fork lift trucks due to the increased overall value proposition and inherent safety of these low pressure systems.

IDAHO

American Semiconductor, Inc.
3100 S. Vista Avenue, Suite 230
Boise, ID 83705-7368

Next-Generation Detector and Imager
Development

This proposal will utilize the demonstrated detector diodes along with conversion of the readout design to MIGFET transistors and build the MAMBO in Flexfet SOI-CMOS to eliminate the threshold shift plaguing current SOI based sensors. This project's success will result in the demonstration of an advanced X-ray Imager that has detector diodes formed in the handle silicon and a 12-bit counter array for high dynamic range X-ray or electron microscope imaging in the SOI layer with immunity to application of large backside biases.

ILLINOIS

Aries Design Automation, LLC
6157 N. Sheridan Road, Suite 16M
Chicago, IL 60660-5818

Exploiting GPUs for Scalable Network
Intrusion Detection

This project will result in a highly efficient Network Intrusion Detection System that utilizes the hundreds of cores on modern Graphics Processing Units to achieve very high processing speeds at a very low cost. Besides the DoE, the resulting technology will be of benefit to the DoD, all branches of the government, and all companies.

STTR Project

Dioxide Materials DBA Dioxide Recycle
2021 S First St, Suite 206
Champaign, IL 61820-7477

Catalysts For Electrochemical
Conversion of CO₂

This project will develop a process to recycle carbon dioxide back to useful chemicals, thereby reducing the carbon footprint of the chemical industry, and making it easier for the nation to meet our global warming goals.

IllinoisRocstar LLC
60 Hazelwood Drive
P.O. Box 3001
Champaign, IL 61826-3001

Turbine Trailing Edge Noise
Reduction Using Adjoint-Based Shape
Optimization

This project will develop high-fidelity simulation software to understand and minimize the noise radiated by the turbine blade trailing edge, enabling large wind turbine installations in more heavily populated areas, reducing design cycle time and lowering cost.

Materials Development, Inc.
3090 Daniels Court
Arlington Heights, IL 60004-1234

Extreme Sample Environment for
Neutron Measurements

This project will develop an advanced materials research using neutrons that is critical in making technological advances in areas such as genetics, “smart materials” for aircraft, high capacity data storage, energy, and security technologies. This project will have a strong impact on U.S. capabilities in advanced materials, energy technology and manufacturing competitiveness.

STTR Project

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

Epicyclic Helical Channels for
Parametric Resonance Ionization
Cooling

In order to maximize the discovery potential of elementary particle colliders at the energy frontier, or to create low-divergence neutrino beams, the momentum spread of particles in the beams must be reduced via ‘cooling’. This project will develop a new approach to the design of the required beam cooling systems.

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

Fast Time-of-Flight System for Muon
Cooling Experiments

The latest developments in large-area fast timing devices are applied to a key area of high energy accelerator research, and can also be applied to medical imaging and homeland security systems.

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

Novel Crab Cavity RF Design

A room-temperature model of a cost-effective crab cavity module will be designed, built, and tested at low power. Radio frequency crab cavities are useful for particle colliders.

STTR Project

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

Simulation of Accelerator Based
Backgrounds in a Muon Collider

This project will develop a program to compute the backgrounds from a muon beam that result from the decay of the muons in a muon collider. This program would be a significant asset for the design and development of the detector and the optimization of the accelerator-detector interface.

STTR Project

Royston Engineering Research LLC
1025 West Vernon Park Place, Unit A
Chicago, IL 60607-3448

A New Paradigm for X-ray Optics
Nanopositioning

This project will develop a novel X-ray optics positioning system that has sub-nanometer resolution enabling orders of magnitude resolution improvement in materials research at synchrotron facilities. This in turn will lead to advances in commercial applications and products being pioneered by material science users of such facilities.

Vega Wave Systems
1275 West Roosevelt Road, Suite 104
West Chicago, IL 60185-4815

Compact, Low-Power, High Speed Fiber
Optic Interconnects for Particle
Physics Detectors

This project will develop 3D integration of very high speed optical communications links for the next generation of high energy physics particle detectors. Spin-offs from this technology are expected to have significant commercial value by improving data transfer and network traffic for large computer network systems, including the internet.

INDIANA

PC Krause and Associates, Inc.
3000 Kent Avenue, Suite C1-100
West Lafayette, IN 47906-1075

Performance and Energy Management in High
Performance Computing Systems Using
Application-Level Behavioral Attribute Driven
Techniques

This project will enable High Performance Computing (HPC) Systems to operate more consistently and with lower energy requirements.

KANSAS

STTR Project

NanoScale Corporation
1310 Research Park Drive
Manhattan, KS 66502-5000

Protective Apparel Fabrics (PAF)
with Distinctly Area-Specific
Waterproof and Breathable Properties

This project will design protective apparel with area-specific waterproof and breathable properties in order to increase comfort and improve protection for users performing D&D work on surplus DOE nuclear facilities.

MARYLAND

Acadia Optronics, LLC
1395 Piccard Drive, Suite 210
Rockville, MD 20850-4348

100 Gb/s Pattern Generator and
Comparator

This project will develop a 100 Gb/s pattern generator and comparator module that will enable testing of high-speed physical links.

Ceramic Tubular Products, LLC

Silicon Carbide Clad Thoria Plutonia

15815 Crabbs Branch Way
Rockville, MD 20855-6636

Fuel for Light Water Reactors

The new fuel and clad technology developed in this project will reduce the volume of nuclear waste from nuclear power plants, increase the overall safety, and enable plant life extension from 60 to 80 years. It will also allow for more complete destruction of fissile plutonium in spent fuel.

Dynaflow, Inc.
10621-J Iron Bridge Road
Jessup, MD 20794-9381

Improving Delignification Using
Cavitation

An energy efficient pretreatment process for lignocellulosic biomass using the DYNAJETS® cavitating jets will be developed to enable efficient extraction of sugar for conversion to biofuels. This technology will reduce the overall production cost of biofuels such as ethanol, and will make U.S. biofuel industry more competitive.

Edgewater Federal Solutions FKA
Edgewater Technology Assoc.
3528 Worthington Blvd. Suite 301
Urbana, MD 21704-7014

Search, Discovery, and Communication
of Scientific and Technical
Knowledge in Distributed System

This project will develop innovative methods for the automatic generation of knowledge bases for the improved searching and exploration of scientific and technical databases.

Enig Associates, Inc.
4600 East West Hwy, Ste 500
Bethesda, MD 20814-3491

ALEGRA-MHD Applications to Solid
Liner MTF/MIF Confinement Concepts

This project will provide insight into both versions of low gain magneo-inertial fusion. The use of high fidelity, high performance computing simulation will provide more flexibility in the ability to study a wide range of experimental configurations than can be done in the laboratory.

Signal Processing, Inc.
13619 Valley Oak Circle
Rockville, MD 20850-3563

A Fast Detection and Localization
Approach to Monitoring Cables in
Underground Power Distribution Network

This project will develop a new fault detection and localization system that is low cost, non-intrusive, and can help early detection of arcing and short-circuit faults in underground power networks.

Synaptic Research, LLC
1448 South Rolling Road
Baltimore, MD 21227-3898

Enhanced Process for the Extraction
and Purification of Oils from
Microalgae Using CO₂ as a Solute

This project will utilize high-pressure CO₂ to release the oils from the cells and promote the efficient separation of wet algal biomass into oils, water, and biomass. The projections for algal biofuel cost reduction due to this technology are significant.

Techno-Sciences, Inc.

Galfenol Energy Harvester for

11750 Beltsville Drive, Suite 300
Beltsville, MD 20705-3194

Wireless Sensors

This project will use an innovative energy harvester device which provides long term power suitable for wireless sensor networks using advanced materials to convert vibration energy, readily available, into useful electrical energy. The benefit of such an approach is a retro-fit capable wireless sensor system which allows for real-time monitoring of power plant processes without introducing significant integration related issues and the ability to reconfigure the wireless system as desired.

Technology Assessment and Transfer, Inc.
133 Defense Hwy 212
Annapolis, MD 21401-8907

CSL-Fabricated Advanced Microchannel
Coolers

This project is using a unique process to make cooling modules for electronics in next-generation hybrid electric vehicles. These cooling modules will increase vehicle efficiency, reduce greenhouse gas emissions, and reduce the overall cost of the vehicle.

STTR Project

Technology Assessment and Transfer, Inc
133 Defense Hwy, 212
Annapolis, MD 21401-8907

Novel Ceramic Membranes for
Efficient Hydrogen Recovery

This project will develop an all-ceramic separation membrane module to cleanly recover hydrogen gas from coal. This module will increase the efficiency of the process and eliminate U.S. dependence on precious metals used for hydrogen separation.

Technology Assessment and Transfer, Inc.
133 Defense Hwy 212
Annapolis, MD 21401-8907

Rapid Prototyping and Manufacturing
of Cast Turbine Components

This project will develop digital manufacturing technology that will provide > 75% cost savings and reduce prototype lead times by >50% for cast metal components used in advanced gas turbines. This technology will enable much more rapid innovation and result in higher efficiency turbine engines.

MASSACHUSETTS

STTR Project

Advanced Thermal Technologies, LLC
91 South Street
Upton, MA 01568-1445

Low Thermal Resistance Integrated
Package and Heat Sink for HEV
IGBT Modules

This company's packaging and heat sink technology will support increased heat dissipation that will lead to improved efficiency and reliability for HEV power conversion modules as well as a range of other industrial and commercial power electronics systems. This technology will support enabling packaging solution for more efficient next generation semiconductor materials that will provide benefits to society in the form of more efficient products that consume less energy and contribute to improved environmental quality by reducing greenhouse gas emissions.

Aerodyne Research, Inc.
45 Manning Road
Billerica, MA 01821-3976

Chemical Ionization Time-of-Flight
Mass Spectrometer for Particle and
Gas-Phase Organic Speciation

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 organic constituents of aerosol particles, leading to a better understanding of the sources, transformations and fates of atmospheric particulate matter.

Aerodyne Research, Inc.
45 Manning Road
Billerica, MA 01821-3976

Dual Quantum Cascade Laser System
For Simultaneous Measurements of
13CH4 and CH3D Methan Isotopolgues

Methane is the second most important greenhouse gas contributing to global warming. This project will produce a laser based isotopic methane monitor that will be used to quantify the various sources of atmospheric methane based on their distinct isotopic signatures in order to assess the impact of methane on global warming and climate change.

Aerodyne Research, Inc.
45 Manning Road
Billerica, MA 01821-3976

High Sensitivity SO2 Monitor using
Quantum Cascade Laser IR Absorption

Understanding the effects of atmospheric constituents on climate requires highly sensitive field measurements, yet current instrumentation is inadequate to provide the detailed information necessary. This project will develop a compact, rugged, low cost optical sensor platform for airborne measurement of nitric acid and other important atmospheric trace gases.

Agiltron, Inc.
15 Cabot Road
Woburn, MA 01801-1003

Micromegas Particle Detector

This proposed innovation for assembling micromegas particle detectors should reduce costs and reduce time to get results in basic physics experiments trying to answer the question – how is the universe put together?

Arradiance, Inc.
142 North Road, Suite F-150
Sudbury, MA 01776-1142

Efficient Manufacture of Extreme Surface Area
Microchannel Plate Devices Functionalized by
Atomic Layer Deposition Thin Films

Efficient manufacture of extreme surface area Microchannel plate devices functionalized by atomic layer deposition thin films is an essential component of next generation high energy physics detector designs as well as novel detection applications in medical discovery and diagnostics and homeland security applications.

Aspen Aerogels, Inc.
30 Forbes Road, Bldg B
Northborough, MA 01532-2501

Manufacturing of Large and Highly Transparent
Aerogel Tiles with Refraction Indices up to
1.1 for Cherenkov Detectors

This project will optimize the process to manufacture large aerogel monoliths with high optical clarity for use in Cherenkov radiation detectors. The optimized material will provide the high-energy physics community with an improved particle detection medium and will allow US laboratories to procure the aerogels from a U.S. manufacturer rather than foreign suppliers. The advances made in manufacturing highly transparent aerogels can be broadly commercialized in the Building and Construction market. It will increase the energy efficiency of windows and building fenestrations.

Aspen Aerogels, Inc.
30 Forbes Road, Bldg B
Northborough, MA 01532-2501

Superhydrophobic Aerogel as Sorbent
Material for CO₂ Capture

This project will develop a novel CO₂ capture solid sorbent for coal fired power plants. The novel aerogel sorbent will 1) effectively remove the CO₂ from post combustion flue gas, 2) will be regenerated at low temperature, and 3) will be suited for multiple-cycle use. The new developed technology will enable to retrofit the existing fleet of coal-fired power plants for carbon capture and minimize global warming caused by greenhouse gas emissions.

Beam Power Technology, Inc.
5 Rolling Green Lane
Chelmsford, MA 01824-4469

Design of a Converging Elliptic Gun
for Elliptic-Beam Klystron
Applications

This company will use its innovative patented technology to design converging elliptic electron guns used to produce lower cost, more energy efficient elliptic-beam klystrons for research and industry.

Boston MicroSystems Inc.
30-H Sixth Road
Woburn, MA 01801-1758

Harsh Environment Gas Composition
Sensor Using Novel SiC Resonant MEMS

This project will develop a multi-analyte gas sensor that operated in high pressure and temperature condition that will be extremely significant to both commercial energy producers and the Federal government in enabling advanced energy systems including combustion, gasification, fuel cells, and gas turbines.

Busek Co. Inc.
11 Tech Circle
Natick, MA 01760-1023

High Current Negative Hydrogen Ion
Source

This project will combine over two decades of plasma thruster development for space propulsion by applying this technology in a state-of-the art high current negative ion source. The completed source will allow researchers to achieve scientific advancements beyond current capabilities.

Celltech Power, LLC
131 Flanders Road
Westborough, MA 01581-1031

Direct Utilization of Coal in Fuel
Cells

This project will create a breakthrough technology, the Liquid Tin Anode Solid Oxide Fuel Cell that has the potential to revolutionize power production through the direct conversion of coal to electricity. This technology

will use coal or biomass in a clean, efficient manner, contributing to our nation's energy security and environmental quality.

Diversified Technologies, Inc.
35 Wiggins Avenue
Bedford, MA 01730-2314

Components for Heating and Fueling
of Fusion Plasmas

This will design a unique prototype solid-state power system for driving fusion reactors. The new design will reduce hardware costs by approximately 30% compared to currently available state-of-the-art systems.

Diversified Technologies, Inc.
35 Wiggins Avenue
Bedford, MA 01730-2314

Drying Enhancement Through PEF
Processing

This project will assess and develop a method of pre-treating biomass prior to drying it as it is refined into biofuel. A novel use of high voltage called Pulsed Electric Field processing will be adapted to improve the efficiency and lower the cost of biomass drying processes.

Diversified Technologies, Inc.
35 Wiggins Avenue
Bedford, MA 01730-2314

Fast Beam Switching Kicker for
Electron Beam Cooling

This project will develop microwave pulse compression technology. Once demonstrated, this technology will allow the electron-ion collider to be constructed. Both the compression and pulse technologies have applications to defense and industry in areas where high peak and average microwave power are needed simultaneously.

Diversified Technologies, Inc.
35 Wiggins Avenue
Bedford, MA 01730-2314

Marx Modulator Optimization for
Advanced Accelerators

This project will work toward completing the design of an affordable, high voltage short pulse modulator applicable to a large number of U.S. and international accelerator programs.

Diversified Technologies, Inc.
35 Wiggins Avenue
Bedford, MA 01730-2314

Ripple Cancellation Supply

This project will develop a small supply that cancels this variation, similar to noise-canceling headphones. This will practically eliminate X-ray motion, giving better research results at minimal cost.

Diversified Technologies, Inc.
35 Wiggins Avenue
Bedford, MA 01730-2314

Robust High Average Power Modulator

The modulators that deliver short electrical pulses for the Spallation Neutron Source at Oak Ridge National Laboratory are not yet reliable, despite ten years of development. This project will design a new modulator that is inherently much more reliable, smaller, and significantly less expensive.

Diversified Technologies, Inc.
35 Wiggins Avenue
Bedford, MA 01730-2314

Solid State Pulsed Power System for
a Stripline Kicker

This project will evaluate kicker driver circuit topologies essential to the next generation of high energy physics particle accelerators worldwide.

EIC Laboratories, Inc.
111 Downey Street
Norwood, MA 02062-2612

Low Cost and Highly Selective
Composite Membrane for Redox Flow
Batteries

This project will develop highly economical components for redox flow batteries that will provide cost effective energy storage of renewable resources and also impact the efficiency of the electrical energy transmission grid.

STTR Project

Envergex, LLC
10 Podunk Road
Sturbridge, MA 01566-1046

Capture of CO₂ by Hybrid Sorption
(CACHYS) for Existing Coal-Fired
Plants

This project will develop a technology to harnesses the synergy between unique sorbents that have been developed, with a novel method of using those sorbents, to capture of CO₂ from power plant exhaust gases. It is expected to reduce the cost of CO₂ capture by a factor of two relative to current solutions.

KSE, Inc.
665 Amherst Road
Sunderland, MA 01375-9420

Acetaldehyde Manufacture by the
Selective Photocatalytic Oxidation
of Ethane

This project will develop a technology that can reduce greenhouse gas emissions, conserve energy, improve efficiency of use of hydrocarbons, and improve U.S. employment in the chemical industry. The selective oxidation technology is also potentially applicable to a wide range of other products from the U.S. chemical industry.

Luminus Devices Incorporated
1100 Technology Park Drive
Billerica, MA 01821-4111

Smart and Efficient Driver for
Big-Chip Photonic Lattice LEDs

This project will develop low-cost, efficient, smart-grid/smart-metering compatible, electrical drivers for these LEDs. Such drivers will enable more companies to exploit the advantages of the big-chip LED approach and accelerate the move to solid-state lighting.

Physical Sciences Inc.

Cryogenic Visible Light Photon

20 New England Business Center
Andover, MA 01810-1077

Counting Array for the Neutron
Electric Dipole Moment Experiment

A collaboration of multiple academic institutions and DOE laboratories is working to measure the neutron electric dipole moment, thereby testing the basic physics of the universe. This project will develop a cryogenic Visible Light Photon Counting array to support this effort.

Physical Sciences Inc.
20 New England Business Center
Andover, MA 01810-1077

Novel Gas Composition Sensor System
for Monitoring Power Generation
Systems

This project will develop a novel laser-based system that will leverage technology from the optical telecommunications industry to monitor gas species concentrations in advanced power generation systems. These measurements may be used to improve efficiency in combustion systems and develop future control strategies to reduce emissions. The novel sensor system may also be used to measure pollutants and greenhouse gases including carbon dioxide produced by factories and vehicles.

Physical Sciences Inc.
20 New England Business Center
Andover, MA 01810-1077

Time-Domain Terahertz Apertureless
Near-Field Scanning Optical
Microscopy

This project will develop a new scientific instrument that will combine terahertz imaging with an atomic force microscope. This instrument will provide new capability to scientists in multiple disciplines, enabling measurements that are not possible with current technology.

Q-Peak, Incorporated
135 South Road
Bedford, MA 01730-2307

Fiber Amplifiers for Laser-Based
Accelerators

The next generation of particle accelerators needs a fundamentally new approach to be able to advance our understanding the fundamental building blocks of nature. This project will help make possible a promising technique based on laser-driven acceleration. Spin-offs may include compact and inexpensive X-ray sources for improved medical diagnostics.

Q-Peak, Incorporated
135 South Road
Bedford, MA 01730-2307

UV Laser for Laser-Ion Stripping of
Hydrogen Beams

This project will develop a laser that will be one of the key components needed to advance accelerator technology particularly for laser-ion stripping of hydrogen beams and free-electron lasers (FELs). The laser will also find application in micro machining, two photon microscopy and stereo lithography via drilling, solar cell manufacturing and medicine.

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

Growth of Semiconductors for Room
Temperature Gamma-Ray Detection

This project will develop high performance gamma-ray detectors that operate at room temperature are critical to many applications including detection and identification of special nuclear materials.

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

High-Performance, CMOS Solid-State
Photomultiplier

This project will develop a high-performance photodetector for radiation detectors, such as PET and SPECT imagers and scientific instruments.

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

High Resolution High Sensitivity
Sensor for Radionuclide Imaging

This project will permit rapid, economical manufacturing of high performance radiation sensors critical to addressing the immediate needs of nuclear medicine, and allow development of superior methods, drugs and technologies to diagnose and stage, and treatments to curtail and even cure, certain cancers, heart diseases and circulatory system disorders.

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

Low Cost, High Performance SPECT
Detectors

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.

STTR Project

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

Multi-Channel Electronics for
Solid-State Photodetectors

The proposed research 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.

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

New High Resolution, Large Area
Detector for Synchrotron
Applications

This project will develop a high performance, large area, position sensitive X-ray detector that will have a positive impact on basic science, non-destructive testing and medical studies.

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

New Room Temperature Semiconductor
Detectors for Small Animal SPECT

This project will develop a high performance, low cost detector for nuclear medicine. High performance gamma-ray detectors that operate at room temperature are critical to many applications including nuclear medicine.

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

Non-Cubic Ceramic Scintillators for
Nuclear Non-Proliferation

This project will investigate promising nuclear detector designs that will have major impact in nuclear non-proliferation, medical imaging, scientific studies as well as commercial applications.

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

Novel Concept in PET Imaging

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.

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

Novel Concepts for Handheld
Radioisotope Identifiers

This project will investigate promising nuclear detector designs that will have major impact in nuclear non-proliferation, medical imaging, scientific studies as well as commercial applications.

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

Novel Polycrystalline Scintillators
for Nuclear Non-Proliferation

This project will investigate promising nuclear detector designs that will have major impact in nuclear non-proliferation, medical imaging, scientific studies as well as commercial applications.

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

Solid-State Sensor to Directly
Replace Coils for Improved Eddy
Current Testing (ECT)

This project will develop new, high sensitivity, solid-state sensors for rapid, high performance inspection of power plants, bridges, and transportation vehicles.

Skyacht Aircraft Inc. DBA Heavy Lift Systems
110 Pulpit Hill Road
Amherst, MA 01002-4006

Tethered Aerostat Crane for Wind
Turbine Construction and Maintenance

The Tethered Aerostat Crane (TAC) is a brand new type of crane specifically designed for use by the wind energy industry. The TAC will break the economic and logistic logjams created by the conventional ground-based cranes that currently hinder the economic viability of wind power.

Spire Corporation
One Patriots Park
Bedford, MA 01730-2396

Next-Generation, LED-based,
Adjustable Spectrum, Pulsed Solar
Simulator

This project will develop a next-generation solar simulator based on light-emitting-diode (LED) technology. The simulator is used to rate the PV module for power output based on international standards at the end of the manufacturing process. Compared to current simulators, this new system will provide higher accuracy, increased reliability, greater versatility, as well as reduced power consumption, maintenance and overall cost of ownership.

Spire Corporation
One Patriots Park
Bedford, MA 01730-2396

Photoluminescence for Solar Cell
Crack Detection

Microcracks in solar cells will be detected using a noncontact, photoluminescent technique that will decrease the cost of solar energy, and improve solar module lifetimes.

STTR Project

Supercon, Inc.
2G 830 Boston Turnpike
Shrewsbury, MA 01545-3386

Development of High Current
High Temperature Superconductor
Cabling Technology

This project will demonstrate the feasibility of a new superconducting cable in order to attain the required high magnetic fields.

Supercon, Inc.
830 Boston Turnpike
Shrewsbury, MA 01545-3386

High Strength Silver Sheath for
Bi2212/Ag Conductor

This project will develop material to advance the technology of high temperature, high field superconductors is necessary for maintaining U.S. leadership in the fields of materials science, biomaterials and high energy physics.

STTR Project

Versatile Dynamics, Inc.
4 Nicholas Lane
Sandwich, MA 02563-1874

Non-flammable and High Voltage
Electrolytes and No Carbonates

This project addresses the marriage of high voltage stability, non-flammable electrolytes, under development with lithium battery manufacturing capabilities. This project will result in a practical, rechargeable lithium battery with voltage capabilities that significantly exceed state of the art batteries.

Weston Geophysical Corp.
181 Bedford St., Suite 1
Lexington, MA 02420-4430

Improved Time-Dependent Seismic
Monitoring Systems for Enhanced
Geothermal Reservoir Characterization

This project will result in images of subsurface seismic velocity structure and maps of micro-earthquake activity, which would provide direct evidence of fracture locations and parameter changes related to fluid flow as they evolve over time in geothermal reservoirs.

MICHIGAN

Fulcrum Composites Inc
1407 East Grove Street
Midland, MI 48640-5284

Development of High Strength, High
Fatigue Wind Blade Spars

This project will develop and demonstrate a new method to produce the spar for wind turbine blades. This will improve long term performance and reliability and contribute to the safe rapid expansion of the wind energy industry in the U.S.

Michigan Aerospace Corporation
1777 Highland Drive, Suite B
Ann Arbor, MI 48108-2285

Weathervane - A Predictive Analytics
Engine for Global Monitoring of Wind
Turbines

Michigan Aerospace Corporation, John Deere Wind Energy and NREL propose the development of the Predictive Analytics system that can be deployed for any model of Wind Turbine to reduce down-time, minimize costs associated with repair and increase the output of individual turbines and Wind Farms delivering power to the U.S. power grid.

STTR Project

Niowave, Inc.
1012 North Walnut Street
Lansing, MI 48906-5061

Development of an SRF Crab
Crossing Cavity for an Electron
Ion Collider

This project will develop a superconducting spoke cavity that will have immediate use in existing nuclear physics research facilities.

STTR Project

Niowave, Inc.
1012 North Walnut Street
Lansing, MI 48906-5061

Development of an SRF
Deflecting/Crabbing System for
FermiLab's Project-X

This project will develop a superconducting crabbing cavity that would have immediate use in existing nuclear physics research facilities.

Niowave, Inc.
1012 North Walnut Street
Lansing, MI 48906-5061

Development of Superconducting
Photonic Band Gap Accelerating
Cavities

Photonic band gap particle accelerators use a novel design that eliminates power reflections which distort the particle beam. This project develops a superconducting version of this new type of cavity to make it usable in high-power accelerators.

MINNESOTA

Geological Storage Consultants, LLC
14394 Embassy Way
Apple Valley, MN 55124-6468

Commercialization and Application of
Robust and Efficient Analysis Tools
for Geological Sequestration of CO₂.

An innovative simulation and modeling tool is being developed that will provide comprehensive risk assessment for geological CO₂ storage projects. This software framework will provide injection site planners, government regulators, and insurance companies with the information to safely and economically store captured carbon dioxide.

SVT Associates, Inc.
7620 Executive Drive
Eden Prairie, MN 55344-3677

Ultra-thin AlN/GaN Heterostructures
for Robust, Radiation-hard
Electronics

This project will result in transistor (HEMT) devices which can reliably function for example under constant radiation in low earth orbits for more than 10 years with less than 30% drop in performance. Additionally, these devices can be integrated with GaN-based detectors for very high luminosity collider experiments.

STTR Project

T3 Scientific, LLC
1839 Noble Road
Arden Hills, MN 55112-7834

High Surface Area-to-Volume
Ultrathin Dense Membrane for
Hydrogen Separation

This proposal is to develop a novel high surface area ultrathin dense silica membrane for the production of high-purity hydrogen from coal to support domestic and global green economy with near-zero emission.

NEVADA

Altairnano
204 Edison Way
Reno, NV 89502-2306

Inorganic Electrode Coatings for
Increased Temperature and Cycle Life
Performance

This project will increase the cell stability of our batteries by altering the chemistry of cells through processes compatible with our current fabrication abilities.

NEW HAMPSHIRE

Brayton Energy, LLC
75B Lafayette Road

Modular Undersea Compressed Air
Energy Storage (UCAES) System

Hampton, NH 03842-2624

A cost-effective solution for energy storage will make intermittent renewable energy sources, e.g., solar and wind, dependable. Undersea storage offers the possibility of containing compressed air under the weight of water allowing for light, inexpensive manufactured systems which can provide energy to the electrical grid on demand.

Creare Incorporated
16 Great Hollow Road
P.O. Box 71
Hanover, NH 03755-3116

A Robust High Speed Switch for
Pulsed Power Applications

Pulsed power applications for high energy physics research, manufacturing, radar, radio communications, and directed energy weapon systems require innovative power semiconductor devices. This project will provide improved cost, reliability, and efficiency for these systems over currently available devices.

Creare Incorporated
16 Great Hollow Road
P.O. Box 71
Hanover, NH 03755-3116

Low-Cost, Durable Water Vapor
Transport Exchanger

This project will develop critical technology that will enable vehicle propulsion and stationary power generation using low-cost, durable fuel cell power systems. This water management technology will enable reliable fuel cell operation by preventing dryout of the fuel cell and providing water needed for fuel processing.

The Aptec Group, LLC
22 Proctor Hill Road
Hollis, NH 03049-6428

Development of an Ontology-Directed
Signal Processing Toolbox

This project is focused on the development of tools for the automatic configuration of signal processing systems. The goal is to develop tools that will be useful in a variety of Government and commercial areas and useable by people who are not signal processing experts.

NEW JERSEY

STTR Project
Continuum Dynamics, Inc.
34 Lexington Avenue
Ewing, NJ 08618-2302

Advanced Methods for Predicting
3D Unsteady Flows Around Wind
Turbines

This project will develop an entirely new class of multidisciplinary analysis software for predicting the aerodynamics, fatigue, vibration and noise of wind turbines. By improving the ability to design and predict the lift of wind turbines, this new software will help to increase the reliability and life span of wind turbines, reduce maintenance costs while minimizing our dependency on foreign energy supplies and reducing greenhouse gas and carbon emissions.

Energy Catalysis Inc.
1200 Florence Columbus Road, Suite 117
Burlington, NJ 08505-4200

Economical Process for Conversion of
Biomass and Coal to Liquid Fuels

This project will develop a direct liquefaction of renewable biomass and vast reserve of coal in U.S. to transportation fuels that will lead to energy independence from foreign oil and boost in the economy. An economical process for direct liquefaction of biomass and coal by hydroconversion in a low cost reactor system using novel catalysts.

Exelus, Inc.
110 Dorsa Ave
Livingston, NJ 07039-1003

Low temperature oxidation of alkanes
to alcohols

This SBIR project will develop a new, cost-effective method for converting abundant, low quality natural gas into methanol which can then be used to make a whole host of products such as transportation fuels and petrochemicals. It uses new chemistry and catalysts to improve energy efficiency while cutting capital costs by half.

Exelus, Inc.
110 Dorsa Ave
Livingston, NJ 07039-1003

Multifunctional Catalyst for Coal
and Biomass to Liquids Process

This project will develop a new, cost-effective method for converting coal and biomass into clean transportation fuels. It uses new chemistry and catalysts to improve energy efficiency and reduce GHG emissions while significantly reducing capital costs.

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

Reduction of Porosity for High
Critical Current Density Bi-2212
Superconductor Wire

High-field magnets are essential components of devices used in a number of advanced fields of science, such as NMR and ICR (widely used in drug discovery), magnetic fusion (searching for everlasting energy), and particle accelerators used in high energy physics. This study seeks to improve electric current carrying capability of Bi-2212 wire by reducing porosity in filament.

Mechanical Solutions, Incorporated
11 Apollo Drive
Whippany, NJ 07981-1423

A System for Conducting
Sophisticated Mechanical Tests In
Situ with High Energy Synchrotron X-Rays

To gain a better understanding of why structures such as bridges, dams, and airplanes fail, x-rays are used to experimentally characterize these failures in a controlled laboratory setting. This project will develop a specialized machine that can induce fracture and fatigue—two common sources of failures—for use in x-ray experiments enabling scientists to better explore these failures.

STTR Project
Menlo Systems, Inc.
69 Stickles Pond Road

Femtosecond Timing Distribution
and Control for Next Generation

This project will study the feasibility and identify the best approach towards developing a modular femtosecond timing distribution system for next generation accelerators and light sources.

Nova Photonics, Inc.
One Oak Place
Princeton, NJ 08540-4701

A Water Hydraulic System for Shutter
Actuation on ITER

This project will develop a innovative shutter system which will protect the sensitive diagnostic systems on ITER from damage from the plasma. A successful demonstration of fusion power on ITER could bring us closer to achieving fusion energy as a clean, safe, and abundant energy source.

United Silicon Carbide, Inc.
100 Jersey Avenue, Bldg. A, Ste 208
New Brunswick, NJ 08901-3268

High Temperature Smart Sensor for
Downhole Logging and Monitoring

This project will develop circuits and subsystems that will enable more sophisticated natural gas and oil exploration. In addition, the underlying technologies will enable more efficient hybrid electric vehicles and electrical distribution systems.

Universal Display Corporation
375 Phillips Blvd.
Ewing, NJ 08618-1428

Novel Optical Enhancement for Thin
Phosphorescent OLED Lighting Panels

This project will enable the development of high-efficiency, environment-friendly, solidstate, white-lighting sources.

Universal Display Corporation
375 Phillips Blvd.
Ewing, NJ 08618-1428

Thermal Management of Phosphorescent
Organic Light Emitting Devices

This project will increase the lifetime of highly efficient solid state lighting based on phosphorescent organic-light-emitting devices, and thereby enable replacement of inefficient incandescent bulbs, which consume over 8% of the electricity produced in the United States.

NEW MEXICO

CPFD Software, LLC
10899 Montgomery Blvd. NE, Suite B
Albuquerque, NM 87111-3935

Hybrid CPU-GPU Parallel Development
of the Eulerian-Lagrangian
Barracuda Multiphase Program.

Accelerating computational power from a commercial engineering software tool (Barracuda) can help designers optimize fossil power plants and develop gasification reactors for coal and biomaterial, while reducing greenhouse gases.

Deep Web Technologies, LLC
301 North Guadalupe, Ste 201
Santa Fe, NM 87501-5501

Automating Scalability of Federated
Search in a Cloud Computing
Environment

This project will demonstrate that cloud computing, a technology promoted by the Obama administration, is well suited for enhancing today's scientific search technology. Enhancements include enabling more efficient and effective research and widening the research net to include foreign language content translated to the researcher's native language.

Manhattan Isotope Technology LLC
228 Maple Drive
Los Alamos, NM 87544--157

A New Evaluation of Recycling of the Cardiac
Imaging Agent, Strontium-82, from spent
Strontium-82/Rubidium-82 Generators

There is currently a shortage of medical radioisotopes in North America. This project will allow the supply of the active pharmaceutical ingredient strontium-82. Strontium-82, is used for diagnosis of cardiac maladies such as coronary artery disease.

NumerEx, LLC
2309 Renard Place SE, Ste 220
Albuquerque, NM 87106-4259

A Three-Dimensional Magnetohydrodynamic
Simulation Capability for Liner Compression of
Field Reversed Configurations

This project will develop a three dimensional computer modeling capability to help guide an innovative experiment that will collapse an aluminum tube a little larger than two soda cans placed end to end on a hot, magnetized, gas in twenty millionths of second to attempt to create fusion in a laboratory.

Research Applications Corporation
148 Piedra Loop
Los Alamos, NM 87544-3837

ePLAS Development for Plasma Jet
Modeling and Applications

This project will apply, improve and disseminate a unique, tested computer simulation code, ePLAS, for plasma jet modeling, creating an optimal path toward the production of hot, dense plasmas for the mastery of controlled fusion power for the nation.

Rocky Mountain Geophysics, Inc.
167 Piedra Loop
Los Alamos, NM 87544-3836

Development of Mine Explosion Ground
Truth Smart Sensors

This project will develop a seismo/acoustic smart sensor system to be used to transmit accurate ground truth information (location, origin time, magnitude) from mining regions to improve U.S. nuclear explosion monitoring capabilities. The system will be compact, inexpensive, simple to deploy and capable of autonomous operation for periods of up to six months.

Southwest Sciences, Inc.
1570 Pacheco Street, Suite E-11
Santa Fe, NM 87505-3993

Instrumentation for Measurement of
Atmospheric Nitric Acid

Understanding the effects of atmospheric constituents on climate requires highly sensitive field measurements, yet current instrumentation is inadequate to provide the detailed information necessary. This project will develop a compact, rugged, low cost optical sensor platform for airborne measurement of nitric acid and other important atmospheric trace gases.

Southwest Sciences, Inc.
1570 Pacheco Street, Suite E-11
Santa Fe, NM 87505-3993

Robust Spectrometer for Carbon
Isotope Ratio Measurements

This project will develop an improved measurement technology that is needed to better characterize the exchange and transformation of carbon between the biosphere and the atmosphere.

Southwest Sciences, Inc.
1570 Pacheco Street, Suite E-11
Santa Fe, NM 87505-3993

Self-calibrating Balloon-Borne
Methane Gas Sensor

Understanding the effects of atmospheric constituents on climate requires highly sensitive field measurements, yet current instrumentation is inadequate to provide the detailed information necessary. This project will develop a compact, rugged, low cost optical sensor platform for airborne measurement of nitric acid and other important atmospheric trace gases.

STAR Cryoelectronics, LLC
25 Bisbee Ct., Ste. A
Santa Fe, NM 87508-1338

Advanced STJ-based X-Ray
Spectrometer for Synchrotron Science
Applications

This project will develop an advanced X-ray spectrometer based on an array of superconducting tunnel junction (STJ) detectors for synchrotron science applications. The next generation X-ray spectrometer design will be cryogen-free with automated controls to simplify and streamline operation. The turn-key instrument will be easily mountable to beamlines at synchrotron facilities.

TechSource, Inc.
190 Central Park Square, Suite 213
Los Alamos, NM 87544-0988

Improvements to Simulation Codes for
Electron Cloud Generation in Long-Bunch,
High-Intensity Proton Accumulator Rings

This project undertakes the development of improved simulation codes for modeling the electron cloud generation in high intensity proton accumulator rings. These tools will aid in the understanding and mitigation of electron cloud effects in these machines.

ThermoDynamic Films
7224 General Kearny Ct. NE
Albuquerque, NM 87109-6304

Post-Peltier Thermoelectric Cooling

This project will develop *post-Peltier thermoelectric* coolers that have the potential to be less expensive and more efficient than conventional thermoelectric devices. The thin-film format of this new technology permits low-cost manufacturing techniques and engenders countless new applications that would be impossible with current technologies.

Vista Photonics, Inc.
67 Condesa Road
Santa Fe, NM 87508-8136

Atmospheric Methane Analyzer

This project will develop a cost-effective field deployable sensor to monitor atmospheric concentrations of the critical greenhouse gas methane. It will have significant advantages when compared to existing technology.

Vista Photonics, Inc.
67 Condesa Road
Santa Fe, NM 87508-8136

Isotope Hygrometer for in situ
Subsurface Characterization

This project will develop an isotope analyzer that can determine the isotope composition of liquid water samples. It will allow tracing the transport and dispersion of contaminants in the subsurface.

Vista Photonics, Inc.
67 Condesa Road
Santa Fe, NM 87508-8136

Trace Carbon Monoxide Analyzer

This project will develop a field deployable sensor to monitor atmospheric concentrations of the critical indirect greenhouse gas carbon monoxide. It will have significant advantages when compared to existing technology.

Voss Scientific, LLC
418 Washington Street SE
Albuquerque, NM 87108-2811

Hybrid Modeling of Plasma Jet
Transport, Merging and Liner
Formation

A high-fidelity computer model is being developed to support the fusion energy program. The simulation techniques will enable a rigorous study of an array of powerful plasma jets converging radially inward to compress a fusion target.

NEW YORK

Dimension Technologies, Inc.
315 Mount Read Boulevard
Rochester, NY 14611-1982

Autostereoscopic Projection Display
for Collaborative Applications

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 in home theater systems.

EPIC Consulting
101 Mountain Ridge Drive
Mount Sinai, NY 11766-1413

Extend the EPICS Client Metadata Set
to Support Arrays, Images, Archive
Data and Advanced Directory Services

This project will produce a well defined, reviewed, and agreed upon definition of the metadata required for proper handling of several array types enables the development of middle layer servers such as orbit and bump control in accelerators.

STTR Project

Helios-NRG, LLC
12 Yardley Lane
East Amherst, NY 14051-1683

Advanced Membrane Technology for Helium
Recover

This project will develop a step change membrane technology which will enable the recovery of helium from vast, but marginal sources which are uneconomic today. This will revive declining U.S. production, maintain U.S. global leadership and ensure reliable supply of this valuable resource for decades to come.

HYPRES, Inc.
175 Clearbrook Rd. #141
Elmsford, NY 10523-1109

Low-Power Radiation-Hard ADC for
Detector Readout

A new low-energy digital logic is proposed for efficient readout of sensitive detectors. The benefits cover a wide spectrum ranging from identification of concealed weaponry to understanding of physics governing the universe

Kitware, Inc.
28 Corporate Drive
Clifton Park, NY 12065-8688

A Scalable Visual System For
Proliferation Analysis

This project's work addresses the need for further advancements in tools which effectively combine nuclear proliferation data so information is automatically connected, allowing intuitive navigation, visualization, and collaboration with a scalable, web-based application.

Kitware, Inc.
28 Corporate Drive
Clifton Park, NY 12065-8688

Web-Based Scientific Collaboratory
for Large Data Analysis

This project will develop advanced software tools for the visual analysis of large and complex data across collaborating scientific communities. These tools will enable users to better understand and extract important information from data.

MTECH Laboratories, LLC
831 Rte. 67, Bldg. 45C
Ballston Spa, NY 12020-0227

Efficient High-Voltage IGBT Modules

The field of cryogenic power electronics promises improved performance over conventional power conversion equipment, as well as seamless integration with extremely low-loss superconducting cables and equipment. This project will develop reliable and high performance packaging technologies, which are necessary to enable such devices.

MTECH Laboratories, LLC
831 Rte. 67, Bldg. 45C
Ballston Spa, NY 12020-0227

Novel Switching Devices for
Accelerator Modulators

This project addresses very high power switches for accelerators used in high-energy physics research, which seeks to broaden the understanding of fundamental physical properties. This project will develop improved devices using a novel topology and mode of operation.

Reservoir Labs, Inc.
632 Broadway, Suite 803
New York, NY 10012-2614

Implementation of an Energy-Saving
Bro-Aware Load Balancer at 100 Gbps
with Closed-Loop Flow Policy Control

This project will develop Network Intrusion Detection Systems (NIDS) that will serve an indispensable role in preserving the integrity of computer networks. This project will design and implement a high-performance energy-saving load balancer that can distribute traffic at line rates of 100 Gbps.

Sydor Instruments, LLC
31 Jet View Drive
Rochester, NY 14624-4903

HERMES-Based X-ray Strip Detector

This project will develop a novel microstrip detector to satisfy immediate needs at synchrotron radiation facilities around the world. Advancements will enable new science by providing a means to measure a full-range diffraction pattern in times on the order of one millisecond.

TAM Ceramics LLC
4511 Hyde Park Blvd.
Niagara Falls, NY 14305-1215

High Temperature Integrated
Thermoelectric System and Materials

This project will research and develop thermoelectric materials and an integrated system to recover waste heat and to convert it into useful electrical energy. It has economical and environmental benefits to industries such as the automotive, glass, power plant, and other industrial processes where high temperature heat is generated.

Underground Systems, Inc.
84 Business Park Drive, Ste 109
Armonk, NY 10504

Underground Cable Advanced
Diagnostics

This project will investigate the design of an advanced diagnostic system that increases the reliability and utilization of the underground transmission system.

United Environment & Energy LLC
111 Ridge Road
Horseheads, NY 14845-1507

High Value Renewable Chemical
Production from CO₂ and Biodiesel
Plant Byproduct

This project will develop an environmentally friendly, cost-effective, energy-efficient, and easy to operate renewable glycerol carbonate production technology from carbon dioxide, which is a greenhouse gas, and glycerol, a biodiesel plant waste.

NORTH CAROLINA

QuarTek Corporation
4180 Piedmont Parkway
Greensboro, NC 27410-8109

Specially Functionalized Nanomagnetic Particles
and Ionic Liquids for Harvesting, Dewatering and
Extraction of Lipids and Carbohydrates from Algae

This project will develop a new job creating industry, creating technologies that will enable the production of cost effective biofuels from cellulosic and algal biomass by employing novel separation and extraction technology.

OHIO

ABS Materials
770 Spruce Street
Wooster, OH 44691-0000

Swellable Organosilica Materials to
Clean Produced Water

This project will develop and improve identified technologies to remediate produced water; and develop process of production to make these technologies commercially viable.

Euclid TechLabs, LLC
5900 Harper Rd. #102
Solon, OH 44139-1866

Development of a 12 GHz
Dielectric-Based Wakefield Power
Extractor for Potential Clic Applications

Dielectric based high power radio frequency (rf) generator offers the possibility of reduced cost and higher efficiency for applications in the next generation high energy physics machine, as well as industry, medicine, and scientific research. This project will develop such a device to meet the particular requirements of the Compact Linear Collider, which is the high energy physics machine under design with joint effort of Europe and U.S.

Euclid TechLabs, LLC
5900 Harper Rd. #102
Solon, OH 44139-1866

Development of a Dielectric-Based
Short RF Pulse Two Beam Accelerator
Prototype Module

Ultra-high gradient and ultra-high power radio frequency (rf) generation are preferred for the future high energy collider design. Unlike the most of the present accelerator designs, which choose pulse lengths in the range of 150-400 ns and gradients ~ 100 MV/m as the operational parameters, we propose a short pulse (~ 20 ns), high repetition rate (>1 kHz), high gradient (>200 MV/m) accelerator as an alternative technology to meet the requirements for future high energy machines if the related technologies can be demonstrated.

Euclid TechLabs, LLC
5900 Harper Rd. #102
Solon, OH 44139-1866

Dielectric Collimators for Linear
Collider Beam Delivery

This project will develop a special device to control electron bunch of the future linear collider. The use of new software and materials that our company has developed is expected to lead to improved performance and efficiency.

Euclid TechLabs, LLC
5900 Harper Rd. #102
Solon, OH 44139-1866

Multipactor Suppression In Dielectric
Loaded Accelerating Structures Using
Vacuum Channel Surface Modification

Dielectric based particle accelerators offer the possibility of reduced cost and higher efficiency for applications in industry, medicine, and scientific research. This project will study ways to eliminate a form of energy absorption that is currently the main obstruction to widespread use of these devices.

Euclid TechLabs, LLC
5900 Harper Rd. #102
Solon, OH 44139-1866

THZ Dielectric Wakefield
Accelerating Structure

This project will develop a manufacturing technology of artificial diamond fiber to be used in dielectric loaded accelerating structures. When developed, this structure will sustain a record high accelerating gradient in THz frequency range. The results will be also applied to next-generation accelerators and high power THz systems as well as to medical equipment development.

Faraday Technology, Inc.
315 Huls Drive
Clayton, OH 45315-8983

Electropolishing Niobium in an
HF-Free Electrolyte

This project will develop an environmentally benign fabrication process for superconducting components for the International Linear Collider. This program will eliminate the use of hydrofluoric acid, improving worker safety, while maintaining or exceeding current performance specifications.

Hyper Tech Research, Inc.
1275 Kinnear Road
Columbus, OH 43212-1155

High Temperature Superconducting
(HTS) Cable for Fusion Systems

This project will develop an advanced and lower cost superconductor wire for the DOE Fusion Energy Program.

Hyper Tech Research, Inc.
1275 Kinnear Road
Columbus, OH 43212-1155

Short Period Model Helical Undulator
for the ILC - Design and
Demonstration

This project will develop this so-called "undulator" is to be constructed from magnets wound with an advanced highly stable Nb₃Sn strand to be developed as part of the proposed program.

Innovative Science Engineering and
Management LLC
7525 B State Road

A Novel Micro Circuit Based Film
Cooling Design for a Ceramic
Combustor Liner

Cincinnati, OH 45255-6406

This project will develop a unique approach to design and fabrication of a high temperature SiC/SiC CMC combustor liner. It offers diverse applications for increasing cycle efficiency, and low emissions in commercial power plants, DOE as well as DOD/DARPA fighter platforms.

STTR Project

NexTech Materials, Ltd.
404 Enterprise Drive
Lewis Center, OH 43035-9423

Advanced Membranes for
CO₂ Capture from Existing Coal-
fired Power Plants

This project will investigate a new membrane for separation of carbon dioxide from coal-fired power plant gas exhaust. This technology could lead to cleaner and more efficient coal-fired power plants.

NexTech Materials, Ltd.
404 Enterprise Drive
Lewis Center, OH 43035-9423

Manufacturing System Design Analysis
of SOFC Stacks

This project will perform a comprehensive manufacturing cost analysis of volume manufacturing of SOFC stacks. Design, materials, and fabrication methods will be evaluated to reduce total system cost, enabling penetration into stationary power generation markets, transportation auxiliary power units, and military applications.

Phycal, LLC
51 Alpha Park
Highland Heights, OH 44143-2202

Solid Phase Lipid Extraction of
Algal Oil

This project will develop and demonstrate an economical method for the extraction of oil from algae for biofuels using oil absorbing glass or zerogel. This will help stimulate successful implementation of economical algal oil production for the burgeoning algae biofuels industry promoting U.S. energy security, safeguarding the environment, and stimulating job creation in the biofuels market.

STTR Project

RNET Technologies, Inc.
240 West Elmwood Drive, Suite 2010
Dayton, OH 45459-4248

Green Storage for
HPC with Solid State Disk (SSD)
Technologies

This project will develop techniques must be developed to account for these profiles before SSDs can replace HDDs. Solid State Disks (SSDs) are the next generation storage hardware, to replace hard drives. SSDs have lower energy requirements coupled with the potential for better performance.

STTR Project

RNET Technologies, Inc.
240 West Elmwood Drive, Suite 2010
Dayton, OH 45459-4248

HPC Application Profiling
for Energy Optimization

The operating (energy) costs of current and future supercomputers are approaching the procurement costs of these expensive machines. One approach to reducing the energy consumption of supercomputers is to give application developers transparent insight into the application's power requirements. This allows application developers to make the necessary power/performance tradeoffs.

STTR Project

UES, Inc.
4401 Dayton-Xenia Road
Dayton, OH 45432-1894

High Temperature Unique
Low Thermal Conductivity Thermal
Barrier Coating (TBC) Architectures

Gas turbine engines utilized in electric power production and aircraft propulsion need to operate at higher temperatures for enhanced efficiency and lower emission. This project will develop a thermal barrier coating technology with unique architectural design will enable the operation of turbine engines at higher operating temperature.

UES, Inc.
4401 Dayton-Xenia Road
Dayton, OH 45432-1894

Improved Current Feeders and Current
Distribution System for Accelerator Magnets Using
High-Temperature Superconductors

This project will develop superconducting current leads based on high temperature superconductors for accelerator magnets and other potential applications with the benefit of lower losses and higher efficiency. Success of this project may lead to the development of new compact and lightweight power transmission devices for accelerators.

STTR Project

UES, Inc.
4401 Dayton-Xenia Road
Dayton, OH 45432-1894

Membrane Materials with
Improved Properties

This project will develop a novel approach in making thin dense pinhole free hydrogen transparent membrane for high separation flux and low materials cost by using commercial technology of filtered cathodic arc deposition.

UES, Inc.
4401 Dayton-Xenia Road
Dayton, OH 45432-1894

Novel YBCO Coated Filaments for
Superconducting Magnets

A novel approach termed fiber coated conductor will bring very high engineering critical current density with extremely low AC loss. Fiber coated conductor will be ideal in making multifilament cable which will be the only viable technology for the next generation magnet, motors, transformers, and generators fabrication.

OKLAHOMA

STTR Project

Glomics, Inc
716 Waterwood Dr.

Development of Microarrays- based Metagenomics
Technology for Monitoring Sulfate- Reducing

This project will greatly assist the commercialization of GeoChip technologies. GeoChip is a metagenomic technology for simultaneously monitoring thousands of microorganisms important to energy, environmental management, agriculture, industry, foods, and human health.

STTR Project

Glomics, Inc
716 Waterwood Dr.
Norman, OK 73072-4369

Development of Novel Random Network
Theory-Based Approaches to Identify Network
Interactions Among Nitrifying Bacteria

This project will develop novel ecological network approaches to characterize network interactions of microbial communities represents transformative advances in biological/environmental sciences, and this will greatly enhance the commercialization of GeoChip technologies, which was awarded as one of the 100 most technological innovations with the greatest commercial potentials in 2009.

OREGON

Agiliron, Inc.
10940 SW Barnes Rd Ste 217
Portland, OR 97225-5368

Scalable Cloud Based Application
Testing Service

This proposed innovation for assembling micromegas particle detectors should reduce costs and reduce time to get results in basic physics experiments trying to answer the question – how is the universe put together?

Galois, Inc.
421 SW Sixth Avenue, Suite 300
Portland, OR 97204-1629

A Deployable, Robust File System for
Parallel I/O

This project will decrease the cost and increase the productivity of massive data storage systems. Users include the high-performance computer industry who rely on fast, reliable computers. It also supports commercial users and providers of massive storage, including providers of massive databases or grid-based storage solutions.

Galois, Inc.
421 SW Sixth Avenue, Suite 300
Portland, OR 97204-1629

Improved Symbol Resolution for
Portable Build Systems

This project will increase the productivity of software developers by describing a process and developing tools that make it easier to create and deploy portable software components in the context of High Performance Computing.

ParaTools, Inc
2836 Kincaid Street
Eugene, OR 97405-4156

Increasing Build IQ: Integration
Quality Tools for Build

This project will produce IQB, a tool enabling faster, higher quality software production on platforms ranging from desktops to exascale leadership machines. IQB will leverage modern multicore performance to ensure consistent construction of large software products where all the pieces must work together to produce reliable scientific results.

ParaTools, Inc
2836 Kincaid Street
Eugene, OR 97405-4156

Packaging Portable HPC Tools for
Linux

This project will increase productivity of HPC developers, adds workers to produce LiveDVD/LiveUSB HPC Linux, delivers higher quality software production on platforms ranging from desktops to exascale leadership machines. HPC Linux targets modern multicore technology and ensures quality. construction of HPC software products.

Voxtel, Inc.
12725 SW Millikan Way, Suite 230
Beaverton, OR 97005-1782

Development of Commercial Foundry
Source for Science-Grade Charged
Particle Imagers

This project will result in transistor (HEMT) devices which can reliably function for example under constant radiation in low earth orbits for more than 10 years with less than 30% drop in performance. Additionally, these devices can be integrated with GaN-based detectors for very high luminosity collider experiments.

Voxtel, Inc.
12725 SW Millikan Way
Suite 230
Beaverton, OR 97005-1782

High Speed Germanium X-Ray Photon
Counting Detector Array

To fully enable the capability of our nation's synchrotrons, a germanium X-ray photon detector and signal processing chip will be developed for high speed X-ray photon counting experiments.

Voxtel, Inc.
12725 SW Millikan Way, Suite 230
Beaverton, OR 97005-1782

Low Cost, Reconfigurable,
Multi-Channel Pulse Processing Platform

This project will develop a novel, low-cost method of achieving psec-scale time stamping and pulse processing of gamma-ray photons and charged particles is being developed.

Voxtel, Inc.
12725 SW Millikan Way, Suite 230
Beaverton, OR 97005-1782

SOI CMOS Wafer Scale Imager Platform

This project will develop a large area, low level imaging technology for persistent surveillance. The imager has higher resolution and sensitivity than commercial CMOS imaging products.

Voxtel, Inc.
12725 SW Millikan Way, Suite 230

Solution-Processed, Large Area,
Pixelated Direct-Detection Radiation

This project will provide for the need for cost effective, large area, pixilated radiation detectors, a solution processed gamma-detector, which can be ink jet printed, from solution-based precursors is proposed.

PENNSYLVANIA

Advanced Cooling Technologies, Inc.
1046 New Holland Ave.
Lancaster, PA 17601-5606

Dielectric Printed Circuit Board
Planar Thermosyphon

A core technology is proposed for improved thermal management of LEDs, currently a critical obstacle in the development of the solid state lighting industry. An innovative approach to circuit board design allows it to also function as a highly conductive heat spreader, significantly improving the thermal management over current methods.

Advanced Cooling Technologies, Inc.
1046 New Holland Ave.
Lancaster, PA 17601-5606

Syngas Production by Thermochemical
Conversion of H₂O and CO₂ Mixtures
Using a Novel Reactor Design

This project will use CO₂ and H₂O in a thermochemical cycle to efficiently produce syngas. The proposed technology (i) does not require coal, methane or other hydrocarbon feedstocks (ii) can operate without catalysts, and (iii) can be expanded for commercial production of fuels such as syngas, methane and other hydrocarbon derivatives.

Advanced Cooling Technologies, Inc.
1046 New Holland Ave.
Lancaster, PA 17601-5606

Vortex Enhanced Direct Contact Heat
Exchanger for Geothermal Cooling

This program will develop a vortex based heat exchanger for geothermal based HVAC applications by taking advantage of the earth's constant and low temperature, to cool a building. The device mixes the incoming cold water with the air to be cooled and separates them after the heat exchange has occurred.

Combustion Research and Flow
Technology, Inc.
6210 Kellers Church Road
Pipersville, PA 18947-2010

Innovative Subgrid-Scale Combustion
Modeling for Gas Turbines

This project will develop an advanced turbulent combustion model to support the development of new fuel-flexible gas turbine technologies. The model will include the physics required to accurately predict gas turbine operations and be efficient enough for engineering design analysis.

KCF Technologies, Inc.
112 West Foster Avenue
State College, PA 16801-4867

Energy Harvester Powered Wireless
Sensors for Extreme Temperature
Environments

This project will provide an energy harvester powered sensors for high temperature environments. This project addresses a significant opportunity to impact power plant energy consumption and operating cost by enabling wireless sensing at a low cost and in high temperature environments.

Nokomis, Inc.
310 5th St.
Charleroi, PA 15022-1517

Novel Coating Materials for RF
Windows

This project will develop an innovative method to improve accelerator efficiency and assist with high-energy physics research. Building upon expertise in RF applications and materials, window materials that allow for greatly improved power handling capability will be developed.

Strategic Polymer Sciences, Inc.
200 Innovation Blvd, Suite 237
State College, PA 16803-6602

Advanced Film for Capacitors for
Power Inverters in Electric Drive Vehicles

This company will develop high performance DC bus film capacitors with high energy density, low cost, and high reliability. The advanced capacitors can be used in electric drive vehicles, medical defibrillators, and military pulsed power weapon systems.

Thermacore, Inc.
780 Eden Road
Lancaster, PA 17601-4794

Vehicle Waste Heat Recovery System

Heat sent to the environment as exhaust represents an untapped resource in our nation's energy portfolio. This project will enable energy to be captured from this waste stream and turned into useful electrical energy without moving parts with the added benefit of improving overall fuel efficiency and reducing greenhouse gas emissions.

TENNESSEE

Analysis and Measurement Services
Corporation
9111 Cross Park Drive, Bldg A
Knoxville, TN 37923-4510

Integrated System for Management of
Cable Aging in Support of Long Life
Operation of Nuclear Power Plants

The resurgence of nuclear energy as an environmentally friendly source of electrical power has encouraged US nuclear power plants to renew their licenses to operate for 60 years or beyond. As such, they are faced with the growing need to effectively manage their aging assets. One of the greatest challenges will be the determination of the condition of aging cables. This proposal is designed to conduct a hands-on R&D effort for the development of a state-of-the-art cable condition monitoring system not currently available in the nuclear power industry.

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

Prognostic Methods for Predicting
Remaining Useful Life of Nuclear
Plant Equipment and Components

Knoxville, TN 37923-4510

This proposal offers to provide a prognostic system that can provide predictions of the remaining useful life or time to failure of critical plant equipment and components. Successful implementation of prognostic technologies in nuclear power plants can potentially reduce reactor trips and refueling outage times.

AppliFlex LLC
PO Box 159293
Nashville, TN 37215-9293

Laser In-Situ Diagnostics and
Processing Probes for Electron
Microscopes

The assembly and fabrication of nanomaterials into a useful structure and devices remains a grand challenge in nanotechnology. This project will develop a novel method and tool for processing, *in-situ* live imaging and characterization of materials in nanoscale by combining the laser technology with electron microscope instrument.

Information International Associates, Inc.
1055 Commerce Park Drive, Ste 110
Oak Ridge, TN 37830-4219

Deep Indexing of Complex Scientific
and Technical Information Documents,

This project will explore the need for researchers locate digital objects such as graphs, charts and tables within scientific and technical information (STI) research documents and suggest a methodology for the Department of Energy to implement that capability for their massive STI holdings.

Information International Associates, Inc.
1055 Commerce Park Drive, Ste 110
Oak Ridge, TN 37830-4219

Mobile Device Applications in the
Digital Library

This project will explore the need for researchers and scientists to access digital library services on mobile devices and to provide access to scientific and technical information (STI) research documents on such devices.

PHDs Co.
777 Emory Valley Road, Suite
Oak Ridge, TN 37830-7048

Growth of Large Diameter High-Purity
Germanium Crystals for Nuclear
Physics Research

There is a fundamental need for more sensitive, reliable, and cost effective instruments for the detection of gamma rays in Nuclear Physics experiments. The large diameter germanium crystals to be developed will provide the basis for these instruments.

TEXAS

Applied Nanotech, Inc.
3006 Longhorn Blvd. Suite 107
Austin, TX 78758-7631

Nanomaterials for High Performance
Thermal Packaging

The novel thermal management substrates will allow high power electronics, such as those in hybrid vehicle propulsion systems, to operate more efficiently and with less cumbersome, lower cost cooling systems. This

company's thermal management solution provides increased heat rejection compared to currently available materials.

Lynntech, Inc.
7610 Eastmark Drive
College Station, TX 77840-4023

Advanced Electrodes for Low-Cost,
Long Cycle Life Li-ion Batteries

Distributed energy storage is essential to increase grid stability, decrease fossil fuel use, increase asset utilization, and smooth output of renewable sources. This project will develop advanced rechargeable batteries that will improve utility-scale batteries' cycle life, performance, reduce negative environmental effects, and provide cost-effective energy storage solutions.

Lynntech, Inc.
7610 Eastmark Drive
College Station, TX 77840-4023

Contaminant Specific Biosensor for
Monitoring Heavy Metal and
Radionuclide Bioremediation

This project will develop a novel biosensor to provide a real-time measurement of bioremediation rates of heavy metal and radionuclide contamination. The novel biosensor could lead to reduced costs and increased acceptance of bioremediation strategies.

Lynntech, Inc.
7610 Eastmark Drive
College Station, TX 77840-4023

High Energy Density Capacitors for
Pulsed Power Systems

Capacitors that have improved energy density than the state-of-the-art capacitors are needed for pulsed power systems. This project will develop nanodielectrics materials that will have enhanced storage capabilities.

Lynntech, Inc.
7610 Eastmark Drive
College Station, TX 77840-4023

Highly Selective Proton-Conducting
Composite Membranes for Redox Flow
Batteries

This project will develop a low-cost and highly selective proton-conducting composite membranes can enable the development of cost-effective and durable power systems for stationary applications. It also helps efficient use of electricity generated from renewable energy sources and reducing emissions.

Lynntech, Inc.
7610 Eastmark Drive
College Station, TX 77840-4023

Home Based Municipal Solid Waste
Processor for Biofuel Synthesis
Based on Non Thermal Plasma

This project will produce methanol and ethanol from municipal solid waste, which is a domestic renewable energy source. This technology is anticipated to provide another tool for the U.S. to battle the rising political and economic costs of foreign oil by switching to transportation fuel produced from domestic sources.

Metal Oxide Technologies, Inc.
8807 Emmott Rd., Suite 100
Houston, TX 77040-3533

Low Cost YBCO Superconductors for
High Energy Particle Colliders

A reliable, commercially viable superconducting wire which operates without electrical loss will benefit not only high energy physics fundamental research, but also: (1) Industry development and economic growth, (2) The environment by reducing the consumption of politically unstable fossil fuel, (3) Government and military mission critical programs.

Saxet Surface Science
3913 Todd Lane, Suite 303
Austin, TX 78744-1057

STRAW A Hydrogen-Specific
Pressure Gauge for XHV

Many of the next generation of physics accelerators will require high average electron currents, a potential issue for electron sources. This project will develop a pressure measurement device that allows routine use of better vacuum to protect these electron sources from ion damage.

Shear Form, Inc.
207 Dellwood St.
Bryan, TX 77801-2520

"Fine grain Nb tube for SRF
Cavities"

Increased deformability in high residual resistance ratio (RRR) Nb tube for superconducting radio frequency (SRF) cavities in linear accelerators will be achieved by an improved microstructure in the Nb. The improved microstructure will be produced by a new materials processing method to reduce the average grain size, improve microstructural uniformity, improve material ductility, and lower SRF cavity manufacturing costs.

Versoft LLC
2310 Bamboo Drive Suite J303
Arlington, TX 76006-5952

Semantic Search Engine for SBK

This project will yield a software tool that can improve the use of existing and emerging genomics databases by allowing users to search based on semantic concepts as opposed to purely syntactic keywords.

UTAH

STTR Project
HiFunda, LLC
2150 South 1300 East, Suite 500
Salt Lake City, UT 84106-4375

High-Reliability Cements for
Enhanced Geothermal Systems

This project will develop a new hybrid cement system that can be easily produced and installed on site during Enhanced Geothermal Systems (EGS) well construction. The proposed project can help to meet one of the key technical needs for the commercial viability of EGS, and can result in the widespread utilization of geothermal energy, which can result in lowering of greenhouse gases while meeting our growing energy needs.

Materials & Systems Research, Inc.
5395 West 700 South
Salt Lake City, UT 84104-4403

Innovative Fabrication of High Temperature CO2
Selective Membrane for Hydrogen Generation via
Membrane-Enhanced Water-Gas Shift Reaction

This project will develop a thin, high temperature CO₂ separation membrane with engineered microstructure for efficient hydrogen production from fossil fuel.

Reaction Engineering International
77 West 200 South, Suite 210
Salt Lake City, UT 84101-3601

A Technology to Mitigate Syngas
Cooler Fouling

This project will develop a soot blowing technology tailored for use in coal gasification plants. This technology will improve the performance of coal gasification plants, thereby reducing U.S. dependence on foreign energy sources and greenhouse gas emissions.

STTR Project

Reaction Engineering International
77 West 200 South, Suite 210
Salt Lake City, UT 84101-3601

Enhanced Methane Production by
Co-Gasification of Potassium-Rich
Biomass and Coal

This project will investigate enhanced methane production from the co-gasification of potassium-rich biomass and coal. The gas produced will be suitable to fire a fuel cell or to provide substitute natural gas to a pipeline. This process will reduce U.S. dependence on foreign energy sources and greenhouse gas emissions.

VIRGINIA

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

X-Portal Technology for Scientific
Discovery

This project will develop the technology to build comprehensive Web portals for the scientific community.

Lambda Instruments, Inc.
840 University City Blvd., Ste 4
Blacksburg, VA 24060-2708

Accident Condition Temperature
Monitoring up to 1600°C in Gen-IV
Reactors using Sapphire Fiber Optic Sensors

Nuclear energy is widely held as being the only viable source of abundant, CO₂ emissions-free electrical energy capable of meeting projected needs in the near term. This project will develop a sensor technology which will enable the safe operation of emerging nuclear reactor designs.

Lambda Instruments, Inc.
840 University City Blvd, Suite 4
Blacksburg, VA 24060-2708

In-Situ Mechanical Characterization of Refractory
Materials up to 1600C for Gen-IV Reactors using
Sapphire Fiber Optic Sensors

Nuclear energy is widely held as being the only viable source of abundant, CO₂ emissions-free electrical energy capable of meeting projected needs in the near term. This project will develop a sensor technology which will enable the safe operation of emerging nuclear reactor designs.

Luna Innovations Incorporated

Laser Vibrometer PFC Health

1 Riverside Circle, Suite 400
Roanoke, VA 24016-4962

Monitoring System

An enabling technique for in-situ health monitoring of fusion reactor's plasma facing components is proposed to support current and future tokamak development (including ITER). This system enables safe operation of these reactors, which in turn reduce the US dependency on foreign oil while simultaneously reducing greenhouse gas emission.

Luna Innovations Incorporated
1 Riverside Circle, Suite 400
Roanoke, VA 24016-4962

Standardized Energy Measurement Interfaces,
Integration with Facility Infrastructure, and Energy-Aware Algorithms for High Performance Computing Systems

This project will develop an intelligent sensor system that will allow for a significant increase in energy efficiency and productivity of high performance computing systems through the use of integrated sensing elements, active feedback systems for environmental controls, and embedded energy aware algorithms to maximize system resource effectiveness.

STTR Project

NanoSonic, Inc
1485 South Main Street
Blacksburg, VA 24060-5556

Bulk Thermoelectric Materials

Thermoelectric (TE) materials allow low-grade heat (waste heat) to be converted into useful electrical energy. This project will result in the technical advancement and commercialization of a low-cost nanostructured composite thermoelectric device.

STTR Project

NanoSonic, Inc.
1485 South Main Street
Blacksburg, VA 24060-5556

Climate Control Technology for Fossil Energy

This project will use captured CO₂ from coal fired power plants to subsequently replace toxic solvents in a wide range of polymer processing operations. Marketability will be ensured by dynamic applicability to multiple commercial and consumer markets, combined with low materials costs.

NanoSonic, Inc.
1485 South Main Street
Blacksburg, VA 24060-5556

High Performance Hybrid Polyorganosiloxane Cements for Enhanced Geothermal Systems

This project will develop a hybrid copolymer cement technology that will significantly enhance the efficiency and reduce maintenance requirements for Enhanced Geothermal Systems (EGS) well components. Marketability will be ensured by dynamic applicability to multiple commercial and consumer markets, combined with low materials and application costs.

NanoSonic, Inc.
1485 South Main Street

Lightweight, Radiation- and Water-Proof, High-Performance

Blacksburg, VA 24060-5556

Textiles

This project develop a new technology allowing to reduce the weight of radiation-protective garments while enhancing their waterproof properties by taking advantage of its nanoscale techniques and high-performance materials. From this will result a lead-free product that may later be seen in hospitals, doctors' and dentists' offices.

Parabon Computation, Inc.
11260 Roger Bacon Drive, Suite 406
Reston, VA 20190-5203

Virtual HPC Cluster Provisioning in
the Cloud

This project will remedy three fundamental software deficiencies in current "cloud computing" environments that otherwise limit their ability to serve the high-performance computing (HPC) community. As a result, users will be able to provision and use virtual clusters "in the cloud" in a convenient, affordable, pay-as-you-go fashion.

WASHINGTON

STTR Project

Eagle Harbor Technologies, Inc.
321 High School Rd. NE, Suite D3, #179
Bainbridge Island, WA 98110-1619

Low-Impurity, Electrode-less
Pre-ionizer Plasma Gun for Innovative Confinement
Concepts

The proposed work seeks to develop a high power plasma refueling gun to provide low impurity starter plasma for Innovative Confinement Concept for fusion energy development.

Hummingbird Precision Machine Inc.
3340 Windolph Lane
Olympia, WA 98502-3837

Development of an Ultra Low
Expansion Transmission Electron
Microscopy in Situ Heating Holder

Exposure of materials to high temperatures can allow exploration of material changes or an improved understanding of the structure-property relations in materials. This project will yield hardware that will allow scientists to more completely characterize such materials at nano-scale resolution in a transmission electron microscope.

Photon Machines, Inc.
15377 NE 90th St.
Redmond, WA 98052-3562

Towards Simultaneous Single Particle Chemical
and Optical Characterization: Development of a
Multi-angle Optical Scattering Module for the
Aerosol Time-of-Flight Mass Spectrometer

This project tackles one of the largest uncertainties in climate change research, building a unique instrument which simultaneously measures the chemistry and the climactic warming or cooling effect of different types of atmospheric particles. This new instrument is expected to dramatically reduce the uncertainties in climate models, better-informing public policy decisions.

STI Optronics, Inc.

Advanced Capillary Discharge for

2755 Northup Way
Bellevue, WA 98004-1495

Laser Wakefield Acceleration

This project will develop a new type of capillary discharge for advanced high-energy electron accelerators. Applications for these accelerators include industrial processing, medicine, homeland defense, and high-energy physics.

STTR Project

Vista Clara Inc.
2615 W Casino Road, Suite 4-JK
Everett, WA 98204-2124

Integrated Use of Surface and Subsurface NMR
for Measuring and Mapping Saturated Hydraulic
Conductivity in Three Dimensions

This project will develop and demonstrate a cost-effective, minimally invasive field method for using NMR geophysics to measure and map hydraulic conductivity in the top 100m of the subsurface. The proposed methodology will provide reliable, higher-resolution information on this key subsurface property for improved understanding and remediation of contaminated groundwater.

WISCONSIN

Orbital Technologies Corporation
1212 Fourier Drive
Madison, WI 53717-1961

Off-Grid Solid-State Agricultural
Lighting

This project investigates the feasibility of using alternative energy sources such as solar photovoltaic to power solid-state lighting systems for ornamental crop production as a means of reducing agricultural energy demands from the general power grid, improving crop productivity and quality, and increasing flexibility in locating commercial growing operations.