OTFAMP 10-641

2010 FY Advanced Materials Program Grant Request LOI

November 2009

Please accept the following LOI for the 2010 FY Advanced Materials Program Grant.

Lead Applicant: Millcell North America
Contact Person: Jeffrey Smith
Phone Number: 630-992-5600
Email: jeff.smith@millcell.com

Project Title: Demonstrating and Market Entry Funding for Millcell North America
Funds Requested: $1,000,000
Collaborators: Scale Finance
Ohio University

P²SI

Next Generation Materials Development & Engineering

2711 Lance Drive
Moraine, OH 45409

Tel: (937) 298.3713 Fax: (937) 298.6615 http://www.p2si.com

3 November 2009

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

RE: Letter of Intent, Ohio Third Frontier Advanced Materials Program

Title: Commercialization of Novel High Temperature Composite Materials for Advanced Aerospace Structures

Lead Applicant Information:

Jason E. Lincoln, PhD
Performance Polymer Solutions Inc.
2711 Lance Drive
Moraine, OH 45409
Tel: (937) 289-3713
jason.lincoln@p2si.com

Estimated Grant Funds to be Requested: $1MM

Collaborators: Air Force Research Laboratory, National Science Foundation, aerospace system manufacturers

Project Summary:

The proposed OTFAMP program aims to commercialize novel high temperature composite materials technologies recently developed by Performance Polymer Solutions Inc. Recent government and industry funded research and development activities have demonstrated P²SI 900HT as the highest glass transition temperature structural polymer based composite system available. In order to optimize commercial implementation, this new material requires design allowables data generation and production part fabrication by commercial aerospace companies to enable insertion into system platforms. P²SI, an Ohio based advanced materials supplier, has partnered with a number of commercial aerospace system manufacturers and targeted insertion applications for P²SI 900HT. By partnering with a number of aerospace companies on this effort, P²SI can accomplish strategic multiple insertion activities through systematic data generation, component demonstration, and production readiness paths. Using our team approach, the critical design allowables data necessary for component insertion will be available to multiple companies, thereby enabling insertion of this advanced material as a metal replacement in a number of advanced aerospace systems. Subsequent prototype and production component fabrication performed by the end users will be accomplished under this effort with the primary objective of technology insertion and establishment of new product revenue streams for our Ohio based business.

OTFAMP 10-643

NATIONAL COMPOSITE CENTER

2000 Composite Drive Kettering, OH 45420 (937) 297-9450 FAX (937) 297-9440
www.compositecenter.org

November 4, 2009

OTFAMP2010@development.ohio.gov
Subject: 2010 OTFAMP LOI
Estimated grant Amount: $1,000,000

Lead Applicant's name:
National Composite Center
2000 Composite Drive
Kettering, OH 45420

Contact person:
Lisa A. Novelli
President
Tele 937-297-9440
Email lnovelli@compositecenter.org

Project Title: "Bio and Nano Enhanced Sheet Molding Composites"

Known Collaborators:
Ford Motor Company
Molded Fiber Glass Companies
Michelman, Inc

Summary of Project:

The annual Sheet Molding Compound/Bulk Molding Compound (SMC/BMC) thermoset composites business for US automotive applications is 325,000,000 pounds. Use of these SMC/BMC composites had origins in the State of Ohio, and 40% of these products are still molded by small companies in Ohio providing over 4,000 jobs.
Automotive manufacturers in the US face major design and materials issues in striving to meet the 2020 FreedomCar 50% weight and 35 mpg CAFE requirements as currently mandated by the Federal Government.
Ohio-based molders face stagnation or loss of business due to the inability to meet new lighter weight, more environmentally friendly and more consistent products, as needed by the auto industry. To meet the testing, certification and design requirements that car manufacturers will place on future improved SMC/BMC materials, Ohio molders will need the services of a common, conveniently located, efficient and low cost SMC/BMC product certification and design center.
The National Composite Center, through funding support from this TFPAMP grant and its cost share collaborators, will develop solutions to the above problems utilizing resources in the State of Ohio, i.e., the chemical industry, the agricultural industry, molders, parts manufacturers and automotive OEMs.

To address the problem of producing economical and lighter weight SMC/BMC materials, NCC will connect to the Ohio agricultural industry to obtain natural reinforcement and filler materials that require chemical modifications to be useful. To address the problem of producing more consistent and economical SMC/BMC materials, NCC will use equipment obtained through a previous Wright Capital grant to demonstrate a novel process to make SMC/BMC materials with natural and nano modified fillers. Current technical work underway at NCC has demonstrated various viable biocomposite formulations, which show promise towards this goal.

Demonstrations of modified natural/bio fillers, manufacturing novel, light weight, economical SMC/BMC products on NCC's industrial-sized equipment, plus rapid prototype design, certification and commercialization capabilities will provide high visibility of these enhanced composite materials to the US automotive industry.
These successes will lead to increased automotive SMC/BMC usage as well as a significant number of molding related jobs in the State of Ohio.

Respectively,

Lisa Novelli
President
National Composite Center

OTFAMP 10-644

Applied Sciences, Inc.
PO Box 579 • 141 W. Xenia Ave. • Cedarville, OH 45314-0579
Phone: 937-766-2020 • Fax: 937-766-5886

November 2, 2009

The Ohio Department of Development
Technology and Innovation Division
77 South High Street 25th Floor
Columbus, OH 43215

Subject: 2010 OTFAMP LOI

Attention: OTFAMP2010@development.ohio.gov

This Letter of Intent serves to communicate Applied Sciences, Inc.'s intention to submit a proposal in response to the FY 2010 Ohio Third Frontier Advanced Materials Program for the following project:

Lead Applicant:	Applied Sciences, Inc. (Ohio for-profit company)
Address:	141 W. Xenia Ave., Cedarville, OH 45314
Phone:	937-766-2020 x100
Contact person:	Max L. Lake, President / CEO
Email:	mllake@apsci.com
Proposed Project Title:	CNF Materials for Battery Applications
Estimated Request	$1,000,000
Known Collaborators	Pyrograf Products, Inc. (Ohio for-profit company)

Sincerely,

Max L. Lake
President

Applied Sciences, Inc.
PO Box 579 • 141 W. Xenia Ave. • Cedarville, OH 45314-0579
Phone: 937-766-2020 • Fax: 937-766-5886

Applied Sciences, Inc.'s proposed project for the FY 2010 Ohio Third Frontier Advanced Materials Program

Project Title: CNF Materials for Battery Applications

Project Description:

Under a previous Third Frontier Advanced Energy Program, ASI has developed an inexpensive CVD processing method for incorporating silicon onto carbon nanofibers which is complementary to the CVD method for carbon nanofiber production. Under the proposed project, ASI and its collaborators will take the next step for commercial development by scaling production, and by distributing large quantities of CNF material to DOE, DOD, and industrial battery interests for extensive qualification.

OTFAMP 10-645

2010 Ohio Third Frontier Advanced Materials Program
Letter of Intent

Lead Applicant:	Replex Plastics POB 967 11 Mount Vernon Avenue Mount Vernon, OH 43050 740-397-5535 phone
Contact:	Mark Schuetz mark@replex.com

Project Title:	Cost-effective semi-weatherable Coating for first-surface metalized polymeric mirrors
Est. Grant Funds:	$1,000,000
Collaborators:	Battelle Memorial Institute Wright Center for Photovoltaics Innovation and Commercialization (PVIC)

Project Summary:

Replex Plastics, Battelle Memorial Institute, and The Ohio State University propose to develop a semi-weatherable protective top coat for first surface polymeric mirrors. This topcoat would represent a platform technology concept for Replex, having broad application for expanding the company's current polymeric mirror product in the Concentrated Solar markets. Polymer-based mirrors offer advantages to the Concentrating Solar Power and Concentrated Photovoltaics technologies in both weight and cost, contributing ultimately to a lower cost/kilowatt hour, helping advance Solar Energy as a viable renewable technology.

Problem: In order to drive down the cost of solar power to bring it on par with current fossil-fuel solutions, it is necessary to reduce the amount of expensive semiconductor materials used, thereby reducing the installed cost. One of the most cost-effective methods for doing so is using low-cost polymer-based mirrors to focus more light on smaller areas of semiconductor material. A first-surface mirror (where the incident light is essentially falling directly on the reflective surface, rather than passing through a substrate, such as glass or clear polymer) offers the highest reflectance (typically as high as 98-99% of the incident light), and lowest refraction, simplifying the optical design. As mentioned previously, the main advantages to polymer-based optical parts in Solar Energy applications are weight and cost. However, durability of the reflective surface is the main disadvantage. In First-Surface mirrors in particular, since there is no substrate covering, protecting the metalized surface is of primary concern. The current solutions for protecting the base metal currently in the market involve applying varying layers of dielectric materials over the metal surface. However, many of these materials are inherently expensive and the thickness of each layer is critical to the constructive action, making the processes, equipment, and controls necessary to achieve the desired results prohibitively expensive.

Proposed Solution: This novel approach proposes to research, adapt, and evaluate the coating materials, methods, and technologies currently used in, among others, automotive applications as a starting point for achieving a lower-cost solution for these non-direct weathering applications. These technologies leverage existing processes, equipment, techniques, and personnel to extend their capabilities to the solar arena.

OTFAMP 10-646

Hansen, Andrew

From: Russ Sewell [rsewell@qualityswitch.com]
Sent: Wednesday, November 04, 2009 10:22 AM
To: OTFAMP2010
Subject: 2010 OTFAMP LOI

I am Russell Sewell, President of Quality Switch, Inc. and would like to submit this as my Letter of Intent to secure a grant from the Ohio Third Frontier Advanced Materials Program.

My contact information is listed below:
Russell Sewell
President
Quality Switch, Inc
715 Arlington Blvd., P.O. Box 250
Newton Falls, OH 44444
PH: 330.872.5707 FAX: 330.872.3664

My e-mail is : rsewell@qualityswitch.com

I am the lead applicant for the proposal of the Ohio Third Frontier Advanced Materials Program.
We estimate we would need grant funds of $100,000.00 (one hundred thousand dollars) to fund this project for one year.

Our proposal would be for studying the relative effect of biodegradable renewable fluids on tapchanger contacts with respect to contact life expectancy.
We call it: **Life Cycle testing for fluids and contact materials**.

Brief Summary of Proposed Project:

Quality Switch presently manufactures electrical switches. These are not the ordinary switches that one finds in the local hardware store. These switches are used inside electrical transformers, a key part of both the present day electrical grids and the more efficient, higher capacity electrical grids of tomorrow.

Plans for the development of the "Smart" Grid include increasing voltages, currents and DC transmission. Implementation of the "Smart" Grid and incorporation of the alternative energy sources (wind, biomass, and solar) will also require new technologies. Incorporated into all of this will be a demand for electrical transformers and the switches inside them. Presently, only a few companies are involved in this arena and most of those are based outside the US. Quality Switch is a player but desires to be even more of a participant. There will be needs for test facilities that go beyond capacities presently available in the North American continent. There will be opportunities for companies to develop new materials for not only switches but also the components inside the devices in and attached to the grid. Those materials will need test facilities that parallel the needs of Quality Switch. There will be opportunities for research partnerships with local universities in the development of equipment, testing of materials, development of expertise and talent related to this expanding market.

We propose to do testing on different types of contact material (such as copper & brass) and the effects of different types of coating such as tin plating, silver plating, etc. on each type of material and also on stationary tapchanger contacts and moving contacts. This would be done by placing the tapchangers with measuring probes on the contacts into simulated transformer tanks and using higher current or voltage than normal plus higher temperature. These tests would also be done in new types of biodegradable and renewable transformer fluids. We hope to show that we could reduce our use of current fluids such as silicone that are harmful to our environment, show that we could extend the life of contacts on the tapchangers and meet the reduced energy needs of our power grid.

OTFAMP 10-647

Applied Sciences, Inc.
PO Box 579 • 141 W. Xenia Ave. • Cedarville, OH 45314-0579
Phone: 937-766-2020 • Fax: 937-766-5886

November 2, 2009

The Ohio Department of Development
Technology and Innovation Division
77 South High Street 25th Floor
Columbus, OH 43215

Subject: 2010 OTFAMP LOI

Attention: OTFAMP2010@development.ohio.gov

This Letter of Intent serves to communicate Applied Sciences, Inc.'s intention to submit a proposal in response to the FY 2010 Ohio Third Frontier Advanced Materials Program for the following project:

Lead Applicant:	Applied Sciences, Inc. (Ohio for-profit company)
Address:	141 W. Xenia Ave., Cedarville, OH 45314
Phone:	937-766-2020 x100
Contact person:	Max L. Lake, President / CEO
Email:	mllake@apsci.com
Proposed Project Title:	VGCF Pre-preg for Advanced Composites
Estimated Request	$1,000,000
Known Collaborators	Pyrograf Products, Inc. (Ohio for-profit company)

Sincerely,

Max L. Lake
President

Applied Sciences, Inc.
PO Box 579 • 141 W. Xenia Ave. • Cedarville, OH 45314-0579
Phone: 937-766-2020 • Fax: 937-766-5886

Applied Sciences, Inc.'s proposed project for the FY 2010 Ohio Third Frontier Advanced Materials Program

Project Title: VGCF Pre-preg for Advanced Composites

Project Description:

Vapor grown carbon fibers (VGCF) and nanofibers (CNF) have shown great promise for EMI shielding and other composite property improvements, but have to date been unavailable as a continuous sheet good that would enable use in conventional composite processing. ASI has demonstrated a lab-scale process for dispersion and subsequent re-formation into a continuous format which can be processed using conventional pre-pregging equipment. In the proposed effort, ASI and its collaborators will further develop the manufacturing capability to supply VGCF and CNF prepreg for composite applications ranging from EMI shielding and thermal management for consumer electronics to lightning strike protection and structural composites for aircraft and spacecraft.

P²SI

Next Generation Materials Development & Engineering

2711 Lance Drive
Moraine, OH 45409

Tel: (937) 298.3713 Fax: (937) 298.6615 http://www.p2si.com

3 November 2009

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

RE: Letter of Intent, Ohio Third Frontier Advanced Materials Program

Title: High Temperature Out-of-Autoclave Structures for Advanced Aerospace Applications

Lead Applicant Information:

Jason E. Lincoln, PhD
Performance Polymer Solutions Inc.
2711 Lance Drive
Moraine, OH 45409
Tel: (937) 289-3713
jason.lincoln@p2si.com

Estimated Grant Funds to be Requested: $1MM

Collaborators: Air Force Research Laboratory, NAVAIR, aerospace system manufacturers

Project Summary:

The proposed OTFAMP program aims to commercialize new high temperature composite materials recently developed by P²SI that can replace titanium and other metals in aerospace structural components up to 700°F. These new composites have a distinct advantage over other state-of-the-art high temperature composites in that they exhibit superior performance *and* have the potential to be used to fabricate large structures out-of-autoclave, resulting in significant cost savings and increased production rates to commercial aerospace system manufacturers. In the proposed OTFAMP program, the P²SI team will target two potential out-of-autoclave insertion applications, develop out-of-autoclave processes and material modifications necessary to achieve high performance parts, and develop necessary material properties database for the optimized out-of-autoclave system. Through partnership with the end user throughout the development, manufacturing, and commercialization stages, we provide the foundation for successful commercialization of this new technology and future consistent product revenues for our Ohio manufacturing small business.

OTFAMP 10-649

Composite Technical Services Inc.

Ohio Department of Development, Technology and Innovation Division
Attention: Ohio Third Frontier Advanced Materials Program
Columbus, OH – 43215

Dear Sir/Madam
Composite Technical Services Inc. is pleased to submit the present Letter of Intent related to a proposal to be evaluated into the Advanced Materials Program for the Fiscal Year 2010.

Lead Applicant : **Composite Technical services, Inc.**
2000 Composite Dr.
Kettering, OH – 45420
Technical Contact: Elena Benedetti – elena@ctsusa.us
Administrative Contact: Debi Talentino – debi@ctsusa.us

Collaborators and Partners: **Nanosperse LLC**
2000 Composite Dr., Kettering, OH

National Composites Center
2000 Composite Dr., Kettering, OH

University of Dayton Research Institute
300 College park, Dayton, OH

Case Western Reserve University
Cleveland, OH

Grant request: **950,000 USD**
Project Duration: **2 years**
Project Title. **New bio-derived nano-structured thermoset coatings and elastomers with improved thermal resistance for the automotive and aerospace industries.**

Project Summary:

The present project aims at increasing the competitiveness of the composite and polymeric industries of Ohio with a direct reflection on the automotive and aerospace component manufacturing sectors. The basic idea of the project starts from the consideration that the new engineering techniques and processes render machinery, motors and electrical appliances more performant and long-lasting. At the same time the tendency to use polymeric materials as integral parts of these appliances is increasing and, although in the structural field very good

performances have been achieved, there are still issues related to durability and temperature/tribological characteristics of coatings and adhesive elastomers. In particular elastometric adhesives are subject to embrittlement in time and failure at high temperatures.

Since automobile and aircraft parts are required to offer not only high performances but also safety for the users there is the need for polymeric materials that meet and exceed the present standards and meet also the new trends substantial bio-renewable content in vehicles and appliances.

Starting from these preliminary remarks the project aims at the scale-up and validation of two new classes of bio-derived materials, of hybrid CNSL/Soybean Oil origin, that will have increased thermal-resistance, electrical insulation and tribological properties compared to state-of the art thermosets. The materials will be thermosetting benzoxazines in the case of coatings for electrical insulation/composites wireboards and thermosetting epoxy-urethanes and polyurea systems as elastomeric compounds for rubber substitution. This latter class of polymers has the aim of bridging the gap between synthetic and natural elastomers performances, maintaining a significant bio-based amount of raw material in the mixture. The scale-up and chemical validation of the products and processes will be carried on by CTS with a significant contribution of Prof. Ishida from Case Western Reserve University.

To increase the thermal and tribological performances of the proposed thermosets a series of nano-structured compounds will be prepared, using CTS' knowledge of the proposed clay and Nanosperse technology, that was successfully scaled-up licensing UDRI Technology. Nanosperse contribution will be of essence to achieve a correct nano-structured dispersion and limit adverse rheologic effects.

The validation of the synthesized materials and compounded thermosets from the microscopic, mechanical, thermal, rheologic and tribiological point of view will be carried out by the University of Dayton Research Insitute (UDRI) that will contribute to the final formulation fo the materials to improve the desired characteristics.

The process and application-related issues will be taken into account by the National Composite Center that will be able to identify the best specific applications for each material.

OTFAMP 10-650

2010 CLUSTER DEVELOPMENT LETTER OF INTENT (LOI)
ADVANCED MATERIALS PROGRAM

Lead Applicant's Name:	UES, Inc.
Address:	4401 Dayton-Xenia Road Dayton, OH 45432-1894
Telephone Number:	937-426-6900
Contact Person:	Dee Dee Donley ddonley@ues.com 937-426-6900, ext. 129
Proposed Project Title:	Design, Fabrication and Surface Modification of Water Jacket Inserts for Die Casting of Aluminum Engine Blocks
Estimated Grant Funds Requested:	$1 million
Known Collaborators:	Honda Engineering North America, Anna, OH Kapex Manufacturing LLC, Saginaw, MI
One Page Summary of Project:	See next page

Summary of the Proposed Project

The water jacket insert is a critical component for die casting of aluminum engine blocks. These inserts are subjected to high levels of thermal and mechanical stresses that cause premature failure due to heat checking and gross cracking. In addition, high and uneven temperatures at the water jacket insert result in to heavy soldering of aluminum. Normally, the fatigue life of water jacket inserts is very short, several thousand to ~10,000 shots for very good case. In order to prolong the life of water jackets, die casters have tried everything from surface coating, jet cooling, early core pull to release the water jacket from hot casting, strictly regulated maintenance and materials selection, but without success. These water jacket inserts are quite expensive thus resulting in considerable replacement cost. The cost due to machine down time is much more significant than the insert replacement cost. Thus, a factor of two improvements in fatigue life can save the die casters of aluminum engine blocks a significant amount of money.

UES, along with its partners Honda Motors of America and Kapex Manufacturing proposes to develop longer lasting water jackets by improving the design, material and coating. UES will investigate the stress variation in critical sections of the die insert during the aluminum die casting cycle that include stress pulses during aluminum injection and lubricant spray and/or air blow off. The areas of the highest thermal stress damage accumulation will be identified and changes in the geometry of water jacket insert will be proposed. If the casting part designers at Honda Motor find the change acceptable, then Kapex Manufacturing will be able to manufacture the inserts according to this new design. Also, new materials with high thermal conductivity and fracture toughness will be considered for the die insert. The newly developed water jacket die inserts will be coated at UES for improved heat checking resistance and reduced soldering. UES is currently providing the coatings for core pins for aluminum die casting to Honda.

OTFAMP 10-651

SunChemical®
Performance Pigments™

Sun Chemical Corporation
5020 Spring Grove Avenue
Cincinnati, OH 45232
USA
Toll Free+1 800 543 2323
Tel +1 513 681 5950
www.sunpigments.com

November 3, 2009

Ohio Third Frontier Advanced Materials Program
The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

Sent To: **OTFAMP2010@development.ohio.gov**

Subject: 2010 OTFAMP LOI

To Whom it May Concern:

Sun Chemical is pleased to submit this letter of intent for the application of a proposal for the 2010 competition for the Ohio Third Frontier Advanced Materials Program. The first page of this letter provides required program information and the second page summarizes the proposed project.

Lead Applicant:	Sun Chemical Corporation 5020 Spring Grove Avenue Cincinnati, OH 45232
Contact Person:	Russell Schwartz, Vice President of Colors Technology
Contact Telephone:	(513)681-5950 extension 268
Contact Email Address:	Russell.Schwartz@SunChemical.com
Project Title:	Materials for Electrowetting Devices: Providing Durable Color for Electronic Paper, Digital Signage, and Consumer Electronic Devices Operating on Electrowetting and Electrofluidic Principles.
Estimated Funds:	$1,000,000 over 3 years
Known Collaborators:	University of Cincinnati – Cincinnati, OH (Project partner) Gamma Dynamics – Cincinnati, OH (Project partner) adt Gmbh – Bad Soden, Germany (Partner) Liquavista – Eindhove, The Netherlands (Partner)

Sincerely,

Russell J. Schwartz

Russell J. Schwartz
Vice President of Colors Technology

SunChemical®
Performance Pigments™

Sun Chemical Corporation
5020 Spring Grove Avenue
Cincinnati, OH 45232
USA
Toll Free+1 800 543 2323
Tel +1 513 681 5950
www.sunpigments.com

Project Summary:

During the past year, the printing ink and pigment industries have suffered as many national newspapers closed, reduced or ceased printing in favor of electronic media, or filed for bankruptcy. Condé Nast has closed four publications: Gourmet, Cookie, Elegant Bride, and Modern Bride. The publication industry has visibly been affected by disruptive electronic media, which are becoming readily available to an increasing number of Americans. Among these electronic technologies are e-readers and e-paper, where use is growing and market projections have it reaching $10 Billion over the next eight years. The key to market adoption for e-reader and e-paper is to achieve full color capability with high contrast and white reflectivity.

Sun Chemical (Sun) and the University of Cincinnati (UC), both located in Cincinnati, are now in their 4th year of a project to create a new class of electrofluidic and electrowetting pigmented fluids. These fluids will offer significant opportunity to improve the existing state of electrowetting devices, which are currently dye-based, and to advance the technical performance of current electronic devices, such as e-paper. The pigmented fluids overcome durability deficiencies that dyes impose on electronic devices for outdoor use while concurrently enabling improved image quality. The improved image quality results from full color capability and white reflectivity approaching that of paper. The rigorous requirements for such materials demand the development of a new class of high performance pigment dispersions which can only be produced by state of the art manufacturing processes.

Through the duration of the program with UC, Sun and UC have been able to demonstrate fluids that function in electrofluidic devices as well as to develop intellectual property around the fluids. The development work completed to date indicates that the performance capability of the fluids will allow for breakthroughs in electrofluidic and electrowetting technology. Working with key partners such as UC and Gamma Dynamics, Sun Chemical is poised to complete the IP portfolio and begin to manufacture and sell these high performance materials. In addition, Sun and UC have identified other key partners or customers such as adt Gmbh and Liquavista, who are actively working to develop display devices relying on electrowetting principles. Nick Sheridon, a recognized industry authority from Xerox PARC said in a recent article that electrowetting has the greatest potential to achieve color.

In summary, funding of $1,000,000 over three years is being requested to build Sun's capability to manufacture and test materials for electrowetting display devices. This includes adding technical expertise for continued development of materials, manufacturing and testing capability with all anticipated funding being applied to facilities in the Cincinnati, OH region.

OTFAMP 10-652

*(513) 469-9919 * 11379 Grooms Rd * Blue Ash, Ohio 45242*

Maverick Corporation
11379 Grooms Road
Blue Ash, Ohio 45242
Phone: (513) 469-9919 Ext. 202
Fax: (513) 247-2452

November 4, 2009

Project Title: "Advanced High-Temperature Adhesives for Military and Commercial Aircraft"

Grant Funds: Total program = **$2M** ($1M cash/in-kind, $1M match from State of Ohio)

Contact: Dr. Robert A. Gray
E-Mail: rgray@maverickcorp.com
Cell Phone: 513-310-1052

Ohio Department of Development:

This letter represents a formal notification that Maverick Corporation intends to file a full proposal in response to the 2009 Ohio Advanced Materials Program. Our proposal will be entitled "Advanced High-Temperature Adhesives for Military and Commercial Aircraft." Through increased market penetration, high-temperature adhesives offer Ohio businesses the opportunity for significant growth in the fabrication of polymer and matrix composite structures for aerospace.

One of the road blocks for transitioning high-temperature composite structure is the lack of adhesives for bonding honeycomb sandwich panels. Maverick plans to team with advanced materials companies throughout the state, and jointly obtain property data and manufacturing methods that can be used to market and sell these products. Maverick will assemble an integrated product development team to complete the project, and to accelerate the commercialization of advanced adhesive materials. Verbal commitments of matching and in-kind support have already been solicited from the following organizations:

Maverick Corporation: Team Lead, polyimide adhesive resin production.
Akron Polymer Systems (APS): Develop nano-filled/toughened adhesive candidate.
Center for Multifunctional Polymer Nanomaterials & Devices (CMPND): Program management.
Renegade Materials Corporation: Produce and market adhesive film products.
University of Dayton Research Institute (UDRI): Adhesive testing.

In order to enhance and promote business development in Ohio, collaborators in Akron, Cincinnati, Columbus, and Dayton were selected to participate in the commercialization effort. All parties involved look forward to working together in the near future.

Sincerely,
Dr. Robert A. Gray – President
Maverick Corporation

OTFAMP 10-653

*(513) 469-9919 * 11379 Grooms Rd * Blue Ash. Ohio 45242*

Maverick Corporation
11379 Grooms Road
Blue Ash, Ohio 45242
Phone: (513) 469-9919 Ext. 202
Fax: (513) 247-2452

November 4, 2009

Project Title: "Low Cost Part Fabrication of High-Temperature Composites"

Grant Funds: Total program = **$2M** ($1M cash/in-kind, $1M match from State of Ohio)

Contact: Dr. Robert A. Gray
E-Mail: rgray@maverickcorp.com
Cell Phone: 513-310-1052

Ohio Department of Development:

This letter represents a formal notification that Maverick Corporation intends to file a full proposal in response to the 2009 Ohio Advanced Materials Program. Our proposal will be entitled "Low Cost Part Fabrication of High-Temperature Composites." Out-of-Autoclave processing of high-temperature resin systems offer Ohio businesses the opportunity for significant growth in the building of large composite structures for aerospace.

One of the road blocks for transitioning large high-temperature composite structure to practice is the large capital equipment cost that is needed to procure high-temperature, high pressure autoclave vessels. Maverick plans to team with Renegade to produce high-temperature prepreg that can be cured under vacuum by only using an air oven. Maverick will produce the enabling resin chemistry while Renegade will develop the manufacturing process to produce and sell the prepreg. Maverick will assemble an integrated product development team to complete the project, and to accelerate the commercialization of Out-of-autoclave materials. Verbal commitments of matching and in-kind support have already been solicited from the following organizations:

Maverick Corporation: Team Lead, polyimide adhesive resin production.
Center for Multifunctional Polymer Nanomaterials & Devices (CMPND): Program management.
Renegade Materials Corporation: Produce and market adhesive film products.
University of Dayton Research Institute (UDRI): Adhesive testing.

In order to enhance and promote business development in Ohio, collaborators in Cincinnati, Columbus, and Dayton were selected to participate in the commercialization effort. All parties involved look forward to working together in the near future.

Sincerely,
Dr. Robert A. Gray – President
Maverick Corporation

P²SI

Next Generation Materials Development & Engineering

2711 Lance Drive
Moraine, OH 45409

Tel: (937) 298.3713 Fax: (937) 298.6615 http://www.p2si.com

3 November 2009

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215

RE: Letter of Intent, Ohio Third Frontier Advanced Materials Program

Title: Commercialization of Novel Hybrid Structural Reinforcement Fiber for Aerospace Applications

Lead Applicant Information: David B. Curliss, PhD
Performance Polymer Solutions Inc.
2711 Lance Drive
Moraine, OH 45409
Tel: (937) 289-3713
jason.lincoln@p2si.com

Estimated Grant Funds to be Requested: $1MM

Collaborators: Aerospace Manufacturers, Office of Naval Research, National Science Foundation

Project Summary:

The proposed OTFAMP program will enable commercialization of novel hybrid structural fiber reinforcement materials technology recently developed by Performance Polymer Solutions Inc. (P^2SI). Federal government funded research and development of this technology by P^2SI has demonstrated that P^2SI's ***Nanofiber-Fused Microfiber*** (Nf^2-M) simultaneously increases interlaminar shear strength, thermal conductivity, electrical conductivity, and damage tolerance of continuous fiber reinforced advanced composite materials. This unique combination of properties overcomes many current limitations of advanced composite materials. P^2SI is a pioneer in this technology that offers a practical and commercially viable means to incorporate carbon nanofiber technology into composite structures and is well positioned for commercialization of the technology with a foundation patent issued (US Patent 7,338,684) and a patent application for a continuous manufacturing process currently being prosecuted. Additionally, under sponsorship from the US Navy P^2SI has established pilot plant production capacity for this technology. The pilot plant scale manufacturing enables optimization of the product and development of process parameters for manufacturing scale-up with minimal risk.

P^2SI, an Ohio based advanced materials supplier, has partnered with a number of commercial aerospace system manufacturers and targeted insertion opportunities for P^2SI Nf^2-M. Process

2711 Lance Drive
Moraine, OH 45409
Tel: (937) 298.3713 Fax: (937) 298.6615 http://www.p2si.com

optimization R&D is currently being conducted under an Office of Naval Research project and the OTFAMP program will focus on structural data generation and manufacturing scale-up. By providing design data and commercial scale production capability to meet the needs of the early insertion opportunities the Nf^2-M materials technology this technology can meet aerospace systems transition points. Using our team approach, the critical design data necessary for component insertion will be available to multiple companies, thereby enabling insertion of this advanced material as a replacement for metals as well as conventional composite materials in many advanced aerospace systems. Subsequent prototype and production component fabrication performed by the end users will be accomplished under this effort with the primary objective of technology insertion and establishment of new product revenue streams for our Ohio based business.

OTFAMP 10-655

Steel Valley Capital, LLC

November 3, 2009

TO: OTFAMP
Ohio Department of Development
77 South High St.
Columbus, OH 43215

Subject: "2010 OTFAMP LOI" emailed to: OTFAMP2010@development.ohio.gov

Dear Sir/Madam:

On behalf of the development team and our collaborators, please accept this letter of intent for the Ohio Third Frontier Advanced Materials Program.

Information requested is as follows:

Lead Applicant:	Steel Valley Capital, LLC
Address:	3017 Belmont Ave. Youngstown, OH 44505-1825
Contact:	Brad C. Knoch, Vice President
Phone Number:	412-526-7869 (cell – primary) 330-759-7680 (office)
Email:	bknoch@mrcgrog.com

Proposed Project Title: **Steel Valley green solid surface product development**

Estimated Grant Funds Requested: $450,000.

Known Collaborators: Youngstown State University, STEM College, Youngstown, OH,
Maryland Refractories Co., Irondale, OH

A one page summary is attached for your review. Thank you for your consideration.

Sincerely,

Brad C. Knoch

Steel Valley Capital, LLC, is developing a new "green" solid surface product, to be primarily used in countertops. The product being developed uses a minimum of 75% grog materials obtained from Maryland Refractories Co in Irondale, Ohio, who recycles industrial waste firebrick reclaimed from area landfills. In fact, 100% of the new product will be recyclable, with no by products or residual waste, manufactured at very low energy use and at normal temperatures. The high concentration of ceramic material gives outstanding mechanical properties including: scratch, impact, heat, stain, and wear resistance. As a solid, waterproof, nonporous surface, this product will not allow germs and bacteria to grow.

We have product samples available developed using a resin base which currently provides heat resistance up to 500 degrees F. However, Steel Valley Capital's management feels that refining the use of commercially available ceramic binders can increase heat resistance to over 2,000 degrees F, increasing potential commercial uses, and being far superior to anything currently on the market, as well as qualifying as a "green" product.

As of Sept., 2009, there were 3,855 total commercial projects LEED certified according to the USGBC. However, there are over 25,000 new registered projects. It is estimated that values of new green building construction will increase from $12 Billion in 2006 to $60 billion in 2010. The green market is EXPLODING, having grown by 300% in the last 4 years alone. The Freedonia Group, Inc., of Cleveland, Ohio, also released a study this year indicating that overall countertop growth will exceed 2.4% annually, with engineered stone countertops leading the way at double digit growth rates.

In NE Ohio, there are tens of millions of tons of discarded refractory materials that can be used as "green" building material. The finished product can be used not only as a counter top, but for furniture and desks, graffiti proof wall or floor tile, and a myriad of other hard surfaced products. Because our recycled product was originally manufactured for strength and heat resistance, in its recycled form it will outperform all other products on the market, and can be competitively priced.

Supporting Steel Valley Capital, LLC, is Maryland Refractories assisting in the development of specialty grogs, as well as product development initiative by our research and technology development partner, Youngstown State University STEM College. With expertise in material sciences, the University will provide comprehensive material testing on a number of experimental composite materials to all applicable ASTM standards. The objective would be to determine the optimum composite material for various applications.

In addition, the University will investigate the use of various high temperature materials to be used as potential "binding agents" to help develop a composite material for extremely high temperature applications, over 2,000 degrees F. Such a composite material would enable industrial and aero-space applications.

The University will also expend technical and engineering resources to assist in developing a cost effective and energy efficient manufacturing process, appropriately scaled for market requirements.

Once these formulations and processes have been fully defined, we see the development of a prosperous multi million dollar company in northeast Ohio supporting tens, if not well over 100 new manufacturing jobs being created.

OTFAMP 10-656

2010 CLUSTER DEVELOPMENT LETTER OF INTENT (LOI)
ADVANCED MATERIALS PROGRAM

Lead Applicant's Name:	UES, Inc.
Address:	4401 Dayton-Xenia Road Dayton, OH 45432-1894
Telephone Number:	937-426-6900
Contact Person:	Dee Dee Donley ddonley@ues.com 937-426-6900, ext. 129
Proposed Project Title:	Real-Time Heavy Metal Sensor for Water Contamination
Estimated Grant Funds Requested:	$1M
Known Collaborators:	Woolpert, Inc.
One Page Summary of Project:	See next page

Summary of the Proposed Project

Detection and identification of heavy metal and toxic industrial contaminants (TIC) in the air and in water is essential to protecting fragile ecosystems and to ensure public health and safety. The goal of this proposal is to develop a real-time hand held device to detect heavy metals in storm water run-off. This project is in collaboration with Woolpert, Inc., a company that will be utilized as a test bed as well as a distribution network for their customers that meet EPA standards.

UES scientists, in collaboration with researchers at AFRL, have developed a method for the peptide-mediated formation of small (<20nm), uniform gold nanoparticles and their use as heavy metal and TIC sensors. Utilizing the intrinsic surface plasmon resonance properties of gold nanoparticles coupled with the biological affinity of the engineered peptides for heavy metal ions and TICs, this system exhibits characteristic colorimetric and electronic responses to particular contaminants. This system has been used to detect down to ppb concentrations of Cu^{2+}, Ag^{+}, Ca^{2+}, Pb^{2+}, Ni^{2+}, Pd^{2+}, Zn^{2+}, Pt^{2+}, Co^{2+}, and Hg^{2+} in laboratory water (liquid) samples as well as ppm concentrations of vaporized naphthalene. UES is integrating these nanoparticles into a handheld device that can be used to detect Cd^{2+}, Pb^{2+}, Zn^{2+}, Co^{2+}, and Hg^{2+} metals in storm water run-off. We will use the Third Frontier funding to develop and test the prototype in real world environments.

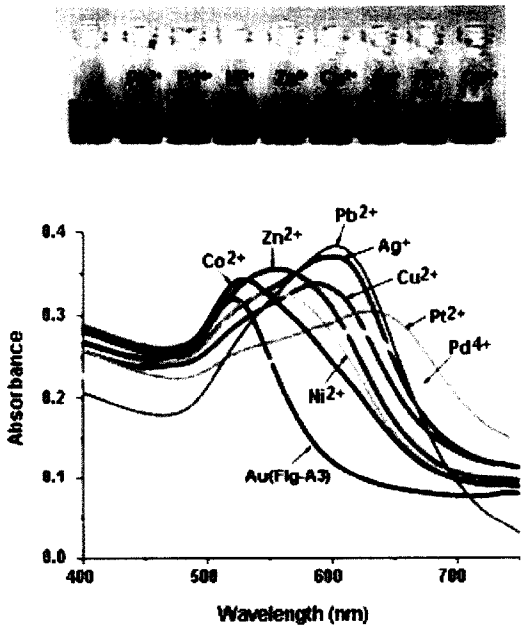

Figure 1. A. Colorimetric change after introduction of target heavy metal. B. Discrete absorbance peaks detected using a spectrophotometer in the presence of individual heavy metals.

OTFAMP 10-657

MAVERICK CORPORATION

*(513) 469-9919 * 11379 Grooms Rd * Blue Ash, Ohio 45242*

Maverick Corporation
11379 Grooms Road
Blue Ash, Ohio 45242
Phone: (513) 469-9919 Ext. 202
Fax: (513) 247-2452

November 4, 2009

Project Title: "High-Temperature Composite Tooling"

Grant Funds: Total program = **$2M** ($1M cash/in-kind, $1M match from State of Ohio)

Contact: Dr. Robert A. Gray
E-Mail: rgray@maverickcorp.com
Cell Phone: 513-310-1052

Ohio Department of Development:

This letter represents a formal notification that Maverick Corporation intends to file a full proposal in response to the 2009 Ohio Advanced Materials Program. Our proposal will be entitled "High-Temperature Composite Tooling." High-temperature composite tooling will offer Ohio businesses the opportunity for significant growth in the building of large, high-temperature composite structures for both military and commercial aerospace applications.

One of the road blocks for transitioning large high-temperature composite structure to practice is the large cost and massive weight of the required tooling. Low-cost, light weight composite tools will save millions of dollars in energy by not having to heat the heavy metal tools that are currently being used by industry. Maverick plans to team with Renegade and GrafTech to produce high-temperature composite tools that can be used in the aerospace industry. Maverick will produce the enabling resin chemistry and coatings while Renegade will develop the manufacturing process to produce and necessary prepreg. GrafTech will provide a world-wide marketing network to sell the tooling technology. Verbal commitments of matching and in-kind support have already been solicited from the following organizations:

Maverick Corporation: Team Lead, polyimide resin coating production.
Center for Multifunctional Polymer Nanomaterials & Devices (CMPND): Program management.
GrafTech International: Sales and distribution partner.
Renegade Materials Corporation: Produce and market film products.
University of Dayton Research Institute (UDRI): Testing.

In order to enhance and promote business development in Ohio, collaborators in Cincinnati, Columbus, and Dayton were selected to participate in the commercialization effort. All parties involved look forward to working together in the near future.

Sincerely,
Dr. Robert A. Gray – President
Maverick Corporation

Biopolymers International, Inc.

OTFAMP 10-658

November 4, 2009

Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

Letter of Intent (LOI) to Submit a Proposal in Response to Ohio Third Frontier – Advanced Materials Program 2010 RFP

Required information:

Lead Applicant:	Biopolymers International, Inc.
Address:	6061 Pearl Road, Cleveland, OH 44130
Contact Person:	Lel F. Somogyi Phone: 440-342-6023 Email: lelsomogyi@biopolymersinternational.com
Proposed Project Title:	Commercialization of a "Green" Process for the Manufacturing of Reactive Polymers
Estimated Grant Funds:	$500,000
Known Collaborators:	University of Akron Research Foundation PolymerOhio

Project Summary:

The objective of this project is to scale up a new process for manufacturing reactive functionalized polymers from PEG (polyethylene-glycol), PDMS (poly dimethyl siloxane), PIB (polyisobutylene)-OH and similar polymers. The reactive functional groups include methacrylate, acrylate, amine, thiol, thymine and other groups. Liquid polymers can be functionalized without the use of solvents, reducing the "carbon footprint." These polymers are used in biomedical as well as commodity applications.

Enzyme-catalyzed processes have the potential for dramatically lowering manufacturing costs of these types of polymers by reducing equipment requirements, eliminating many intermediate chemical and filtration steps, and simplifying the reaction process. The potential exists for at least halving manufacturing costs, but savings could be orders of magnitude greater if the process is refined.

OTFAMP 10-659

LakeShore

November 3, 2009

Ohio Department of Development
Technology and Innovation Division
77 S. High Street, 25th Floor
Columbus, OH 43216

Subject: Letter of Intent (LOI) – "Ohio Third Frontier Advanced Materials Program"

To Whom It May Concern:

This letter is a notice of intent from Lake Shore Cryotronics to submit a proposal in response to the Ohio Third Frontier Advanced Materials Program RFP released on October 7, 2009.

Prospective Lead Applicant:	Lake Shore Cryotronics Inc. 575 McCorkle Blvd Westerville OH 43082 614.891.2243
Contact Person:	Philip Swinehart, VP R&D, pswinehart@lakeshore.com
Collaborators:	Lake Shore is working with an integrated team composed of collaborators at The Ohio State University and end users in various industries.
Proposed Project Title:	Easy to manufacture platform technology for advanced materials
Estimated funds:	A $2 million program including $1 million in State of Ohio funds.

Summary:

Lake Shore, along with its collaborators and end users, is working on a breakthrough thin film manufacturing technology that has applications in a variety of cutting edge fields. The technology employs simple manufacturing processes and greatly reduces the cost of depositing thin films for devices. Characteristics of thin films manufactured by the proposed technique rival those manufactured by ultra low vacuum high cost equipment. The proof of principle tests have been very promising and have led to development of multiple applications. Photovoltaics, energy storage, sensors and actuators are some of the key fields of application vital to the goals of the TF program that will be addressed in this proposal. Proposed is a disruptive technology capable of generating an attractive return on investment (ROI) when high volume manufacturability is achieved. Lake Shore, along with its collaborators, is seeking TF funds to reach manufacturability in five key applications over the course of a three year program.

Sincerely,

Philip R. Swinehart
Vice President, Research and Development

OTFAMP 10-660

Letter of Intent (LOI)
FY2010 Ohio Third Frontier Advanced Materials Program (OTFAMP)

Lead Applicant's name: Ioana E. Pavel, Ph.D., Assistant Professor Physical Chemistry
Address: Wright State University, Department of Chemistry, 464 Oelman Hall, 3640 Colonel Glenn Hwy., Dayton, OH 45435-0001, U.S.A.
E-mail: ioana.pavel@wright.edu
Phone: (937)-775-4652

Proposed project title: "Green" silver nanomaterials for ultrasensitive SERS-based detection and therapeutic applications.

Estimated Grant Funds: $350,000 for 2 years. The grant funds will mainly be used to purchase instrumentation, chemicals, and other laboratory supplies, and to support proper personnel including graduate and undergraduate students.

Collaborators:
1) Dawn Wooley, Ph.D. -Associate Professor of Virology
Address: Wright State University, Department of NeuroScience and Cell Bio Physiology
Allyn Hall 127, 3640 Colonel Glenn Hwy., Dayton, OH 45435-0001, U.S.A.
Email: dawn.wooley@wright.edu
Phone: (937)-775-4993

2) Rajender S. Varma, Ph.D.
Address: U.S. Environmental Protection Agency, National Risk Management Research Laboratory, Sustainable Technology Division, 26 West Martin Luther King Drive, MS 443, Cincinnati, OH 45268, U.S.A.
E-mail: Varma.Rajender@epamail.epa.gov or Varma.Rajender@epa.gov
Phone: (513)-487-2701

"Green" silver nanomaterials for ultrasensitive SERS-based detection and therapeutic applications.

The synthesis of silver nanomaterials is an extremely active research area because of the numerous potential applications in the material science, chemistry, biomedical, pharmaceutical, and energy arenas. One of the most exciting and demanding applications of these nanomaterials is associated with the detection of single-molecules by surface-enhanced Raman spectroscopy (SERS). The main challenge in SERS is to fabricate SERS-active nanostructures that are reproducible, dependable, sensitive, environmentally sustainable, non-toxic, and energy conservative. The scientific goals of this project are: 1) to synthesize novel silver nanomaterials by using alternative, energy-efficient methods (e.g., microwave-assisted reactions in water) and non-toxic, non-hazardous, biological reagents (e.g., plant extracts, amino acids, nucleotides, vitamins, dietary supplements, etc.) in collaboration with the U.S. Environmental Protection Agency, 2) to use chemical and physical methods to characterize and to quantify the amount of synthesized nanomaterials, 3) to demonstrate that these nanomaterials are capable of generating local optical fields of very high electromagnetic energy for ultrasensitive SERS-based detection, and 4) to assess the cytotoxicity effects and the antimicrobial activity of these nanomaterials. Various techniques in the areas of chemistry, materials science, toxicity, biology, and immunology will be used to accomplish these goals. It is expected that novel "green" silver nanomaterials with the following properties will be identified: a) SERS enhancement factors larger or comparable to those generated by classical silver nanomaterials and b) promising antimicrobial activity against *Yersinia pestis* (i.e., the causative agent of the plague) and other bacterial species of medical and public health significance. Based on the nanomaterial's capability of generating local optical fields of high electromagnetic energy and suitability for SERS analysis, the cellular location of the silver nanomaterials and the antimicrobial mechanism of action on the silver nanomaterials will be interrogated. The results of this study will directly serve the environment, science, and public community by developing alternative, energy-efficient processes for the preparation of bio-friendly, non-toxic silver nanomaterials for ultrasensitive, molecular SERS-based detection and other biomedical applications. Additionally, since the funding will allow the selection of undergraduate students to participate in this project, the recruitment and development of the next generation of nanotechnology scientists will be promoted through this advanced, early scientific research opportunity at the undergraduate level.

BOARDMAN MOLDED PRODUCTS INC.

November 2, 2009

Ohio Department of Development, Technology and Innovation Division
Attention: Ohio Third Frontier Advanced Energy Program
77 South High St. 25th Floor.
Columbus, OH 43215

To Whom It May Concern:

Boardman Molded Products is pleased to submit this Letter of Intent to submit a proposal in response to the Ohio Third Frontier Advanced Entergy Program Fiscal Year 2010 Request for Proposals.

Lead Applicant:	Boardman Molded Products Inc. 1110 Thalia Ave., Youngstown, OH 44512
Administrative Contact:	Ron Kessler, President (330) 788-2400 x 102 rkessler@spacelinks1.com
Technical Contact:	Dave Neill, Engineer, Boardman Molded Products (330) 788-2400 x 140 dneill@spacelinks1.com
Project Title:	Advanced Material Project for protective covering and ultra thin lighting source.
Estimated Grant Funds to be Requested:	$750,000
Collaborators:	Boardman Molded Products Inc. Youngstown State University, STEM College Cee Light Inc.
Employment implications:	Project will help retain 10 jobs, commercial application will add 25-50 jobs local and state wide.

1110 Thalia Avenue
Youngstown, Ohio 44512
(330) 788-2400 • (330) 788-9665

BOARDMAN MOLDED PRODUCTS INC.

Description:

Business overview: Boardman Molded Products is a leading manufacturer of commercial entryway flooring systems and entryway matting. Its many innovative patens have led literally hundreds of millions of feet to walk over its products every year. Major national retailers utilize BMP products to help keep stores safer, cleaner and more aesthetically appealing.

The ability to reach consumers just before they enter a retail environment is very appealing to major advertising brands. One of BMP's pending patents utilizes the entryways of its retail customers, transforming them into an advertising apparatus.

This advertising segment can expand BMP's core business creating new manufacturing, distribution, graphic design and marketing jobs based in Youngstown, OH.

Project description: The key to the project is a unique under-lighting system that attracts the consumer's eye as they walk over the advertisements. The goal of this project is to develop a more cost effective lighting system and matting components, which allows this project to be commercially viable.

Project goals:
1. Create a clear high impact protective envelope.
2. Develop a more cost effective lighting source, possibly using green energy
3. Construct a low profile, waterproof electric connector
4. Develop a molding work cell to produce a durable, clear plastic compound product

University participation: BMP's research and product development partner will be Youngstown State University STEM College. Capitalizing on their expertise in the materials sciences, the University will help design the tooling and mold process to enable consistent manufacture of the 4' X 3' foot clear vinyl flooring without warping or shrinkage. Process development may require the use of robotic material handling to maintain product quality.

The current product design will be reviewed and enhanced to ensure electrical and physical integrity throughout product life, under typical usage conditions.

The University will also assist in identifying alternative light sources, including possibly Phiso-electric lighting, with enhanced optics and lower costs.

Boardman Molded Products looks forward to participating in this program to promote technology-based economic development within Ohio.

Best regards,

Ron Kessler, President
Boardman Molded Products Inc.

1110 Thalia Avenue
Youngstown, Ohio 44512
(330) 788-2400 • (330) 788-9665

OTFAMP 10-662

Hansen, Andrew

From: Wendy Lawson Scott [scott@orbitalresearch.com]
Sent: Wednesday, November 04, 2009 12:30 PM
To: OTFAMP2010
Subject: 2010 OTFAMP LOI

To Whom it May Concern:

Orbital Research is pleased to submit this second letter of intent to state Orbital's intent to produce and file a full proposal entitled, "Commercialization of a Harsh Environment Smart Sensor Interface" in response to the Ohio Third Frontier Sensors Program released on October 7, 2009.

1. Lead Applicant:
   Orbital Research Inc.
   4415 Euclid Avenue, Suite 500
   Cleveland , Ohio 44103
   216-649-0399 phone
   216-649-0347 fax

2. Contact Person:
   Joseph T. Snyder, Ph.D.
   snyder@orbitalresearch.com

3. Project Title:
   Commercialization of a Harsh Environment Smart Sensor Interface

4. Estimated Grant Funds:
   $420,000

5. Known Collaborators:
   Linear Dimension Semiconductor, LLC

   Cleveland State University

6. Proposed Project Summary:

Orbital Research proposes the commercialization of technology currently being developed under the Federal SBIR program and sponsored by the Navy, Air Force and NASA under several awards. The base technology has developed alpha and beta prototype Application Specific Integrated Circuits (ASICs) used in sensor intelligence and communion modules that offer commercial sensors the "smarts" that are sought for future sensor systems based on digital communications. These ASICs and modules are designed to function over broad environmental conditions and are especially designed to operate under severe thermal and vibration conditions. Military applications for these devices include turbine engine sensing and health management, distributed engine control, and aerospace test and evaluation. Commercial applications include commercial aircraft, automotive, ground-based power generation, oil industry, and harsh industrial processing applications.

Based on the R&D completed to date, Orbital proposes to establish a commercial enterprise to manufacture and distribute ASICs and modules to OEMs of sensors and actuators for both military and civilian commercial markets. These commercialization activities are beyond the funding allowed by the SBIR program, but premature for other investment capital sources.

Thank you.

Wendy Lawson Scott
Orbital Research Inc.
4415 Euclid Avenue, Suite 500
Cleveland, Ohio 44103
216-649-0399

OTFAMP 10-663

Letter of Intent for Ohio Third Frontier Program

Lead Applicant: Delphi Automotive Systems
Delphi Packard Electrical/Electronic Architecture Division
4551 Research Parkway
Warren, OH 44483 USA

Contact Person: Randy Sumner
randy.sumner@delphi.com

Lead Project Director: Larry Groves

Known Collaborators: Case Western Reserve University, Youngstown State University

Proposed Project Title: Development and Commercialization of the Next Generation of Light Weight, Cost Effective Electrical Cables

Estimated Grant Funds to be Requested: $1,000,000

Summary:

Delphi Packard is a world leading supplier of automotive electrical cables. The proposed project is to develop the next generation of lighter weight, cost effective automotive electrical cables. Such cables today use almost exclusively copper based conductors. Copper is an excellent conductor of electricity with good mechanical strength, good environmental resistance and adequate flex fatigue properties. However, the weight, cost, and availability of copper have been a roadblock to making some advances in the automotive wiring systems. Aluminum is underutilized, but is an enabler to reducing automobile weight and cost. The goal is to make cables out of light aluminum alloys, rather than the heavier copper. In automotive applications, the lighter-weight translates into direct energy savings. Overall use of aluminum has the potential to cut a vehicle's weight by 10 percent and can boost its fuel economy up to 8 percent. If this project is successful we expect to replace at least 40% of the copper in the wiring with aluminum. This collaborative project will include alloy development, characterization of alloy properties, development of cable fabrication processes, development of materials and methods for terminating the cables, development of materials and methods for sealing the terminated cables, and commercialization.

OTFAMP 10-664

Ohio Third Frontier Advanced Materials Program (AMP)

Letter of Intent

Leading Applicant: Case Western Reserve University

Contact Person: Professor Liming Dai
Department of Chemical Engineering
Case Western Reserve University
A.W. Smith Building, Room 116
10900 Euclid Avenue
Cleveland, Ohio 44106-7217
Email: liming.dai@case.edu
Phone: (216)368-4151

Project Title: Development of Liquid Crystal/Carbon Nanomaterials for High-Efficient Solar Cells

Anticipated Grants Funds to be requested: $1,500,000

Known Collaborators:

Zhenhai Xia, Department of Mechanical Engineering, University of Akron

Quan Li, Liquid Crystal Institute, Kent State University

Mohan Sankaran, Department of Chemical Engineering, Case Western Reserve University

Vikas Prakash, Mechanical and Aerospace Engineering, Case Western Reserve University

Pingshan Wang, Materials Science and Technology, LLC, Ohio

Development of Liquid Crystalline Polymers /Carbon Nanomaterials for High-Efficient Solar Cells

Summary

As promising thin-film photovoltaic devices, organic solar cells offer many advantages, including low-cost, lightweight, large-area processability, and versatility for applications. Recently developed heterojunction device structure can support a highly efficient photoinduced charge transfer at the junction between electron-donating and electron-accepting materials, leading to a high photocurrent quantum efficiency up to 70%. The device performance, however, is currently limited by the low light absorption, poor carrier transport, and degradation of the materials. We propose to develop high-efficient bilayer bulkheterojunction solar cells from high-hole-mobility liquid crystalline polymer (PBTTT) and vertically aligned carbon nanotube arrays (VACNTs). The bilayer structure was demonstrated in our previous work to show extended optical absorption, and dispersed heterojunction devices containing vertically aligned carbon nanotubes can show improved carrier transport properties. The hole transportation can also be improved by electrochemical or chemical vapor deposition of appropriate liquid crystalline polymers onto the individual VA-CNT to provide a well-controlled conjugation path and phase morphology. In this project, the novel photovoltaic active polymers for the fabrication of conjugated polymer/CNT dispersed heterojunction solar cells will be developed for high-efficienct organic solar cells with the new heterojunction architecture containing VA-CNTs.

The proposed new advanced materials address major issue in developing Advanced Energy and Environmental Technologies, which is one of Ohio's key industries. The materials are expected to be used to manufacture high-efficient solar cells. The fund will be used to support personnel and supplies for the design, construction and testing of the materials and solar cell systems. The cost-sharing fund will be used for facilities maintenance, and support research and technical stuff. The proposal project is expected to complete within two years.

KENT DISPLAYS INCORPORATED

November 4, 2009

Third Frontier Commission
Ohio Department of Development
Technology Division
77 South High Street,
Columbus, Ohio 43215-6130

Dear Sir or Madam,

Kent Displays submits this Letter of Intent, as the Lead Applicant, for a full proposal to the Ohio Third Frontier Applied Materials Program.

Lead Applicant
Kent Displays, Inc.
343 Portage Blvd.,
Kent, Ohio 44240
330-673-8784

Contact: Dr. Asad Khan
akhan@kentdisplays.com

Prospective collaborators
Kent State University

Title: Advanced Liquid Crystalline, Chiral, and Dye Materials for Flexible Liquid Crystal Films

Estimated funding request: $1 million

Description of Project
New technologies such as flexible liquid crystal displays and eyewear films require advanced materials for their commercialization success. Suppliers of such materials are often not enthusiastic about supporting emerging technologies due to low volume and high technology demands. Ironically, these suppliers are eager to support strong emerging markets once materials are developed.

It is this gap in materials support that is needed to help take flexible liquid crystal film technologies supported by Ohio Third Frontier at Kent Displays and AlphaMicron to their fullest commercialization potential. The need is strong and the timing is right for this to be a viable advanced materials program that has direct impact on the Ohio economy and the commercialization of the technologies and products mentioned here.

343 Portage Boulevard
Kent, Ohio 44240 USA
+1 330.673.8784
Fax: 330.673.4408

Reflex-

We propose to work on three core areas

A. Advanced liquid crystal materials
B. Chiral materials
C. Dye and other additive materials

Better liquid crystalline materials are needed as those developed for rigid displays and film technologies are not ideally suited for flexible applications. We will leverage previous developments as well as a strong supplier network to formulate the right materials. These liquid crystal mixtures will be developed in parallel with new and unique chiral materials that are critical in obtaining the right mixture. Chiral materials are already being developed through other State and federally funded and programs that are nearing completion. This will leverage the existing work and further amplify the effort. Combing the liquid crystal development with chiral material development is strongly needed and never done before. Lastly, we will develop dyes and other additives that can help optical and electro-optical performance of the flexible liquid crystal films.

Based on the above materials development that will feed into significant commercialization activities around reflective bistable displays at Kent Displays and flexible eye wear and related applications at AlphaMicron, the economic impact of those commercialization activities will be greatly increased. The proposers feel strongly that the material strengths lie right here in Ohio in industrial partners, end users, and academic Universities. Additionally, the continued growth of the flexible display and electronics industry in the North East Ohio region further justifies the development of such key advanced materials here.

The proposed team consists of KDI as the lead applicant and KSU as collaborator. Both organizations have had many years of working closely together. Indeed both are involved in specific materials development programs at present that have clearly shown the strength in such efforts as well as why these efforts need to be increased substantially.

Thank you for your consideration. Please feel free to contact me regarding this letter or any questions that may arise at 330-673-8784 ext. 114 or akhan@kentdisplays.com

Sincerely,

Asad Khan
Chief Technical Officer
Kent Displays Inc.

OTFAMP 10-666

TYCOR
Fiber Reinforced Cores

WebCore Technologies, LLC.
8821 Washington Church Road
Miamisburg, OH 45342
www.webcoreonline.com

Phone: 937-435-2200 ext 224
Fax: 937-435-2430
E-mail: rbanerjee@webcoreonline.com

November 2, 2009

Attn: John Griffin
Director
Ohio Department of Development, Technology Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

Subject: 2010 TFAMP LOI

Dear Mr. Griffin:

Please accept this Letter of Intent from WebCore Technologies, LLC. for our Third Frontier Advanced Materials Program (TFAMP) proposal. The relevant information about our proposal are as follows:

Lead Applicant: WebCore Technologies, LLC.
Address: 8821 Washington Church Road, Miamisburg, Ohio 45342
Telephone: (937) 435-2200
Contact Person: Dr. Rob Banerjee, Vice President of Business Development
Contact Email: rbanerjee@webcoreonline.com
Project Title: Commercialization of Composite Truck Body Components
Estimated Grant Amount Requested: $1 million
Known Collaborators: Crane Composites, Owens Corning, Ashland Performance Materials, EMTEC

Summary of the Proposed Project

The shock of oil price hike of 2008 and the continuing pressure to reduce greenhouse gas emissions have fundamentally transformed the automotive industry to focus on more fuel-efficient vehicles, both for passenger cars as well as commercial trucks, trailers and vans. As a result, the need for lightweight vehicle body components is more pronounced than ever. Composite materials can offer significant weight reduction in commercial vehicle body components, however the relatively high cost of composite materials has been a barrier to more widespread use of composites in commercial vehicles.

WebCore and its collaborators are proposing to develop a novel process to manufacture low-cost composite sandwich panels to produce truck body components including floor, roof, walls and doors. This innovative process eliminates the inefficiencies of the current panel manufacturing processes through an integrated one-step process and thus significantly lowering the manufacturing cost. This new process is built on the proven TYCOR technology platform that has been successfully used in the transportation and wind energy industry.

TYCOR
Fiber Reinforced Cores

WebCore Technologies, LLC.
8821 Washington Church Road
Miamisburg, OH 45342
www.webcoreonline.com

Phone: 937-435-2200 ext 224
Fax: 937-435-2430
E-mail: rbanerjee@webcoreonline.com

The Ohio Third Frontier Program has the opportunity to further reinforce and strengthen the State's position in the motor vehicle and parts manufacturing industry by investing in this technology. The team will leverage and build on past and current state investments to benefit Ohio through increased investment, sales, and jobs created. Building upon years of applied research and development, the team will address various technical challenges through further design, testing and manufacturing process development of composite panels to meet the performance and quality standards in large volume production scale at a competitive price that the truck manufacturers demand.

The Third Frontier Advanced Materials grant and matching fund is sufficient to fund demonstrating activities and to move the composite panel technology into market entry. Once market entry is realized, it is anticipated the project will result in the creation of significant technology based economic benefits for the State of Ohio.

Sincerely,

Rob Banerjee

Rob Banerjee, Ph.D.
Vice President, Business Development
WebCore Technologies, LLC.
8821 Washington Church Road
Miamisburg, Ohio 45342
Office: 937-435-2200 ext 224
Mobile: 937-321-5035
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GENERAL | NANO

Ohio Third Frontier Advanced Materials Program

LETTER OF INTENT TO SUBMIT A PROPOSAL

LEAD APPLICANT: GENERAL NANO, LLC
ADDRESS: 3040 FAIRFIELD AVENUE, CINCINNATI OHIO 45206
PHONE #: 513.309.5947
CONTACT PERSON: JOE SPRENGARD, JR.
EMAIL: Joe.Sprengard@GeneralNanoLLC.com

PROJECT TITLE: COMMERCIALIZING CARBON NANOTUBE THREAD, RIBBON, & YARN IN OHIO FOR US DEFENSE INDUSTRIES – OHIO TECHNOLOGY, GLOBAL MARKET

GRANT FUNDS TO BE REQUESTED: $1M OPERATING (TF R&D FUND) AND $1M CAPITAL EQUIPMENT (WCF)

EXPECTED COLLABORATORS: UNIVERSITY OF CINCINNATI; ATKINS & PEARCE; HONEYWELL INTERNATIONAL; LION APPAREL; NORTHROP GRUMMAN; BOSE CORPORATION; UNITED STATES AIR FORCE; PARKER HANNIFIN

EXECUTIVE SUMMARY OF THE PROPOSED PROJECT

General Nano LLC ("GN") is one of two nanotechnology companies in the United States with the know-how to spin Carbon Nanotubes (CNT), or Black Cotton™, into electrically and thermally conducive thread, yarn and ribbon for applications in the aerospace, sensors, electronics, textiles, biomedicine, telecommunications, medical equipment, energy, and defense industries.

Founded in September 2007 by University of Cincinnati technologists Dr. Vesselin Shanov and Dr. Mark Schulz and business executive Mr. Joseph E. Sprengard, GN owns the exclusive license for growing the longest CNT in the world [1] and is the recipient of SBIR Phase I & II projects from the United States Air Force, as well as a recommended National Science Foundation SBIR Ph I project beginning January 2010. GN has also developed collaborative partnerships with many leading institutions and companies, including Lockheed Martin, BOSE Corporation, Northrup Grumman, Lion Apparel, Honeywell International, Atkins & Pearce and Parker Hannifin.

GN's lead scientists are also the program directors of the University of Cincinnati's Nanoworld Lab, an acclaimed research and development operation that secures more than $1m per year in R & D funding to advance nanotechnology and biotechnology.

GN intends to compete for the Ohio Third Frontier Advanced Materials Program to accelerate the commercialization of Black Cotton™. GN's proposal will request $1m Operating from the TF R & D Fund and $1m Capital Equipment from the WCF. The 1:1 match will include a combination of cash and in-kind commitments. The operating funds and the cash cost share will be used to purchase equipment and hire engineers to manufacture black cotton at a commercial scale and to support research at the University of Cincinnati. The capital equipment funds will be used to purchase instrumentation that the University of Cincinnati will use to advance CNT research and commercialization. The in-kind cost sharing will include CNT research that will directly focus on advancing the properties of Black Cotton™ and intermediate thread and ribbon materials.

[1] www.nsf.gov/news/news_summ.jsp?cntn_id=108992&org=NSF&from=news

PROPOSED PROJECT

The Third Frontier project is a three-year effort to bring CNT arrays called Black Cotton™ into full scale production and to partner with companies that will manufacture intermediate, derivative, and end products. The technical effort will encompass improving and tailoring the properties and spinning processes to accelerate the commercial development of Black Cotton™. The technical activity will be supported by the Nanoworld Laboratory at the University of Cincinnati.

New, high-wage jobs will be created by GN, including, but not limited to, substrate processing, CNT synthesis and mechanical engineers. At UC, additional post doctors will also be hired.

Current GN employees that will participant in the project are Joseph Sprengard (President), Lucy Li (expert in CNT synthesis), Vesselin Shanov and Mark Schulz. The current faculty members at UC that will be participants in the project are Vesselin Shanov, Mark Schulz (UC faculty members and part-time employees of GN experts in CNT synthesis and spinning), Dong Qian (expert in modeling CNT rope), and Dean Carlo Montemagno (expert in nano science and technology).

Company collaborators on the project are anticipated to provide cost sharing in terms of cash and in-kind support including use of their facilities and time committed to the project by their employees. Other partner companies have specified their interest in end product that can meet their specifications.

We look forward to submitting our proposal.

Joe Sprengard, Jr.
President & CEO
General Nano, LLC

OTFAMP 10-668

TechSolve

November 4th, 2010

FY2010 Ohio Third Frontier Advanced Materials Program (OTFAMP)
The Ohio Department of Development
Technology and Innovation Division, Attention: OTFAMP
77 South High Street, 25th Floor
Columbus, Ohio 43125-6130

Subject: Letter of Intent (LOI) for the proposal, "Development and Commercialization of Carbon Nanotube (CNT) Composites Based Dampers"

Dear Sir/Madam,

Dr. Anil Srivastava will be submitting a proposal on behalf of TechSolve Inc, Cincinnati, OH, Zyvex Performance Materials, Columbus, OH and Ohio State University, Columbus, OH for consideration by FY2010 Ohio Third Frontier Advanced Materials Program (OTFAMP).

Prospective Lead Applicant's Information:

TechSolve, Inc.
6705 Steger Dr.
Cincinnati OH, 45237
Tel: (513) 948-2000

Contact Person:

Dr. Anil Srivastava
Manager, Manufacturing Technology
Tel: (513) 948-2004
E-Mail: srivastava@techsolve.org

Proposed Project Title:

Development and Commercialization of Carbon Nanotube (CNT) Composites Based Dampers

Estimated Grant Funds to be Requested:

One Million ($1,000,000) for Three Year Duration

Known Collaborators:

1. Mr. Lance Criscuolo
   President
   Zyvex Performance Materials
   1255 Kinnear Road, Suite 100
   Columbus, OH 43212-115
   Tel: (614) 481-2218
   E-Mail: lcriscuolo@zyvexpro.com

2. Professor Rajiv Shivpuri
   Department of Industrial, Welding and Systems Engineering
   210 Baker Systems, 1971 Neil Avenue
   The Ohio State University, Columbus, OH 43210-1271
   Tel: (614) 292-7874
   E-Mail: shivpuri.1@osu.edu

The proposal shall be submitted under:

FY2010 Ohio Third Frontier Advanced Materials Program (OTFAMP)

Point of Contact:

Dr. Anil Srivastava
Manager, Manufacturing Technology
TechSolve, Inc.
6705 Steger Drive
Cincinnati OH, 45237
(513) 948-2004
srivastava@techsolve.org

Thank You!

Anil Srivastava, PhD
Manager, Manufacturing Technology

Summary of the proposed project

Development and Commercialization of Carbon Nanotube (CNT) Composites Based Dampers

Carbon nanotube (CNT) composites based dampers, in particular directional dampers, are of interest for industries such as motor vehicles and aerospace/aviation. Directional dampers allow for the flexibility in damping critical modes of vibration, which is especially important for vehicle suspension where high damping of certain modes may make the system more sluggish. The objective of the proposed research program is to address the development and commercial manufacturing of carbon nanotube (CNT) composites based directional dampers.

Multi-walled carbon nanotubes have the ability to dissipate viscous energy when subjected to a shear load. This property can be used to dissipate viscous energy in CNT composites. For example, aligned CNTs in a PDMS matrix have been observed to have good damping characteristics. However the efforts to manufacture these composites have not been focused towards the *design, development and commercialization of directional dampers.*

The challenges faced in the realization of commercial CNT based directional dampers are two-fold. First, a science-based understanding of the energy dissipation process in aligned CNT composites is needed to design and develop this new class of dampers. This will enable the design of woven/ply-based CNT networks within the PDMS matrix that can provide the desired damping. Second, the manufacturing technique used to deposit the CNT networks should be designed for "scale-up" towards commercialization.

As part of this research initiative, the proposers will first study the physics of the damping process in CNT-polymer composites. Simulations will be used to arrive at shapes of preferred CNT networks that provide the most effective damping characteristic to the composite. To address the commercialization aspect of these dampers, the proposers intend to deposit complex patterns of nano-scale reinforcements on polymer substrates by using a single-droplet generator in conjunction with a 5-axis micro-scale machine tool.

OTFAMP 10-669

TechSolve

November 4th, 2010

FY2010 Ohio Third Frontier Advanced Materials Program (OTFAMP)
The Ohio Department of Development
Technology and Innovation Division, Attention: OTFAMP
77 South High Street, 25th Floor
Columbus, Ohio 43125-6130

Subject: Letter of Intent (LOI) for the proposal, "Development of Machining Database for Composites with Special Emphasis on Carbon Nanotube (CNT) and Bio-Based Composites"

Dear Sir/Madam,

Dr. Anil Srivastava will be submitting a proposal on behalf of TechSolve Inc, Cincinnati, OH, Zyvex Performance Materials, Columbus, OH and EMCC, Columbus, OH for consideration by FY2010 Ohio Third Frontier Advanced Materials Program (OTFAMP).

Prospective Lead Applicant's Information:

TechSolve, Inc.
6705 Steger Dr.
Cincinnati OH, 45237
Tel: (513) 948-2000

Contact Person:

Dr. Anil Srivastava
Manager, Manufacturing Technology
Tel: (513) 948-2004
E-Mail: srivastava@techsolve.org

Proposed Project Title:

Development of Machining Database for Composites with Special Emphasis on Carbon Nanotube (CNT) and Bio-based Composites

Estimated Grant Funds to be Requested:

One Million ($1,000,000) for Three Year Duration

Known Collaborators:

1. Mr. Lance Criscuolo
   President
   Zyvex Performance Materials
   1255 Kinnear Road, Suite 100
   Columbus, OH 43212-115
   Tel: (614) 481-2218
   E-Mail: lcriscuolo@zyvexpro.com

2. Dr. Prabhat Krishnswamy
   Vice President
   Engineering Mechanics Corporation of Columbus (EMCC)
   3518 Riverside Drive, Suite 202
   Columbus, OH 43221-1735
   Tel: (614) 459-3200; Ext. 229
   E-Mail: kswamy@emc.sq.com

The proposal shall be submitted under:

FY2010 Ohio Third Frontier Advanced Materials Program (OTFAMP)

Point of Contact:

Dr. Anil Srivastava
Manager, Manufacturing Technology
TechSolve, Inc.
6705 Steger Drive
Cincinnati OH, 45237
(513) 948-2004
srivastava@techsolve.org

Thank You!

Anil Srivastava, PhD
Manager, Manufacturing Technology

Summary of the proposed project

Development of Machining Database for Composites with Special Emphasis on Carbon Nanotube (CNT) and Bio-based Composites

One of the primary requirements for an efficient manufacturing process is the availability of a credible machining database for various materials. With many years of rigorous efforts, Cincinnati, OH based TechSolve Inc. developed Machining databases such as CUTDATA™ and Machining Data Handbook that are critical for the industry all over the world to effectively perform machining operations. The State of Ohio has a prominent composite manufacturing industry. Companies like Zyvex Performance Materials and Engineering Mechanics Corporation of Columbus (EMCC), both located in Columbus, OH are developing novel carbon nanotubes (CNT) based and bio-based composites for various commercial, defense, navy and aerospace applications.

Bio-based composites are being increasingly used to address issues of sustainability especially in the automotive and building product applications. The reinforcement phases in these composites include materials such as flax, jute, hemp, and corn stalk. While the machining behavior of conventional composites such as carbon fiber and glass fiber composites has been studied by the manufacturing community, there is no significant work done to address the machinability of these new classes of CNT-based and bio-based composite materials. CNT-based composites may enhance machinability as compared to only carbon-fiber-reinforced-plastics (CFRP). Materials that incorporate biological content generally have a propensity for chipping and flaking, and thus can exhibit limited machinability. Other factors unique to these materials include thermal degradation and water absorption that are also likely to pose challenges.

The proposed research program will be geared towards understanding the machining characteristics of CNT-based and bio-based materials and developing innovative techniques that ensure efficient machining of these composites. The results obtained from the proposed machining studies would contribute in the creation of a machining database for micro/meso-scale machining of composite materials.

The overall objective of the proposed work will be to develop a micro-machining database for a wide range of composite materials used in micro-scale applications. However, specific materials that will be studied include: (1) *Thermoplastic and thermosetting carbon nanotube composites*: Polystyrene-CNT composite, polyetherimide-CNT composite and Bis-phenol A-CNT composite; and (2) other *Novel materials:* e.g., bio-based composites. The data base will be developed for selected material removal operations, such as turning, milling, drilling.

OTFAMP 10-670

Ohio Agricultural Research and Development Center

Department of Food, Agricultural, and Biological Engineering
1680 Madison Avenue
Wooster, OH 44691-4096

Phone: 330-263-3855
Fax: 330-263-3670
E-mail:li.851@osu.edu

Letter of Intent to TFAEP Program

Lead Applicant: Ohio State University, 1960 Kenny Rd, Columbus, OH 43210
Contact Person: Yebo Li, Phone: 330-263-3855, E-mail: li.851@osu.edu
Project Title: Development and Demonstration of Biomass Based Polyurethane Foam Production System
Estimated Grant Funds: $1,000,000
Collaborator(s): Arlington Energy LLC, Arlington Bioproducts LLC

Summary of project:

This project is based on an OSU pending patent for the production of polyurethane foam from lignocellulosic biomass and biodiesel processing waste. The Ohio State University will collaborate with Arlington Energy LLC, Arlington Bioproducts LLC and the supply chains in Ohio to build up a pilot scale plant for the production of polyurethane foam from lignocellulosic biomass. The goal of the project is to accelerate the commercialization production of polyurethane foams in Ohio and the specific objectives of the project are to:

- Optimize the operational parameters of the liquefaction process, such as processing time and temperature, catalyst (sulfuric acid) and solvent loading;
- Establish polyurethane (PU) foam formulations to produce insulation foam sheets and peanut packing materials with thermal and physical performance comparable to existing commercial products;
- Design, build, and test a pilot scale liquefaction and foaming system for production of market-oriented PU products such as insulation foam sheets and loose-fill peanut packing materials;
- Establish effective protocols for the characterization of polyols and PU products;
- Provide end products for testing by end users.

OTFAMP 10-671

Letter of Intent
Ohio Third Frontier Advanced Materials Program (OTFAMP)

Lead : Akron Polymer Systems, Inc.
2990 Gilchrist Road
Akron, OH 44305 US
Technical Phone: 330-794-6359
Fax: 330-794-6241

Contact Person: Matt Graham
mgraham@akronpolysys.com

Project Title: Novel single-layer graphene oxide/polyimide transparent and electrically conducting materials for organic light emitting diode and liquid crystal display applications

Estimated Grant Funds Requested: $1,000,000

Known Collaborators: Nanotek Instruments, Inc., Dayton, Ohio

Project Summary:

The intent of this FY2010 Ohio Third Frontier Advanced Materials Program (OTFAMP) project is to commercialize a set of low-cost, electrically conductive, and optically transparent films for organic light emitting diode (OLED) and liquid crystal displays (LCD). This will be achieved by combining polymeric materials possessing a tailored set of optical, mechanical, and thermal properties with single-layer graphene platelets to introduce electrical conductivity. These transparent conducting layers will have cost to performance ratios superior to currently available solutions.

OLED lighting is a high growth sector that requires a lower cost, high performance electrode to be economically viable. Solid state lighting (SSL) offers the opportunity to dramatically increase the efficiency of lighting systems and thereby reduce US electricity consumption, 22% of all the electricity generated in the US is used in lighting, and reduce the US carbon footprint. The OLED market is disadvantaged by exorbitant manufacturing costs, which is a major deterrent to mass production. To realize their promise, SSL systems must be economically competitive with current systems (LEDs cost 560 times more per kilolumen than incandescent lights), and be able to fill new niches underserved by current illuminating devices to penetrate the lighting market. To reduce the cost per lumen, the efficiency of SSL systems needs to be improved (currently the highest OLED laboratory efficiency is 102 lm/W with a target value of 150 lm/W), the lifetime of SSL systems needs to be increased, and the fabrication costs need to be reduced. With a high performance flexible conducting substrate, OLEDs can be produced using cost effective roll-to-roll manufacturing which can increase production efficiencies over glass materials and lower the manufacturing costs.

The current display industry is $50 billion a year in size and is expected to dramatically grow with the emergence and proliferation of next generation display technologies which include new display modes and form factors. Critical to the economic viability of these devices is the cost and performance of the transparent conducting layer. With a wide range of display applications, from TVs to cell phones and touch sensitive displays, there is a wide range of cost and performance targets. Eliminating the need for a heavy and fragile glass base electrode will reduce the design constraints on display device and increase their range of use.

This new high performance transparent conducting electrode technology will be developed by two Ohio companies - Akron Polymer Systems (APS) and Nanotek Instruments - that have complementary areas of technical and business expertise. APS has substantial experience in the development of optical materials and films. The APS co-founders invented an optical compensation film that was licensed and resulted in over $1 billion in sales. In addition to this material, APS has developed a range of soluble optical materials. APS's technical contribution will be the identification of the optimal film material by balancing transparency, color, strength, thermal expansion, processing temperature, solubility, and cost of the base film material.

Through US DOE SBIR Phase-I and Phase-II grants, Nanotek Instruments has developed techniques to produce single-layer graphene oxide materials, and spun off a company, Angstron Materials Co., for mass production of graphene materials at 2007. Currently, Angstron is the largest producer of nano-graphene in the world. This capacity will be expanded to 100 tons/year by the end of 2010. Graphene oxide was found to exhibit (a) electron mobility 100 times faster than that in silicon, (b) the highest intrinsic strength, and (c) highest thermal conductivity of all existing materials. Nanotek will contribute its expertise in graphene materials to optimize the cost and electrical performance of the transparent electrode.

The proposed work is aimed at integrating the two most advanced component technologies to develop the next generation high-conductivity and high-transparency thin film. The proposed technology commercialization activities include: (1) process scale-up (e.g., to construct the pilot-scale systems for electrically conductive and optically transparent films; (2) market validation and expansion (e.g., to proactively conduct direct marketing activities in selected market sectors); (3) business development, marketing, and sales (e.g., preparation of conductive, transparent film that will be evaluated by potential customers, investors, and strategic partners); and (4) sourcing of materials and components.

OTFAMP 10-672

Lead Applicant: Nanotech Innovations LLC, 132 Artino Street, Oberlin, Ohio 44074 (440) 926-4888

Contact: Dennis M. Flood, dmflood@nanotech-innovations.com, (440) 926-4888 ext.1

Title: Manufacturing Scale up of Electronic Grade Carbon Nanotubes and Production of Sub-micron CNT-Coated Silica Nanoparticles for Improved Composite Materials.

Anticipated Requested Funds: $750,000

Collaborators: Dr. Ali Dhinojwala, University of Akron, Department of Polymer Science, ali4@uakron.edu (330)972-6246

Summary:
Nanotech Innovations (NTI) has a patent pending technology that simplifies the growth of carbon nanotubes. The process was developed by researchers at the NASA Glenn Research Center, who were awarded the right by the Agency to patent the process as individual inventors. NTI was formed for the purpose of commercializing the technology, the rights to which have been assigned to NTI by the inventors. A patent application has been filed by the Company and is presently undergoing examination. In its present embodiment the technology produces very high quality multiwall carbon nanotubes (MWNTs) using a single source precursor in a low cost, simple, one step chemical vapor deposition (CVD) process that eliminates the need for pre-patterned substrates needed for all other CVD-based processes.

NTI at present manufactures and sells the SSP-354, a compact cnt growth system specifically configured for ease of use and low cost operation. (Find details at www.nanotech-innovations.com.) Marketing and sales are presently targeted at university research laboratories, undergraduate instructional laboratories, company labs and non-profit R&D centers. The company has determined there is a potential base of about 15,000 customers for this product in the United States and Canada and has begun a marketing and sales program aimed at those customers.

The Company desires to move beyond its present technology and related market, however, by developing a commercial scale system utilizing a fluidized bed reactor (FBR) to not only increase cnt production but also add new product capability. In addition to obtaining higher production yields of high quality cnts, the company desires to explore manufacturing a new nanoparticle technology under investigation by Akron University's Department of Polymer Science, the collaborator in the project. The Dhinojwala Group at the University will explore the development and use of cnt-coated, sub-micron scale silica particles with differing shapes and surface to volume ratios for use in a wide variety of applications, ranging from dramatically improved composite materials, improved adhesives and uses in tribology. The purpose of the proposed collaboration is to move the Akron-based technology from the lab into commercial manufacturing. The proposed FBR production process for cnts is completely compatible with production of this new class of nanoparticle.

The expected duration of the project is 24 months. Its successful conclusion will add significantly to the carbon nanomaterial manufacturing and application core identified by the ODOD as a key growth area for the State.

OTFAMP 10-673

McMaster Industries Inc . Letter of Intent
2010 OTFAMP LOI

To Whom It May Concern:

McMaster Industries Inc. is developing a new composite material that looks like plastic but is stronger than steel . It is 1/3 the weight of steel and ½ the weight of aluminum and has many other unique attributes . It is a new industrial engineering material formulation being developed by McMaster Industries Inc. that represents a significant advancement in polyurea technology . It is a blend of ring-opened cylic esters and polyamines combined with polyisocyanate formulations .
As a compound , the ingredients , and their proportions can be varied to provide a superior product with tremendous flexibility to meet a wide range of applications and specifications now provided by steel or other comparable alloys and more expensive plastic comounds .
A key feature is the ability to to process the material on low pressure machinery , without the need to supply thermal energy . this results in substantial machinery and tooling costs It can be sprayed as a coating or cast like an elastomer .
It is believed that the outstanding characteristics of this material will permit it to be the material of choice in a wide variety of product applications.

We have developed the base formulation working with a lab here in Canada and have to do further R&D to create a specific formulation for a proposed light weight shipping pallet that will be both unbreakable and non-combustable , and environmentally friendly, a market leader.

Funding is needed for Formulation

Design

Testing

Amount estimated to reach commercialization
Including marketing $750,000.00

It is my intention to manufacture in Medina, Ohio

Al McMaster President /CEO
McMaster Industries Inc .
905-983-9281
almcmaster@nexicom.net
al_mcmaster@yahoo.com

Dr. Frank W. Maine , Ph.D., P.Eng
Senior Chemist
519-823-1089
maine.f@sympatico.ca

OTFAMP 10-674

November 4th, 2009

To: The State of Ohio Department of Development
From: Greatbatch, Inc

Re: Letter of Intent, 2010 OTFAMP

Greatbatch wishes to notify the State of Ohio by means of this letter that it intends to submit a proposal for the Ohio Third Frontier Advanced Materials Program, fiscal year 2010.

Lead Applicant:	Greatbatch, Inc.
Address:	1771 E 30th Street Cleveland, OH 44114
Contact person:	Jan J. Lewandowski, Ph.D. Tel: 216-325-7433 Fax : 216-937-2812 JJLewandowski@greatbatchmedical.com
Funds Requested:	$1,000,000
Collaborators:	Case Western Reserve University Nanomimetics, Inc
Project Title:	Application of Biomimetic Coating for Implantable Cardiac Hemodynamic Monitor

Assurance of biocompatibility of an implantable device is critical from the point of view of patients' safety as well as to assure device performance by protecting the implant from degradation caused by harsh physiological environment. GREATBATCH, in cooperation with Case Western Reserve University, developed a proprietary, synthetic coating technology that mimics the biochemistry of the vascular epithelial cells thus providing biocompatibility of the coated implant.

Through NIH-funded feasibility studies, it was demonstrated that the coating reduces adsorption of clot forming blood components (blood pump study) as well as reducing formation of the fibrous capsule on the vascular implants (rat study). Compatibility of the coating with several polymers (such as polyurethanes, polycarbonate, parylene) has been demonstrated.

The response of the organism to the implant, however, differs depending on the implantation site and type of the implant. Due to this effect, it is necessary to evaluate coating performance for each specific application as required by the FDA. The proposed project consists of:

(1) Evaluation of coating performance on the coated device that will consist of: optimization of coating procedure for the specific device, *in vitro* determination of coating performance (platelet adsorption, fibrinogen adsorption) followed by *in vivo* study using canine model.

(2) Presently coating material is synthesized in GREATBATCH lab in quantities satisfactory for proposed testing. Further effort will be done to scale-up synthesis process for larger scale production which has high product throughout with better in-process controls

OTFAMP 10-675

WELLMAN
PRODUCTS GROUP

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Solon, OH 44139
Phone: 440-528-4031 Ext.
Fax: 917-464-7231 (FAX)
Email: fkahle@wellmanproducts.com
www.WELLMANPRODUCTS.COM

November 4, 2009

The Ohio Department of Development
Technology Division
77 South High Street 25th Floor
Columbus, OH 43215

To whom it may concern:

This is to serve as our letter of intent to submit a proposal regarding the RFP titled Ohio Third Frontier Advanced Materials Program. Wellman Products Group will be the lead applicant with headquarters at the address noted above. I will be the primary contact. In collaboration with us will be ThermalCentric Corporation of Delaware.

Title: "Corrosion-free Carbon Heat Exchangers for Waste Energy Recovery"

There is an urgent need for corrosion-free heat exchangers that allow for the recovery of large amounts of heat currently wasted in both industrial processes and the production of energy. This amount has been estimated by Lawrence Livermore National Laboratory to be in excess of 58 Quadrillion Btu's of energy with a value in excess of one trillion dollars annually (U.S. only).

Wellman Products Group, together with ThermalCentric Corporation, is seeking to manufacture and demonstrate an all-carbon heat exchanger that addresses this need. An independent commercialization study funded by the Department of Energy on behalf of ThermalCentric for such a product projected annual revenues of $250 Million by Year 5 of commercialization, based upon a 4% market penetration. The technology has already achieved technical proof of concept and there is independent and abundant evidence of interest by potential end-users.

The scope of the project is the development, demonstration and implementation of a product combining Wellman's latest advances in Carbon Composite materials into new products aimed at the Advanced Energy and Environmental Technologies industries.

Carbon/carbon materials have been in use for many years in several highly demanding applications where light weight and high thermal capability are required. The most notable ones in the public view are applications such as long range aircraft and Formula One racing brakes. Although carbon/carbon has many potential uses, current processing methods limit its use due to very long production cycles, high energy utilization in the manufacture and very high product costs. Through an internal long term research and development program at Wellman, we have developed a unique production method and compositions of Carbon/Carbon materials which can be applied in a number of applications where conventional carbon/carbon materials were either technically or commercially not viable.

Development and commercialization of carbon heat exchangers has been made difficult by several technical challenges. We believe based on utilizing Wellman's advanced carbon material and manufacturing technology in conjunction with ThermalCentric designs and technology, we can resolve the technical issues resulting in significant impact and commercialization of new energy saving technologies.

The manufacture and demonstration of a commercially viable all-carbon heat exchanger will not only support the development of advanced materials technologies in the State of Ohio, but would allow ThermalCentric to establish a facility in the State of Ohio and for both companies to secure additional financial resources needed to quickly commercialize new Cleantech products based on their advanced carbon materials and manufacturing techniques.

Rapid commercialization to meet existing demand would lead to significant new employment in Ohio within 1 to 3 years of completing the project. Virtually all of the specific goals listed in the state solicitation will be addressed in this proposal.

The estimated financial scope of the project grant will be $1 million in state funding requiring 24 months to achieve the objectives.

Sincerely,

Franklin Kahle
Market Segment Manager
Off-Highway, Powersports & Industrial

OTFAMP 10-676

November 4, 2009

Ohio Third Frontier
Advanced Materials Program

Project Title: "Anti Reflective Coatings for Photovoltaic Applications"
Estimated Grant Funds: $1M
Known Collaborators: EFOI, OSU, Institute for Materials Research, NanoTech West

To whom it may concern:

We at Energy Focus, Inc (EFOI) are pleased to submit a letter of intent in response to your FY 2010 solicitation. Energy Focus, Inc. is a technology oriented company producing innovative energy efficient products. We are a small business and have several successes in Federal Government funding. We have competed for and won Small Business Innovative Research awards from the Department of Energy, the Defense Advanced Research Projects Agency (DARPA) and the US Army. Additionally, built relationships within other agencies such as Naval Sea Systems Command (NAVSEA) where we sold products developed through the government funded projects. We will be submitting a proposal entitled, "Anti Reflective Coatings for Photovoltaic Applications". The following is an overview of the proposal:

Summary

Energy Focus will develop a family of antireflective coatings for photovoltaic materials and mirror substrates to reduce reflections and improve the conversion efficiency of the solar cells. The coatings will be developed and manufactured in Ohio. Our partners include the Institute for Materials Research and NTW (Nanotech West) at the Ohio State University. Energy Focus will be building on developments initially funded by the Dept of Energy and the Dept. of Defense. The Team will employ the advanced facilities and staff of the OSU Nanotech West microfabrication center to help with the technology prototype development. We anticipate requesting $1M in grant funding for this effort.

We look forward to working with your organization.

Sincerely,

Karen Leak

Karen Leak
Energy Focus, Inc
Contracts Manager
440-715-1299
kleak@efoi.com

OTFAMP 10-677

MegaJoule Storage, LLC

November 4, 2009

Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

Subject: 2010 OTFAMP Letter of Intent
VIA: E-mail to OTFAMP2010@development.ohio.gov

To Whom It May Concern:

Please let this letter serve as our notice of intent to apply for the fiscal year 2010 Ohio Third Frontier Advanced Materials Program (OTFAMP). Below is the information requested in Section 1.3.3 of the Request for Proposal for the OTFAMP. The attached project summary provides additional details about our project.

Lead applicant: MegaJoule Storage LLC
Contact: Herb Crowther, President
Address: 1112 Kenilworth Avenue, Cleveland, OH 44113
Telephone: 216-496-8302
Fax: 216-751-9537
E-mail: hcrowther@capling.com
Proposed project title: Advanced Materials for Affordable Energy Storage
Estimated grant funds to be requested: $1 million
Target collaborators: JME, Inc., Crown Battery, Eaton Corporation, Great Lakes Institute for Energy Innovation: Case Western Reserve University

Thank you for your assistance. Please feel free to contact me if you need additional information.

Sincerely,

Herb Crowther
President, MegaJoule Storage LLC

Attachment: Project Summary

Advanced Materials for Affordable Energy Storage
2010 Ohio Third Frontier Advanced Materials Program Project Summary

Business Overview: MegaJoule Storage LLC is developing electrical energy storage products for utility-scale stationary energy storage applications. This energy storage is based on proprietary electrochemical capacitor technology that offers lower cost, longer life and greater ease of use compared to other energy storage technologies. The project will develop advanced carbon materials that reduce the cost and improve the performance of energy storage systems for sale to electric utility, renewable energy, industrial and commercial companies. Commercialization of MegaJoule's energy storage products will expand Ohio's emerging advanced energy cluster and contribute to the state's advanced materials industry capabilities.

Project Description: This grant will assist MegaJoule and its collaborators in optimizing nanoscale activated carbon materials for use in advanced energy storage capacitors. A system demonstration in field conditions will demonstrate the functionality and performance of partial scale fully integrated energy storage systems in "peak shifting" day-night energy storage, and "firming" of renewable energy power generation. Improved performance of advanced carbon materials and successful field applications will lead to venture investment in MegaJoule to expand product development, manufacturing and distribution capacity.

MegaJoule's headquarters operations are based in Cuyahoga County. MegaJoule is collaborating with JME, Inc., Shaker Heights, Ohio; Crown Battery, Fremont, Ohio; Eaton Corporation, Cleveland, Ohio, and Case Western Reserve University, Cleveland, Ohio. JME, Inc. will provide materials research, development, and performance testing. Crown Battery will provide battery components and perform cell assembly for test and demonstration systems. Eaton Corporation will provide power electronics for the system demonstration. CWRU will provide analytical services to aid advanced material optimization and wind power profiles for characterization and testing energy storage material performance.

MegaJoule has a first-to-market opportunity with a product line featuring transportable, turn-key, bulk energy storage systems ranging from 50 kilowatt hours (kWh) to megawatt hour (MWh) scale capacity.

The market opportunity for MegaJoule's advanced energy storage products is compelling. Energy storage is a large and rapidly growing global market. Lux Research (Lux) predicts a $64 billion market by 2012, driven largely by bulk energy storage for utility companies. One of the largest US utilities, American Electric Power (AEP), publicly announced a goal of deploying 1,000 megawatts (MW) of advanced storage capacity within the next decade. Extrapolating AEP's vision across the US electric utility industry would translate into 15,000 MW of new domestic energy storage capacity. Investor-owned utilities, renewable energy project developers and government agencies have expressed interest in field testing MegaJoule's products.

OTFAMP funds will assist the growth of MegaJoule by providing capital that will allow it to accelerate reductions in product cost, enter the marketplace faster, and ultimately create jobs in Ohio. MegaJoule will invest heavily in the project and expects to exceed the targeted 1:1 cost share ratio. The success of the project will be measured by system sales revenue as well as job creation in Ohio and capital investment in MegaJoule. The success of the project, combined with other recent successes in advanced energy storage technology in Ohio, will help to develop the State of Ohio's leadership in the rapidly growing advanced energy industry.

Cell Pore Acquisition, LLP

November 4, 2009

Ohio Third Frontier Advanced Materials Program
RFP Administered by:
The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus Ohio 43215

Dear Proposal Review Committee:

Cell-Pore Acquisition LLP (CPA) intends to submit a proposal for the 2010 OTFAMP. Cell-Pore Acquisition LLP (CPA) is a new company being formed with Private equity funding, final terms are nearly set and this new company will begin operations prior to year-end. The company will restart commercial activities of a product line recently halted due to bankruptcy of its parent NanoDynamics.

Cell-Pore™ is the basis for a family of proprietary ceramic products with unusually high surface areas and tailored chemistries, making them highly effective in a variety of gas and water bio-filtration and remediation applications. CPA intends to purchase the business operations based upon the Cell-Pore™ technology.

Cell Pore Acquisition LLP, intends to establish it's manufacturing base in the Columbus OH area and will leverage the expertise (people) and resources that were formerly employed by NanoDynamics and its subsidiary Metamateria. NanoDynamics had invested in a medium scale manufacturing facility in Buffalo NY. CPA intends to acquire the assets from this facility and re-establish them in a facility in Ohio during 2010.

Tim Marth will be the President of CPA and is based in the Columbus area. He will be the point of contact for the proposal. His contact information is as follows:

Tim Marth

President Cell Pore Acquistion, LLP

1101 Challis Springs Drive

New Albany OH 43054

Telephone: 614-499-2617

Email: TLMarth@aol.com

The focus of the project will be to fund application development activities that will drive the successful commercialization of the Cell Pore™ technology. Collaborators have been identified and will be

described in detail in the proposal. CPA will use the funding to prove applications and assist with the difficult transition of re-establishing this enterprise and quickly move from the demonstrating to genuine market entry phase of the business. Cell Pore™ technology can be used as a standalone filter component or as a substrate for growing nanoscale reagents to create highly contaminant selective polishing filters. Cell-Pore™ represents a unique porous ceramic substrate which is the only one of its kind in the US. It differentiates itself through its lower cost, the type of interconnected porosity and the high surface area available for biological growth or for enhancement with nanomaterials. Biofiltration (using anerobic and aerobic beneficial bacteria) has historically offered an environmentally elegant method of dealing with waste streams. However, the range of applications for biofiltration has been limited by the historical substrate media available to support the bacteria. Cell-Pore's characteristics (high, interconnected porosity with nano-scale surface areas) remove many of these historic substrate limitations, and create new economic applications for biofiltration. Biofiltration replaces more expensive and environmentally damaging technologies, such as incineration and chemical treatment. Cell Pore™ provides a material that combines an engineered high surface area matrix with a composition that is very well suited for microbial activity. This combination provides a basis for new design and operating parameters for system designers and equipment builders. The primary factors creating a unique value proposition for these materials are:

a) Much Higher Specific Concentration of bacteria than competing media
b) Better Contact Efficiency – Minimizing Hydraulic Retention Time (HRT)
c) Inherent Design Flexibility/Oxygen Delivery Mechanism(s)

Cell Pore is an exciting materials technology that has yet to establish solid commercial traction required to be a going concern, this funding from the state will help ensure that transition is achieved successfully creating a positive and dramatic economic impact for the state.

Regards,

Timothy A. Marth

President, CPA

OTFAMP 10-679

LOCKHEED MARTIN

Date: October 4, 2009

To: Ohio Department of Development Technology and Innovation Division
OTFPVP2010@development.ohio.gov

From: Lockheed Martin MS2 Integrated Defense Technologies
1210 Massillon Road
Akron, OH 44315-0001

Subject: 2010 Ohio Third Frontier Advanced Materials Program Letter of Intent

Lead Applicant: Lockheed Martin MS2 Integrated Defense Technologies

Contact Person: Dr. Daniel H Jones
daniel.h.jones@lmco.com

Project Title: Reduced-Permeability, High-Modulus Film Project for Military Lighter-Than-Air

Grant Funds to be Requested: $1,000,000

Collaborators:

Akron Polymer Systems
2990 Gilchrist Rd.
Suite 2100
Akron, OH 44305-4418
Contact: Dr Matthew Graham
Business Manager

University of Akron College of Polymer Engineering
Akron, OH 44325
Dr Miko Cakmak
Professor

Project Summary: See attachment

Respectfully Submitted,
Daniel H Jones

Dr Daniel H Jones
Materials & Process Engineer, Senior

Improved-Permeability, High-Modulus Film Project Summary

With the sponsorship of ODOD's Third Frontier funding, Lockheed Martin MS2 Integrated Defense Technologies, Akron Polymer Systems and the University of Akron have developed a high-modulus film for an application in Lockheed Martin's High Altitude Airship™ program (HAA™). Because of its high strength and high modulus (low stretching), this material has the potential to replace other materials with concomitant reductions in weight and increased stability. Weight reductions have proven to be the most effective means of reducing fuel usage in today's global economy. This project will adapt recent advances in nanotechnology to our team's high-modulus films to develop a strong film with low permeability to gases.

The new polymer developed under the current Research Commercialization Project (RCP) also has the advantage of relative ease and reduced processing costs because it is a soluble polymer (unlike DuPont's Kapton polyimide). The Improved-Permeability, High-Modulus Film Project will address adaptation of the soluble polymer . For the current market, Lighter-Than-Air platforms, the team will address the following:

(1) Improve (i.e., reduce) permeability to preserve lift gases, helium and hydrogen
(2) Increase dispersion and layered structure of nano-clays (or polymer nano-platlets) for improved properties and improved processing, possibly improved protection from the sun's damaging radiation
(3) Establish processing procedures for optimization of structure and improved properties
(4) Capitalize on secondary effects introduced by the nano techniques

Production of the high-modulus polymer will continue at Akron Polymer Systems' facility in Akron. Process development will continue at the University of Akron. Lockheed Martin will lead development and test, supported by APS & UA.

In addition to the current need for the defense industry's LTA products, an impermeable, strong, light film will have tremendous impact on the packaging industry. When commodities vendors ship millions of products across the globe or across the country, even slight decreases in weight result in billion dollar savings in transportation costs. The reduced permeability will extend practical application of the film in the agricultural and food industries.

Our team's campaign to exploit this market opportunity will have direct and significant impact on Ohio. The major collaborators are located in northeast Ohio. Akron Polymer Systems, the University of Akron and Lockheed Martin MS2 IDT have proven their expertise in development of this film. The team will extend the value of the new film technology as well as open new markets for Ohio.

OTFAMP 10-680

LOCKHEED MARTIN

Date: October 4, 2009

To: Ohio Department of Development Technology and Innovation Division
Mactac

From: Lockheed Martin MS2 Integrated Defense Technologies
1210 Massillon Road
Akron, OH 44315-0001

Subject: 2010 Ohio Third Frontier Advanced Materials Program Letter of Intent

Lead Applicant: Lockheed Martin MS2 Integrated Defense Technologies

Contact Person: Dr. Daniel H Jones
daniel.h.jones@lmco.com

Project Title: Nano-Reinforced Flexible Polymer Matrix Project

Grant Funds to be Requested: $1,000,000

Potential Collaborators:
Akron Polymer Systems
Case Western Reserve University
EWI
University of Akron College of Polymer Engineering
Mactac
Maverick
Renegade
Zyvex

Respectfully Submitted,
Daniel H Jones

Dr Daniel H Jones
Sr Materials & Process Engineer

Nano-Reinforced Flexible Polymer Matrix Project Summary

Fiber reinforced polymer (FRP) composites have formed the backbone (literally) of modern material development. In a typical FRP composite, rigid fibers (organic, like carbon fiber, or inorganic, like glass) impart strength and rigidity to an otherwise weak, somewhat flexible, thermoset polymer matrix. In an FRP composite, the matrix is the continuous phase and dominates the composition. Lockheed Martin MS2 Integrated Defense Technologies (IDT) has established itself as an expert in flexible, laminate composites in which flexible fibers form a (somewhat) continuous phase and dominate the laminate properties. The laminated layers are usually held together by a thermoplastic polymer.

With the support of ODOD and our team of Ohio companies, Lockheed Martin has set the goal to develop a thermoset polymer for flexible laminate adhesion. Thermoset adhesives offer the following advantages over thermosplastics:

1) Elimination of delamination in subsequent lamination and seaming procedures due to reheating the thermoplastic adhesive
2) Reduced variation in properties due to phase changes (such as Tg)over wider temperature ranges
3) Reduced stress set
4) Exclusion of creep failure/rupture

In cooperation with its Ohio partners, Lockheed Martin plans to overcome the following issues:
Must current, continuous lamination processors use thermoplastic sheets. The team would have to develop new materials handling processes for liquid thermosets or develop a "solid" (low-flow) thermoset pre polymer that would fit into current lamination equipment and:

1) Control, delay, initiate and sustain the thermoset cure reaction until the surfaces are joined.
2) Control viscosity & flow of adhesive sheet in storage & under heat
3) Control surface tack of adhesive sheet in storage & under heat

The team's development plan would also target increased strength (adhesion & cohesion) by adapting nano reinforcement compatibility with the substrate and matrix

Lockheed Martin would continue investment in previous related work in polymer dendrites begun at Case Western Reserve University, Cleveland. The University of Akron would support with expertise in curing polymers already in place, including radiation, conduction (through nano fibers), microencapsulation, and permeation

This work would be developed in the university laboratories and put into practice on commercial processing lines at Renegade, Mactac and the National Composite Center with the help of expertise from EWI (joining technologies), and Maverick (high temperature adhesives experience in composites) and Zyvex (compatibilizing carbon nano tubes).

OTFAMP 10-681

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THE GARLAND COMPANY

November 2, 2009

Ohio Department of Development
Technology Division
77 South High Street, 25th Floor
Columbus, Ohio 43215

Subject: 2010 OTFAMP Letter of Intent
VIA: E-mail to OTFAMP2010@development.ohio.gov

To Whom It May Concern:

Please let this letter serve as notice of intent for The Garland Company to apply for the fiscal year 2010 Ohio Third Frontier Advanced Materials Program (OTFAMP). Below is the information requested in Section 1.3.3 of the Request for Proposal for the OTFAMP. The attached project summary provides additional details about our project.

Lead applicant: The Garland Company, Inc.
Address: 3800 East 91st Street, Cleveland, OH 44105
Telephone: 216-641-7500
Fax: 216-641-0633
Contact: Joe Mellott
E-mail: JoeMellott@garlandind.com
Proposed project title: Bio-based Roofing Products
Estimated grant funds to be requested: $1 million
Collaborator(s): Ohio BioProducts Innovation Center (OBIC) and selected OBIC alliance members

Thank you for your assistance. Please feel free to contact me if you need additional information.

Sincerely,

Joe Mellott
The Garland Company, Inc.
Attachment: Project Summary

The Garland Company
Bio-based Roofing Products Project
2010 Ohio Third Frontier Advanced Materials Program
Project Summary

Currently, significant emphasis is being placed on using bio-based materials in building materials. The federal government, and many state governments, are giving preference to or requiring materials that include bio-products. The Federal Biobased Products Preferred Procurement Program creates a preference across the entire federal government to purchase bio-based products, when practical, based on price, availability and performance. Recently, Ohio passed legislation to require the director of Ohio's Department of Administrative Services (DAS) to establish a program that ensures supplies composed of bio-based products are purchased by DAS, state colleges and universities and other state agencies when costs are comparable to products that are not bio-based.
These programs, combined with the variability of existing materials cost, concerns about pollutants in the manufacturing process, and the creation of bio-product incentives have created a tremendous market opportunity for bio-based commercial roofing materials. However, there are no viable bio-based roofing materials that exist in the market today. These factors have created a clear opportunity for companies that can overcome the existing technological and market barriers to deliver cost-effective bio-based roofing materials.

The Garland Company ("Garland"), an employee-owned manufacturer of commercial roofing products that has been located in the City of Cleveland for over 100 years is collaborating with the Ohio BioProducts Innovation Center ("OBIC") to develop a high-performance commercial roofing product using bio-based materials.

Currently, most commercial roofing materials are made using hydrocarbons which occur in crude oil. Replacing oil-based raw materials with bio-products such as soy oil, linseed oil, tallow, or other bio-products would accomplish key economic and environmental goals. With Third Frontier funding, the Garland Company and OBIC's proposed project would entail identifying and testing potential bio-polyols, solvents, pigments, and other inputs that could be substituted for existing materials, developing and testing prototype roofing materials, certifying the material for end-use, identifying raw material sources, developing a supply chain for raw materials, and developing the manufacturing process.

As a developer and manufacturer of industry-leading roofing products, Garland is uniquely positioned to leverage its existing customer relationships, sales force, manufacturing assets and expertise, experience in the commercial roofing markets to take product developments to market immediately. The commercial results of its collaboration with OBIC will be rapid, as innovations will be integrated into the Garland's current roofing products, with new bio-based roofing materials being introduced within two to three years. The project will also lead to new permanent full-time administrative, financial, technical, and manufacturing jobs which would be created at Garland's facility in Cleveland. In addition, by creating a large new market for Bio-products, many of which will likely be produced and processed in Ohio, the project will create jobs throughout the developing supply chain.

OTFAMP 10-682

Riehl Engineering Ltd
2000 Composite Dr.
Kettering, OH 45420
Ph: 937.602.4544
Fax: 937.297.9437

Ohio Department of Economic Development
Third Frontier
RE: Letter of Intent for Ohio Third Frontier | Advanced Materials Program
"Advanced Solid State Continuous Carbon Nanotube Manufacturing Process"

The letter is to announce our intention of submitting a proposal to the Advanced Materials Program. The proposal to be submitted is to address the need to accelerate the development and growth of the advanced materials industry, specifically carbon nanotubes, in Ohio. Riehl Engineering's proposed avenues for advancing this need include: presentation of near-term specific commercialization plans with respect to products, and processes; up-scaling RE's viable and proven manufacturing processes and technologies; and demonstrating RE's applications that are market ready.

The title of the proposal being submitted is "Advanced Solid State Carbon Nanotube Manufacturing Process." The participants in the proposal include: Riehl Engineering (lead), University of Cincinnati, Yellow Springs Instruments, Green Valley Venture Capitalists, Sustainable Carbon Nanotechnology and Engineering.

Riehl Engineering Ltd has developed the science necessary to produce ***catalyst free, ultra small carbon nanotubes***. This process, and resulting material, is drastically different and improved over current vapor phase carbon nanotube and nanofiber production technology. Because no catalyst is necessary in production, un precedence levels of purity (99.99%+) are obtainable. This allows the research commercialization team to approach successfully the electronic and electrochemical markets previously unavailable to carbon nanotube manufactures. In addition to radically increasing production sizes, the research team will expand the process to enable production of ***continuous carbon nanotube yarn*** for aerospace, communication, and defense related products.

The request for state funding is $500,000.00 in match.

Thank you,

Bill L. Riehl, PhD, PE
Managing Partner
blr@riehlengineering.com

OTFAMP 10-683

Riehl Engineering Ltd
2000 Composite Dr.
Kettering, OH 45420
Ph: 937.602.4544
Fax: 937.297.9437

Ohio Department of Economic Development
Third Frontier
RE: Letter of Intent for Ohio Third Frontier | Advanced Materials Program
"Advanced Solid State Continuous Carbon Nanotube Thread Production"

The letter is to announce our intention of submitting a proposal to the Advanced Materials Program. The proposal to be submitted is to address the need to accelerate the development and growth of the advanced materials industry, specifically carbon nanotubes, in Ohio. Riehl Engineering's proposed avenues for advancing this need include: presentation of near-term specific commercialization plans with respect to products, and processes; up-scaling RE's viable and proven manufacturing processes and technologies; and demonstrating RE's applications that are market ready.

The title of the proposal being submitted is "Advanced Solid State Carbon Nanotube Thread Production." The participants in the proposal include: Riehl Engineering (lead), University of Cincinnati, Yellow Springs Instruments, Green Valley Venture Capitalists, Sustainable Carbon Nanotechnology and Engineering.

Riehl Engineering Ltd has developed the science necessary to produce a continuous yarn of ***catalyst free, ultra small carbon nanotubes***. This process, and resulting material, is drastically different and improved over current vapor phase carbon nanotube and nanofiber production technology. Because no catalyst is necessary in production, un precedence levels of purity (99.99%+) are obtainable. This allows the research commercialization team to approach successfully the electronic and electrochemical markets previously unavailable to carbon nanotube manufactures. In addition to radically increasing production sizes, the research team will expand the process to enable production of ***continuous carbon nanotube yarn*** for aerospace, communication, and defense related products.

The request for state funding is $650,000.00 in match.

Thank you,

Bill L. Riehl, PhD, PE
Managing Partner
blr@riehlengineering.com