Greenlight Optics

11235 Williamson Rd
Cincinnati, OH 45241
513-247-9777

February 3, 2011

OTFSP 11-801

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

Subject: Letter of Intent to submit a proposal for the Ohio Third Frontier Sensors Program for 2011

Greenlight Optics, LLC is pleased to provide this letter of intent to submit a proposal for the Ohio Third Frontier Sensors Program for Fiscal Year 2011.

Lead Applicant Name:	Greenlight Optics, LLC
Address:	11235 Williamson Road Cincinnati, OH 45241
Telephone:	513-247-9777
Contact Person:	Michael O'Keefe, Managing Partner
Contact Email:	mokeefe@greenlightoptics.com
Project Title:	**Lightweight, Large Aperture Super-telephoto Lens**
Estimated Grant Amount Requested:	$1,000,000
Known Collaborators:	IDCAST UDRI OPCON Design Associates

Summary of Proposed Project:

While the advanced digital imaging market continues to grow, current lens offerings require that customers make a trade-off between high magnification and light gathering power. Greenlight proposes commercialization of a camera lens platform offering both high magnification (long focal length) and light gathering power (low f/#), at an affordable price. The combination of low f/# and long focal length enables long range facial recognition, surveillance operations in low light conditions and improved signal quality for advanced digital image processing. With the ability to clearly capture distant objects and faces, a significant opportunity exists in the law enforcement, security, military, photography, and astronomy market segments. A new product platform employing dozens of Ohioans will be created and sustained due to IP protected lens design and trade secret manufacturing process technology.

Sincerely,

Michael O'Keefe
Managing Partner
Greenlight Optics, LLC

Letter of Intent for Ohio Third Frontier Sensors Program Proposal

To:
OTFSP2011@development.ohio.gov

OTFSP 11-802

Subject:
2011 OTFSP LOI

Lead Applicant's Name:
Department of Geography, University of Cincinnati
401g Braunstein Hall
University of Cincinnati
Cincinnati, Ohio, 45221-0131
513-556-3421 Department
513-556-3370 Fax phone number,

Contact person:
Dr. Richard A. Beck
Department of Geography
401g Braunstein Hall
University of Cincinnati
Cincinnati, Ohio, 45221-0131
richard.beck@uc.edu
513-280-3126 Cell
513-556-3426 Office
513-556-3421 Department
513-556-3370 Fax

Proposed Project title: *GeoTempo: A Modular Software and Electronics Platform for Standardized, End-to-End, Plug-and-Play, Location- and Time-Aware Sensor Networks for Integrated Advanced Remote Sensing and Chemical/Biological Sensing for Environmental Monitoring, Safety and Security and Aerospace Applications.*

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

Known Collaborators:
Urban Alta, Inc.
Stonewater Controls, LLC
SkySentry, LLC

One Page Summary of the Proposed Project:

The next frontier for advanced sensor applications is efficient integration through standardization. We propose to commercialize recent basic research in software development for standardized, end-to-end, plug-and-play sensor networks for integrated advanced remote sensing and chemical/biological sensing for environmental monitoring, safety and security and aerospace applications funded by the National Science Foundation and the Army Space and Missile Defense Battle Laboratory. Our initial focus will be on Inland Maritime Environmental Health, Safety and Security along the Ohio and Mississippi River Systems and the Great Lakes although potential markets include municipal water and sewer systems, electric power grid management, public safety, homeland security and defense both nationally and internationally.

It can be argued that most of the recent economic growth in the United States has been the direct result of the adoption of open (non-proprietary) computing and information standards. The entire Internet boom was fueled by the phenomenal success of DARPA's Transmission Control Protocol and Internet Protocol layered and modular standards for computer communication in combination with wiring and signaling standards developed by Xerox, Intel and Digital Equipment (Ethernet with RJ45 connectors on CAT-5 or CAT-6 cable).

In contrast, the communications and wiring and signaling interfaces and data streams of most sensors remain highly heterogeneous and therefore expensive and time consuming to integrate and apply. For example, some sensors come with 9-pin serial connections, some with USB connections, and some with Ethernet connections. Some sensors transmit their data in ASCII code, some in proprietary binary formats. Even those sensors that are sold with Ethernet connections and transmit data in ASCII code use a wide variety of data formats (grammar and punctuation) and vocabularies to describe themselves. An even smaller subset of existing sensors includes location and time information necessary to apply them efficiently as part of in large geographically distributed information networks.

To meet these needs we will meet two of the three major technical objectives of the OTFSP in remote and chemical/biological sensors: 1) expand the application and use of sensors; and 2) enable the fusion of multiple sensor platforms to obtain a complete picture of an environment with a modular system of commercially available sensor electronic interfaces and software components. We plan to meet both needs by implementing and commercializing the still somewhat general Open Geospatial Consortium (OGC) Sensor Web standards as a modular commercial product consisting of electronic and software interfaces for existing sensors that adapt them into a similarly standardized integration platform. We will create standardized interfaces for a variety of commercially available interfaces

For the last three years our team has focused primarily on adapting existing sensors to new rigorous implementation of the OGC standards at the database, visualization and analysis levels for NSF, DHS and the Army for airborne and ground sensors. We have also created prototype electronics that adapt serial sensor streams to TCP/IP/Ethernet with FTP protocol pushing the new OGC Sensor ML XML encoding standards. We propose to develop, construct and sell ruggedized electronic adapters and software to integrate popular sensors from Ohio and other companies as plug-and-play, end-to-end, geospatially enabled sensor webs.

Standardized geospatially-enabled sensor networks are just as crucial to national defense and the global war on terror as DARPA's standardized computer networks. They are also crucial to every-day public safety. Indeed security and safety are two sides of the same coin. Intentional incidents and avoidable accidents can have similar consequences. Both intentional incident and accident response benefit from situational awareness provided by standardized networks of location- and time-stamped sensors linked to standardized database, visualization and analysis tools in common operational pictures. Such standardization will take at least a decade before it encompasses all sensors just as it did for computers. We see numerous commercial opportunities for electronics and software that enable sensor network integration to provide new capabilities and applications at lower cost accordingly.

OTFSP 11-803

Crystal Diagnostics™

February 4, 2011

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

Dear Sir or Madam:

Crystal Diagnostics, Ltd. (CDx) intends to submit a proposal for funding through the 2011 Ohio Third Frontier Sensors Program. The pertinent information is:

Lead Applicant:	Crystal Diagnostics, Ltd. (CDx)
Contact Person:	Bob Bunting
Address:	Crystal Diagnostics Applied Research Laboratory, D-146, 4209 State Route 44, Box 95 Rootstown, OH 44272
Phone number:	(303) 507-0936
Email:	bbunting@crystaldiagnostics.com
Project title:	Commercialization of Liquid Crystal Bio-Sensor System for Rapid Microbial Detection
OTF Grant Funds:	$1 million
Collaborators:	NEOUCOM and Kent State University

Crystal Diagnostics Ltd. (CDx) has developed a proprietary liquid crystal technology to rapidly detect dangerous microbes and pathogens in fluids, allowing for much faster, more accurate analysis at reduced lifecycle costs vs. traditional testing methods. The technology utilizes a pathogen detection reader and disposable LCD cassettes, similar to a printer and ink cartridge model.

With assistance from our collaborators, NEOUCOM and Kent State University, and a previous OTF Wright Project grant, CDx is completing final testing and manufacturing scale-up, and has secured beta product partners. The 2011 OTF Sensor grant proceeds will be used to deliver an advanced analysis cassette, complete testing, scale-up, and commercialization in the recreational water market and complete strategic partnerships to maximize market penetration and create more new high paying jobs in Ohio. CDx is taking advantage of the medical and Liquid Crystal clusters in NE Ohio as a way to advance its development.

OTFSP 11-804

Lead Applicant Name:	Akira Takashima, M.D., Ph.D.
Lead Applicant Address:	The University of Toledo College of Medicine Department of Medical Microbiology & Immunology 3000 Arlington Avenue Toledo, OH 43614-2598
Telephone:	419-383-5423
Contact Person/Email	Akira Takashima, M.D., Ph.D., akira.takashima@utoledo.edu

Proposal Title:	Ohio Center for Allergen Biomarker Development
Dollars Requested:	$1 million
Collaborators:	G. Frank Gerberick, Ph.D., P&G

All toxicology tests have long been performed using animals to meet regulatory requirements. Each new chemical that goes through multiple tests may use up to 5,000 animals and cost $1-2 M. Due to rapid and dramatic changes in public views, regulatory requirements, and increasing costs associated with animal testing, concerted efforts are being made toward development, validation, and use of alternative *in vitro* tests. In Europe alone, about 30,000 chemicals are in use without full toxicity data required by the new regulation by the European Commission (EC), called the Registration, Evaluation and Authorization of Chemicals (REACH). According to the European Union (EU) legislation known as the Cosmetic Directive, no cosmetic will be allowed to be sold in Europe after deadlines if it contains any ingredients tested in animals. In the United States, the National Academy of Sciences released a report "Toxicology testing in the 21st century: A vision and a strategy," recommending the use of high throughput (HTP) screening and genomics-based approaches. The Environmental Protection Agency (EPA) launched in 2007 a computational toxicology program, ToxCast, to accelerate modern toxicology research and most recently a broadened version, Tox21, to coordinate nation-wide HTP screening efforts. Thus, development of state-of-the-art *in vitro* toxicology tests is a major global challenge.

As an organ positioned at the environmental interface, the skin is constantly exposed to a wide variety of chemical insults. Among many diseases caused by environmental chemicals, contact dermatitis is the leading disease in terms of the incidence – occupational contact dermatitis alone is estimated to occur at the rate of 0.5-1.9 cases/worker/year. Thus, the Centers for Disease Control and Prevention (CDC) has listed contact dermatitis as one of the 21 research priority areas of the National Occupational Research Agenda (NORA). Because contact dermatitis is preventable by eliminating skin contact with causative agents (i.e., skin allergens), development of *in vitro* assays for their detection has a major impact on global public health. Moreover, such assays should have a huge economic impact, considering the current costs for animal testing. Nevertheless, no internationally approved *in vitro* assay is currently available to detect skin allergens.

Two laboratories, both located in Ohio, can now solve this global challenge. Akira Takashima (PI) at The University of Toledo (UT) recently developed a HTP-compatible assay platform – briefly, this assay is devised to measure rapid generation of reactive oxygen species (ROS) in dendritic cells (DC), which play central roles in the induction of allergic contact dermatitis. Frank Gerberick (Co-PI) at P&G has developed the Peptide Reactivity Assay to measure molecular binding of skin allergens to specific amino acid moieties. We believe that the DC-based ROS Assay and the Peptide Reactivity Assay represent the most advanced *in vitro* assay platforms designed to examine the initial and causative events of allergic contact dermatitis at cellular and molecular levels. Importantly, not only does the combination of the two assays markedly improve the overall sensitivity and specificity, it also allows us to categorize contact allergens based on their mechanisms of action. Here we propose to launch an interdisciplinary collaborative program between an academic institution and an industrial leader in Ohio.

Our major objectives are: a) to test broader spectra of chemicals with the two existing assays (Year 1), b) to develop newer assay(s) designed to categorize skin allergens based on their broader biological and chemical properties (Years 1 and 2), c) to generate mathematic and computational model(s) for predicting skin sensitizing potentials (Year 3), and d) to validate the newly developed allergen testing platform *via* international, multi-center trials (Year 4). Our in-house expertise and resources in immunology, toxicology, chemistry, HTP screening, and systems biology should enable us to achieve these objectives in the above timeline.

Our business goals are: a) to establish the Allergen Biomarkers in Ohio (ABOhio) as a for-profit organization sponsored by UT and supported by P&G (Year 1), b) to provide "chemical testing services" to industrial customers through ABOhio (Year 2), and c) to manufacture and commercialize assay kits and computational programs for allergen detection though ABOhio (Year 3). The PI is a board-certified dermatologist and an internationally recognized expert in the skin immunology field. The Co-PI is a leading pioneer and world authority in the areas of contact dermatitis and allergen testing. Our extensive networks in academia and industry, together with strong commitments from the two hosting institutions, should help us accomplish these challenging goals.

LakeShore.

February 10, 2011

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

OTFSP 11-805

Email: OTFSP2011@development.ohio.gov

Re: 2011 OTFSP LOI - Letter of Intent for Competing in the 2011 Sensors Program

Dear Sir/Madam:
This serves as the Letter of Intent (LOI) to submit a proposal in the 2011 Ohio Third Frontier Sensors Program.

Lead Applicant: Lake Shore Cryotronics, Inc.
575 McCorkle Blvd.
Westerville, OH 43082

Contact: Rob Ellis, Director of Strategic Planning
Phone: 614-212-1468
Email: rob.ellis@lakeshore.com

Project Title:
Cost-effective terahertz-based characterization system for semiconductor materials research

Grant Funds Requested:
$1,000,000

Collaborators:
Traycer Diagnostic Systems, The Ohio State University / Center for Emerging Materials, University of Dayton Research Institute / IDCAST, Air Force Research Lab, Raytheon, Boeing, Lockheed-Martin, Northrop Grumman

Project Summary:
Lake Shore Cryotronics is a privately held company headquartered in Westerville, Ohio, that has been an international leader in the development of innovative measurement and control technologies since 1968. The company's diverse product portfolio includes a comprehensive line of cryogenic temperature sensors and instruments, magnetic sensors and instruments, metrology systems for electronic and magnetic property measurements of materials, and cryogenic micro-manipulated probe stations. Lake Shore's customers are scientists and researchers in academia, national labs, and high technology industry who are investigating the transport properties of a wide array of materials: semiconductors, magnetic materials, superconductors, nano-scale electronic and magnetic materials, etc. Lake Shore has an international presence and exports approximately 60% of its products through a distribution channel network consisting of 22 independent dealers and manufacturers' representatives who promote, sell and service their products in over 40 countries.

This proposed project will develop a ground-breaking and cost-effective new system for rapidly and non-destructively characterizing the electronic and magneto-transport properties of

materials with potential for use in next-generation semiconductor, spintronic, and nanoelectronic devices. The system will use terahertz energy to analyze a variety of different characteristics of such materials over a broad temperature (1.5K to 675K) and magnetic field (to 2.5T) range, supported by Lake Shore's cryogenic probe stations.

The funds awarded would be used for advanced fabrication and packaging of high efficiency terahertz sources, emitters and detectors, instrument design, systems integration with existing probe station products, application software development, and pre-launch commercial testing.

This terahertz instrument will introduce a new dimension of optical platforms into Lake Shore's product family, consistent with the company's desired growth strategy. As a result, job growth opportunities for Ohio would potentially come from:

- Addition of new design engineering, manufacturing engineering, application engineering, assembly and test, sales and support roles at Lake Shore in Westerville, Ohio.
- Addition of new engineering, manufacturing, support and other roles at Traycer Diagnostic Systems in Columbus, Ohio.
- Incremental demand for local suppliers of components and materials required for production of these new systems. Lake Shore's supply chain is heavily weighted towards Ohio-based companies.
- Reduction of outsourced (out-of-state) electronic material characterization activity for Ohio research institutions such as OSU, UD, Wright State, Case Western, etc., with commensurate increase in staffing to support this new local research capability.

In addition, this project will leverage the growing concentration of terahertz technology infrastructure in Ohio and further contribute to our state becoming a global leader in this rapidly advancing technology area.

We look forward to your consideration of our full submittal.

Sincerely,

Rob Ellis
Director of Strategic Planning

Ohio Third Frontier Sensors Program
Fiscal Year 2011
Letter of Intent: NanoDetection Technology, Inc
2/11/11

OTFSP 11-806

Lead Applicant Name: NanoDetection Technology, Inc.
Address: 30 West 3rd Street, 6th Floor, Cincinnati, OH 45202
Contact Person: Mr. Joel Ivers, CEO
Email address for Contact: Joel@NanoDetectionTechnology.com
Proposed Project Title: ***Advanced Sensor/Detector Platform System with Commercial Applications in Multiple Markets***
Estimated Grant Funds Requested: $1MM
Known Collaborators: Brystin Research, Inc. (Mr. Jack Stubbs)

Ohio Third Frontier Sensors Program
Fiscal Year 2011
Letter of Intent: NanoDetection Technology, Inc.
2/11/11

Project Summary:

NanoDetection Technology™ (NDT), a Delaware C-corporation, has developed a novel, rapid and cost-effective point-of-care *in vitro* diagnostic test platform system for potentially lethal pathogens and biomarkers. NDT seeks funding to improve the lower limit of detection and improve the sensitivity of the current prototype sensor/detector system and to complete the commercialization of its first system targeted at the healthcare market, while partnering with other companies in the food safety market and working with a foreign government on the detection of a specific parasite. NDT is collaborating with another Ohio company who has already begun building the market-ready sensor/detector.

The platform technology employed is the same for all pathogens tested and is based on a unique, patented portable chemiluminesence sensor/detector, designed with an integrated circuit. The NDT sensor/detector combines 25 discreet photodiodes into an integrated computer biochip with ASIC (Application Specific Integrated Circuit) design. Multiple pathogens can be detected at one time with the use of a lateral flow sample cartridge, data can be transferred through a digital signal, and field tracking and positioning through GPS can be obtained. There are three patents issued in the U.S., one issued in Canada, and additional patents issued in five EU countries. NDT holds the exclusive worldwide marketing and licensing rights to the technology, which was developed at Oak Ridge National Laboratories.

The sensor/detector has already demonstrated that it can accurately detect pathogens found in healthcare settings (e.g., MRSA, UTI bacteria, etc.) and the food chain (e.g., *E. coli*, *Salmonella*, and *Listeria*), and it has potential to detect pathogens utilized in bioterrorism (e.g., anthrax, ricin, etc.). The system can also detect DNA and biomarkers that give it a broad market appeal. The company already has obtained funding from the USDA for food safety and it has interest from a major animal health and food safety company for use as a diagnostic tool as part of its food safety program. Additionally, the company is in discussions with a foreign country for the use of the sensor/detector to detect a significant parasite that has major consequences for human health. Thus, the system has already achieved technical proof of concept and has already shown strong commercial potential.

One of the major advantages of this sensor technology is that the hardware investment by the end-user is up to 30 times less than competing technologies, and the cost to run each test is less than half the cost of any other assay. In addition, the NDT system is the only *in vitro* diagnostic system available that can test a broad range of pathogens (multiplexing) that is quick (15-20 minutes), portable (lightweight and small), easy (no extensively trained lab personnel required), and has demonstrated performance equal to current industry standards.

NDT will focus its initial efforts on marketing a low-cost point-of-care test to hospitals and physician offices. Although the company's first target is for the detection of MRSA

(methicillin-resistant *Staphylococcus aureus*), MSSA, and Staph-Epi in skin and soft tissue that meets a significant unmet need, the company has plans to follow up with a series of tests including an Upper Respiratory panel, a Diarrhea panel, and a Urinary Track Infection Panel. The initial indication NDT is pursuing is rapid MRSA testing in skin and soft tissue, which is estimated to be a $1B market opportunity in the U.S. alone.

February 11, 2011

OTFSP 11-807

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

Dear Reviewing Authority:

This letter presents our Intent to submit a proposal under the Ohio Third Frontier Program. Advantage Development, Inc. intends to be the lead applicant in this proposal. Our address and phone contact are: P. O. Box 45154, Westlake, OH 44145 and 216-570-8775, respectively. I, the undersigned, will be the lead Point of Contact (POC) and my email address is: mcollins@advan-devel.com. The proposed project title is "Interoperability Gateway". The estimated Grant Funds will be $1,000,000. The known collaborator will be Advatech Pacific, Dayton, OH.

Sincerely,

Michael R. Collins
President

P. O. Box 45154, Westlake, OH 44145
Cellular: 216-570-8775 -- email: mcollins@ advan-devel.com

Interoperability Gateway

Today, with all of the past developments of networks, communications systems, and command and control (C2) environments, there is a failure to communicate. In the vernacular of the marketplace, this is a failure to "interoperate". This proposed effort would result in a Gateway that would enable Interoperability between different security domains, while automatically filtering what information is shared based upon independent rule sets.

Recently, standards work has been on-going within NATO, and other Partners for Peace, countries to describe an emergent capability built around the "loaned radio". The STANAG 4677, and its Appendices, describes an environment and capability that if "designed to" would enable disparate National C2 Systems (NCS) to interoperate. The current STANAG recognizes the emergent capabilities in data radio transmission and implements the convergence of multiple technologies to affect interoperability between two, or multiple, Coalition squads in adjacent Operational Areas (OAs) to communicate between different NCS.

This development effort recognizes that this capability transcends squad to squad interoperability and additionally allows any sensor, device, or person at the tactical edge to access and interoperate with its adjacent, or global, target system. The universality of this approach provides a total end-to-end solution to the emergent needs for information produced and consumed at the edge of the networks, whether this is for military applications or commercial Supervisory Control and Data Acquisition (SCADA) applications. It also addresses this within the temporal structures of yesterday's, today's, and tomorrow's systems. This solution addresses the bi-directional nature of the information, the security of this information, and the portability of this information within the "loaned radio" environment.

Our proposed product embraces on-going regular and scheduled standardization work, emergent Coalition demonstration funding, and existing needs, and developments, being articulated not only in the United States, but also in almost every participatory country, whether its application is military, homeland security, or commercial. The proposed product also leverages pre-existent hardware developments and earlier software developments and demonstrations from other program areas. Anticipated cost sharing includes sources from all of the above.

Dudley, Jon C.

From: Thomas McCann [tmccann@gridsentry.us]
Sent: Friday, February 11, 2011 2:29 PM
To: OTFSP2011
Subject: 2011 OTFSP LOI
Attachments: One_Page_Summary.doc

OTFSP 11-808

Lead Applicant Name: Grid Sentry LLC
Address: 3915 Germany Lane, Beavercreek, OH 45431
Phone No: 937-974-3838
Contact Person: Thomas M McCann
E-mail address; tmccann@gridsentry.us
Proposed Project Title: Development of an Underground Residential Distribution Sensor (URDS)
Estimated Grant Funds to be Requested: $600,000
Known Collaborators: Defense Research Associates Inc., Dayton Power and Light Company,

Development of an Underground Residential Distribution Sensor (URDS)

This purpose of this project will be to develop, design, and test a sensor which is capable of real-time conveyance of critical information about underground electric power lines. The primary function of these sensors are to provide a Fault Detection System (FDS) to increase the reliability of electrical service to utility customers, speed up outage response time, improve safety and reduce outages due to transformer and cable failures. The sensors will be designed to be mounted on the underground distribution lines and will provide the following functionality: measure line current, line temperature, report the occurrence of fault currents and indicate line out condition. The development of an underground URDS application will provide a vehicle for national and international utility providers to achieve the following strategic benefits:

1. Reduced downtime / customer outages
2. Substantially reduced maintenance personnel efforts during system outages
3. Substantially reduced control center efforts
4. Information integration
5. System-wide automation

The UDRS sensor will consist of a power core to inductively power harvest from the magnetic field around the power line. This unique and innovative capability avoids the need to replace batteries on a regular basis. The Grid Sentry UDRS sensors take the targeted measurements, stores the data in the internal processor and securely transmits the essential data to the ground based Master Control Station for analysis and retransmission on a recurring basis to the power company's Supervisory Control and Data Acquisition/Emergency Management System (SCADA/EMS). The frequency of measurement and the transmission data timing are user selected and can be modified.

When there is a fault or power outage, the sensor will still provide a status message to indicate a "line-out" condition by using power from super capacitor. Transmission of the outage status will continue until power is restored or when the super capacitor is near depletion a "last gasp" message is sent to clearly notify the utility that the sensor is off-line. This information will allow the utilities to reduce power losses (and cost), increase the efficiency of the distribution grid, and improve knowledge of outages and their locations bringing the benefits of the Smart Grid to the power industry and its customers.

The project draws on Grid Sentry technology currently being demonstrated with utilities for application on above ground power distribution lines. The project will include four major tasks:

1. Mechanical design and development of the housing for installation on the underground power lines
2. Design and development of the current transformer and sensor coil for application to the line sizes used in underground applications.
3. Design and development of communications equipment that will effectively communicate the measured data from inside the underground enclosures.
4. Fabrication of sample units for lab, environmental and user environment testing

Ohio Third Frontier Sensors Program
Letter of Intent

OTFSP 11-809

Lead Applicant: WeiFour Inc.
Milpitas, CA 95036

Contact Person: Dr. Kevin Zhang
Director of Manufacturing
Email: zhang88_98@yahoo.com
Phone: 310-928-0106

Project title: High speed imaging ellipsometor/polarimeter for optical sensing
Anticipated grants funds to be requested: $1,000,000

Collaborators: TBD

Proposal Summary

Since founded in 2008, WeiFour Inc. has developed innovative technologies (with patent approved) to record and process optical signals for imaging, display and measurement applications. So far we have focused our resources on the development of technologies and applications. We are looking for additional support in manufacturing, marketing, and sales, which will generate job opportunities immediately in Ohio State if the manufacturing and commercialization is going to be supported by Ohio Third Frontier Project.

Key benefits of our technology are:

- Extremely fast measurements;
- Detail polarization information;
- Low cost;
- Simple, portable system configuration

We have finished the product development of two prototypes in final engineering stage on optical bench in our California office:

- ✓ Visible (420nm-750nm) spectroscopic ellipsometer/polarimeter;
- ✓ Single wavelength ellipsometer/polarimeter.

The overall market and applications for polarization measurement instruments are increasing. However, complexity and relatively slow measurement speed of these existing instruments are two of the limitations that slow down the further expansion of applications and markets. With WeiFour's Technologies, we will get in the traditional and potential markets with simple, robust and high speed optical polarization detection instrument. To explore these markets, WeiFour have developed products that can satisfy the current market, and sell to the customer who will use this product for currently known applications and are exploring the new applications. Universities, research institutions, and small tech companies are some of our customers.

OTFSP 11-810

UNIVERSITY of DAYTON

February 14, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
OTFWPP2011@development.ohio.gov

SUBJECT: Letter of Intent for 2011 Ohio Third Frontier Sensors Program

Dear Sir or Madam:

The University of Dayton is pleased to submit this Letter of Intent for the Fiscal Year 2011 Wright Projects Program Request for Proposal. Information for this project is as follows:

Prospective Lead Applicant: University of Dayton

Address and Contact Person:
Joseph W. Haus, Ph.D.
Director, Electro-Optics Program
Director, LADAR and Optical Communications Institute
University of Dayton
Dayton, OH 45469-2591
Tel: (937) 229-2797
Email: jwhaus@udayton.edu

Project Title: Technology for Low-Cost Environmental and Green Space Management

Estimated grant funds: $600,000

Known collaborators:

- Global Neighbor, Inc; an Ohio company whose role is lead commercialization company
- Media Corp, a Kansas company whose role is to market the product through DRTV, other direct marketing processes, and catalog sales
- EMTEC; Commercialization and strategy of near term market implementation
- Central State University; HBCU focusing on plant greenhouse testing and identification verification testing

Summary of the Proposed Project:

The Team will develop a commercial grade low-cost variation of military sensor technology applied to target delivery of environmentally benign weed management mechanics for multiple markets: residential, agricultural, nursery, and green-space management (gardens, parks, etc.). By applying this platform with the previous work by Central State University and Global Neighbor Inc. we can commercialize environmentally benign weed management techniques. Our project will be able to serve many markets while improving environmental conditions.

The project targets a portion of the pollution problem by reducing the need for "weed-n-feed" type chemicals for residential market, chemical herbicides used in agriculture market and used in horticultural markets. We deliver a more convenient environmentally sound solution. Why target the residential market? Lawn turf is America's biggest crop and a mixed bag for our habitats. Homeowners tend to apply fertilizers and herbicides at several-fold the recommended levels. (*US News and World Reports May 5, 2005*) As we become more sensitive to potential danger to health and wildlife, consumers seek less harmful alternatives to the millions of pounds of chemicals applied to their lawns that seep into watersheds yearly.

We are marketing the platform in residential, horticultural and agricultural fields. We specifically see applications in areas, such as, residential lawn care, horticulture and agriculture and environmental applications. Our innovative solution makes us less dependent on chemicals (usually petroleum-based products) to remove unwanted or invasive plants. This product is an organically friendly method that can be used on a small (residential) scale or expanded to a large (agricultural) scale.

We address the issue of the development of the characterization and measurement of progress and enumerate the baseline data to be gathered to enable assessment of future impact by the following:

- Estimate cost tolerance and technique effectiveness by market segment;
- Construct alpha test units and verify results in controlled environment using the CSU facility;
- Test alpha units in mock environment.

The results will be used to construct a fully operational prototype that will then be commercialized.

The University of Dayton looks forward to participating in this program to promote technology based economic development within Ohio.

Sincerely,

J W Haus

Joseph W. Haus, Ph.D.

February 14, 2010
Ohio Third Frontier
Sensors Program
Fiscal Year 2011
OTFSP2011@development.ohio.gov

OTFSP 11-811

Letter of Intent; "2011 OTFSP LOI"

Lead Applicant's Name:	Energy Focus, Inc.
Lead Applicant's Address:	32000 Aurora Rd. Solon, OH 44139
Lead Applicant's Phone #:	440-715-1288
Contact Person:	Laszlo Takacs Director of Research and Development ltakacs@efoi.com
Proposed Project Title:	"Cost-effective Real-time Intelligent Collective Knowledge Environmental Transmitter (CRICKET) System"
Estimated Grant Funds:	$1,000,000
Known Collaborators:	OSU, IDCAST, Valtronic USA

Project Summary:
An inexpensive wireless lighting sensor and system will be developed and manufactured in Ohio. The sensor will be ultra-thin, mechanically flexible and durable to enable easy application by construction crews, interior designers/decorators and end users. It is intended to be applied in and around the working surfaces and corridors of an office or industrial space. The sensor senses light and reports its data to a network. The sensor will allow lighting levels to be controlled and optimized in such a way as to save significant amounts of energy and to drastically reduce the commissioning (configuration and installation) cost of energy-saving lighting controls. These costs form the most significant impediment to energy-saving building infrastructure upgrades. For the owner/occupier of the space, the ongoing energy savings of maintaining constant light levels automatically (taking advantage of natural daylight for example to reduce lighting power) will provide ongoing and significant energy savings for the life of the building.

Thank you.

www.energyfocusinc.com
32000 Aurora Road Solon, Ohio 44139
Tel (800) 327-7877 Fax (440) 715-1314

Dudley, Jon C.

From: Steven.Carrington@L-3Com.com
Sent: Monday, February 14, 2011 3:58 PM
To: OTFSP2011
Subject: 2011 OTFSP LOI

OTFSP 11-812

communications
Cincinnati Electronics
7500 Innovation Way
Mason, Ohio 45040-9699
Tel: (513) 573-6100 Fax: (513) 573-6741
www.L-3com.com/ce

1. Lead Applicant:

L-3 Communications Cincinnati Electronics
7500 Innovation Way
Mason, Ohio 45040-9699

2. Contact:

Steve Carrington, Director Business Development
7500 Innovation Way
Mason, Ohio 45040-9699
steve.carrington@L-3com.com
T: (513) 573-6706
C: (513) 288-9371

3. Proposal Name: **360° Situational Awareness Sensor**

4. Estimated Grant Funds Requested: **$990,000**

5. Current Known Collaborators:
University of Dayton Research Institute (UDRI), Dayton Ohio
Zyvex Technologies, Columbus Ohio

I. Executive Summary

As the technology for unmanned, robotic systems continues to advance, demands for improved, more capable sensor systems will continue to grow in parallel. Sensors will require the ability to detect, recognize, and identify objects at more distant ranges, in higher resolution, and utilize the imagery for a variety of mission applications. Future demand will focus on increasing sensor field of view while maintaining high resolution and real time display and processing enormous amounts of data without building large, fragile, or costly systems.

II. Background

L-3 Communications Cincinnati Electronics (L-3 CE) is an established pioneer in military/defense technology and space electronics. A leader in high technology and engineering services, CE is world renowned for its expertise in the areas of infrared detection and space & missile electronics. L-3 CE is engaged in the design, development, and manufacture of highly-sophisticated imaging and electronics equipment that is used in a variety of product areas for defense, government, and commercial applications.

Drawing upon ongoing relationships and demonstrations with DOD customers, L-3 learned of the need for wider field of view sensors that maintain high standards of resolution and image clarity while operating in a harsh environment. In addition, the sensor imagery is expected to enhance the requirement of detecting obstacles, threats, and targets of interests without necessarily requiring operator action.

Utilizing Internal Research and Development funding, L-3 developed a proof of concept imaging device on an existing product line platform. Integrating a high definition camera with an advanced optic design was successfully accomplished in 2010, underscoring conceptual development and market development that occurred with numerous Department of Defense customers in various market segments. Ultimately, the L-3 team determined a specific need within a niche military community with ongoing technological development programs and operational tests that desired the type of performance demonstrated. In the last quarter of 2010, the L-3 team conducted a field demonstration to senior program and systems engineers actively engaged in a developmental program with positive results and feedback.

III. Project Proposal

L-3 CE proposes to lead a collaborative team to develop the next generation imaging sensor system that is capable of processing Panoramic WFOV imagery for use both as a display/interface and as input for advanced detection and/or tracking algorithms for obstacles or targets within specified parameters. The major objectives will be the development of the image processor and testing in a suitable environment.

IV. Impact and meaning for Ohio

The DOD Sensor market has benefitted from the efforts of L-3 Cincinnati Electronics and UDRI both individually and through collaborative projects. The suggested sensor will further deepen the ties and activities between two world class organizations where the latest in infrared sensor technology is joined with the best in class of image processing and exploitation. With the introduction of Zyvex Technologies onto the team, the advanced sensor application can exploit the maritime market which has shown high interest in developing sensors that enable autonomous and long range operations.

Additional funding will advance the development of the total system and application as a means of furthering market testing, experimentation and customer acceptance. This in turn will help broaden the appeal and utility of sensors that enable expansion of robotic capabilities for both DOD and commercial marketplaces.

Ultimately, the strategy of pairing sensor technology with automated processing for target detection and tracking is aligned with the needs and requirements of DOD and commercial users of unmanned robotic systems. Assuring a US and Ohio based lead in the development of technology that is gaining greater acceptance daily is critical to maintaining a technological edge and will ensure the creation and continuation of high tech jobs in the area.

711 E Monument Ave Ste 101 · Dayton, OH 45402
www.optonicus.com

To: **OTFSP2011@development.ohio.gov**
Date: **14 February 2011**
Subject: **2011 OTFSP LOI**

OTFSP 11-813

Dear Sir/Madam:

Please accept this email letter attachment as Optonicus' Letter of Intent to submit a proposal for the Ohio Third Frontier Sensors Program, Fiscal Year 2011.

Lead Applicant:	**Optonicus** 711 E Monument Ave Ste 101 Dayton, OH 45402 415-341-5940
Contact Person: Email:	Rob Markovich rob@optonicus.com
Proposed Project Title:	**The Gigalink Product Family**: Wireless Gigabit Data Transceiver Systems for Sensor Information Delivery, Pre-Processing and Distribution
Estimated Grant Funds Requested:	$1,000,000
Known Collaborators:	**Institute for Development Commercialization of Advanced Sensor Technology (IDCAST),** Dayton, OH www.idcast.com **University of Dayton Research Institute**, Dayton, OH, www.udri.udayton.edu **Rosewood Machine and Tool Co.**, Rosewood, OH **Army Research Lab**, Laurel, MD www.arl.army.mil

A one page summary of the proposed project follows.
We look forward to submitting a full project proposal to the Third Frontier Sensor Program in March.

Sincerely,
Rob Markovich
Chief Executive Officer, Optonicus – The Leading Innovator in Intelligent Optical Systems

optonicus

711 E Monument Ave Ste 101 · Dayton, OH 45402
www.optonicus.com

Ohio Third Frontier Sensor Program
Project Summary for: The Gigalink Product Family – Wireless Gigabit Data Transceiver Systems for Sensor Information Delivery, Pre-Processing and Distribution

The market for high-speed, high-resolution, and high-definition (HD) imaging and video sensors (HD Sensors) is large and expanding rapidly. HD Sensors, capable of delivering ultra-high (Giga-pixel class) image resolution and HD video data streams, have arrived in response to the growing needs for real-time access to full situational awareness in a variety of commercial security, public safety, and government defense applications. With current technology, HD Sensor data is stored locally because no cost-efficient high bandwidth (1-40 gigabit) wireless capability exists for data transfer to the user. As the amount of sensor data is dramatically increasing, sensor systems face the danger of overloading on-sensor storage and/or existing RF communications links within a split of a second. Exasperating the problem, the performance of existing HD Sensors isn't fully realized since the collected data cannot be transferred to a user and processed in real-time. Therefore, the current emphasis in HD Sensor development becomes not innovation of more advanced sensing, but rather incremental improvements related to real-time sensor data pre-processing, transfer (relay) and distribution to multiple users. Therefore, HD Sensor efficiency and cost should be estimated not only on the sensor itself, but also on the sensor data transfer system. It is the sensor data transfer and processing component that drives up cost and now constricts the overall market.

The Optonicus solution is the Gigalink product family, providing wireless gigabit data transfer for sensor information delivery, pre-processing and distribution. Optonicus Gigalink products will provide economical, small-size, light-weight and low power (SWaP), adaptive free-space optical communication modules that will directly interface with HD Sensors.

Using Optonicus' proprietary adaptive electo-optical components, the Gigalink modules will provide wireless gigabit communication links even in hazardous operating environments including presence of mechanical vibration, atmospheric distortions, temperature variations, etc. In addition to providing gigabit communications across significantly longer distances than conventional free-space optical communication systems, Gigalink modules will also provide a nearly 5x improvement in SWaP and a 3x reduction in cost. In today's HD Sensor platforms, reducing SWaP is critical for operational life and budgetary constraints. Small footprints, lighter weight, smaller batteries – all extend sensor system useful life, reduce form factor for better mobility and logistics, and expand the market.

Gigalink's modular design will allow economical enhancement of sensor communication capabilities. Higher sensor data transfer rates can be achieved, over even longer distances, and networked across several users, by combining several Gigalink modules. The company's current INFOCO product family of intelligent fiber collimators, couplers, and arrays comprise the key building blocks for developing Gigalink products, and enable the significant and sustained competitive advantage.

Optonicus aspires to fast, significant, and profitable growth through phased market focus and quickly building upon success. The company will first partner with leading HD Sensor suppliers and offer Gigalink modules for integration into their systems. Second, Optonicus will release standalone Gigalink products to be used in applications beyond sensors, i.e. telecommunications networking. Third, Optonicus will release combined HD Sensor and Gigalink systems for select markets (e.g. sensors combining video camera and Gigabit wireless uplink for perimeter surveillance). Cost sharing an Ohio Third Frontier Sensor Program grant with a $1.4M investment from Army Research Lab, Optonicus will deliver on all three of these business phases.

February 14, 2011

OTFSP 11-814

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

Dear Sirs/Madams:

Photon-X, UDRI and other collaborators intend to submit a proposal to the Ohio Third Frontier Sensors Program requesting funding to build a factory in Ohio to manufacture, market and support a new category device called a Kinesic Analyzer. A kinesic analyzer is a 3D video camera that automatically recognizes human emotions, gestures and other behaviors. Some proposal particulars are listed here:

Project Title	Kinesic Analyzer: A 3D Video Camera For Recognizing Human Emotions, Gestures And Other Behaviors
Funds Requested	$1,000,000
Lead Applicant	Photon-X, Inc. 711 E Monument Avenue Dayton, OH 45402 POC: Scott Ackerson, scott@photon-x.com, (484) 888-2379
Key Collaborator	Signature Sciences Exploration (SSE) Laboratory University of Dayton Research Institute (UDRI) 300 College Park, Dayton OH 45469-0101 POC: Nicole Arbuckle

There are multiple billion dollar markets for kinesic analyzers in global economic sectors including security, Internet and transportation. Lead customers for the Photon-X kinesic analyzers under this OTF program include Raytheon and AFRL (dismount behavior), Eaton Corporation (driver behavior), Boeing (pilot behavior) and Proctor & Gamble (consumer behavior).

Photon-X Spatial Phase Imaging (SPI) technology enables any video camera (cell phone, consumer, TV) to be turned into a 3D video camera simply by replacing conventional imaging and processing chips with their SPI equivalents. 3D video makes possible remarkable advances in visual intelligence (automated vision). The University of Dayton Research Institute (UDRI) Signature Sciences Exploration (SSE) Laboratory and Photon-X have developed a unique capability for 3D pattern recognition. The two capabilities (3D video and pattern recognition) enable reliable, high speed, low cost kinesic analysis for the first time in history.

Best Regards,

Blair A. Barbour
President & CEO

OTFSP 11-815

Department of Mechanical Engineering

College of Engineering
Peter L. and Clara M. Scott Laboratory
201 West 19th Avenue Suite N350
Columbus, OH 43210-1142

Phone (614) 292-2289
Fax (614) 292-3163
MEAdmin@mecheng.ohio-state.edu
www.mecheng.osu.edu

February 15, 2011

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

OTFSP2011@development.ohio.gov

Dear Sir/Madam:

This letter of intent is for the project, "Low-Cost High Accuracy GNSS/IMU Sensor for Car Safety and Accident Prevention," submitted by the lead applicant, Dennis A. Guenther, Ph.D., P.E, Emeritus Professor, 201 West 19th Avenue, Suite N343, Columbus, Ohio 43210, e-mail guenther.1@osu.edu. The requested funding is for $1,000,000 submitted by the Department of Mechanical Engineering of The Ohio State University and collaborators SEA, Ltd. and DGNSS Solutions, LLC.

I remain,

Very truly yours,

Dennis A. Guenther

Dennis A. Guenther, Ph.D., P.E.
Emeritus Professor
Department of Mechanical Engineering
The Ohio State University
guenther.1@osu.edu

PROPOSED PROJECT SUMMARY

The modernization of the GPS Constellation with new satellites, transmitting new and stronger signals, designed for multipath resistance and easier signal tracking are revolutionizing GPS positioning. Russia, Europe and China are racing with the US to develop their own Global Satellite Navigation Systems (GNSS). GLONASS (Russia), Galileo (Europe), will be fully operational in the next few years with Compass (China) soon to follow. The availability of all these Satellite Systems will allow the GNSS receivers to deliver low-cost GNSS cm-level navigation.

The rapid advances in the MEMS Inertial Measurement Unit (IMU) and image positioning technologies have the potential to provide sub-meter accuracy for the few minutes when GPS positions are not available, especially in urban canyons. These advancements will have major implications in Intelligent Transportation System (ITS), and car safety applications. The development of a low-cost sub-meter GPS/IMU positioning sensor able to integrate the measurements from any available car sensors (i.e., infrared/visual video image, radar, laser, and angle sensors) will provide the capability to monitor in real-time the car dynamics and the car environment. Adding to the GNSS/IMU sensor the ability to interface directly with the controls of the car and to communicate with the other vehicles (V2V – Vehicle-To-Vehicle) and the Infrastructure (V2I – VehicleTo-Infrastructure) will provide the enabling technology for the next generation of the In-Vehicle Navigation Systems. This technology has the potential to revolutionize car safety and reduce substantially the number of highway accidents, saving tens of thousands of lives in the US and hundreds of thousands of lives around the world.

The proposed sensor will have the capability to warn the car driver for potential accidents, warn the other vehicle drivers for impending or existing accidents, prevent multi-car collisions, and provide signals to on-vehicle control systems to avert inevitable fatal accidents. In addition, this sensor will provide real-time information to monitor vehicle-trajectories and vehicle dynamics, estimate trailing vehicle trajectories, monitor deviations of vehicle trajectories from the expected trajectories (i.e., movement around potholes, debris, disabled vehicles, etc.), detect sudden stops, detect vehicle sliding, detect vehicle trajectories within signalized and un-signalized intersections, predict, and prevent potential side-crashes.

This proposal will focus on the development of a low-cost high-accuracy modular GNSS/IMU sensor configurable to 1) Interface with the controls of the cars; 2) Communicate with the other vehicles (V2V) and the Infrastructure (V2I); and 3) Accept infrared/visual images, radar range measurements, laser, and angle measurements. This sensor will be developed as an add-on module to be integrated in new cars, and be retrofitted in old ones. The market opportunity for this integrated sensor is very large, both in the US and internationally, because it is designed to be low-cost, modular, and it has the potential to save hundreds of thousands of lives. In the US alone there are 41,000 car accident related deaths, with 30% of them involving people younger than 25 years old (FHWA Strategic Plan, October 2008).

The Ohio State University has a long history and an excellent research record in GNSS/IMU/Imaging technology development since the initial stages of the GPS system deployment in the early eighties. OSU also has a strong component in car automation and safety within the Center of Automotive Research (CAR). This combination provides the perfect environment to build and commercialize the enabling technologies for the next generation of the In-Vehicle Navigation systems.

OTFSP 11-816

WOOLPERT

DESIGN GEOSPATIAL INFRASTRUCTURE

February 15, 2011

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

Dear To Whom It May Concern:

Woolpert is pleased to provide you with our Letter of Intent for the Fiscal Year 2011 Ohio Third Frontier Sensors Program. Woolpert, a remote sensing and engineering firm, is an industry leader in architectural, engineering and geospatial services, and three-dimensional (3D) technologies.

Lead Applicant:
Woolpert, Inc.
4454 Idea Center Boulevard,
Dayton, Ohio 45430-1500.
Tel: 937.461.5660
Contact: Stephen Phipps
Email: steve.phipps@woolpert.com

Estimated Grant Funds Requested: $500,000

Proposed Project Title:
"The Development of Low-Cost 3D Building Information Management (BIM) Models."

Known Collaborators: Trimble and Optech

Project Description:
Woolpert will leverage our industry leading skills in the acquisition and processing of both terrestrial and airborne LiDAR point cloud data and electro-optical imagery to develop processes and tools to be applied to the development of precise three dimensional interior building models to support the efficient management of capital facilities. These 3D building models will form the foundation for the development of Building Information Management (BIM) databases which are the emerging standard for the storage of capital facility information used by facility managers.

In the United States, buildings account for (Source: USEPA):

- 39% of total energy use
- 12% of the total water consumption
- 68% of total electricity consumption
- 38% of the carbon dioxide emissions

Approximately 50% of this consumption comes from non-residential buildings and the vast majority of these buildings will not be replaced in the near future. To reduce the impact on the environment, a massive renovation effort must occur over the next few decades that will impact many of these buildings. President Obama has recently issued multiple Executive Orders that require Federal government (the largest owner of real estate in the world) to reduce its consumption of energy and greenhouse gasses. The private sector will also be moving forward in this area.

Renovation of an existing facility begins with the understanding of what is in the facility, where items are located, and how the building is constructed. In many existing facilities, no reliable floor plans exist so they must be created before the renovations can be designed. The most accurate method for doing so is the use of laser scanning. Today, a team of surveyors equipped with a mobile laser scanner can create an

accurate point cloud of all the features of the interior of a 100,000 square foot office building in a matter of hours. However, a much longer period, often weeks, is required to reduce the point cloud to a usable format of intelligent building elements in the form of a Building Information Model (BIM).

Woolpert is proposing to use funding from the OTFSP to develop a set of automated routines that will recognize basic building entities and create an intelligent BIM from a laser scanning point cloud. We believe that this capability could generate millions of dollars in contract opportunities for Woolpert and its collaborators, thus creating a new industry in the State of Ohio.

Woolpert does not propose to develop new LiDAR and imagery acquisition systems using Ohio third Frontier funding. Our team has been investigating the emerging BIM industry and technology for over two years and has identified two acquisition systems already in development to be for acquisition of the baseline data to be used for this research. These systems are:

- The Trimble Indoor Mapping Solution (TIMMS). The TIMMS solution utilizes a terrestrial LiDAR sensor coupled with a 360° spherical camera. Woolpert has a long standing collaborative working relationship with Trimble. In fact, our team is currently using the TIMMS system to survey a facility for a U.S. Air Force customer.
- The Optech Indoor Mobile Mapping System. The Optec mobile system is being developed as an evolution of the Optec LYNX mobile mapping system. The Optec system utilizes a terrestrial LiDAR sensor optimized for interior building surveys and integrated high resolution color camera system. Woolpert has extensive experience using both Optec's Airborne and LYNX Terrestrial LiDAR systems.

Woolpert has been an active participant in the development and evolution of both the Trimble and Optech Indoor mapping systems.

Both systems produce dense LiDAR point clouds and high resolution imagery that Woolpert believes is essential for the development of detailed BIM models. Woolpert proposed to tools and process to identify and extract floors, ceilings, walls, doors and window features from the fusion of the LiDAR point clouds and imagery collected by these indoors acquisition systems. Woolpert will develop tools to texturize the extracted 3D model features (floors, ceilings, walls, doors and windows) with the imagery collected to yield a photo realistic rendering of the interior space.

The purpose of our Ohio Third Frontier proposal is to create jobs and generate revenue for Ohio by positioning ourselves as an expanding the application of the proprietary visualization software. Woolpert proposes to use Third Frontier funds to develop procedures and tools to automatically identify and extract the features necessary to build an effective 3D model of the interior space using the "raw" LiDAR point cloud and color imagery collected by the survey systems that are already commercially available.

Additionally, we will use Ohio Third Frontier funds to identify other potential markets and interested end-users that can provide resources for the next level of commercialization. Woolpert will endeavor to identify the most interested end-users who can provide the best return on investment and provide the greatest resources for commercialization.

Again, we appreciate the opportunity to submit this letter of intent for the Ohio Third Frontier Sensors Program Fiscal Year 2011 Request for Proposals. We look forward to submitting our Ohio Third Frontier Sensors Program proposal.

Sincerely,

Woolpert, Inc.

Stephen P. Phipps

Stephen P. Phipps
Senior Vice President

OTFSP 11-817

THE UNIVERSITY OF TOLEDO 1872

February 14, 2011

Ohio Department of Development
Technology of Innovation Division
Attention: Ohio Third Frontier Program
77 South High Street, 25th Floor
Columbus, OH 43215

Subject: Letter of Intent for Application for the Ohio Third Frontier Sensors - FY 2011 Program

Dear Sir/Madam,

The University of Toledo is planning to submit a proposal to the Ohio Third Frontier Wright Projects FY 2011 Program. Details of the intended proposal are given below:

1. **Lead Applicant:**
   The University of Toledo, 2801 W. Bancroft Street, Toledo, OH 43606

2. **Contact Person:**
   Dr. A. H. Jayatissa, Associate Professor; Department of Mechanical, Industrial and Manufacturing Engineering; Mail Stop 312; The University of Toledo,
   2801 W. Bancroft Street, Toledo, OH 43606
   Phone: (419) 530-8245; Fax: (419) 530-8206; E-mail: ajayati@utnet.utoledo.edu

3. **Project Title:**
   Advanced Micromachined Biocompatible Physical Sensor Research and Commercialization

4. **Estimated Grant Funds to Request:** $1,000,000

5. **Collaborators:**
   Orbital Research, Inc.; 4415 Euclid Ave., Suite 500, Cleveland, OH 44103-3733

6. **Project Summary:** Please see attached.

Should you have any question regarding this letter of intent, please do not hesitate to contact me at your earliest convenience.

Sincerely,

AHJayatissa

Ahalapitiya H. Jayatissa

College of Engineering
Mechanical, Industrial and Manufacturing Engineering • Mail Stop 312 • 2801 W. Bancroft St. • Toledo, Ohio 43606-3390
419.530.8210 Phone • 419.530.8206 Fax • www.mime.eng.utoledo.edu

THE UNIVERSITY OF TOLEDO 1872

Project Summary:

The proposed project will focus on the development of facilities and equipment that enable rapid development and fabrication of materials and devices needed for advanced biocompatible sensors. Specifically, the proposed project is to develop high performance micromachined biocompatible sensors for monitoring physical properties, such as pressure, temperature, acceleration, air flow, and chemical composition. Micromachined physical sensors have worldwide applications in many fields, including medicine, biology, environment monitoring, agriculture, household, security, alternative energy, and the military. Orbital Research, Inc. is experienced in the development and marketing of advanced sensors and wireless monitoring devices, making it a natural partner with The University of Toledo for the proposed project.

As the part of this project, fabrication processes will be developed for commercial production of surface acoustic wave (SAW) based physical sensors that have extremely high sensitivity, multi-functionality, and biocompatibility. In addition, the team is also planning to develop manufacturing process for commercial micromachined accelerometer based sensors. This project will involve a wide range of engineering and scientific research and development (R&D) activities associated with the commercialization of biocompatible sensors.

The proposed project builds on the expertise of the team members in the field of electronic material processing and sensor fabrication technologies. The team members have significant experience and background studies relevant to the proposed project in the recent past. Because of the partnership with Orbital Research, Inc., this project brings numerous opportunities, such as synthesis of materials, designing and fabrication of sensors, demonstration of prototype devices, optimization, and product commercialization. It is expected that this project will generate new employment opportunities in advanced technologies, training of the next generation in advanced sensor development, and high-tech device manufacturing capabilities in Ohio.

College of Engineering
Mechanical, Industrial and Manufacturing Engineering • Mail Stop 312 • 2801 W. Bancroft St. • Toledo, Ohio 43606-3390
419.530.8210 Phone • 419.530.8206 Fax • www.mime.eng.utoledo.edu

OTFSP 11-818

February 15, 2011

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

Letter of Intent
for
Ohio Third Frontier Sensors Program

Lead Applicant: Glass Sensors LLC.
Address: 770 Spruce Street, Wooster, OH 44691
Phone: 330-234-7999
Point of Contact: Jane O. V. Leisure
E-mail: j.leisure@glasssensors.com

Proposed Project Title:
Real-Time Low Power Oil-in-Water Sensors For Pipeline and Tank Monitoring

Requested Grant Funds: $1,000,000

Prospective Collaborators:
College of Wooster, Wooster, OH
University of Cincinnati, Cincinnati, OH

Real-Time Low Power Oil-in-Water Sensors For Pipeline and Tank Monitoring

Over 3,700 miles of pipelines carry hazardous liquids in Ohio. In addition, there are over 10,000 miles of gas lines in Ohio. Between 2000 and 2009 there were 27 major fuel pipeline spills in Ohio were more than 210 gallons of fluid were released into the environment. In one incident in 2005 in Middletown, 28,000 gallons of propane leaked leading to a massive fire killing workers and causing $6.8 million in damage. Similar incidents have been reported across the United States as aging infrastructure and accidents have led to leak and spills.

Oil and gas refiners and distributors are in need of simple real time oil-in-water sensors. Available sensor systems are complex and expensive to buy, maintain, and monitor. Applications of simple and rugged sensors for oil-in-water include monitoring underwater and underground piping, tank leak detection, off-shore oil/gas production, and alerting officials to contamination in natural bodies of water. Such a sensor is therefore of critical need for public safety and environmental protection. Glass Sensors has prototyped a new a sensor device based on Osorb, a shape changing silica that can act as an actuator to detect oil in water.

Glass sensors LLC. Is a subsidiary of ABSMaterials Inc. and has an exclusive license from ABSMaterials to use Osorb to make sensors. ABSMaterials is the sole manufacturer of Osorb, an organosilica nanoglass capable of absorbing hydrocarbons. Osorb is a "swellable organically modified silica" (SOMS, tradename: Osorb™) and is a new class of nano-engineered hybrid organic-inorganic material that rapidly and reversibly swells up to eight times its dried volume when exposed to sorbates. Osorb can absorb a wide range of neat, dissolved, or vapor-phase organics. This includes alcohols, industrial solvents, and petroleum products either in the vapor or liquid phases. Swelling occurs immediately upon contact with neat organic liquids or vapors. One gram can exert one-hundred newtons of force upon swelling.

We have demonstrated in the laboratory that Osorb can absorb hydrocarbons from water with high efficiency and capacity. Glass Sensors is also in commercial development of hydrocarbon vapor sensors for fuel vapors for home appliance protection. Ohio Third Frontier funding will be used to develop a new product line of oil-in-water sensors that can be manufactured within a one year time frame creating forty-five jobs.

The goals of this project include:

1. Finalizing our Osorb based actuator sensor for oil-in-water monitoring;
2. Demonstrating it to clients and government agencies;
3. Build a manufacturing line for mass production of 100,000 units per month.

The University of Akron

OTFSP 11-819

2011 OTFSP LOI

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

Re: 2011 Ohio Third Frontier Sensors Program

To whom it may concern:

This letter is to inform the Ohio Department of Development that the College of Polymer Science and Polymer Engineering at The University of Akron intends to submit a proposal for Ohio Third Frontier Sensors Program FY 2011.

Lead Applicant:
Professors Xiong Gong, Stephen Z. D. Cheng, and Mukerrem Cakmak
College of Polymer Science and Polymer Engineering
The University of Akron
Akron, OH 44325

Contact Person:
Dr. Xiong Gong
Assistant Professor
College of Polymer Science and Polymer Engineering
The University of Akron
Email: xgong@uakron.edu
Voice: (330) 972-4983

Project Title:
Commercializing Ultrasensitive Solution-Processed Polymer Sensors

Estimated Grant Funds to be requested:
$1M

Known Partners/Collaborators:
Akron Polymer Systems
2990 Gilchrist Rd.
Akron, OH 44305
Tel: (330) 794-6340
Fax: (330) 794-6241
www.akronpolysys.com

The University of Akron

Project Summary:

Sensing across the ultraviolet (UV), visible, and infrared (IR) spectra simultaneously is critical for a host of growing applications including environmental monitoring, remote sensing, fibre-optic communication, day and night-time surveillance, as well as emerging medical imaging modalities. Today, separate expensive sensors and/or materials are required for the different sub-bands within the UV to IR wavelength (λ) range. In general, AlGaN, Si, and InGaAs based sensors are used for detection of these important sub-bands. Therefore, it would be advantageous to have low cost, solution-processed sensor system with high quantum efficiency, high sensitivity, and a high-speed response over the UV to the IR spectrum range which does not require cooling. Such a sensor would be dramatically more versatile than current broad-spectrum sensor systems and would enable a range of new technologies.

This project will demonstrate the fabrication of high sensitivity sensors utilizing narrow band-gap semiconducting polymers. The scope of the proposed project includes the commercialization of the technology, the adaptation of the fabrication process to meet the sensor specifications, and the fabrication of a prototype device. It is anticipate that the program will result in the Ohio-based manufacturing of new, low cost, flexible sensors with high sensitivity and high-speed response over a broad spectral range utilizing roll-to-roll processing technology.

Sincerely

2/15/2011

Xiong Gong, Ph.D.
Assistant Professor
Department of Polymer Engineering
College of Polymer Science and Polymer Engineering
The University of Akron
Akron, Ohio 44325-3909

Dudley, Jon C.

From: Nilesen Gokay [ngokay@innovainc-usa.c
Sent: Tuesday, February 15, 2011 11:14 AM
To: OTFSP2011
Cc: Turk81953@aol.com; 'Dee'
Subject: 2011 OTFSP LOI
Attachments: INNOVA PROPOSED ITP PROJECT SUMMARY 2-15-11.pdf

OTFSP 11-820

Dear Sir/Madam:

Please accept this email as Innova, Inc.'s Letter of Intent to submit a proposal for the Ohio Third Frontier Sensors Program.

Lead Applicant: Innova, Inc. (www.innovainc-usa.com)
130 Westpark Road
Centerville, Ohio 45459
937-436-1064 (hone)
937-436-2355 (fax)

Contact Person: Cem Gokay
Email: turk81953@aol.com

Proposed Project Title: Integrated Targeting Gimbal

Estimated Grant Funds to be requested: $1,100,000 - $1,200,000

Collaborators: - The University of Dayton and its Affiliates UDRI, CUE and IDCAST
- FLIR Systems, Inc./D-Diode, LLC (www.gs.flir.com)

Innova's Executive Vice President (Cem Gokay) will be the principal investigator for the proposed project. Mr. Gokay worked at The University of Dayton Research Institute (UDRI) for over six years prior to forming CJ Laser Corporation (Innova's predecessor). Innova was formed in 1994 when Quantel/Big Sky Laser Technologies purchased CJ Laser Corporation due to its patents on diode-pumped laser technologies.

Innova's relationship with FLIR Systems, Inc. resulted in formation of a Joint Venture (D-Diode, LLC) between Innova and FLIR in 2008 to introduce its patented high power laser diode modules for defense, homeland security, industrial, and medical application markets. FLIR hired an Ohio marketing person and as D-Diode operates from Centerville, Ohio.

Innova executed a Teaming Agreement with Carl Zeiss Optronics US and SA to establish US content, integration with Innova products, and maintenance capabilities. Innova has been recognized and has been funded by the Dayton Development Coalition's Entrepreneurial Signature Program for the development of "Mini Rugged Laser" technology. Based on this laser technology, Innova became the recipient of a 2010 OTFS Grant and produced state-of-the-art designators for handheld and portable targeting systems. The miniaturized designator developed creates the basis for the proposed project "Integrated Targeting Gimbal" where now Innova desires to adapt its technology for mini Unmanned Vehicle platforms. Unlike it predecessors, this Gimbal will feature a completely different design approach providing unsurpassable targeting precision due to the proposed boresighting between targeting cameras and the lasers.

A one page summary of the proposed project is attached.

Nilesen Gokay
President

INNOVA INC.
A Certified Woman Owned Business
ISO 9001:2008 Certified
130 Westpark Drive
Centerville, OH 45459
937-436-1064 Office
ngokay@innovainc-usa.com

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OHIO THIRD FRONTIER SENSORS PROGRAM PROPOSED PROJECT
"INTEGRATED TARGETING GIMBAL (ITG)"

Miniaturization and the cost reduction of electronic warfare equipment is an expanding field especially with the expanded use of unmanned vehicles. Such electronic equipment includes technologies involving cameras, illuminators, designators, rangefinders, stabilized gimbals, etc. Innova, with 2010 OTFS funding, already developed critical designator /illuminator and now desires to adapt its unique product capabilities to mini gimbals to produce Integrated Targeting Gimbals. Innova continues to seek for the expansion of its facilities and personnel. Innova projects obtaining investor funding during 2011 where the current laser technologies will provide the revenue stream for the anticipated expansion where the annual sales will reach over $20M in 2014. For the proposed commercialization activity, Innova will be working with companies such as FLIR Systems, Inc. and Goodrich/Cloudcap who are currently producing and dominating the relevant stabilized targeting gimbal markets.

Current targeting gimbal designs are based on cameras for surveillance/identification purposes. Their mechanical design and software algorithms are not geared for "precision" targeting but only imaging. In current designs, the boresighting between all the elements of the targeting device cannot be real time verified and, in most cases, drifts due to thermo mechanical variations of the military mission environment.

Innova's existing scalable laser technology (patent applied for and favorable reviews received from the examiner) features a packaging ability that can form the frame of the commercially available payload area of any stabilized mini gimbal (such as Model T2 from Cloudcap or 7", 9" HD gimbals from FLIR). Innova is in the process of establishing a supplier relationship with Goodrich/Cloudcap where Cloudcap will provide the base gimbal module for this Innova proposed project. The proposed adaptation/ commercialization project goals, objectives, technical approach, work plan, deliverables are summarized below:

- Take Innova's current laser designator product (LaserSPOT™) and convert it into a payload frame form of the proposed Integrated Targeting Gimbal (ITG).
- Generate manufacturing models supporting the ITG design including weight, optical power, image resolution, spot detection, and the mechanical stability of the boresighting.
- Based on customer driven requirements, design the new payload area to include visible/near IR cameras with spot detection, mini rangefinder, mini designator and pointing capabilities.
- Within 18 months, have a first operational prototype; within 24 months, have the second deliverable prototype for the first customer; and within 30 months, complete the commercialization and deliver the third production model to the second customer.

The size of the opportunity within 12 months following the conclusion of the proposed project will include, but is not limited to:

- Airborne mini UAV platforms
- Ground UAV platforms (mule, robots, etc.)
- Ground post-mounted stabilized gimbal platforms

Innova, an ISO 9001:2008 and certified woman owned business, has been awarded SBIR and other government agency contracts in the past. The company's accounting practices have passed DCAA audits. We are looking forward to receiving acceptance as one of the contenders for a Third Frontier Program and receiving a LOI identification number in preparation of submitting our proposal.

Nilesen Gokay
President

[illegible] Westpark Road Centerville, Ohio 45459
[illegible] Office
[illegible] Fax

NWBOC
WBE CERTIFIED

www.innovainc-usa.com
A Certified Woman Owned Business

WRIGHT STATE UNIVERSITY

OTFSP 11-821

LOI for OTF Sensors Program FY2011

Date: Tuesday, February 15, 2011

Lead Applicant: John Mackay, Business Development Officer
Wright State University
College of Engineering & Computer Science
3640 Colonel Glenn Highway
Dayton, OH 45435
Office: 937-775-5257
Email: john.mackay@wright.edu

Project Title: Commercialization of Terahertz-based Sensors

Estimated Grant Funds: $1 million

Collaborators: Teraphysics Corp.

Project Summary:

Terahertz radiation is a commercially powerful range within the electromagnetic spectrum which operates between the frequencies of typical optical devices and typical electronic devices. Terahertz radar can detect the presence and composition of organic matter. Thus, for military and security applications, terahertz radar can remotely detect explosive materials, poisonous gases, and biological warfare agents. In the medical arena, terahertz waves can detect the presence of cancer, viruses, bacteria, and other diseases remotely without surgery or biopsies. Terahertz waves can also be used in pharmaceutical and agricultural materials processing industries for quality control and research. Thus, the applications of terahertz-based sensors mirror many of Ohio's key industries, including: Biomedical; Instruments, Controls and Electronics; Agriculture and Food Processing; and Polymers and Advanced Materials, including Bioproducts.

The hurdle that prevents widespread adoption of terahertz waves is that they are difficult to create. Current devices are either extremely low power or are too big, or do not operate at ambient temperatures, or all of the above.

Project Summary (continued):

Cleveland-based Teraphysics Corp. has the solution to this technical challenge – an efficient terahertz amplifier. The development of this technology is analogous to the development of the silicon chip in computers. Just as the silicon chip enabled widespread use of small but powerful personal computers, Teraphysics' patented terahertz amplifier will enable widespread and practical use of handheld terahertz wave devices for applications described above. Several Defense agencies have already funded Teraphysics to develop high-powered terahertz sources for weapons and screening applications.

Under this Ohio Third Frontier program, terahertz experts at Wright State University will develop additional terahertz-based instruments, powered by Teraphysics' terahertz amplifier, for use in one or more of the key Ohio industries described above.

OTFSP 11-822

15 February 2011

Mr. Aaron Boesch
Persistent Surveillance Systems
140 North Valley Road
Xenia, OH 45385

Ohio Department of Development
Technology and Innovation Division
77 South High St., 25th floor
Columbus, OH 43215

This Letter of Intent (LOI) is in response to the Ohio Third Frontier Sensors Program FY2010 RFP. Persistent Surveillance Systems, in partnership with Goodrich ISR, intends to submit a proposal in response to the Sensor Program RFP.

Persistent Surveillance Systems will be the lead applicant for the *24/7 Wide-Area Airborne Surveillance (WAAS) Coverage with Midwave Infrared (MWIR) Sensor Integration and Operations*. The total estimated grant funds to be requested for this effort are $760k. The contact information for the lead applicant is given below:

Organization: Persistent Surveillance Systems
Address: 140 N Valley Rd, Xenia, OH 45385
Company Phone: 937-260-4281
POC: Aaron Boesch, Partner
POC Phone: 651-336-0539 (cell phone – POC is employed in Xenia, OH)
POC Email: aaron@persistentsurveillance.com
Website: www.persistentsurveillance.com

A one-page description of the effort is attached. Thank you for this opportunity.

Sincerely,

//signed//

Aaron Boesch
Partner, Persistent Surveillance Systems

Proposal Summary: Persistent Surveillance Systems (PSS), in partnership with Goodrich ISR, will integrate Goodrich's 64 megapixel MWIR Wide-Area Airborne Surveillance (WAAS) Sensor with Persistent Surveillance Systems back-end image processing, compression, and image dissemination software developed under the Ohio-assisted Hawkeye II effort.

This new sensor will give Persistent Surveillance Systems a full day/night product – effectively closing the capability gap between PSS sensors and operational military WAAS systems. PSS is meeting all prior technology and growth commitments to Ohio; the absence of an unassisted night-time surveillance offering is the remaining technical barrier to entry into still higher-growth dual use markets in Warfighter/law enforcement support, border/perimeter protection, field investigation, and responder effectiveness. Additional OTFSP participation will accelerate and reduce the risk of demonstrating a full 24/7 delivery of PSS's proven combination of wide-area coverage, play forward/backward recording, and investigation/prosecution-quality forensics support. This will in turn accelerate the formation of high quality Ohio-based production, distribution and sales, and image analyst jobs.

PSS will be the prime contractor to configure, integrate, flight test, and operationally demonstrate the NightHawk sensor. PSS will demonstrate the utility of the new sensor through flight demonstrations for existing and potential customers, and will add NightHawk to the GSA schedule – giving customers an immediate contract vehicle for nighttime WAAS operations.

PSS's longstanding business relationship with Goodrich will be the foundation for this effort. Goodrich has agreed to assist PSS with the necessary technical, marketing, and operational support required to complete this effort. They will also provide their MWIR sensor for all integration and demonstration exercises with PSS equipment, software, and analytics.

Background: PSS is a wide area surveillance systems and service provider and has been providing live and forensic analysis for 3 years. PSS founders led the development of Project Angel Fire, the first real time, wide area surveillance system and saw the system through its successful operational demonstration at 29 Palms - the demonstration that led to Angel Fire's deployment to Iraq.

The PSS team has used this experience to develop a lower-cost, new generation of WAAS technology that supports civil, commercial, and military users. In March 2008, Persistent Surveillance Systems led the first-ever commercial WAAS operational demonstration with a completely new WAAS technology for the Philadelphia Police Department. Since that time, the PSS team has led wide-area surveillance operations with the Baltimore PD, NASCAR races, Iowa floods, U.S. Army Ft. Leonard Wood, and Yuma Proving Grounds.

In August 2009, PSS began WAAS operations over Juarez, Mexico for the DEA, El Paso Intelligence Center (EPIC), and Mexican government. In less than 6 months, PSS witnessed and investigated over 34 murders including the execution of a female police officer, multiple drug-cartel killings, and the identification of active hit-squads near the U.S./Mexican border. Mexican authorities confirmed that PSS support led to the arrest of criminals responsible for over 75 murders.

STANSolutions

OTFSP 11-823

LETTER OF INTENT: OHIO THIRD FRONTIER SENSORS PROGRAM

February 15, 2011

The Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
OTFSP2011@development.ohio.gov

To Whom It May Concern:

STAN Solutions, LLC, a Dayton, Ohio-based company, is pleased to submit this Letter of Intent to respond to the **Ohio Third Frontier Sensors Program** RFP released on January 5, 2011. Information for this project is as follows:

Lead Applicant

Company Name: STAN Solutions, LLC.
Address: 901 W. Third Street. Dayton, OH 45402
Telephone: 937-531-6637

Contact person: J. Tony Manuel, CEO
937-416-6113
Contact email: tony.manuel@stan-solutions.com

Proposed Project Title

Manufacturing and Introduction of GigaPixel Surveillance Camera System for Public Safety and Security Applications

Estimated Grant Funds to be Requested

$1 Million

Known Collaborators

- University of Dayton Research Institute (UDRI)
- Institute for Development and Commercialization of Advanced Sensor Technology (IDCAST)
- Adaptive Imaging Technology, Ltd.
- Innova, Inc.

901 W. Third Street. Dayton, OH 45402
Tel: 937.531.6637 | Fax: 937.531.6638 | www.stan-solutions.com

Summary of Proposed Project

The project will integrate and demonstrate a manufacturing-ready security and surveillance camera that delivers three critical characteristics:

1. A single camera can provide a panoramic video image, along with any number of ultra-high resolution zooms within that panorama, all simultaneously.
2. The camera can operate day and night, without the problems associated with current night-vision solutions.
3. An innovation unique to our technology allows full image resolution to be retained on areas of interest while dynamically maintaining total scene pixels transmission. This translates directly into an enabler for practical connectivity within current wireless communication performance infrastructure and standards.

In addition, the system will include a unique *"just in time" laser illumination system with ranging capability* (i.e., areas of the scene are illuminated precisely as they are being acquired by the camera).

Addressing manufacturing and field-durability concerns, our technology provides these characteristics with a small bill-of-materials and only one moving part in the core sensor system. This is in sharp contrast to current offerings in the market and represents a significant competitive discriminator.

From the user's standpoint, the core benefit is that a *single device provides the same functionality as a large number of conventional cameras and illumination systems*. In other words, requirements that demand large numbers of high-end cameras and illuminators today can be met instead with a single or small group of cameras.

This product will primarily be marketed for urban monitoring and critical infrastructure and transportation security. At the heart of our value proposition: without sacrificing performance and coverage area savings are realized through lower total cost-of-acquisition and installation; lower cost-of-ownership and maintenance; and lower cost-of-operation. A smaller team can monitor and assist responders across a large area from a single station. The resulting high quality situational intelligence can be accessed at any point within the wireless sphere using standard secure computational and communications devices.

The enabling design is complete and has been demonstrated in a field-prototype. This project addresses key packaging and manufacturing requirements; integration with supporting communications and user systems; and demonstrations of market impact leading to Ohio-based jobs for production, sales & distribution, and on-going engineering.

Our team thanks the Ohio Department of Development for administering this RFP on behalf of the State of Ohio. We are looking forward to submitting our full proposal by March 18, 2011.

With Best Regards,

J. Tony Manuel
CEO
STAN Solutions, LLC

901 W. Third Street. Dayton, OH 45402
Tel: 937.531.6637 | Fax: 937.531.6638 | www.stan-solutions.com

WRIGHT STATE
UNIVERSITY

Department of Physics

3640 Colonel Glenn Highway
Dayton, OH 43435

February 15, 2011

OTFSP 11-824

Ohio Department of Development
77 South High Street
Columbus, Ohio 43215

Subject: 2011 Sensors Program Letter of Intent

Dear Sir/Madam:

Wright State University is pleased to submit this Letter of Intent in response to the Ohio Third Frontier Sensors FY 011 Request for Proposal. It is our intent to submit a full proposal for the following project:

Title: "Spectroscopic Chemical Sensor for Analytical, Environmental and Bio-medical Monitoring"

Lead Applicant: Wright State University

Point of Contact: Ivan Medvedev, Ph.D.
Department of Physics
Wright State University
Dayton Ohio, 45435
Phone: (937) 775-2561
Fax: (937) 775- 2222
E-mail: ivan.medvedev@wright.edu

Collaborators: The Ohio State University, Spectral Energies LLC, other collaborators to be determined

Estimated Funds Requested: $1,000,000

Project Summary: It is the object of this project to develop a highly specific and sensitive sensing platform for detection of a wide variety of gaseous chemicals based on their unique rotational and vibrational molecular spectroscopic fingerprints. The commercial product foreseen from this program can have a wide number of potential commercial markets such as analytical, environmental and bio-medical sensing. Potential markets include the monitoring of volatile organic compounds (VOCs), medical applications, such as breath analysis, and more general chemical analysis related to defense (chemical agents), industry (VOCs and Toxic Industrial Chemicals), and environmental (VOCs and other hazardous chemicals) fields. This technology will fill a void for gas-phase chemical sensing in the far infrared spectral region. Due

WRIGHT STATE
UNIVERSITY

Department of Physics

3640 Colonel Glenn Highway
Dayton, OH 43435

to the highly favorable physics (sensitivity and specificity) we anticipate that this technology will be adopted as a common and wide spread analytical tool.

Sincerely,

Ivan R. Medvedev, Ph.D.
Assistant Professor
Department of Physics,
244 Fawcett Hall
Wright State University
3640 Colonel Glenn Highway
Dayton, OH 45435
phone: (937) 775-2561

OTFSP 11-825

2011 OTF Sensors Program Letter of Intent

Prospective Lead Applicant's Name:

Prof. Jay Lee
Ohio Eminent Scholar and L. W. Scott Alter Chair Professor in Advanced Manufacturing, Mechanical Engineering,
University of Cincinnati
513-556-2493

Address:

P.O. Box 210072
Cincinnati, OH 45220, USA

Email: jay.lee@uc.edu

Proposed Project Title:

Prognostics-Ready Sensory System for Electric Vehicle (E.V.) Batteries

Estimated Grant Funds:

Up to $500,000

Known Collaborators:

- Amp Electric Vehicles
  - 4540 Alpine Ave
    Cincinnati, OH 45242
- National Instruments

Summary of Proposed Project:

University of Cincinnati (Center for Intelligent Maintenance Systems IMS) will be submitting a proposal for the commercialization of a prognostics-ready sensory system for the health management of electric vehicle battery technologies. An integrated sensory platform (software and hardware) uses advanced tools and algorithms to assess the current battery health condition (State of Health SOH), identify the type of fault in case of multiple failure modes, and give a performance prediction to be able to infer when a probable fault may occur in the battery system. The proposal will be submitted on behalf of the University of Cincinnati, located in Cincinnati, OH.

Recent advances in energy-storage technology have led to the development of new batteries with higher capacities, smaller sizes and weights, and shorter charging cycles. The emergence of new battery technology has enabled the realization of new applications for electric as well as hybrid-electric vehicles. With these new advances, the battery is transforming from a primitive energy-storage device to a more advanced information-rich device. Nevertheless, the advances in battery technologies are still limited to material, design, and manufacturing of battery cells and packs. The battery is still fundamentally an energy-storage device and there exists a need for tools and techniques that can enable its transformation to an information-rich device.

The proposed system will address the long-standing issues of battery technologies by proposing a sensory system to transform batteries to "information-rich" energy-storage devices with enhanced capabilities. The enhanced capabilities can include: embedded service capabilities; remote smart monitoring for hard-to-access applications; and online management of batteries during their life-cycle for ensured vehicle mobility. Such information could serve many purposes including: battery life-cycle management to ensure mobility; valuable feedback to battery designer to enhance design; and feedback to manufacturer to enhance quality and shorten manufacturing cycles.

OTFSP 11-826

EMERSON

Timothy E. Graff
VP Strategic Development

Therm-O-Disc, Inc.
1320 South Main Street
Mansfield, OH 44907
USA

February 15, 2011

The Ohio Department of Development
Technology and Innovation Division
77 S. High St., 25th Floor
Columbus, OH 43215

Subject: Letter of Intent for 2011 Ohio Third Frontier Sensors Program

To Whom It May Concern:

This letter provides notice of intent for Therm-O-Disc, Inc. to submit a proposal to the Ohio Third Frontier Sensors Program RFP, which was released on January 5, 2011.

Applicant: Therm-O-Disc, Inc.

Address: 1320 S. Main St.
Mansfield, OH 44907

Phone: (419) 525-8298

Contact Person: Timothy E. Graff
Vice President Strategic Development
tim.graff@emerson.com

Project Title: *Canister Depletion Sensor for Personal Respirators*

Known Collaborators: to be determined

Estimated Dollars: This project is estimated to be a $2 million effort, with $1,000,000 of Third Frontier Research and Development funds and $1,000,000 of cost share funds.

Summary: This project will involve sensor material optimization, sensor system design, testing, and development of related manufacturing technology for filter canister end of service life indicators applied to existing commercial personal respirator applications, fabrication of fully packaged prototype sensors, field testing of these sensors, and establishment of quality control and reliability testing protocols. The technology to be implemented in the project is based on adaptation of existing Therm-O-Disc conductive polymer sensors for targeted organic vapors critical to personal respirator applications.

The envisioned commercialization partner is a leading manufacturer of safety products incorporating electronics, mechanical systems and advanced materials to protect users against hazardous or life-threatening situations.

The development effort will be in collaboration with several key contributors

- Ohio colleges and universities
- Ohio research institutions
- Ohio companies for co-development of electronics and software design
- Ohio companies supporting manufacturing and related technology

Lead Applicant and Contact Person:

OTFSP 11-827

Derek S. Damron, Ph.D.
Professor, Biological Sciences
115A Cunningham Hall
Kent State University
Kent, Ohio 44242
330-672-3370
ddamron@kent.edu

Title:

A portable electronic nose based on carbon nanotubes-doped biomembranes and its application for detection of airborne/aquatic pathogens, narcotics and explosives.

Estimated Grant Funds to be Requested:

$1,000,000 from TFRD
$1,000,000 from WCF

Total Funds Requested :$2,000,000

Research Team Members:

Team member	Role	Responsibility
Derek S. Damron, Ph.D. Biology-KSU	Team Leader	Oversee all aspects of the proposed project Responsible for facilitating protein purification, characterization
Mary A. Russell, Ph.D. Biology-KSU	Collaborator for Bio-Molecular Studies	Protein purification, characterization and signal transduction
L-C Chien, Ph.D. Chemical Physics/LCI	Collaborator	Responsible for optimization of sensor materials and sensors
Erol Sancaktar, Ph.D. Polymer Engineering, U. of Akron	Collaborator for Polymer Studies	Polymer substrate design and engineering
C-C Liu, Ph.D Chemical Engineering/Electronics Design Center, CWRU.	Collaborator	Design of circuits, sensor integration, data acquisition and fabrication
Hung-I Kuo, Ph.D. Computer Science/Electrical Eng.-CWRU	Collaborator	Responsible for nano-chip fabrication and system testing
Michael Suster, Ph.D. Michael Suster Group, Inc	Collaborator	Responsible for sensors, wireless integration and system testing

End User Collaborators:

***The Davey Tree Expert Company* (http://www.davey.com)**

The Davey Tree Expert Company is one of the leaders in the tree and turf management industry. One of the services that the Davey Resource Group provides to the utility companies is the evaluation of the integrity of wood utility poles (about 1 million poles in the state of Ohio alone). One of the main problems concerning the utility poles is the damage caused by fungus intrusion. The damage to these poles by these fungus intrusion costs the utility companies over $5M a year. In order to inspect these poles, service men are deployed where they have to dig a hole in the pole to collect a wood sample by

excavating the ground around the pole base. If sensors are placed with these poles and are connected via a wireless network, it can save over $1M a year. The Davey Tree expert company deals with five other major areas with market size exceeding $50M a year. They include (1) invasive species through wood packaging, (2) bore pests in trees and firewood, (3) turf pest treatments, (4) microbial activity effecting soil health, and (5) decay rates, decay pathogens, and hazardous trees. These issues are currently handled manually and with high cost and low efficiency. An *e*-nose that can detect these activities by monitoring airborne molecules and transmit those data wireless in real time can be worth $10M a year.

***Global Tracking Service* (http://www.globalww.com)**

Global Tracking Service (GTS) develops, markets, leases and services products that assist in "monitoring compliance and modifying behavior" of individuals who are under the supervision of the criminal justice system and social service agencies for the state of Ohio. GTS currently services an average of over 100 offenders a month. These numbers are expected to grow by 10% in next year and 30% by year 2015. What is lacking in these systems is a system to detect alcohol or illegal substance use by these individuals. An *e*-nose which can detect alcohol and distinguish beer from liquor and/or wine as well as also possessing capabilities of distinguishing between the type of illegal drug used (marijuana, cocaine, heroin, etc) can be attached to these bracelets and will serve as an tremendous added value for law enforcement agencies.

***Emerald Environmental Inc* (http://www.emerald-environmental.com/) and *NEXSENS Technology Inc* (http://www.nexsens.com/)**

The environmental laboratory market is not growing and is very competitive with overcapacity on the supply side. For environmental labs, news instrumentation will be essential to responding to market changes. For these laboratories, the need for greater productivity requires increased throughput, ease of use and continuous workflow. Instrumentation with greater automation, integration, and software capabilities as well as service and support can meet these needs. Several factors, however, bode well for laboratories that invest in new technology. The *e*-nose can enhance the company's productivity by increasing the speed and efficiency of detection of food and water contamination from bacteria, viruses and other harmful compounds. The enhanced detection capabilities of the *e*-nose with specialized probes containing an array of different sensors capable of simultaneously detecting and screening moving particles and targeted species will increase the speed and efficiency of detection resulting in greater productivity and work flow. The *e*-nose will allow for an increase in the number of samples being analyzed, more efficiently assist in lowering contamination levels and reduce public health concerns about water and air contamination. The growing number of regulations for assessing food and water quality will result in attractive markets for those laboratories that are prepared to respond with productivity improvements. NEXSENS will specifically assist in device testing as well as provide insight into efficient and cost–effective manufacturing of the device on a large scale.

A portable electronic nose based in carbon-nanotubes-doped biomembranes ant its application for detection of airborne/aquatic pathogens, narcotics and explosives

Project Summary:

This project seeks support to advance a novel and commercially viable portable nanostructured electronic nose (*e*-nose) based on hybrid carbon nanotubes (CNTs) and a membrane protein airborne sensor. The long term goal of the proposed multidisciplinary high-risk, high reward project is to open a new area of investigation at Kent State University and advance the underlying technology that enables the ability to (a) probe structural anomalies in membrane proteins responsible for diseases (G-protein coupled receptors and ion channels), (b) increase the tempo for robust and rational drug design and high throughput drug screening, (c) assess food, soil and water quality and (d) detect airborne pathogens, explosives and narcotics. The *e*-nose will act as standalone wireless device that can be networked and used as an "emergency alert system" on our homeland (airports, shopping malls, theme parks, sporting events) or in the battle field for detection of airborne or water-based pathogens (bacteria, viruses) as well as other potentially life-threatening chemicals. Moreover, the device will also shorten threat detection time with fewer false positives than any current technology enhancing national security and reducing the potential threat for widespread epidemic of infectious diseases. As such, the critical national need for stronger homeland security will be greatly enhanced and the fear of such threats will be markedly reduced providing a better quality of life for all fellow Americans. The *e*-nose consists of a nano-chip (< 1sq. cm in size) containing a lipid bilayer that mimics the eukaryotic cell membrane and an on-chip and off-chip high resolution electrical measurement system. We propose to use soft nanoporous polymeric materials that rest on the substrate and support the membrane thus significantly reducing the risk of protein denaturation. For this purpose, the project team involving Akron Material Concepts and the University of Akron will develop block copolymer based nanoporous membranes/masks utilizing the expertise they gained over the last five years on combined bottom up / top down nanomanufacturing method based on block copolymer self assembly and excimer laser ablative etching. These nanoporous membranes can be used not only as support membranes but also as cover membranes for the *e*-nose to allow the passage of only certain size molecules into the biosensor for targeted applications with higher accuracy and integrity. We note that such nanoporous membranes will have wider applications in the biomedical arena including controlled release drug technology, nanoporous mask production for laser induced perforations in stratum corneum, inner ear round window membrane and timpanic membrane, and other similar applications, as well as lithography related applications in electronic chip production. Because of its size and self contained integrated wireless circuitry, we envision the *e*-nose ultimately being incorporated on any and all manufactured garments in the U.S. Such broad applications will revolutionize our national detection warning systems and extend our capabilities of monitoring the spread of epidemics such as swine flu and other infectious diseases. The project incorporates three independent joint venture agreements between Bionautics Technologies Inc, Kent State University, Akron Materials Concepts and The University of Akron to create new jobs in Ohio and increase commerce. The project team also includes internationally recognized experts in the areas of miniature electrochemical sensors and micro-fabrication from the Chemical Engineering Department and Electronics Design Center at Case Western Reserve University. During this project, prototypes of the nano-chip and on-chip/off-chip electrical measurement system will be fabricated and tested per our committed end users specific needs as we move into the demonstrating phase of our established commercialization plan. In addition, protein expression, purification and encapsulation of the proteins onto the nano-chip will be further refined and improved upon utilizing different compositions of synthetic lipid bilayers as well as polymer-tethered lipid bilayers and nanoporous polymer membranes. Our team is highly qualified and the project synergistically utilizes a multidisciplinary approach bringing together experts from universities and industry with expertise in the areas of computer science, electronic engineering, biology, physics, material science, nanotechnology and sensor fabrication. We also have a number of Ohio industry partners that are providing cost-sharing support for the proposal. We believe our experienced research team has put together a novel well integrated high-risk, high-reward, research proposal that will increase the quantity of high-quality research with significant commercial relevance in Ohio companies as well as addressing the technical needs of our committed end users.

Letter of Intent to submit a proposal to the Ohio Thi

OTFSP 11-828

Lead Applicant's Name: Detection Innovations, Inc.

Address: 714 East Monument Avenue, Suite 212, Dayton, OH 45402

Phone Number: 937.285.4819

Contact Person: Douglas Lundy, CEO & CTO; dlundy@detectioninnovations.com

Project Title: Real-time monitoring and instantaneous alert reporting system offering accurate, rapid, selective and sensitive multi-threat sensing and detection that utilizes micro gas chromatographs based on variable geometry column technology.

Estimated Grant Funds: $656,674

Known Collaborators: NoBull Innovations, Schlumberger, University of Michigan and University of Dayton Research Institute

Project Summary: The U.S. and its allies are vulnerable to threats and unexpected resource utilization, whether they are accidental or intentional, from chemical, biological, radiological-nuclear & explosives (CBRNE), hazardous material & volatile organic compounds (HAZMAT/VOCs), food, air, water contamination (CONTAMINATION), water, fuel, electricity energy consumption & location, humidity, temperature, impact (CRITICAL CONDITIONS). Regardless of the source, our shipping containers, seaports, aircraft, airports, transit systems, air, food and water supply chain, building resource utilization, ecosystems and military operations are currently all under-monitored and at risk.

To respond to this challenge, Detection Innovations, whose CEO & CTO was a senior executive at Teklogix (a successful multi-national company with its main North American office in Cincinnati) and the founder and champion of its wireless data communication system and portable terminal appliances and networks, has assembled a strong team and designed a sensing and detection system that will offer leading-edge wireless, remote, robust, rapid threat sensing and assessment and hazard detection and screening products for trucking, military, transit, transportation and homeland security, including specific enforcement jurisdictions such as the FDA, EPA, TSA, DoE, DoT, DoD & OSHA. The system responds to under-monitored market needs by providing all-in-one, commercial-strength products, that simultaneously detect multiple threats and provide real-time in-line, local and remote reporting. Depending upon the environment, the system is configured to sense, detect and report specific hazards, threats and critical conditions. In order to incorporate and integrate industry-leading micro Gas Chromatography (micro GC) into its micro GC sensing and detection module, Detection Innovations chose to collaborate with the University of Dayton Research Institute (UDRI) to lead the micro GC portion of the project and the University of Michigan and Schlumberger are supporting collaborators. At the heart of this effort is the development of a Gas Chromatograph column package, based on NoBull Innovations' (NBI) proprietary variable geometry columns (VGCs), that will be one of the key innovations separating our micro GC sensing and detection module from other products and systems, past and present, that have yet to deliver on the 40-year-old micro GC promises. NBI's tasks will include acquiring or developing next generation system components (fluidic and electronic) as well as the integration and optimization for each identified application. It is clear, based upon generally available market intelligence and our past and present market research studies, performed by a leading market research firm that specializes in the sensor, instrumentation and CBRNE market sectors, that VGCs provide several analytical and engineering advantages that are unprecedented, namely, separation capabilities sufficient for real-world samples; separation time frames amenable to real-world applications; performance that motivates purchasers of older Gas Chromatography technologies to switch to these leading-edge products and systems; and low power usage that enables the size reductions and true portability that the CBRNE market has been seeking for many years. Although other groups around the world possess the knowledge and expertise to tackle many of these micro GC issues, only NBI can provide VGCs, which are absolutely essential to delivering the size, portability, and performance levels necessary to address and delight the CBRNE market, and others, that are Detection Innovations' main target market sectors.

OTFSP 11-829

Date: Tuesday, February 15th 2011
To: Ohio Third Frontier Sensor Program
From Jack Keller (jack@advtechassoc.com)

Re: 2011 Letter of Intent to Ohio Third Frontier Sensor Program

Attachment: Spectre Corporation Summary

Dear Sir/Madam

Please accept this email and attachment as Spectre Corporation's Letter of Intent to submit a proposal for the Third Frontier Sensor Program

Lead Applicant: Spectre Corporation (www.advtechassoc.com)
151 Innovation Drive – Suite 340
Elyria, Ohio 44035

Contact person: John (Jack) Keller
Email: jack@advtechassoc.com
Phone: 440-250-0580
Cell phone: 440-263-1646
Fax: 440-366-4212

Estimated Grant Fund requested: $1,000,000.00

Collaborators
NASA/Glenn Research Center
Lorain County Community College
The Great Lakes Innovation and Development Fund (GLIDE)
Spectre Sensors, Incorporated

Spectre Corporation President, Jack Keller, will be the principal investigator for the proposed project. Mr. Keller has worked in the pressure and temperature sensor industry for over 21 years. Spectre Corporation has provided sensors to virtually every possible industry segment: Tide generators, deep-sea research, chemical and petrochemical, offshore drilling and research with customers encompassing NASA/Glenn, NASA/Plumbrook, NASA/Marshall, Stanford Linear Accelerator, CERN, Northrup Grumman and General Atomics to mention a few.

Spectre Corporation's strategic alliances with NASA/Glenn, LCCC and GLIDE to manufacture in Lorain County, Ohio the next generation of high-performance pressure sensor technology. This technology lends itself to virtually any industry and expands the performance to applications and operational temperatures that were heretofore unattainable.

Spectre Corporation's intent with this project is to move our entire, current Williamsville, New York pressure sensor and transmitter manufacturing facility to Lorain County, Ohio to begin development of the new sensor design. Spectre Corporation has hundreds of existing customers around the globe for which the new sensor could replace existing sensors in use, as well as provide opportunity to pursue applications which have been previously unattainable by any current pressure transducer manufacturer's design.

Spectre Corporation (Advanced Technology Associates)

OHIO THIRD FRONTIER SENSOR PROGRAM PROPOSED PROJECT OTFSP 2011

"SILICON CARBIDE & PIEZO-RESISTIVE PRESSURE/TEMPERATURE SENSORS FOR COMMERCIAL, AEROSPACE, AND INDUSTRIAL APPLICATIONS"

Spectre Corporation is an Ohio-based manufacturer of pressure and temperature sensors for numerous markets worldwide (Chemical, Petrochemical, Aerospace, Energy, Industrial, Water Treatment, etc). Spectre manufactures sensors and then sells via distribution channels throughout America, Canada, Mexico, Europe and Australia.

We package various common piezo-resistive sensor elements that are provided from domestic and off-shore sources. The majority of the worldwide pressure sensor manufacturers rely on this same legacy technology. These legacy sensors elements have several well known limitations, the most critical of which is their exhibition of large and non-repeatable errors with temperature. These errors increase manufacturing cost of the final product, increase maintenance intervals and system design complexity for the end-user as well as limiting the life of the sensor itself.

The advantages of the Silicon Carbide Sensor developed by NASA are threefold: It performs at 700°F, higher temperatures than any competitive sensor, its hardness gives it long-term performance that no other sensor currently offers, and its chemical characteristics are virtually inert, making it applicable to countless chemical, bio-medical , and process control applications that no other sensor technology can pursue.

Working together with our collaborators we propose to commercially develop, manufacture and aggressively market the superior technologies of Silicon Carbide Sensors and our own new chemically doped piezo-resistive sensors for existing, developing, and high-potential markets. Spectre's proposal will solidify our relationship with our existing customers, expand these dynamic new technologies to countless other applications previously unavailable within our established customer base and develop new opportunities for State of the Art Sensor technologies in various applications, markets and territories. Given Spectre's pedigree, application experience and market presence; we know of a number of billion dollar (revenues) customers with specific applications that have been asking for the performance that these new sensor technologies deliver ...applications we have been forced to bypass before today.

The proposed project goals, objectives, technical approach, work plan, and deliverables are listed below:

- Take the current laboratory sensor technologies and package them in a common industrially viable platform; creating a design that allows scalable manufacturing and subsequent testing by numerous customers in many marketplaces for multiple and diverse applications previously unreachable with legacy technologies.

- Within 6 months, provide sensors to numerous customers that represent over $1,000,000.00 in potential new sales. We can provide a preliminary list upon request that verifies local, national, and international customers that are looking for the performance that these new sensors can provide and the sales numbers they represent. (This client info would need to remain commercially confidential)

- These customers would fulfill the requirement that the sensors exponentially expand opportunities at Chemical, Biochemical, Military, Aerospace, Energy and other markets we currently sell our legacy piezo-resistive technology sensors.

- Within 12-18 months, we can provide sensors to numerous other customers that easily represent over $10,000,000.00 in new sales. Once again, we can provide a preliminary list upon request that verifies the customers that are looking for the performance that these new sensors would provide and the sales numbers they potentially represent.

We are looking forward to receiving acceptance as one of the contenders for a Third Frontier Program and receiving a LOI identification number in preparation for submitting our proposal.

John C. Keller

President – Spectre Sensors

OTFSP 11-830

Science Applications International Corporation
4031 Colonel Glenn Highway, Beavercreek, OH 45431

15 February 2011

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

Science Applications International Corporation (SAIC) is pleased to announce our intention to submit a proposal for consideration under the Ohio Third Frontier Sensors Program. Please find enclosed the short description of a project titled "Tactical Multi-int Fusion Systems (TMiFS) Modularization/Miniaturization." This project will be led by SAIC and seeks to develop advances in sensor and processor technologies which will result in increased flexibility and utilization of critical Intelligence, Surveillance, and Reconnaissance (ISR) capabilities that can be used by civil law enforcement, U.S. border and port protection, and U.S military forces and fits into the Regional Concept of the National Center of Excellence in Ohio.

SAIC's program lead will be Mr. Jason Fisher. He will organize and coordinate the activities of the integrated team of SAIC engineers and collaborators. Currently anticipated collaborators on this project are SelectTech Services Corporation, Goodrich Aerospace's Electronic Systems, and IDCast and has the potential of creating and maintaining 15 to 20 jobs in the region. Our colleagues at AFRL Sensors Directorate will also participate as a cooperative research and development program partner. Exact roles for the project collaborators, as well as a finalized list of collaborators, will be provided with SAIC's detailed proposal.

SAIC anticipates requesting $1 million in Third Frontier grant funds to match an equal contribution in the form of Internal Research and Development (IR&D) funds, unrecovered indirect costs, and in-kind contributions.

To summarize:

Project title:	Tactical Multi-int Fusion Systems Modularization/Miniaturization
Project lead:	Mr. Jason Fisher, SAIC 4031 Colonel Glenn Highway Beavercreek, OH 45431 Jason.R.Fisher@saic.com (937) 321-8830
Funds requested:	$1,000,000

Please address any questions or additional information to the attention of Mr. Fisher. SAIC is excited about the opportunity to continue our partnership with the State of Ohio to bring economic growth and new jobs to the greater Dayton region.

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Derek L. Maddox
Deputy for Operations, ISR Systems Division

Tactical Multi-Int Fusion Systems Modularization/Miniaturization Program

Electro-optical (EO), infrared (IR), hyperspectral imaging (HSI), ground moving target indicator radars, and other sensing technologies have had successes in civil law enforcement, border protection, and military Intelligence, Surveillance, and Reconnaissance (ISR) markets. These sensing technologies are even more potent when combined into multi-intelligence, multi-sensor packages. Problems arise, however, from significant size, weight, and power (SWAP) requirements of these sensing systems that can be integrated onto available and planned fixed, ground, and airborne platforms. Providing an integrated sensing package that can be flexibly used on a range of platforms (manned aircraft, unmanned aircraft, airship, etc.) requires significant advances in technology to reduce the SWAP of the packages and the number of personnel for operations and maintenance. The objective of the Tactical Multi-Int Fusion Systems Modularization/Miniaturization (TMiFS) program is to advance the modularization, miniaturization, and fusion of these critical sensing and information technologies. Additionally, the program will examine current usage of such sensor systems and develop recommendations for increasing the operational value and impact of fused information from a layered sensing deployment.

Specifically, SAIC's project will, within one year, demonstrate a prototype mission payload sensor in both ground and airborne Systems Integrations Laboratories (SILs). The payload architecture will be developed to provide a set of standard physical and data interfaces. The design will be modular, able to accommodate a wide variety of sensors and be compatible with a variety of both manned and unmanned aerial vehicles in terms of size, weight and power.

The modularity of the sensor package will enable "plug and play" inter-operation of sensors. The sensor payload might be specially configured for specific mission objectives. This modular design will facilitate the rapid integration of new sensors and new sensing technologies from our collaboration partners as well expanding potential new partners as the system matures.

In conjunction with development of the integrated payload, the TMiFS team will examine how sensor systems are used and also how information from diverse sensors can best be combined to leverage the strengths of each contributing sensor to provide heightened situational awareness to both intelligence analysts and decision makers. This will be used to guide the development of advanced information processing systems operations centers, and decision support systems. The TMiFS project leverages a successful technology integration and demonstration project performed for the USAF's Air Force Research Laboratory Sensor's Directorate at Wright-Patterson Air Force Base using a single air platform. The proposed TMiFS project will extend the technology demonstration project to have broader application to multiple civil and military organizations by creating the Beavercreek and Springfield, Ohio areas as a center of excellence for the integration, system ground and flight testing, operator and maintenance training, and logistics support to repair and upgrade of advanced ISR systems.

SAIC will leverage the agility of small local firms in the areas of concept development, small quantity manufacture and test of program systems. The goal of accelerating the development and growth of the sensors industry and its supply chain in Ohio will be met by partnering with and incubating small, entrepreneurial Ohio-based sensor related companies during the achievement of Level A metrics. As the program matures towards accomplishment of Level B and C metrics SAIC will leverage its experience in systems integration and commercialization to foster the acceleration of the transition from lab to production.

SAIC has demonstrated the success of this strategy in the development of the Blue Devil multi-int aircraft system that migrated technology from the Air Force Research Laboratory to the operational theater in Afghanistan.

OTFSP 11-831

Date: Tuesday, February 15th 2011
To: Ohio Third Frontier Sensor Program
From: Jack Keller (jack@advtechassoc.com)

Re: 2011 Letter of Intent to Ohio Third Frontier Sensor Program

Attachment: Spectre Corporation Summary

Dear Sir/Madam

Please accept this email and attachment as Spectre Corporation's Letter of Intent to submit a proposal for the Third Frontier Sensor Program

Lead Applicant: Spectre Corporation (www.advtechassoc.com)
151 Innovation Drive – Suite 340
Elyria, Ohio 44035

Contact person: John (Jack) Keller
Email: jack@advtechassoc.com
Phone: 440-250-0580
Cell phone: 440-263-1646
Fax: 440-366-4212

Estimated Grant Fund requested: $1,000,000.00

Collaborators: Lorain County Community College
The Great Lakes Innovation and Development Fund (GLIDE)
Spectre Corporation

Spectre Corporation President, Jack Keller, will be the principal investigator for the proposed project. Mr. Keller has worked in the pressure and temperature sensor industry for over 21 years. Spectre Corporation has provided sensors to virtually every possible industry segment: Tide generators, deep-sea research, chemical and petrochemical, offshore drilling and research with customers encompassing NASA/Glenn, NASA/Plumbrook, NASA/Marshall, Stanford Linear Accelerator, CERN, Northrup Grumman and General Atomics to mention a few.

Spectre Corporation's existing strategic alliances with LCCC and GLIDE to manufacture in Lorain County, Ohio the next generation of high-performance pressure sensor technology. This technology lends itself to virtually any industry and expands the performance to applications that we previously unattainable.

Spectre Corporation's intent with this project is to move our entire, current Williamsville, New York pressure sensor and transmitter manufacturing facility to Lorain County, Ohio to begin development of the new sensor design. Spectre Corporation has hundreds of existing customers around the globe for which the new sensor could replace existing sensors in use, as well as provide opportunity to pursue applications which have been previously unattainable by any current pressure transducer manufacturer's design.

Spectre Corporation (Advanced Technology Associates)

OHIO THIRD FRONTIER SENSOR PROGRAM PROPOSED PROJECT OTFSP 2011

"CHEMICALLY ENHANCED PIEZO-RESISTIVE PRESSURE/TEMPERATURE SENSORS FOR COMMERCIAL, AEROSPACE, AND INDUSTRIAL APPLICATIONS"

Spectre Corporation is an Ohio-based manufacturer of pressure and temperature sensors for numerous markets worldwide (Chemical, Petrochemical, Aerospace, Energy, Industrial, Water Treatment, etc). Spectre manufactures sensors and then sells via distribution channels throughout America, Canada, Mexico, Europe and Australia.

We package various common piezo-resistive sensor elements that are provided from domestic and off-shore sources. The majority of the worldwide pressure sensor manufacturers rely on this same legacy technology. These legacy sensors elements have several well known limitations, the most critical of which is their exhibition of large and non-repeatable errors with temperature. These errors increase manufacturing cost of the final product, increase maintenance intervals and system design complexity for the end-user as well as limiting the life of the sensor itself.

The advantage of our new sensor design is that it has all the advantages of piezo-resistive sensors (ie. Signal-to-noise ratio, large gauge factor, etc), yet it is chemically doped in a manner to provide superior and predictable performance over temperature. This allows us to provide superior performance at dramatically reduced cost.

Working together with our collaborators we propose to commercially develop, manufacture and aggressively market this superior pressure sensor. Spectre's proposal will solidify our relationship with our existing customers, expand these dynamic new technologies to countless other applications previously unavailable within our established customer base and develop new opportunities for State of the Art Sensor technologies in various applications, markets and territories. Given Spectre's pedigree, application experience and market presence; we know of a number of billion dollar (revenues) customers with specific applications that have been asking for the performance that these new sensor technologies deliver ...applications we have been forced to bypass before today.

The proposed project goals, objectives, technical approach, work plan, and deliverables are listed below:

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- Within 6 months, provide sensors to numerous customers that represent over $1,000,000.00 in potential new sales. We can provide a preliminary list upon request that verifies local, national, and international customers that are looking for the performance that these new sensors can provide and the sales numbers they represent. (This client info would need to remain commercially confidential)

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We are looking forward to receiving acceptance as one of the contenders for a Third Frontier Program and receiving a LOI identification number in preparation for submitting our proposal.

John C. Keller

President - Spectre Sensors

WRIGHT STATE UNIVERSITY

OTFSP 11-832

LOI for OTF Sensors Program FY2011

Date: Tuesday, February 15, 2011

Lead Applicant: John Mackay, Business Development Officer
Wright State University
College of Engineering & Computer Science
3640 Colonel Glenn Highway
Dayton, OH 45435
Office: 937-775-5257
Email: john.mackay@wright.edu

Project Title: Commercialization of Terahertz-based Sensor for Burn Tissue

Estimated Grant Funds: $1 million

Collaborators: Teraphysics Corp.

Project Summary:

Terahertz radiation is a commercially powerful range within the electromagnetic spectrum which operates between the frequencies of typical optical devices and typical electronic devices. Terahertz radar can detect the presence and composition of organic matter. Thus, for military and security applications, terahertz radar can remotely detect explosive materials, poisonous gases, and biological warfare agents. In the medical arena, terahertz waves can detect the presence of cancer, viruses, bacteria, and other diseases remotely without surgery or biopsies. It can be used to determine the severity of burns inflicted upon human tissue. Terahertz waves can also be used in pharmaceutical and agricultural materials processing industries for quality control and research.

In this project, Wright State University will develop a terahertz-based sensor that is capable of analyzing the severity of burns inflicted upon burn tissue. Such a sensor could be used to facilitate the analysis and treatment of burn tissue.

Lorain County Community College

OTFSP 11-833

February 15, 2011

Ohio Department of Development
Technology and Innovation Division, Attention: OTFSP
77 South High Street, 25th Floor
Columbus, OH 43215
via email: OTFSP2011@development.ohio.gov

Re: 2011 OTFSP LOI

Dear Madam or Sir:

On behalf of Lorain County Community College and our teaming partners, I am delighted to submit this letter of intent to apply for funding through the Ohio Third Frontier Sensors Program RFP. The proposed project, **Low-Cost Terahertz Micro-Device Integration for Manufacturability**, will leverage the resources of the SMART Commercialization Center for Microsystems on the campus of Lorain County Community College to help accelerate the commercialization of a hand-held Terahertz Power Module (TPM) being developed in Northeast Ohio by Teraphysics Corporation. Support provided by the Ohio Third Frontier Sensors Program will enable the development of a commercially viable micro-device integration design and process that will reduce the risk and cost associated with commercializing sensor technology. The SMART Commercialization Center for Microsystems is a core facility for university and industry partners to access state-of-the-market equipment and support in sensor packaging, reliability testing, and product life simulation. The proposed project will leverage these existing laboratory and equipment resources which are designed to accelerate micro-device sensor technologies.

The Lorain County Community College is the lead applicant for this proposal:

Lead Applicant Name:	Lorain County Community College
Lead Applicant Address:	1005 Abbe Road North, Elyria, Ohio, 44035
Lead Applicant Phone Number:	440-366-4257
Lead Applicant Contact:	Matthew Apanius, Director of Operations, SMART Commercialization Center for Microsystems
Contact's Phone Number:	440-366-4257
Contact's Email Address:	mapanius@lorainccc.edu
Proposed Project Title:	Low-Cost Terahertz Micro-Device Integration for Manufacturability
Estimated Grant Funds to be Requested:	$1 million
Known Collaborators:	Teraphysics Corporation 110 Alpha Park Highland Heights, OH 44143 440-573-0008

Lorain County
Community College

Thank you for this opportunity. Lorain County Community College has a solid history of partnership and collaboration with local community, industry, and the commercialization infrastructure of the State of Ohio. I am excited to pursue an expansion of our collaboration through this potentially transformational opportunity for Ohio's economy.

Sincerely,
Matthew Apanius
Director of Operations
SMART Commercialization Center for Microsystems
Lorain County Community College

OTFSP 11-834

STAR DYNAMICS
CORPORATION

February 15, 2011

Ohio Department of Development
Technology and Innovation Division
77 South High Street
P.O. Box 1001
Columbus, Ohio 43215-6130
Attn: OTFSP2011@development.ohio.gov

Subject: STAR Dynamics Letter of Intent for Ohio Third Frontier Sensors Program

Dear Sirs and Madams:

Please be advised that STAR Dynamics Corporation intends to provide a proposal for the Ohio Third Frontier Sensors Program for 2011.

Lead Applicant: STAR Dynamics Corporation
4455 Reynolds Drive
Hilliard, Ohio 43026
Contact: Glen Herchik
Office Phone: 614-334-8906
Mobile Phone: 614-535-8089
e-mail: glen.herchik@stardynamics.com

Collaborator: Matrix Research Inc.
1300 Research Park Drive
Dayton, Ohio 45432

Collaborator: The Ohio State University
Enarson Hall
154 West 12th Avenue
Columbus, Ohio 43210

Project Title: Mobile Radar Cross Section (RCS) Diagnostics Laboratory (MRDL)

Project Summary:

The intent of this project is to fabricate a commercial, outdoor Mobile Radar Cross Section (RCS) Diagnostics Laboratory (MRDL) and an indoor Scalable Compact Test Range (SCTR) with capabilities that complement each other. The MRDL would function as a measurement-services facility offered to outside commercial and government organizations. More importantly, such an asset would facilitate significant growth of product development for the STAR Dynamics and Matrix Research team. The fundamental premise of this business strategy is to offer transportable, electromagnetic measurement and test-range capabilities wherever necessary and to augment those services with a fixed-site, indoor measurement facility.

Specifically, the MRDL would augment the SCTR with components that enable further development and commercialization of aerospace hardware such as low-observable radomes, antennas, and structures. In addition to the jobs created for the State of Ohio through the incremental measurement products and services, it would also increase the number of highly technical jobs required to process and analyze the data product of the laboratories. This combination of capabilities is unique and can be effectively leveraged to rapidly expand the RF products and radar-signature measurement services of both STAR Dynamics and Matrix Research.

Significant interest exists in the aerospace and radar-sensor communities for a mobile diagnostic radar laboratory that provides commercial, non-government-sponsored RCS measurements for product development and system diagnostics. The MRDL will essentially consist of a commercially-available, STAR Dynamics instrumentation radar housed in a mobile platform such as a 5-ton truck. The MRDL will be self-contained and can be driven to measurement locations across the country. On location, the MRDL deploys subsystem hardware such as antennas and antenna positioners to the exterior of the mobile platform, then, the articles under test (AUTs) are measured by driving the MRDL past the AUTs while collecting radar signature data.

Data collected may be utilized in a variety of ways including diagnostic radar imaging to display AUT "hot spots" and generating calibrated RCS levels for specification verification. AUTs that may be measured using this means include military trucks or tanks, watercraft, and grounded aircraft.

As precedence for this business proposal, a similar mobile asset belonging to the US Air Force exists in the radar-signature-measurement community. This system is the Mobile Diagnostic Laboratory (MDL) owned by Wright Patterson Air Force Base (WPAFB) Air Force Research Labs (AFRL). Matrix Research supported AFRL in the development of this tool over the past twenty years and is currently under contract for the operation and maintenance of the mobile facility. STAR Dynamics provided the core instrumentation radar for the MDL. AFRL's objective for the MDL is to provide radar signature measurement research and development, as well as mission-specific support to national defense programs. As such, the MDL is generally unavailable for commercial-development use even though the need exists in the community. In addition, potential users of the technology are hesitant to provide the government with complete access to their proprietary performance data while in the product-development stage. As such, there is a significant need for a commercial version of this technology. The Star Dynamics/Matrix team believes that this effort will yield increased jobs in the services business, and support the development and production of future aerospace components.

Grant Funds Requested: $1,000,000

Sincerely,

Glen Herchik
Vice President of Business Development
STAR Dynamics Corporation

Delta Systems, Inc.
1734 Frost Road
Streetsboro, OH 44241
330 626 2811
330 626 5249
www.deltasystemsinc.com

OTFSP 11-835

Letter of Intent for Ohio Third Frontier Sensors Grant

Project name: Occupant Presence Seat Sensor

2/15/11

Lead Applicant:	Delta Systems 1734 Frost Rd Streetsboro, OH, 44241 330/626-2811
Contact person:	Dave Rubin – drubin@deltasystemsinc.com
Collaborators:	Molex

Estimated grant request: $200,000 – 300,000

Project Overview

Occupant Presence Sensors are used in a variety of applications ranging from operational interlocks on industrial equipment to air-bag controllers in automobiles. Problems with current OPS systems include lifetime issues due to their mechanical nature, weather-related failures, false triggers caused by 'bouncing' of the occupant while in operation, incorrect sense results due to heavy objects placed on seats, not correctly sensing lighter occupants, and false triggers due to interference from nearby objects.

Delta is developing a seat sensor that detects the presence of a person via a capacitive sensing (no moving parts) technology - rather than traditional mechanical switches and sensors. The system consists of an electronic control unit (ECU) and one or more sensors. The proposed product is expected to have advantages in differentiating between people and inanimate objects, sensing occupants who may be present in a variety of seated positions, and sensing occupant presence utilizing other parts of the environment besides the seat. This sensor will be ideal for applications where high reliability and long life are required.

While capacitive sensing technologies have been tried in the past, this project takes advantage of new advances in capacitive technology. The Delta Systems sensor will be able to sense presence/no-presence as well as derive some locational information. We expect this system to accurately sense human presence with minimal false triggers, and be highly reliable due to being a sealed and integrated system with no moving parts. The resulting commercial product will have applications in industries ranging from medical to construction to transportation.

wyle

OTFSP 11-836

February, 2011

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

Attention: The Ohio Department of Development and OTF Review Board
Subject: Wyle Letter of Intent – Ohio Third Frontier Sensors Program FY2011

This letter is to make known the intent of Wyle Laboratories Inc. and collaborating partners to submit a full proposal for the FY2011 Ohio Third Frontier Sensors Program. Wyle is an internationally trusted leader in Advanced Non-Destructive Inspection (ANDI) and the application of advanced technology for high reliability non-destructive testing. For the last quarter century, Wyle has served as a prime United States Air Force comprehensive NDI solution supplier and also provides NDI support to the U.S. Army, U.S. Navy, and commercial entities. Wyle offers products and services to assess the structural integrity of mission critical systems and components and specializes in integrated solutions to challenging flaw detection and geometric complexity problems using eddy current and ultrasonic technology. A summary of the proposed project is given on the following page, and the requested information is listed below.

Prospective Lead Applicant:	Wyle Laboratories Inc. –Advanced NDI Group 2700 Indian Ripple Road, Dayton, OH 45440-3638 Phone: 937-320-2700
Contact Person:	Shaun Freed, Ph.D. shaun.freed@wyle.com Phone: 937-320-2717
Proposed Project Title:	**Laser Ultrasonic Sensor Platform for Advanced Materials Characterization and Jet Engine Inspections**
Estimated Grant Funds:	$1,000,000
Known Collaborators:	Wyle Laboratories, Air Force Research Laboratory's Materials and Manufacturing Directorate (AFRL/RX), University of Dayton Electro-Optics Department, and the Institute for Development and Commercialization of Advanced Sensor Technology (IDCAST)

Sincerely,

Shaun Freed

Shaun Freed, Ph.D.
Advanced NDI Scientist, **Wyle**

wyle

Ohio Third Frontier (OTF) Sensors Program 2011 Proposed Project Summary:

Laser Ultrasonic Sensor Platform for Advanced Materials Characterization and Jet Engine Inspections

Wyle's Advanced Nondestructive Inspection (NDI) group located in Dayton, Ohio specializes in delivering automated crack detection solutions to the Air Force for performing jet engine part inspections at the depot production floor. With the advance of aerospace materials from traditional metallic alloys into highly engineered composites, ceramics, and hybrid formulations, come new requirements for equally advanced sensor technologies capable to characterize defects beyond simple crack sizing. Laser Ultrasonics (LU) research has demonstrated dramatic benefits for characterizing advanced materials, but wide spread commercial acceptance as an inspection technique has been hindered by an inadequate collaboration infrastructure. Wyle and Ohio are well positioned to overcome these obstacles by developing a commercialization path between the LU researcher and materials scientist and also between lab demonstrations and production floor part inspections.

Laser Ultrasound is a non-contact advanced NDI sensing method with many new benefits beyond what traditional techniques can offer. Specifically, it is well suited for robotic automation, complexly curved components, high resolution inspections, and adaptation to advanced material systems and extreme environments. Because of the advanced nature of LU, commercial inspection applications typically require significant research and development prior to implementation. This suggests a strong economic opportunity for Ohio which has a unique cluster of experts in ultrasonic NDI and optics research. Expert LU and materials research groups exist all across Ohio including Wyle, AFRL, University of Dayton, University of Cincinnati, and NASA Glenn Research Center for potential collaborations. Recently, Wyle partnered with the University of Dayton Research Institute (UDRI) and the Air Force Research Laboratory (AFRL) to demonstrate LU characterization of high temperature polymeric material degradation. The AFRL NDE group has also demonstrated LU procedures for sizing cracks in aerospace engine alloys. Key partnerships will also be established with one of the best electro-optics programs in the country located at the University of Dayton and the Institute for Development and Commercialization of Advanced Sensor Technology (IDCAST).

The proposed project will seek to achieve both short term and long term economic growth for Ohio by collaborating current in-state research efforts into a standardized and highly configurable LU materials research platform, followed by an incorporation of the LU system into Wyle's commercially successful robotic inspection station. In effect, this project will demonstrate commercial viability along two paths. New advanced materials characterization methods will be provided to materials researchers through a partnership with AFRL, and delivery of a production floor jet engine part inspection will be pursued in partnership with the Joint Strike Fighter F135 engine development effort. Both commercial paths are significant, because the fundamental materials characterization research at one end of the spectrum leads toward future component inspections long term at the other end of the spectrum. While metallic alloys dominate the current jet engine market, the next generation of engines will include advanced ceramic and composite components offering new opportunities for Ohio.

Stoneridge Inc., Control Devices ▼ 345 South Mill Street, Lexington, Ohio 44904-9573
Phone 419-884-1219 ▼ Fax 419-884-4277

Letter of Intent

OTFSP 11-837

Justin Sloan
Analyst, Strategic Marketing
Stoneridge, Inc., Control Devices Division
345 South Mill Street
Lexington, OH 44904
419-884-4287
February 15, 2011

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

This Letter of Intent (LOI) is in response to the Ohio Third Frontier Sensors Program (OTFSP) FY2011 Request for Proposals (RFP). Stoneridge, Inc., Control Devices Division, in collaboration with Ohio State University, intend to submit a proposal in response to the Sensors Program RFP.

Lead Applicant Name:	Stoneridge, Inc., Control Devices Division
Lead Applicant Address:	345 South Mill Street Lexington, OH 44904
Lead Applicant Phone Number:	419-884-4287
Contact Person:	Justin Sloan
Contact Person E-mail Address:	Justin.Sloan@Stoneridge.com
Proposed Project Title:	Development of a simplified soot sensor with high sensitivity and rapid regeneration capability to control emissions of advanced combustion engines
Estimated Grant Funds to be Requested:	$1,000,000
Collaborators:	Ohio State University

A one-page summary of the effort is attached. Thank you for this opportunity.

Sincerely,
Justin Sloan

Stoneridge Inc., Control Devices ▼ 345 South Mill Street, Lexington, Ohio 44904-9573

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Stoneridge

FY 2011 Ohio Third Frontier Sensors Program Proposed Project

Development of a simplified soot sensor with high sensitivity and rapid regeneration capability to control emissions of advanced combustion engines

The need for a Particulate Matter (PM) sensor (aka Soot Sensor) results from more stringent upcoming on-board diagnostic (OBD) legislation on diesel particulate filter (DPF) monitoring in on-road vehicles. The current approach to DPF monitoring for OBD relies on measuring differential pressure across the DPF. The fundamental problem with this approach is that future OBD thresholds will be well below the effective detection limits that can be achieved with the differential pressure method. Therefore, new sensors are needed that can directly detect the soot emissions post-DPF and withstand the harsh exhaust gas environment. Prototype PM Sensors are available, but there are several problems associated with current sensors under development by various suppliers. These issues are: 1) long term durability which is caused by complex construction of these sensors and various exhaust constituents affecting their operation and, 2) incorrect and noisy signals under certain exhaust soot concentration and flow conditions. Consequently the cost and complexity of sensors under development is increasing, and vehicle and exhaust system manufacturers are looking for a higher performance, more robust sensor capable of meeting OBD challenges at a lower cost with simpler and more reliable construction.

To solve these problems, the proposed program targets the commercialization of a simplified soot sensor with high sensitivity and rapid regeneration capability to control soot emissions of advanced combustion engines. The Lead Applicant, Stoneridge Control Devices, has developed a proprietary design that is more robust and regenerates faster while using a much simpler construction. The basic alpha level concept has been test by Control Devices and OEM's with promising results. Control Devices will collaborate with Ohio State University (OSU). OSU has agreed to assist Control Devices with: 1) long-term durability testing using an instrumented dynamometer which includes careful assessment of various exhaust constituents such as ash and iron oxide, 2) research to scientifically characterize soot chemicals in the context of sensing properties. Much research has been done to understand soot filters and soot properties when it comes to filter effectiveness, but little to no research has been conducted to characterize soot's electrical impedance under various exhaust conditions.

Therefore, the proposed program's primary objectives, goals, approach and deliverables are:

- To meet the urgent market need of a robust and low cost sensor that enables vehicle manufacturers to meet the 2013 California Air Resources Board (CARB) and 2014 European Euro 6 OBD requirements.
- Construct alpha level sensors and collaborate with Ohio State University to perform long term durability tests.
- Work with Ohio State University to characterize basic soot sensing properties.
- Use the data from dynamometer tests along with soot electrical properties to modify sensor construction, modify software algorithms and repeat durability tests to validate improvements in performance.
- Produce production intent design prototypes within 6 months, and begin series production within 24 months.
- This project will deliver a simplified soot sensor with high sensitivity and rapid regeneration capability to control soot emissions of advanced combustion engines to serve the global transportation industry.

In 2014, the total available market (TAM) for PM sensors is estimated to be ~$810 million. This sensor program represents a significant economic opportunity to the state of Ohio and Stoneridge Control Devices is prepared to meet the challenge. Based in Warren, Ohio, Stoneridge's global reach consists of 17 manufacturing facilities and 14 sales and engineering support offices at various locations around the world. With more than 100 years of experience in the industry, Stoneridge Control Devices is one of the largest sensor suppliers in North America and Europe.

We look forward to receiving acceptance to the Ohio Third Frontier Sensors Program. We are confident that this project will expand Ohio's technological strengths and economic prosperity.

Team:

Lead :

OTFSP 11-838

COAX Technologies inc,
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Collaborators:

- CASE University

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- Advanced Precision Systems (APSYS Inc)

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4- Lorain County Community College

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Budget:

	Participant	Role	Request Grant($K)	Matching fund	Total
	CO-AX Technologies Inc.	Production	150	160	310
	CASE University	Polymer preparation	120	90	210
	Advanced Precision Systems Inc. (APSYS Inc)	sensor platform and electronics	120	160	280
	Lorain C.C.C.	Product Characterization	90	110	200
	TBD	Field test and customer	80	70	150
		TOTAL	**$560K**	**$590K**	**$1,150K**

2011 Ohio Third Frontier Sensor Program-Letter of Intent

Proposed title:

Development and Commercialization of High Sensitivity and Low cost MEMS-Electrochemical Ammonia Sensor for Live Stock Production or General Environmental Monitoring Applications.

In poultry industry there is a multifaceted concerns about the presence of ammonia in the production environment. Ammonia (NH3) and ammonia derivatives cause issues with production performance, animal health, workers health as well as general environmental impacts. In recent years there has been a significant effort in reduction of ammonia. However, the most common technique is to exhaust air as much as possible. However in cold weather areas such as Ohio, this technique, if not optimized, can increase the production cost. Presence of ammonia sensors will provide feed-back in a ventilation system and help maintaining ammonia in an acceptable level. In addition, permanent monitoring of the gas will help a better management of the production. In addition of live stock production, some other industries such as refrigeration or chemical industry are users of ammonia sensors.

Main techniques that are used for ammonia sensing are electro-chemical, solid state, opto-chemical, infra-red or hybrid techniques. Sensors performance are characterized by 1-their level of sensitivity before saturation, 2- cross-sensitivity to other gases (such as SH2), 3- slow time response, 4- Drift (or need for recalibration), 5- usable life time and finally cost and ease of use. Each technology has its own advantage and draw-backs.

Currently there are only about a handful of companies around the globe specialized in ammonia sensing. Cost and short life time are two major draw-backs preventing the ammonia sensors from widely usage of sensors. In majority of cases, the available ammonia sensors in the market have a life time of only about a year and they need to be replaced. In addition to the sensing part, the electronics associated with available products is very bulky, power hungry and use old technologies.

In past few years CASE University has done some preliminary experiments using a ***novel polymeric electrolyte*** for ammonia sensing. This new polymer was deposited on a micro-fabricated structure (MEMS) that was provided by APSYS inc. The preliminary measurement based on fabricated samples has shown: 1- high sensitivity (better than 10 ppm measured) , 2-fast time response (order of seconds) 3-linear response 4-and finally low cross sensitivity to some other gases. In addition to the promising high performances, fabrication of this sensor is very easy and low cost. Application for a patent for this sensor is in progress.

Due to the type of material used in construction of this ammonia sensor, it is expected that this device can also be used in aqueos solution. This property of our device brings a new field of applications for fish farming or algae growing. APSYS inc has developed miniature electronic signal condition and wired or wireless communication with this device. Ultimate product will be a packaged device (not only the sensing element), with modular structure.

From electronic view, the low power consumption of the complete transducer (sensor & electronics) combined with wireless communication capability allows this fully autonomous measurement instrument to be powered by solar-cell and transmit its data to a base control unit in the facility. Such a capability is a huge cost saving for installation of our products and good incentive for a facility manger to use it.

Our team is constituted of Coax Technologies-Solon, Case University-Cleveland, Advanced Precision Systems (APSYS Inc)-Cleveland, and Lorain Community College, each bringing our complimentary expertise for a successful technological and commercial accomplishment.

COAX Technologies was established in 1993 and has ISO9001 qualification? Professor Ghassemi at CASE University has an extensive experience in the development of polymers for different applications such as fuel cells and sensing. APSYS inc established in 2002 and its strength is in the design of MEMS sensors, embedded instruments and wireless telecommunication.

Since its creation, APSYS has designed over 10 different new products in the area of embedded instruments, biomedical and environmental sensors. In 2008 APSYS was awarded by a third frontier grant for the development of a soil moisture sensor. Lorain community college will bring their capabilities and facilities for test and characterization of the product once it is designed.

The basic target market for our product is live stock production including Poultry, cattle (dairy or non-dairy), pig and ship production. Every producer has potential for use of our product. Fish farming and algae growers are other potential customers for our aquas ammonia sensors.

Beyond the main focus of our product towards life stock, some other specific areas of application have been considered. Chemical industry, refrigeration system manufacturers are examples. In Industrial application, availability of ammonia and ammonia derivatives leak detector is of great interest to prevent health or explosion hazards. Pharmaceutical industry is another potential customer.

The market for our ammonia sensor goes beyond domestic customers.

By commercialization of this high performance ammonia sensor COAX Technologies and APSYS Inc estimate being able to create significant jobs for product production, technical support, installation and customer support. This sensing device and associated electronics can fully be produced in Ohio.

Hassan Varghai

Manager

COAX Technology

Date: 02/14/2011

OTFSP 11-839

intwine ENERGY

Lead Applicant:	Intwine Innovations, LLC
Address:	8401 Chagrin Rd. Ste. 10A Chagrin Falls, OH 44023
Phone:	216-912-7509
Contact:	Dave Martin
Email Address:	dmartin@intwineenergy.com
Project Title:	Scalable, reliable, secure, standards-based remote sensing platform for smart energy and remote healthcare applications
Collaborators:	To Be Determined
Estimated Funds to be requested:	$1,000,000

To Whom It May Concern,

Remote sensor technologies already serve crucial roles in operations and applications throughout major vertical markets (particularly energy, healthcare, and security). The efficiency of operations within these major verticals vastly improves as remote sensor data acquisition evolves from basic SCADA systems to real-time machine-to-machine technologies capable of two-way monitoring and control. With the evolution of remote sensing capabilities, new applications are born and these technologies will continue to play an ever-expanding role in how major markets operate and in turn change our day to day lives.

Many data acquisition systems have operated on expensive, proprietary, closed networks. These networks are often bandwidth limited and costly to maintain and scale. These network shortfalls often limit the applications otherwise possible with today's technology. The most extensive network in the world, the internet, is often avoided for these applications due to concerns regarding reliability, rural penetration, and security. However, the economic benefits of leveraging the IP network are hard to ignore and the bandwidth capabilities create the potential for applications that incumbent sensor infrastructures cannot support. Furthermore, the IP network is a natural way to extend wide area networks into local area networks such homes and small businesses, and in turn vastly increase the value of remote sensor systems, especially in remote healthcare markets and the emerging smart grid.

Intwine has developed a highly scalable M2M Cloud-based platform, CloudBUS, to capture sensor data and transmit it over the IP network to secure and valuable software applications that turn data into meaningful information. Intwine's technology brings the "internet of things" to life and enables open communication between end-users and market leaders to provide equal access to data and actionable information in markets where it is crucial to the success of enhancing future applications and market efficiency.

Intwine's proposed project is to refine the CloudBUS platform for operations in smart grid and remote healthcare markets and demonstrate reliability , scalability, and security to validate the platform for market entry. The development will include incorporating 3G and 4G cellular capabilities for reliability, optimizing communication protocols when bandwidth is limited, and incorporating remote healthcare

and smart energy communication standards as well as security/privacy requirements into the CloudBUS platform.

Sincerely,

Dave Martin

President

TIMKEN
Where You Turn

OTFSP 11-840

Date: February 15, 2011

To:
Ohio Department of Development
Technology and Innovation Division
77 South High Street, 25th Floor
Columbus, OH 43215
OTFSP2011@development.ohio.gov

From:
The Timken Company
1835 Dueber Avenue S.W., P.O. Box 6930, Mail Code TEC-05
Canton, OH 44706

Subject: 2011 Third Frontier Sensors Program – Letter of Intent

Lead Applicant: The Timken Company (Timken)

Contact Person:
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Project Title: Wind Energy Sensor Development & Commercialization

Grant Funds to be Requested: $1,000,000 R&D / $1,000,000 WCF

Collaborators:
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University of Akron Research Foundation (UARF)
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Auburn Science & Engineering Center 201
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Project Summary: See attachment

Respectfully Submitted,

Robert V. Kolarik II

Robert V. Kolarik II
Technology Program Manager
The Timken Company

Project Summary

This proposal is to develop and commercialize sensors to meet the needs of wind energy, aerospace and civil infrastructure markets. This will be accomplished by creating a research and development test capability at the new Wind Energy R&D Center located at SSC and being partially funded by the State of Ohio (TECH 11-058). The embellished Center would be capable of developing and embedding new sensors for the testing of key components used in large wind turbines for long-term health monitoring. This funding would enable the Center to not only be a test facility, but a research facility in the area of sensors to fuel the needs of global markets in wind energy, aerospace and civil infrastructure.

The $1M in R&D funds will be used to develop the sensors and instrumentation for the research capability at the Wind Center while allowing for the sensorization of key components that will go into large wind turbines. Researchers at the UA will take the lead in the research and characterization efforts, while Center associates will evaluate whether these sensors are viable for the demanding needs of the wind energy market. The $1M Wright Capital funds will be used to construct and outfit an advanced sensors laboratory in the Wind Center.

The UA is becoming an economic engine in the area of sensors for clean technologies with their engagement with local industry being funded by OTF, U.S. Departments of Energy and Defense. Further, the UARF is extremely experienced in spinning off companies and has the desired network of contacts and supply chains to make a JV successful in Northeast Ohio. A potential outcome of this project, if successful, would be a joint venture (JV) by UARF with Timken that would commercialize sensors based on the intellectual property of Timken and the UA. This JV would be an innovative and unique approach to create and open new markets in the sensorization of wind turbines and other key infrastructure. There will be some job creation within the Wind Energy R&D Center and at the UA from this proposal, but the most significant job creation may be with the joint venture envisioned by this proposal.

LOI Information Page

Lead Applicant: EYZtek, Inc.

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(2) Dr. Alan Zhang, email: achang@eyztek.com

Project title: Human-Technology Interactional Sensor Development for IED Detection

Estimated Grant Funds: $958,000

Collaborators: Ohio State Univ., Dayton Univ. and Wright State Univ.

Human-Technology Interactional Sensor Development for IED Detection

Lead Applicant: EYZtek, Inc.

Summary

US and other countries had spent billions of dollars to develop technologies for improvised explosive device (IED) detection but IEDs still kill our soldiers and innocent people almost every day. The only effective method is to use the laser-based spectroscopy detecting the IED residue; successful detection must satisfy the following requirements: (1) High sensitivity – can detect part per million (PPM) or part per billion (PPB) amount of IED residue in gas, liquid or solid phase. (2) High selectivity – can distinguish different IED and background materials. (3) Eye safe - the laser must not damage the retina. (4) Battle field use - outdoor even under the sunlight. (5) Short interrogating time – less than 0.1s. (6) Standoff detection – at least 30m. (7) Fast scanning speed – less than 1s to scan a suspected area such as a car door handle. (8) In situ detection – no sample preparing. (9) Light weight – man portable or robot mounted. (10) Less expensive – no more than $35K in production. (11) Wide area search while on the move – search the roadside from a vehicle with traffic speed. (12) High detection probability (PD) and Low false alarm (FA) rate – PD>95% and FA<5%. Unfortunately, most technologies/systems developed can only detect bulk IED at a fixed point, they only use spectroscopy and did not consider human-tech interaction so cannot satisfy most of above requirements. Lessons learned from Iraq and Afghanistan clearly indicated that IEDs cannot be detected by technology or human being alone, human-tech interaction must be engaged. Under the Army and Navy contracts, EYZtek has designed and developed 2 human-tech interactional IED detection systems. One is a UV Raman/fluorescence, CCD and LWIR 3-sensor fusion system for standoff detection and the other is a handheld fusion system for close-range detection and forensics application. In the fist system we will train solders using their eyes, view finder with wide field of view or CCD/LWIR cameras on the telescope of the fusion system to do wide area search while on the move to find small suspected area first then use the spectrometer to detecte the IED. The reason is that the laser spot is very small (2cmx2cm in 30m), to scan a one-mile long and 2-meter wide road needs 185 days! Even if the small suspected area (e.g., 0.5mx0.5m) is found, human eye still cannot detect the IED, soldiers must use or interact with the technology – spectrometer to scan the area then they are able to detect and identify the IED in 10 minutes not 185 days. Therefore, the human-tech interaction approach will be the best solution for IED detection. Our systems will use a common objective lens for 3-sensor pixel-by-pixel fusion (we were granted a US patent in 2008) so when the soldier finds a suspected area (e.g., a disturbed soil with high emissivity so an IED is possible underneath) on the CCD/LWIR screen the laser will also aim the target automatically. Since the laser is in deep UV, the resonance Raman spectrum (RRS) and the native fluorescence spectrum (NFS) will be separated to detect the IED jointly. The NFS has much higher sensitivity than RRS and the RRS has much higher selectivity than NFS so their fusion can get the best solution. By using a tunable filter a handheld fusion system is also developed for car door handle scanning, check point inspection, airport screening, and visualization of the latent fingerprint to know who the suspect is and detection of the constituents inside the print to know where the suspect had handled/touched. The fusion systems also can be used for food inspection, water quality analysis, early cancer detection, etc. Not only military users we have signed a contract of $700K with a US firm for their commercial applications. Market is big, large revenue and many high-pay jobs can be created in Ohio by this project.