



8401 Chagrin Road ● Suite 10A ● Chagrin Falls, OH 44023 ● 440-543-2727

November 4th, 2009

To Whom It May Concern:

Lead Applicant: Intwine Innovations, LLC
8401 Chagrin Road Suite 10A
Chagrin Falls, OH 44023

Contact: Dave Martin, CEO
Phone: 440-773-7144 Email: DMartin@victorysales.com

Project Title: Wireless Sensor Network for Energy Management Applications

Estimated Funds Requested: \$1,000,000

Collaborators: Blue Line Innovations
Case Western Reserve University
Radio Thermostat Company of America

Invited: Aclara Technologies
Cleveland Public Power

Project Summary:

At the foundation of Intwine's proposed project is a proven internet protocol-based connectivity solution. Intwine's low power, cost-effective connectivity module securely communicates sensor data through any standard WiFi router to our servers. Ultimately, the end-user has remote access to the data and also the ability to control the connected device via a custom web dashboard. With this solution, Intwine has developed a WiFi thermostat based on Radio Thermostat Company of America's (RTCOA) CT80 model. The thermostat is fully programmable and controllable over the web and is also capable of logging temperature, humidity, and the HVAC energy usage over time.

With the end-to-end connectivity solution and smart thermostat in-place, Intwine looks to expand on our solution to develop and commercialize a complete, intelligent Energy Management system for homeowners. Intwine will fuse usage data throughout the home with information from utilities or energy providers. The ultimate goal is to provide consumers actionable information that will ultimately save energy and money.

In recent years huge investments have been made in developing smart meter technologies that send consumer usage data back to utilities. However, there is still a major void in communicating this valuable information to the consumers themselves. At the first stage of development, Intwine will collaborate with Blue Line Innovations. Blue Line Innovations has developed an aftermarket sensor unit

that attaches to the outside of electricity meters and transmits the usage data to an indoor display unit. Importantly, the sensor unit is compatible with 90% of the electricity meters deployed in North America. Intwine will develop a secure RF link from Blue Line's sensor unit to our WiFi-enabled thermostat. This link will provide the homeowner real-time usage information in-home, and it will also be accessible remotely through Intwine's web portal. By leveraging Blue Line's sensing unit for this data, Intwine's Energy Management system will remain compatible to the vast majority of the North American market.

In the second stage of development, Intwine will develop a smart watt-meter and power strip to enable major loads throughout the home to be monitored and turned on/off when needed. Fusing this data with the aggregate usage data on our back-end will provide homeowners with a real-time finger-print of energy usage. Algorithms will be developed to assist users with making intelligent energy saving choices to optimize efficiency.

As the final stage of development, Intwine will integrate utility information and develop demand-response capabilities. Intwine's connectivity solution will overcome the deficiencies of similar systems, in that the whole solution is a closed loop between the energy providers and consumers:

Access: The consumers have access to actionable information on aggregate usage, major load usage, and utility pricing structures.

Notify: Energy Providers have the ability to notify customers of peak loading times through Intwine's connectivity platform (message to thermostat, email, or SMS text-message).

Control: The consumers have the ability to remotely respond to the warning and shed load with the push of a button via Intwine's web-based Energy Portal.

Verification: The utilities can verify that the consumers actually did respond to the peak-demand warning, provide tiered pricing incentives, and give confirmation to the consumers.

At the conclusion of development, Intwine will deploy a pilot project sponsored by Case Western Reserve University to explore the benefits and effectiveness of our solution.

Thank you for your consideration,

Dave Martin
Intwine Innovations, CEO



241 S. Abbe Rd
P.O. Box 4014
Elyria, Ohio 44145
440-284-5472
440-284-5410 fax
440-463-9039 cell

John.Higgs@craneaerospace.com

John J. Higgs
Vice President, Fluid Management, Crane Aerospace

November 4, 2009

Dear Sir or Madam:

On behalf of Crane Aerospace, Lear Romec, we provide this letter of intent (LOI) to seek funding from the Ohio Third Frontier Sensors Program (OTFSP2010) for our Fluid Condition Sensor System (FCSS). The required details of the LOI submission are provided below along with a brief narrative of the technology being proposed.

Lead Applicant:

Crane Aerospace, Lear Romec
241 S. Abbe Rd., Elyria, Ohio 44036
440-284-5472
Contact: John J. Higgs, Vice President
Email: John.Higgs@craneaerospace.com

Project Title: Fluid Condition Sensor System (FCSS)

Estimated Funds: \$800,000/2Y

Collaborators:

Case Western Reserve University
Professor Kenneth A. Loparo
EECS Department
10900 Euclid Avenue
Cleveland Ohio, 44106

Rockwell Automation
Dr. Fred Discenzo
1 Allen-Bradley Drive
Mayfield Heights, OH 44141
440-646-7325

Abstract: Attached On Page 2

Sincerely,

A handwritten signature in black ink, appearing to read "John J. Higgs".

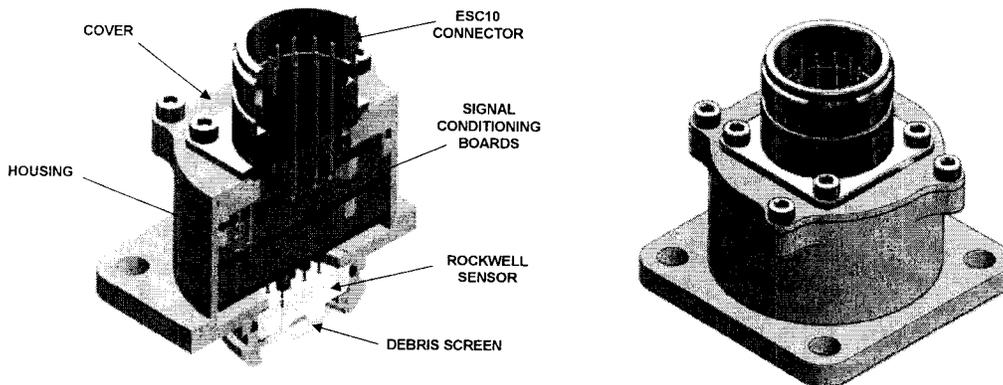
John J. Higgs
Vice President, Crane Aerospace Fluid Management

Abstract:

There is a growing need on commercial and military aerospace platforms to provide diagnostic and prognostic capability which enables predictive “on-condition” maintenance. One way to provide this prediction is to monitor the aircraft’s fluid conveyance systems for fluid conditions which are a direct indicator that maintenance action is required or component failure is imminent. In response to this need, Crane Aerospace is developing a Fluid Condition Sensor System (FCSS) for existing and future Aircraft platforms.

The proposed sensor is a multi-element electrical, electrochemical, MEMs sensor suite. The sensor suite consists of individual elements that provide for Acidity Measurement, Electrochemical Fluid Characterization, Temperature, Dielectric, and Viscosity. Together these five sense elements provide fluid parameters that effectively indicate the overall condition of the fluid including the presence of contaminants. This sensor suite is integrated on a single substrate and is designed for continuous “*in situ*” fluid condition monitoring.

The sense element technology is packaged on a single substrate and designed to satisfy the environmental conditions of the application. A packaged version of the sensor is shown in the figure below. The package is intended to represent a version of the sensor configuration that could easily be integrated with the oil tank on an aircraft engine.



The proposed technology is unique for several reasons. First, the application of multiple sense elements in a single package differs greatly from sensors currently available “off the shelf” which provide a single electrical signal to quantify fluid condition. Secondly, the sense element technology itself is relatively mature, and is based on known electro-chemical methods for establishing fluid properties that are readily correlated to industry standard lab tests. Third, Crane Aerospace’s pedigree as both an oil system component supplier, pressure sensor supplier, and proximity sensor supplier give it ready access to the technology, manufacturing, and skills to package and harden the device for this application. Last, Crane Aerospace has assembled an elite team of electrochemists, tribologists, oil analysis experts, and experienced aerospace product developers in the state of Ohio who are uniquely qualified to support development of the technology.

The technology is in its early demonstration phase with a prospective aircraft engine customer and will need to be rapidly commercialized for both new and existing engine platforms. Crane Aerospace, along with its collaborators, have the engineering, manufacturing, marketing, sales and support organizations to ensure the proposed development is a technical and commercial success that will positively impact many manufacturers in the state of Ohio. Crane Aerospace is seeking OTFSP2010 funding for this project in order to rapidly advance to the point of product commercialization for aerospace by 2012.

OTFSP 10-733

November 2, 2009

Ohio Department of Development
Technology and Innovation Division
77 South High Street
Columbus, Ohio 43215

OTFSP2010@development.ohio.gov

2010 OTFSP LOI

Dear Sir,

Spirit Solutions inc. is pleased to submit this Letter of Intent to submit a proposal in response to the Ohio Third Frontier Sensors Program 2010 Request for Proposals.

Lead Applicant: Spirit Solutions Inc.
2400 East River Road
Dayton Ohio 45439

937-431-8041

Contact Person: Ron Coate
rcoate@ssi-ir.com

Project Title: Smart Thermal Imaging Wheel and Rail Inspection

Estimated grant funds to be requested: \$1,000,000

Spirit Solutions Inc., based in Dayton, Ohio, was created in 2002 to incorporate military based infrared imaging technology in commercial applications. Combining hardware and software knowledge SSI delivers complete solutions to solve customer problems.

Wheel inspection using thermal imaging brings an aspect to the evaluation of wheel performance and safety that is not available in present technologies. Thermal patterns develop during a wheels rotation, real time observation of these patterns allows for fault identification, prediction of failure and the need for service. Additionally the inspection technology can be used for rail and highway.

Summary:

Spirit Solutions Inc (SSI) requests OHIO THIRD FRONTIER FUNDING for the commercialization of our thermal imaging inspection system that utilizes long wave 2D infrared sensor array technologies to inspect wheels on rail cars and semi trucks. The system also shows potential to inspect rail. Good rail health is defined by the absence of fractures, delaminating and other metal failure states as well as the bed of the track and the associated ties and spikes of the rail assembly. Good wheel health is defined as the absence of dragging brakes, the absence of hot bearings and having proper rotation. Wheel health is similar for both rail cars and semis. Train car derailments range from the minor car derailments to the catastrophic urban derailments involving the spilling of life threatening hazardous chemicals. These accidents cost the railroad at minimum of one million dollars per derailment with loss of commerce due to the shutdown of the specific rail line, damage to products and repair. The flaws that can occur to cause a rail car to derail is either from a flaw in the axel assembly of the rail car itself or due to poor rail health. Semis with bearing / brake problems affect the safety of the nations highways. SSI has developed an infrared inspection system for the brake / axel assembly, which has raised interest from Norfolk Southern, Union Pacific, CSX and the State of Washington (highway safety). SSI is currently viewed as a technology innovator in the area of 2D infrared sensors applications for the rail industry. Currently SSI is the patent owner of the wheel inspection technology.

The thermal sensor inspection system is ready to move into the manufacturing stage and marketing stage. The system requires testing in environmental extremes to determine required performance to meet all aspects of commercial specifications and manufacturability.

SSI believes that it can finalize the commercial specifications, manufacturability and reduce the prototype costs to an inspection system that will be very price competitive and offer the industries a leap forward over current inspection techniques within a period of two years.



November 4, 2009

Ohio Department of Development
Technology and Innovation Division
77 South High Street
P.O. Box 1001
Columbus, Ohio 43215-6130

Attn: OTFSP2010@development.ohio.gov

Subject: STAR Dynamics Letter of Intent (LOI) "2010 OTFSP LOI"

Dear Sirs:

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

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

Collaborator: Honeywell International

Collaborator: The Ohio State University

Project Title: Target Detection and Tracking using Airborne Weather Radar

Project Summary:

Interest exists in several aerospace segments, ranging from unmanned aerial systems to helicopter search and rescue, for a single multi-purpose radar capable of supporting both weather detection and target detection and tracking, including both airborne and surface targets.

The detailed requirements for each segment's applications varies greatly, but the underlying question is what capability can be supported with existing high performance weather radars, such that additional capability can be installed without additional hardware.

The IntuVue™ Weather Radar is the next generation in weather radar capable of complex processing and incorporates high performance solid state, coherent transmitter/receiver architecture. The current IntuVue radar offers unique features and benefits that drive high interest across the aerospace industry and high adoption/installation rates in segments where it has been introduced.

For these reasons, we believe IntuVue is an ideal architecture to support a target tracking mode, enabling it to answer not only the customer need for weather hazard awareness but also address those segment needs for target identification and tracking.

The intent of this project is to evaluate the capability of the current IntuVue system, identify the necessary design changes and/or function/performance tradeoffs with the ultimate goal of incorporating the target tracking capability, to the greatest extent possible, into the existing architecture. The target tracking capability is described as the capability to provide target identification, position, range, bearing, heading, speed and altitude (for airborne targets) for up to 20 targets. Further detail, such as radar cross sections (RCS) of targets, minimum/maximum range of detection, probability of detect, probability of false detection, etc. are to be defined in the SOW.

Grant Funds Requested: \$1,000,000

Sincerely,

Glen Herchik
VP of Business Development

Michigan Aerospace Corporation

1777 Highland Drive, Suite B
Ann Arbor, Michigan 48108
(734) 975-8777 (734) 975-0239 *fax*

November 2, 2009

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

AeroForesight is pleased to submit this Letter of Intent in response to the Ohio Department of Development's Request for the Third Frontier Project. Our intent is to incorporate and establish an office in Northwest Ohio. AeroForesight is a spin out company from Michigan Aerospace Corporation.

The Lead Applicant on this proposal is:

Jack Miner, 734-604-4003

AeroForesight (to be established), 1777 Highland Drive, Suite B, Ann Arbor, MI 48108
(Proposal will include location in Ohio).

Proposed Project Title: Optical Technology for Aviation Sensors

Estimated Grant Funds to be requested: tbd

Proposed Collaborators:

- Edison Material Technology Center, Dayton, OH
- Michigan Aerospace Corporation, Ann Arbor , MI

Thank you for your consideration in the matter.

Sincerely,

Jack Miner
AeroForesight Corporation (To be established)

Lead Institution: Case Western Reserve University
10900 Euclid Avenue
Cleveland, OH 44106

Title of Proposal: Center for Advanced Infrastructure Sensing and Inspection Technology

Estimated Cost of Project: \$500,000

PI: Xiong (Bill) Yu, Assistant Professor of Civil Engineering, xxy21@case.edu, 216-368-6247

Collaboration Institute: Cleveland State University

Nov 3rd, 2009

Abstract

This document is a Letter of Intent to submit a third frontier proposal in response to Funding Opportunity Announcement. The proposal will outline a plan to create a Center for Advanced Infrastructure Sensing and Inspection Technology. Research at the center will emphasize developing advanced sensor technology for transportation and building applications. The target is to ensure the infrastructure to be hazard resilient and energy efficient. The thrust of research activities will emphasize sensors that are built up: 1) smart materials; 2) energy harvesting mechanism; 3) innovative data acquisition schema.

Project title: **Integrated Sensor Technology Platform**

Project Abstract:

In today's commercial, manufacturing, residential, & healthcare environments, people and equipment are becoming more mobile and deployed in increasingly harder to reach locations. These changes create a compelling need for the convergence of monitoring, measuring, analysis and wireless communication of information. To facilitate this convergence, a move toward integrating sensors, measurement and analysis, with wireless communication technologies is becoming paramount. Further, to accommodate the drive toward sustainable products within the energy, production, safety and security realm, implementation of such convergent technologies is a driving factor.

The initiative we will propose is such a convergent technology. It proposes to integrate sensors for healthcare, industrial, commercial, security and safety market sectors with advanced microcontroller technologies that consolidate computing capabilities, with front end digitization, I/O and wireless transceivers capable of communicating on standard network protocols (i.e. Zigbee, Bluetooth, 802.11a/b/g/n, Wimax, RFID, ANT, SimpliciTI, cellular sms, ..etc) with encryption/decryption capability. The intent is to apply a standardized, but scalable electronic hardware platform to various sensor technologies for parameter measurement (i.e. Air & O₂ flow rate, CO₂ detection, proximity switching, and temperature).

Initial designs have concentrated on two areas:

Liquid O₂ level and flow rate

This application applies to mobile Liquid O₂ canisters utilized in healthcare facilities for patient respiratory therapy. The device will measure flow rate & determine remaining liquid O₂ volume in the canister by sensing capacitive changes due to liquid level changes. These measurements will be converted to time remaining until run-out (a predetermined minimum allowed level) and displayed. Also, a flow rate sensor will be implemented to determine proper O₂ delivery and tubing connectivity. The on board microcontroller will perform all signal digitization, and calculations. When the level reaches the predetermined run-out, an onboard wireless communication channel will transmit an alert and canister ID signal to a receiver attached to a USB port of the nearest PC within the healthcare facility. Software applications on the PC can then connect to the Internet and transmit to the O₂ supplier appropriate information that will facilitate delivery of a new canister. The implementation of both level (and possibly volume) and flow rate detection, will demonstrate the applicability and scalability of a standardized electronic platform for this type of sensor monitoring, analysis, transmission, reception, PC connectivity and alerting software.

BigT Inc LLC. Tax ID 20-0191317, based in Akron Ohio, will be the lead applicant. The President is Tony Saikaly, and will act as the contact person. BigT Inc LLC. will be collaborating with Case Western Reserve University Institute of Technology, and Video Systems & Security Inc, all which are based in Ohio.

We estimate the cost for the research and development of the project to total \$352,000. These funds will cover costs such as engineering time, components, proto types, and all research related materials.

I thank you for your kind consideration for this proposal. Please feel free to contact me anytime with questions.

Kindest Regards,

Tony Saikaly
President BigT Inc LLC.
Ph 330-283-2663
E-mail: Tony.Saikaly@yahoo.com



November 1, 2009

The Ohio Department of Development
Technology and Innovation Division, Attention: OTFSP
77 South High Street, 25th Floor
Columbus, OH 43215
Attn: OTFSP2010@development.ohio.gov

SUBJECT: GBI Cincinnati Ohio Third Frontier Letter of Intent for the commercialization of “MTConnect-enabled Predictive Quality Control System (PQCS) Utilizing Cloud Computing Architecture”

GBI Cincinnati will be submitting a proposal to the State of Ohio for the commercialization of the MTConnect enabled Predictive Quality Control System (PQCS) utilizing Cloud Computing Architecture having direct application on complex part manufacturing for the aerospace and aviation industry.

The proposal will be submitted on behalf of the lead applicant GBI Cincinnati Inc. in collaboration with TechSolve, Inc.

PQCS will be commercialized on the open architecture Revolution Series machines. The Revolution is the new series of machines from GBI Cincinnati who is an industry leader in supplying machine tool technology. The Revolution is designed specifically for the aerospace industry and other manufacturers that machine complex geometry parts. One of the key features on the new Revolution machine is the PC-based MTI Controller which is designed to machine at a constant velocity thus reducing the cycle time up to 50%.

GBI Cincinnati will seek \$0.98M in funding from the State of Ohio.

Sincerely,

Kevin V. G. Bevan
President – GBI Cincinnati, Inc.

OTF Proposal Contacts:

Kevin Bevan
President
GBI Cincinnati, Inc.
6899 Steger Drive
Cincinnati, Ohio 45237
Phone: 513.841.8684
Fax: 513.841.7326
kbevan@gbicincinnati.com

Amit Deshpande
Research Engineer
TechSolve, Inc.
6705 Steger Dr.
Cincinnati Ohio 45237
Phone: 513.948.2118
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Dr. John P. Snyder
Program Manager
TechSolve, Inc.
6705 Steger Dr.
Cincinnati Ohio 45237
Phone: 513.948.2112
Fax: 513.948.2109
snyder@techsolve.org

GBI Collaborators:

TechSolve, Inc – Cincinnati, Ohio

6899 Steger Drive • Cincinnati, Ohio 45237 • (513) 841-8684 • www.gbicincinnati.com

Revolution Controller Integrated Predictive Quality Control System utilizing Cloud Computing Architecture

GBI Cincinnati Inc. (Lead Applicant) & TechSolve Inc. (Collaborator)

Intense global competition has forced many US manufacturers to examine their current business practices as well as evaluate how to meet these challenges and remain competitive. Major emphasis has been placed on disruptive innovation and manufacturing research with recognition of the need to improve product and process quality, automation, and decrease scrap. The traditional manufacturing process is to produce a part on the machine tool, transfer it to the coordinate measuring machine, check for quality, and then make decisions. If the quality is found unacceptable, the production line is stopped to locate and alleviate the root cause of the defect. In this type of post-production quality control practice, not only is the part, that was inspected, scrapped; but there is also a considerable amount of work in progress (WIP) that ends up being purged. This preventative quality control practice, which barely manages to satisfy customer quality requirements, is not sustainable in today's competitive market. The problem is further amplified in the aerospace industry where machining complex parts is very expensive, plus they have long cycle times.

The goal of the proposed project is to commercialize the Predictive Quality Control System (PQCS) utilizing Cloud Computing Architecture which has a direct application on complex part manufacturing for aerospace and aviation industry. PQCS predictive methodology monitors critical, real-time process/machining parameters, checks them against boundary limits, and then raises alarms/alerts. The PQCS system will be MTConnect compatible which will boost its market potential (for more information about MTConnect visit www.mtconnect.org). The proposed system will ensure zero scrap and minimum downtime thus boosting the overall equipment effectiveness (OEE) and process capability indices. Another major benefit of the system will be the reduction of the number of inspected parts in a batch of final product which directly translates into reduced lead times and inspection costs.

PQCS will be commercialized on the open architecture Revolution Series machines. The Revolution is the new series of machines from GBI Cincinnati who is an industry leader in supplying machine tool technology. The Revolution is designed specifically for the aerospace and aviation industry in addition to other manufacturers that machine complex geometry parts. The key to the new machine is the PC-based MTI Controller which is designed to machine at a constant velocity thus reducing the cycle time up to 50%. The advanced capabilities of the technology include: processing power of 50,000 blocks per second in an 8-axis application; constant velocity controller; large amounts of data-handling efficiency; numerous smart buffers; and integrated end-user application like WorkNC. These functionalities result in improved tool life, better part finish, less drive and motor wear, and life extension of the machine tool.

MTConnect compatibility will ensure industry-wide applications, easier integration, and commercial viability.

November 3, 2009

To Whom It May Concern:

This letter serves at notification of our intention to submit a proposal for the 2010 Ohio Third Frontier Research and Development Grant for the Sensors Program solicitation. As per the solicitation requirements, a one page summary of our proposed project is attached to this document. We have also included the required program information below.

Regards,



Dr. H. Howard Fan
President
GIRD Systems, Inc.

Lead Applicant's Name:	GIRD Systems, Inc.
Address:	310 Terrace Ave., Suite 200, Cincinnati, OH 45220
Phone Number:	513-281-2900
Contact Person:	Dr. Howard Fan
Contact Phone Number:	513-281-2900 x101
Contact E-mail Address:	hfan@girdsystems.com
Proposed Project Title:	Polarization-Invariant Wideband Direction Finding
Estimated Grant Funds Requested:	\$700,000.00
Known Collaborators:	Southwest Research Institute

Summary of the Proposed Project

Polarization-Invariant Wideband Direction Finding

One of the fundamental technologies in military signals intelligence is the measurement of the direction-of-arrival of a detected signal. Using this information, the receiver can determine where an enemy transmitter is located or distinguish friendly communications signals from sources of jamming or interference. The Sensors Directorate of the Air Force Research Lab at Wright Patterson Air Force Base, OH is interested in expanding their capabilities in this area and GIRD Systems of Cincinnati, OH is in the process of developing a novel new system that enhances their capabilities in this area.

Recent advances in direction finding techniques and signal processing hardware have made high-resolution direction-finding possible over a wide signal bandwidth. Direction finding algorithms typically ignore the fact that the source signals exhibit some type of polarization. While these techniques have been well-developed in theory, in practice the effectiveness of these techniques could be severely degraded because of the source signal polarization effects. GIRD Systems has developed a new signal processing algorithm that overcomes this problem and meets the AFRL Sensor Directorate's objective of "advancing the state of the art in the targeting of electro-magnetic emission sources". This algorithm was developed under a SBIR Phase I program, which funds the basic research and proof-of-concept.

GIRD System's approach is unique in that it uses some property of most communications signals that common direction-finding algorithms do not. Among the benefits of our approach is that the exact parameters of the monitored signal, such as bandwidth, center frequency, and modulation scheme, do not need to be known exactly. This is a tremendous benefit in signals intelligence applications where details about enemy transmissions are not always known. During the Phase I period of our SBIR program, we adapted our algorithm to work for any type of signal polarization. Moreover, we can detect the type of signal polarization and report it as part of the direction finding result. Simulations conducted during Phase I have shown this approach to be very promising. For Phase II of the program, we will be constructing a fully-functional prototype system which will consist of eight antennas, which will feed a central processing and high-speed capture system. We will be working with our partner organization, Southwest Research Institute of San Antonio, TX to demonstrate the developed system on their RF testing range, which will simulate the system operating on an Air Force Platform in flight.

With additional funding from the Ohio Third Frontier program, we expect to be able to leap forward from the basic prototype that we are in the process of developing with Air Force funding to a field-ready system that will be ready for production and can be manufactured in quantity to satisfy the needs of Air Force Research Lab at Wright-Patterson AFB. Specifically, AFRL is looking to use this developed system to improve the situational awareness and targeting capabilities of the Aeronautical Systems Center airborne platforms. This product also has potential to be manufactured for use within other branches of government involved in signals/sensors intelligence, including the Department of Defense (Army and Navy), Department of Homeland Security, Central Intelligence Agency, Federal Bureau of Investigation, and National Security Agency. In the commercial sector, this product also has application in a wide array of telecommunications systems, most notably in the cellular telephone industry for localization services such as E-911 and location-aware data services.

GIRD Systems, Inc.
Engineering Research and Development

November 3, 2009

To Whom It May Concern:

This letter serves at notification of our intention to submit a proposal for the 2010 Ohio Third Frontier Research and Development Grant for the Sensors Program solicitation. As per the solicitation requirements, a one page summary of our proposed project is attached to this document. We have also included the required program information below.

Regards,



Dr. H. Howard Fan
President
GIRD Systems, Inc.

Lead Applicant's Name:	GIRD Systems, Inc.
Address:	310 Terrace Ave., Suite 200, Cincinnati, OH 45220
Phone Number:	513-281-2900
Contact Person:	Dr. Howard Fan
Contact Phone Number:	513-281-2900 x101
Contact E-mail Address:	hfan@girdsystems.com
Proposed Project Title:	Multi-Carrier VHF/UHF Amplifier with Suppressed Intermodulation Products
Estimated Grant Funds Requested:	\$500,000.00
Known Collaborators:	Nova Engineering (a division of L3 Communications)

Summary of the Proposed Project

Multi-Carrier VHF/UHF Amplifier with Suppressed Intermodulation Products

As sensor networks become more ubiquitous, reducing the power consumption of RF transmissions by the network becomes a critical design consideration. While much work has gone into reducing the power consumption by the sensor during measurement, when it comes time to transmit this data to another node in the network or to a receiving station, the transmission process can be inefficient. Minimizing power consumption in all aspects of operation is especially important for wireless sensor networks that are designed to operate for long period of time on solar power or a battery. A reduction in power consumption can mean longer uptime in the field without maintenance or over periods with limited solar exposure.

GIRD Systems of Cincinnati, OH and L3 Communications Nova Engineering of Springdale, OH are working on a solution to improve the efficiency of radio frequency (RF) amplifiers for communications and sensor networks. When a signal is being amplified for transmission, it is important to keep the power amplifier in the linear region of operation, meaning that the amplifier can not be pushed to its physical limit. When a signal is amplified beyond the linear region of the amplifier, the transmitted signal becomes distorted, preventing the receiver from demodulating the signal after transmission. One way to guarantee that the signal is being transmitted in the linear region is to use an amplifier much more powerful than is needed for transmission but use only a fraction of its capability to keep the operation in its linear region. While this avoids the introduction of distortion, it is very inefficient and wasteful of power due to the size of the amplifier in use.

To combat these inefficiencies, one can use a smaller amplifier and push its operation into the non-linear region of that device. GIRD Systems and Nova Engineering are developing a system that allows for this approach to be possible while still avoiding distortion through the use of digital signal processing techniques. Using our digital signal processing techniques, we can apply transformations to the signal being amplified to ensure that the output is linear even when the amplifier is operating in the non-linear region. Two important qualities of our approach compared to other digital signal processing algorithms are that our approach is based on models created from real data and is adaptable over time. Due to their non-linear nature, amplifiers cannot be modeled very accurately with a set of equations. Using real data and incorporating adaptability ensures that the linearization process is based in a solid foundation and will keep performing even when the amplifier characteristics change due to effects such as a changing ambient temperature.

If successful, this project will have implications in a variety of markets and could spur manufacturing efforts for a wide product line. One potential customer that we will have immediately will be the United States Navy, who is already providing funding for this effort. They have tried several approaches in the past to increase power amplifier efficiency for their Digital Modular Radio program and will be very interested in getting this program into the field should the technology demonstration at the end of our funding period prove successful. Outside of the Navy, there are many other opportunities in the commercial sector and in other military branches. Nova Engineering is experienced in developing sensor products for the military and has a whole line of sensor and communications products that can be used to establish ourselves in this market for power amplifier technologies. Other industries, such as the cellular telephone industry (specifically for the emerging 4G networks that are in the process of being rolled out over the next few years) and other wireless technology providers (such as companies involved in rolling out Wi-Max wireless data services) may benefit from this technology by using more efficient power amplifiers in their wireless networks and in millions of handheld cellular phone devices to prolong their battery lives.

Hansen, Andrew

From: Jeffrey D Myers [jeff@engineeredcapital.com]
Sent: Wednesday, November 04, 2009 10:47 AM
To: OTFSP2010
Subject: 2010 OTFSP LOI
Attachments: White_Paper_Smart Gridjdm 1pager.docx

To whom it may concern:

Lead Applicant's name, - Jeffrey D. Myers
Address - 3041 Asbury Dr Columbus Ohio 43221
Phone number - 614-668-1312
Contact person – Jeff Myers
Email address – jeff@engineeredcapital.com
Project title – Wide Area Energy Management System
Estimated Grant Funds to be requested – 750k
Known Collaborators – Jim Saunders, Battelle Memorial Institute
A one page summary of the proposed Project. – find attachment

Jeff Myers
Engineered Capital
614-668-1312

Wide Area Energy Management GUI - Abstract

We propose a four phase program that will result in a graphic user interface that uses real-time and near real-time sensor, data gathering, modeling and reporting infrastructure to support secure, strategic, tactical, and sustainable energy management.

We propose a novel approach that is a scalable, secure solution, allows user selectable systems to connect directly to a network's operation center (NOC), and provides configurable real-time reporting information to the utility management structure.

Phase one begins by manually collecting data and identifying course modeling and sensor needs. This immediate information gathering will allow and assessment of energy supply and usage and provide guidance for the next phase of implementing commercial off the shelf sensors to begin giving the command center instant energy audit capabilities. Development of the secure data system will begin.

In the second phase, modeling of the energy system will begin while behavioral patterns and the user interface are developed.

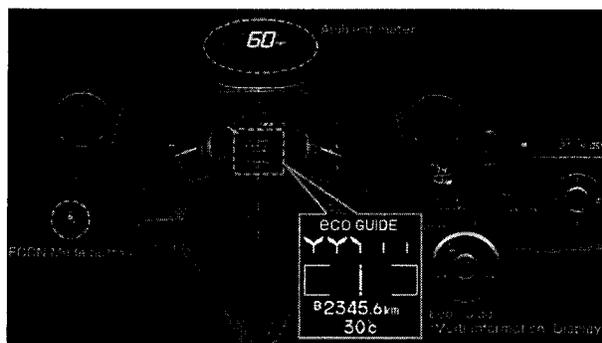
In phase three, manual policies and data gathering procedures will be replaced by automatic controls where appropriate.

Finally, the last phase will deliver an integrated a GUI or heads up display (HUD) with command monitoring capability directly into the NOC and will:

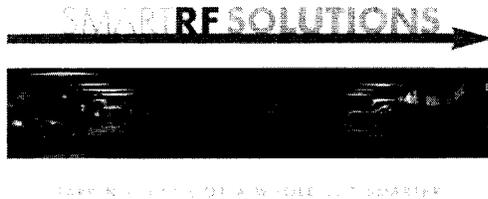
- Create a platform that communicates information from the deployed sensors and controls
- Provides real time reporting to the command structure described as the Wide Area Energy Management Dashboard Concept (WAEMDC).

The WAEMDC will provide the ability to close the gaps in operational visibility, risk management, and data gathering and will enable real-time decision management.

The proposed WAEMDC system is similar in spirit to Honda Inc.'s head's up display for the Insight passenger vehicle, shown here. This simple display of sensor and control information, such as instantaneous miles per gallon, an eco guide that has a plant grow more or less leaves depending how 'green' one is driving, and a control button to engage ECON mode, achieves real behavior changes simply by providing meaningful data to the driver. We will develop a GUI that is easy to use and achieves real behavioral changes in electrical power users.



This is proposed as a 12 month program with a cost of roughly 750K.



711 E. Monument Ave., Suite 300, Dayton, OH 45402
Telephone: 937-217-RFID
Web: <http://www.smartrfsolutions.com>
Email: sales@smartrfsolutions.com

LETTER OF INTENT

November 4, 2009

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

Dear Colleague:

SmartRF Solutions LLC, a Dayton, Ohio-based company, wishes to notify The Ohio Department of Development (Technology and Innovation Division) of our intention to submit a proposal in response to the Ohio Third Frontier Sensors Program RFP released on October 7, 2009. Please find our contact information, proposed project title, estimated funding request, known collaborators and project summary illustrated in the following paragraphs and pages.

Lead Applicant

- Company Name: SmartRF Solutions, LLC
- Address: 711 E. Monument Ave., Suite 300, Dayton, OH 45402
- Telephone: 937-217-7343 / 937-558-2980
- Contact Person: Dr. Arijit Sengupta
- Contact Telephone: 937-217-7343
- Contact Email: arijit.sengupta@smartrfsolutions.com

Proposed Project Title

Rapid development and deployment of control applications in Transportation and Other Industries using RFID-centered Sensor networks

Estimated Grant funds to be Requested

\$1,000,000.00 from State Funds, to be equally matched in kind by Dayton RFID Convergence Center and Wright State University, over a period of three years.

Known Collaborators

- Dayton RFID Convergence Center
- Wright State University

Summary of Proposed Project

This Project proposes the complete development of a complete sensor-centric application development method. The lead applicant is a small business that has developed a technique for automated vehicle identification using Radio Frequency Identification (RFID), and induction loop sensor technologies. However, many other sensors (such as cameras, ultrasonic, laser) are commonly used in transportation logistics, and applications often need to incorporate information from all such sensors in real-time. This project proposes the development of a flexible architecture for RFID-centric application development, involving a conceptual model for specifying control logic, a data acquisition and analysis tool for capturing and analyzing the sensor data, and the architecture for deploying production-quality applications. The project will build a complete application development solution, consisting of a complete software design methodology, as well as hardware development kits. This architecture can be used in industries such as transportation, defense, security, healthcare and pharmaceuticals.

Organizations using or planning to use RFID technology must commit considerable resources to develop the applications that process the sensor-generated data online or offline in order to make significant business decisions.

The work will be performed by personnel from the following:

- a. SmartRF Solutions, lead applicant
- b. Dayton RFID Convergence Center (DRCC)
- c. Wright State University, Raj Sooin College of Business

The proposal will provide a complete description of a complete suite of software, hardware and integration methodologies that would allow the possibility of highly accelerated development of sensor-controlled applications. The funds requested will be used to equip a dedicated facility with RFID and other sensors for the purpose of testing and integration into the proposed model, and apply the model in the lead applicant's primary business of Automatic Vehicle Identification, as well as in other industries where rapid deployment of sensor data is required.

Once developed, the project will help small to medium businesses to incorporate sensor control systems in their businesses, creating new business potentials, leading to more jobs and higher revenues. SmartRF Solutions has already collaborated with Wright State University to develop the basic theoretical framework for this architecture (currently termed FlexRFID), and has applied it successfully in SmartPark RF, an Automatic Vehicle Identification technique that is currently being commercialized by the company.

Our team would like to thank The Ohio Department of Development for administering this RFP on behalf of the state of Ohio. We are looking forward to submitting the full proposal to you by December 7th.

Best regards,



Arijit Sengupta
Founder, SmartRF Solutions



LABEL & PACKAGING PRODUCTS
LOGISTICS PRODUCTS
RFID SOLUTIONS
PROMOTIONAL RESPONSE PRODUCTS

November 2, 2009

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

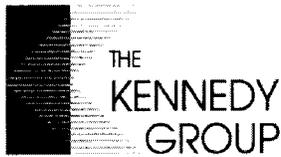
Dear Ohio Department of Development:

Please accept this Letter of Intent from The Kennedy Group for our Fiscal Year 2010 Ohio Third Frontier Sensors Program proposal.

Lead Applicant Name:	The Kennedy Group
Address:	38601 Kennedy Parkway Willoughby, OH 44094
Telephone:	440-951-7660
Contact Person:	Mike Kennedy, President
Contact Email:	mikekennedy@kennedygroup.com
Project Title:	Commercialization of Wireless Sensors(RFID) from a Standard Platform Technology
Estimated Grant Amount Requested:	\$1,000,000
Known Collaborators:	Blue Spark Technologies

Summary of Proposed Project:

The Kennedy Group, with headquarters and principal manufacturing facility in Willoughby, Ohio, has been leading the label, packaging, promotion and identification industries for more than three decades. By subscribing to a philosophy of futuristic thinking, the company has grown significantly and continues to expand. Today, its extensive products offerings, services and equipment are used in a wide range of industries by more than 3,000 customers in 40 states and seven countries. Through various exclusive programs and service offerings, such as its state-of-the art pre-press department, in-house testing capabilities, research and development laboratory, RFID (radio frequency identification) Center and climate control facility. The Kennedy Group has combined existing strengths with a strong commitment to RFID to make The Kennedy Group a leading supplier of RFID solutions. The Kennedy Group currently supplies RFID solutions to industry in North America and overseas.



LABEL & PACKAGING PRODUCTS
LOGISTICS PRODUCTS
RFID SOLUTIONS
PROMOTIONAL RESPONSE PRODUCTS

AFFILIATE OFFICE
• MERELBEKE, BELGIUM

Cont. - Page 2

This project will lead to the commercialization of low cost sensor systems with the capability to communicate over distances of up to 50 m using advanced low power UHF technologies conforming to the well-established EPCglobal Gen 2 standards defining communication protocols, including secure authentication and data management, between remote transponders and fixed interrogators. Developing new products around existing platform technologies will result in faster and broader market acceptance, lower development costs, and lower product costs.

The new products developed under this grant will provide functionality to sense proximity of the remote transponder to interrogators, transfer unique identification information, gather and store environmental information (such as temperature or data) whether or not in the presence of an interrogator, and upload stored information to the interrogator upon demand. The new remote transponder products developed will be supplied in standard label, tag, and card formats. Thus, the transponders can be affixed to items of interest and travel to measure and store measurements and provide tracking identification at points of interrogation.

Present RFID systems offer limited performance in the presence of high moisture commodities and metal assets. Also, there is no product that combines data logging of environmental conditions with tracking functions into a single label, tag, or card that is compatible with existing EPCglobal standard.

The key technical issues to address include: design and fabrication onto flexible circuits of optimized UHF antennas, the assembly of silicon integrated circuit chips onto these flexible circuits, the integration of a thin, flexible, disposable battery with the flexible circuit, the optimization of the battery design, the assembly/converting of the components into a deliverable RFID product, the testing of components and completed systems, and establishing performance standards. It is the assessment of the lead applicant that the technical issues have the nature of “development” and not “research.” It is expected that solutions will develop by applying known technologies in innovative ways.

The target applications of this Sensor Program project focus on the Logistics cluster identified by the Ohio Third Frontier. Among the applications are: tracking assets and products moving through the logistics supply chain; measuring and recording time and temperature conditions at preset intervals for temperature sensitive items including critical medical supplies, medical components, pharmaceuticals, industrial chemicals, and food, among other critical commodities. This project also has relevance to the Instrument, Control and Electronics cluster of the OTF. It is expected that this project will leverage resources of Wright Sensor Center and Institute for the Development and Commercialization of Advanced Sensor Technology, involve collaborators around Ohio including Blue Spark Technologies (printed battery technology) of Westlake, and relate to the recent Flexible Electronics cluster development activities of NorTech.

Very truly yours,

Michael R. Kennedy
President

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

Subject: 2010 OTFSP LOI

Dear OTFSP 2010,

Hereby we express our intent to submit a proposal to the OHIO Third Frontier Sensors Program.

The prospective Lead Applicant is Kent State University, Kent, OH, 44242

The contact person is Antal Jáklí, Liquid Crystal Institute, Kent State University, Kent, OH, 44242, Tel: 330 672 4886;

The proposed title of the proposal is: **Research, Development and Commercialization of giant flexoelectric effect of bent-core liquid crystals.**

Estimated Grant Funds: \$800,000

Known Collaborators:

1. James Gleeson, Department of Physics, Kent State University, Kent, OH 44242
2. Samuel Sprunt, Department of Physics, Kent State University, Kent, OH 44242
3. P. Westerman, Liquid Crystal Institute, Kent State University, Kent, OH, 44242
4. A Kent State University Spin off Company (CEO: John Harden Jr.), to be established by December 31. 2009

Summary of the proposed project

Flexoelectricity is a property of the liquid crystalline state of matter. As opposed to piezoelectricity, wherein an electric field in matter arises due to a bulk density modulation or “hard” distortion, flexoelectricity manifests itself as a coupling between “softer” orientational strain and electric polarization. The effect was first predicted and observed almost 40 years ago¹, but the flexoelectric coupling in traditional rod-shaped (or “calamitic”) LC’s is invariably too small to be used to develop an LC-based technology for mechanical-electric energy conversion. Recently we have performed the first study of the flexoelectric properties of an entirely new class of nematics, based on bent-core or “banana” shape compounds. Remarkably, we found the flexoelectric coefficient, which characterizes the strength of coupling of orientational strain to polarization, to be more *than 1000 times larger in this BCN material than in the best calamitic LCs*. This astonishing increase catapults BCNs into the realm of realistic promise for a new generation of rugged, broadband, cheap and highly processible mechanical sensor devices. This giant flexoelectric effect was found in both the pure bent-core fluid (BCN),² in BCNs swollen in conventional calamitic elastomer (BCN-LCE)³, and on Side Chain Bent-Core Liquid Crystal Elastomers (BCLCE).⁴

Depending on the type of application therefore all three kinds of BCN materials can be used as light weight soft sensors when either sandwiched between ultrathin conducting plastic plates, or in case of BCN-LCE and BCLCE, they can be just coated with conducting substrates. In these forms they can provide a wide range of applications, starting as sensors of the motion of biological cells and bacteria, sensing bend of nanomaterials, motion sensors for robotics, aeronautics applications and alarm systems or even vibration sensing of cars, or tires. In the proposed research we will synthesize and characterize a large number of new bent-core materials. We will tailor their temperature ranges, their elastic properties and sensing ranges. We will also develop electrically conducting flexible, peel able and stackable thin films that can be even used in applications other than sensors. The Spin off company then will commercialize the several products which are the most promising for instant applications.

¹ R. B. Meyer, *Phys. Rev. Lett.*, **22**, 918 (1969)

² J. Harden, B. Mbang, N. Éber, K. Fodor-Csorba, S. Sprunt, J.T. Gleeson, A. Jákli, "Giant flexoelectricity of bent-core nematic liquid crystals", *Physical Review Letters*, *97*, 157802 (2006)

³ M. Chambers, R. Verduzco, J. T. Gleeson, S. Sprunt and A. Jákli Flexoelectricity of a calamitic liquid crystal elastomer swollen with a bent-core liquid crystal", *J. Mater. Chem.* 2009, **DOI**: 10.1039/b911652d

⁴ Presentation in the 5th International Liquid Crystal Elastomer Conference, September 24-26, Kent, OH: http://www.e-lc.org/presentations/Documents/J_Harden_2009_10_02_11_26_51.pdf



M-7 Technologies • 1019 Ohio Works Drive • Youngstown, OH 44510 • 330-779-0700 • Fax: 330-797-0471 • M7Tek.com

November 3, 2009

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

Re: 2010 OTFSP Letter of Intent
For the: Integrated Sensor Networks as Enabling Tools for Cyber-Manufacturing

Submitted via: Email to: OTFSP2010@development.ohio.gov

To the Ohio Department of Development:

Please be advised that, on behalf of M*7 Technologies, I wish to submit this Letter of Intent (LOI) for the 2010 Ohio Third Frontier Sensors Program.

- Lead Applicant: M*7 Technologies
- Contact Person: Michael S. Garvey
President
Office: 330-779-0700
Cell: 330-509-9750
MGarvey@m7tek.com
- Address: 1019 Ohio Works Drive
Youngstown, Ohio 44510
- Project Title: **Integrated Sensor Networks as Enabling Tools for Cyber-Manufacturing**
- Grant Funds Requested: \$2.0 million
- Known Collaborators: Youngstown State University: www.yzu.edu
Ohio Supercomputer Center: www.osc.edu
Youngstown Business Incubator: www.ybi.org

Sincerely,

A handwritten signature in black ink, appearing to read 'Michael S. Garvey', is written over a horizontal line.

Michael S. Garvey, President

Engineered Solutions for Heavy Industry

M*7 Technologies: Integrated Sensor Networks as Enabling Tools for Cyber-Manufacturing

Page 1 of 2 Pages

M*7 Technologies

Integrated Sensor Networks as Enabling Tools for Cyber-Manufacturing

2010 Ohio Third Frontier Sensors Program - Project Summary

3D Sensor Networks based on automated systems for measuring an object's size, shape, and orientation in addition to materials characterization data and/or other meta-data (e.g., thermal cycling history) will be an integral component of any truly automated cyber-manufacturing system. The ability to quickly, inexpensively, precisely, and routinely measure detailed information about a part or assembly during its manufacture or after storage, use, or damage is particularly critical where skilled labor is in short supply to make experienced based/enhanced "judgment calls" in person. This now routinely occurs in dangerous (e.g., in deep mines, inside nuclear reactors, and in Kandahar), and/or remote (e.g., in isolated energy facilities and on board ships on their 3rd deployment in 5 years), and/or unpleasant (e.g., night shift or extreme climate) environments. It is compounded by skilled labor shortages that drive costs up and/or quite routinely prevent anyone being available that has the requisite skills. One approach that is being considered/implemented is to separate the skilled labor from the challenging environment. This is done by remotely operating some or all of the machine (and other) tools in an automated or semi-automated cyber-manufacturing system. For non-trivial manufacturing tasks, this requires not only tools to control and monitor the remote machine tools (in addition to the materials handling system) but also a much higher level of in-process measurement tools (e.g., metrology and surface composition, roughness, & hardness) to both guide the iterative manufacturing process and also to ensure that the final product meets customer specifications.

The Commercial Implementation of Remote Manufacturing is entirely reliant upon the seamless integration of advanced sensor networks fully into the digital manufacturing process (engineering design, machine tool control, inspection, etc.) since reproducible quality is otherwise unobtainable. In this project, we will work closely with developers/vendors of both such software, sensors, networks, and machine tools to fully integrate and validate specific systems aimed at already identified and characterized commercial markets where cyber-manufacturing has large cost and/or security advantages. This will be done using an Ohio based workforce and a network of Ohio centered manufacturing and systems integration companies.

Engineered Solutions for Heavy Industry

M*7 Technologies: Integrated Sensor Networks as Enabling Tools for Cyber-Manufacturing

Page 2 of 2 Pages



M-7 Technologies • 1019 Ohio Works Drive • Youngstown, OH 44510 • 330-779-0700 • Fax: 330-797-0471 • M7Tek.com

November 3, 2009

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

Re: 2010 OTFSP Letter of Intent
For the: The Integration of 3D Imaging Sensor Networks & Product Lifecycle Management Systems

Submitted via: Email to: OTFSP2010@development.ohio.gov

To the Ohio Department of Development:

Please be advised that, on behalf of M*7 Technologies, I wish to submit this Letter of Intent (LOI) for the 2010 Ohio Third Frontier Sensors Program.

- Lead Applicant: M*7 Technologies
- Contact Person: Michael S. Garvey
President
Office: 330-779-0700
Cell: 330-509-9750
MGarvey@m7tek.com
- Address: 1019 Ohio Works Drive
Youngstown, Ohio 44510
- Project Title: **The Integration of 3D Imaging Sensor Networks & Product Lifecycle Management Systems**
- Grant Funds Requested: \$2.0 million
- Known Collaborators: Youngstown State University: www.yzu.edu
Ohio Supercomputer Center: www.osc.edu
Youngstown Business Incubator: www.ybi.org

Sincerely,

A handwritten signature in black ink, appearing to read 'Michael S. Garvey', is written over a horizontal line.

Michael S. Garvey, President

Engineered Solutions for Heavy Industry

M*7 Technologies: The Integration of 3D Imaging Sensor Networks & Product Lifecycle Management Systems

M*7 Technologies

The Integration of 3D Imaging Sensor Networks & Product Lifecycle Management Systems

2010 Ohio Third Frontier Sensors Program - Project Summary

Metrology is the science of measurement: deriving information such as size, shape, and the normal geometry of parts and assemblies. Advanced Digital Metrology and 3D Imaging Sensor Systems enable the measurement of shapes many orders of magnitude faster than mechanical methods especially when complete information on the size, shape, and surface variation of complex objects is required (e.g., for complete industrial manufacturing facilities or the complex shapes of stealth aircraft & wind-power turbine blades). These accurate "as-built" representations can be fully integrated into the digital manufacturing process for advanced materials, processes, and assembled systems.

Advanced Metrology and 3D Imaging Sensor Systems are emerging technologies for 21st century companies and will be key foundation stones for the next economic growth cycle. They add synergistic value to manufacturing controls & automation, to the operation & support of the resulting high-technology products, and to the skills of our current workforce; thus building upon regional strengths. 3D Imaging combines information technology and advanced (often laser based) measurement sensor systems and has proven its value in niche high-technology/aerospace/defense applications. Indeed, it is at the threshold of wide scale implementation; however, it is currently below the radar screens of many other markets, especially those populated by small to medium-sized companies who are the primary identified market segment for this project's commercial products.

Product Lifecycle Management, PLM, has become an increasingly widespread business process that has been shown to dramatically reduce the cost of ownership of both individual manufactured items and complex systems of systems. Amongst other factors, it involves the cradle to grave documentation of each physical manufactured/system component - a process that has moved from one based primarily on paper records to one that is largely digital. Engineered product conception, design, and testing now routinely moves through manufacturing to the customer as an itemized digital file(s) that can be annotated to reflect process, utilization, maintenance, and other "as used" information. Large cost and time savings and quality improvements are expected if 3D imaging sensor data can be fully and automatically integrated into this process. Indeed, even the current labor intensive manual tools have demonstrated their value in the aerospace and related high-technology industries. However, cost considerations along with other market forces have prevented a wider scale integration of 3D imaging sensor technologies with digital PLM, especially for small to medium-sized enterprises.

This Project will focus on dramatically improving the commercial utility of 3D sensor system integration into engineering and PLM processes for this much larger market. This will be done by automating the collection, analysis, processing, and storage of the data from 3D imaging sensor networks, including the automated integration of this "as built/as used" 3D metrological information with digital engineering design & manufacturing software; PLM systems; and related data management tools & systems.

Engineered Solutions for Heavy Industry

M*7 Technologies: The Integration of 3D Imaging Sensor Networks & Product Lifecycle Management Systems

Page 2 of 2 Pages



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November 3, 2009

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

Re: 2010 OTFSP Letter of Intent
For the: 3D Sensor Networks for Advanced Surface & Volumetric Materials Characterization in Precision Manufacturing

Submitted via: Email to: OTFSP2010@development.ohio.gov

To the Ohio Department of Development:

Please be advised that, on behalf of M*7 Technologies, I wish to submit this Letter of Intent (LOI) for the 2010 Ohio Third Frontier Sensors Program.

- Lead Applicant: M*7 Technologies
- Contact Person: Michael S. Garvey
President
Office: 330-779-0700
Cell: 330-509-9750
MGarvey@m7tek.com
- Address: 1019 Ohio Works Drive
Youngstown, Ohio 44510
- Project Title: **3D Sensor Networks for Advanced Surface & Volumetric Materials Characterization in Precision Manufacturing**
- Grant Funds Requested: \$3.0 million
- Known Collaborators: Youngstown State University: www.yzu.edu
Ohio Supercomputer Center: www.osc.edu
Youngstown Business Incubator: www.ybi.org

Sincerely,

A handwritten signature in black ink that reads "Michael S. Garvey".

Michael S. Garvey, President

Engineered Solutions for Heavy Industry

M*7 Technologies: 3D Sensor Networks for Advanced Surface & Volumetric Materials Characterization in Precision Manufacturing

M*7 Technologies

3D Sensor Networks for Advanced Surface & Volumetric Materials Characterization in Precision Manufacturing

2010 Ohio Third Frontier Sensors Program - Project Summary

3D Imaging Sensors such as laser scanners can be used to rapidly and reliably provide very accurate information on the size, shape, and the normal geometry of parts and assemblies ranging of tiny computer components to large manufacturing facilities and aircraft carriers. Advances in the technologies for collecting and processing the surface geometries of these items are leading to a transformation of how metrology studies are carried out. This technology is cascading from high technology/large scale projects such as the measurement of wing shapes and automobile assembly plants to increasingly smaller scale applications – which might be referred to as the “blue collar” manufacturing of mass produced products by small to medium-scale companies with a legacy manufacturing background. The relative speed, precision, and low cost with which size, shape, and surface variation can be measured in real or near-real time is changing both the manufacturing process and the life cycle management of an increasing range of manufactured items/systems. While highly valuable, current generation tools typically fail to extend this surface geometry characterization of the “as built/as used” parts to other physical properties, at least in a seamless/high resolution way.

Materials Characterization Sensors such as X-ray fluorescence, diffraction, and absorption systems, spectroscopic imagers, and other chemical/materials characterization tools are becoming increasingly fast, sensitive, and easy to use. Their rapidly decreasing cost per measurement along with sensor miniaturization and automation means that it is now increasingly possible to imagine not only collecting comprehensive 3D geometric surface maps with point measurements of some properties but hybridizing these technologies such that one could routinely, quickly, automatically, and inexpensively collect 3D maps of materials identity and properties. In particular, we are working with instrument/software developers/vendors to fully integrate 3D laser metrology and engineering design tools with advanced materials characterization sensor systems to do so. The *surface* (or near sub-surface) characterization tools closest to commercial viability for such applications include systems for concurrent and/or closely consecutive multi-spectral imaging (e.g., UV-Visible, Raman, and IR imaging), X-ray fluorescence and/or diffraction, and others (e.g., surface roughness & hardness) – these would be collected and assembled as 3D map(s) of the object’s surface in terms of not *just* its geometry but *also* its elemental, phase, and chemical composition, mechanical properties, etc. The *volumetric* characterization tools closest to commercial viability include X-ray tomography and phased array ultrasonic sensor systems. These could be overlain upon one another and/or upon the engineering design and “as built/as used” condition - at resolutions below a micron for many methods.

3D Materials Characterization Sensor Networks would allow the simultaneous or near simultaneous measurement of both geometry and materials identity and properties – data that would be integrated with other 3D imaging and product life cycle management tools via high speed, user friendly, and automated software tools that will be developed in collaboration with both engineering and PLM software and sensor/sensor system companies.

Engineered Solutions for Heavy Industry

M*7 Technologies: 3D Sensor Networks for Advanced Surface & Volumetric Materials Characterization in Precision Manufacturing



444 East 2nd Street

Dayton, Ohio 45402

Voice : 937-285-4820 Direct Voice : 937-768-2084 Fax : 937-285-4835

November 4, 2009

Ohio Department of Development, Technology and Innovation Division

Attention: Ohio Third Frontier Sensor Program

77 South High Street, 25th Floor

Columbus, Ohio 43215

Dear Sirs:

International Health Monitoring Systems Inc. (IHMSI) is pleased to submit this Letter of Intent to submit a proposal in response to the Ohio Third Frontier Sensors Program Fiscal Year 2010 Request for Proposals.

Lead Applicant: International Health Monitoring Systems Inc.

444 East 2nd Street

Dayton, Ohio 45402

Administrative Contact: William K. McCroskey

President IHMSI

Direct Voice: 937-768-2084 Voice: 937-285-4820

William.mccroskey@ihmsi.com

Technical Contacts: William K. McCroskey - President

Direct Voice: 937-768-2084 Voice: 937-285-4820

William.mccroskey@ihmsi.com

Project Title: "Commercialization of Structural Health Monitoring Systems, LIDAR Wind and Turbine Monitoring, and Smart Learning Controls for Wind Turbine Efficiency Improvement: A Value Proposition Demonstration."

Estimated Grant Funds to be Requested: \$600,000.00



Known Collaborators:

1. **Molded Fiber Glass Companies**, 2925 MFG Place, P.O. Box 675, Ashtabula, Ohio 44005-0675 Carl LaFrance – Wind Energy Champion
2. **Institute for Development and Commercialization of Advanced Sensor Technology (IDCAST)** 444 East Second St., Dayton, Ohio 45402 Larrell Walters - Director
3. **Ladar & Optical Communications Institute (LOCI)**, 300 College Park, Dayton, Ohio 45460 Joseph Haus - Director
4. **University of Dayton Research Institute (UDRI)** 300 College Park Dayton, Ohio 45469
Division Multi-Scale Composites & Polymers – Brian Rice – Division Head
Structural Integrity Division – Michael Bouchard - Division Head
Wind Turbine Reliability - Jared Stonecash
5. **E3-Design** 6000 W. Jackson Rd. Enon, Ohio 45323– Wind Turbine Controls and Composite Design - Eric Lang - President
6. **Edison Materials Technology Center (EMTEC)** 3155 Research Boulevard, Dayton, Ohio 45420 – Gary Walzer – Alternative Energy Technology
7. **Fraunhofer Institute USA – Plymouth, Michigan 48170** IZFP Sensors – Norbert Meyendorf
8. **Invenergy LLC** – Owner of 18 Wind Generation Farms Chicago, Illinois - Arron Nadum – Harding Co. Ohio Field. Director.
9. **Green Energy Ohio** – City Club Building, Suite 1027 , 850 Euclid, Cleveland, Ohio 44114 - Kemp Jaycox – Wind Program Manager.
10. **Dayton Development Coalition Entrepreneurial Signature Program** - 900 Kettering Tower, Dayton, Ohio 45423 – Christina Howard -VP Entrepreneurial Development
11. Others To Be Determined

Project Description Summary:

IHMSI is proposing to demonstrate real-time smart Structural Health Monitoring (SHM) systems, LIDAR Wind and Rotor Blade Monitoring Systems and Intelligent Adaptive Learning Controls for improved efficiency and greater revenues for Wind Energy Operators and the supply chain to the wind energy industry.

IHMSI is requesting 3rd frontier funds to assist in demonstration of the value proposition for IHMSI novel Structural Health Monitoring sensor systems and LIDAR Wind and Blade Monitoring sensor systems to increase efficiencies of new wind turbine designs and retrofits to existing wind turbines.



Problem:

- Wind Turbine systems are large flexible structures subjected to aerodynamic excitations of large magnitudes.
- Wind Velocity and Turbulences vary rapidly over time and are a function wind turbine height.
- Wind Turbine Uptime and optimization of structure and controls to fluctuating wind conditions is needed for improved power output.
- Continuous Structural Health Monitoring is needed for maximal uptime and minimal maintenance scheduled down time.
- Wind Velocity, Turbulence, and Rotor blade dynamic position monitoring is needed to increased optimized wind gathering and wind power generation efficiency.

Solution:

- Intelligent Structural Health Monitoring (SHM)
- LIDAR Wind Velocity, Turbulence Monitoring for input wind states and rotor blade dynamic positions
- Adaptive Learning controls using SHM systems, LIDAR systems, and Wind turbine control models for optimized wind harvesting with improved efficiency.

IHMSI's Commercialization of Structural Health Monitoring Sensor Systems, LIDAR Wind and Turbine Monitoring Sensor Systems, and Smart Learning Controls for Wind Turbine Efficiency Improvement require demonstration of the Value Proposition both in IHMSI's Wind Laboratory and on current operational wind turbine systems.

IHMSI and it's respective collaborators have the wind supply chain in mind to commercialize systems with current wind turbine operational system via a value added retrofit business and new wind turbine designs optimized to utilized IHMSI's proprietary sensor systems, real-time volume multimodal data acquisition processors, and adaptive real-time controls.

Regards,

Bill

William K. McCroskey
President
International Health Monitoring Systems, Inc.
444 East 2nd Street
Dayton, Ohio 45402
www.ihmsi.com

2010 OTFSP LOI

Lead Applicant

Name: EYZtek, Inc.

Address:

3915 Germany Lane, Ste 3

Dayton, OH 45431

Tel: 937-427-2892

Fax: 937-427-3252

Contact: Alan Zhang, PhD, azhang@eyztek.com

Proposed project title:

SRWD and GPR Fusion for In Situ Pavement Performance Evaluation with 70 MPH

Estimated funds requested: \$1.5M (\$1M from OTFC and \$0.5M from WFC)

Collaborator

Name: Wright State University

Address:

3640 Colonel Glenn Hwy

Dayton, OH 54531

Tel: 937-775-5037

Fax: 937-775-5133

Contact: Kefu Xue, PhD (Chair of Electrical Engineering Dept), kefu.xue@wright.edu

SRWD and GPR Fusion for In Situ Pavement Performance Evaluation with 70 MPH

Lead Applicant: EYZtek, Inc., Collaborator: Wright State Univ.

Abstract

In the United States, there are 4,000,000 miles of highways, 600,000 bridges, and 15,000 airports. Crumbling pavements, aging bridges, and deteriorating transit is one of the most critical issues faced by the nation. Repair, rehabilitation, and replacement of deteriorating transportation infrastructure require a significant amount of taxpayer money. Further, congestion due to inadequate capacity of the transportation network, and detours and lane/road closures during pavement performance assessment and repair causes enormous hardships to the public and economic losses. According to the data available at the Federal Highway Administration, more than 50 percent of urban roads were in poor or mediocre condition. The American Society of Civil Engineering 2009 infrastructure report indicates, "Americans spend 4.2 billion hours a year in congested traffic at a cost to the economy of \$78.2 billion. Poor conditions cost motorists \$67 billion a year in repairs and operating costs." The *Critical National Need* is the development of a device that utilizes *Advanced Sensing Technologies and Procedures* to detect defects underneath pavement and measure pavement performance for an entire road network without traffic interruption. The current state-of-the-art technology such as falling weight deflectometer (FWD) needs 15 minutes to measure a discrete point and the road/bridge must be closed. Although the 53-ft heavy rolling wheel deflectometer (HRWD) can measure the highway deflection continuously, it is not suitable for numerous small or urban roads. It cannot measure the most important deflection basin and pavement thickness. In addition, the HRWD uses the FWD software improperly and the historic pavement thickness data from the old document at the time of the road construction to predict the current pavement property. A new method that can detect and see the defects underneath the pavement and can give the pavement hardness and stiffness in situ with highway speed is urgently needed. Under the SBIR Phase-II contract from the Air Force, EYZtek has developed this technology using a short RWD (can be towed by a light truck) integrated with a ground penetration Radar (GPR). The SRWD uses laser rangefinders to quantitatively measure the pavement deflection and basin and the GPR to measure the pavement thickness and see the defects underneath. The fusion of data from SRWD and GPR plus GPS and speedometer can give 3-D road profile in real time with accurate road registration. Many tests on highway, runway and bridge with speed up to 70 mph have been successfully conducted. However further improvement in mechanics, electronics, software and civil engineering are still needed before going to full production. Therefore EYZtek will team up with Wright State University (WSU) to conduct the product improvement. Expert knowledge and technical capability in Electrical Engineering, Computer Science, and Mechanic Engineering at WSU will give great contribution to the improvement of the current prototype. WSU also has facilities and instruments for precise calibration. Based on EYZtek's successful prototype and assistance from WSU, we believe within one year, the team can build a smaller, lighter, and better model for full production. EYZtek has enough funding, space and manpower to establish the production line. ODOT and MDOT have already sent letters of intent hoping to test the prototype on their standard roads; if the test is successful they will pay the survey on many highways, runways, bridges and roads. Usually the cost of survey is \$50K per km lane. It is very profitable and we expect that all 50 states and the international market will need this system. Large revenue and many high-pay jobs can be created in Ohio by this project.



NexTech Materials, Ltd
404 Enterprise Drive
Lewis Center, OH 43035

+1-614-842-6606
FAX +1-614-842-6607
www.nextechmaterials.com
www.fuelcellmaterials.com

November 4, 2009

Ohio Department of Development, Technology Division
77 S. High St., 25th Floor
Columbus, OH 43216-1001

Subject: Letter of Intent for Ohio Third Frontier Sensors Program

To Whom It May Concern:

This letter provides notice of intent for NexTech Materials, Ltd. to submit a proposal to the Ohio Third Frontier Sensors Program RFP, which was released on October 7, 2009.

Applicant: NexTech Materials, Ltd.

Address: 404 Enterprise Drive
Lewis Center, OH 43035

Phone: (614) 842-6606

Contact Person: Scott L. Swartz, Ph.D.
Chief Technology Officer
s.swartz@nextechmaterials.com

Project Title: *Hydrogen Sensor Manufacturing Technology*

Known Collaborators: to be determined

Estimated Dollars: This project is estimated to be a \$2,000,000 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 development of manufacturing technology for low-cost hydrogen sensors for existing commercial applications, fabrication of fully packaged prototype sensors, field testing of these sensors at customer sites, and establishment of quality control and reliability testing protocols. The technology to be implemented in the project is based on NexTech's patent-pending hydrogen sensor materials and device platforms.



VIA ELECTRONIC MAIL
November 4, 2009

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

Dear Sirs/Madams:

This letter (LOI) expresses the intent of UDRI, Humintell and Photon-X (Team) to submit a plan to the Ohio Third Frontier Sensors Program (OTFSP) to commercialize a new category-defining device called a kinesic recorder. Generally speaking, a kinesic recorder operates in a conversational setting to detect and classify psycho/physiological events in one or more participants based on "body language." The recorder further allows such events to be subsequently replayed and analyzed. Conversational settings include doctor-patient interviews, checkpoint interactions and FBI interrogations, among many other possibilities. The term "kinesics" refers to the study of facial expressions and body movements as means of communication.

Our kinesic recorders will gather, from unobtrusive 3D video images of a person's face, extraordinarily useful information including:

- Emotional states (Joy, sadness, anger, disgust, surprise, contempt, fear ...)
- Cognitive states (Concentration, fatigue, frustration, speech ...)
- Deceptive states (Subtle emotions, micro-expressions ...)
- Emblematic states (Rolling eyes, lifting eyebrows, ...)
- Physiological states (Dilated pupils, open pores, darting eyes, sweating ...), and
- Identity (Static and behavioral biometrics ...)

Target markets for our kinesic recorders will be the intelligence, defense and law enforcement communities. Our recorders will be comprised of three major components: analytic software, a 3D video camera and a camera controller. Our analytic software will be enabled by Humintell intellectual property. Dr. David Matsumoto, Humintell's founder and CEO, is a world renowned expert in recognizing human emotion based on facial expressions. Our analytic software will be designed and built by UDRI, making use of UDRI's proven expertise in human signature and computer science. Our 3D camera will be based on Photon-X Spatial Phase Imaging (SPI) technology. SPI cameras resemble conventional (2D) cameras in footprint and operation, but capture images *through a single aperture in three dimensions*. Because SPI cameras actually sense the world *much more clearly and unambiguously* than conventional cameras, they represent the first technology on which robust kinesic recorders can be built. SPI cameras have incidentally been substantially developed in Ohio by Photon-X people beginning with work that I did at the University of Dayton back in the mid 80's.

Please refer to Attachment A for information about our proposal and team.

Best Regards,

A handwritten signature in black ink, appearing to read "Blair A. Barbour".

Blair A. Barbour
President & CEO



Attachment A

Information about Our Proposal & Team

Lead Applicant Photon-X, Inc.
444 East Second Street
Dayton, OH 45402
(937) 285-4816
POC: Blair Barbour, blair@photon-x.com

Project Title Kinesic Recorder

Estimated Funds \$1,000,000 OTFSP

Collaborator Signature Sciences Exploration (SSE) Laboratory
University of Dayton Research Institute (UDRI)
300 College Park
Dayton, OH 45469-0101
POC: Nicole Arbuckle

Collaborator Humintell
11165 San Pablo Avenue
El Cerrito, CA 94530
POC: Dr. David Matsumoto

OTFSP 10-752

2010 CLUSTER DEVELOPMENT LETTER OF INTENT (LOI) SENSORS PROGRAM

Lead Applicant's Name: UES, Inc.

Address: 4401 Dayton-Xenia Road
Dayton, OH 45432-1894

Telephone Number: 937-426-6900

Contact Person: Dee Dee Donley
ddonley@ues.com
937-426-6900, ext. 129

Proposed Project Title: Real-time *E. coli* detector using **C**ontaminant Sensor **N**ETwork
(COSNET)

Estimated Grant Funds Requested: \$1M

Known Collaborators: EDaptive Computing, Inc.
Ohio State University

One Page Summary of Project: See next page

According to the Center for Disease Control, *E. coli* is responsible for sickening 73,000 people every year. 50% of *E. coli* out breaks from 1990 – 2006 were in beef, and 29 million pounds of ground beef were recalled as a result of O157:H7 *E. coli* contamination in 2007. The goal of this initiative is to develop an effective, real-time detector that can prevent food contamination from *E. coli* in meat packaging and distribution centers. This would allow the government and industry to protect domestic food sources from intended and unintended contamination. Our design is unique. It is, to the best of our knowledge, the first real-time biological detection system that can also identify location of the contamination, eliminate false positives and recommend both decontamination and recall strategies. The sensor consists of two components: 1) a real-time generic biological sensor platform that can detect very low levels of infectious *E. coli* toxins and can be adapted to detect any biological agents (including *Listeria* and *Salmonella*), and 2) a computer network system that uses algorithms to assess the contamination. Both of these components are under development using internal funds. Third Frontier funding will be used to integrate the two components and to develop a test bed for the *E. coli* sensor at Ohio State University Meat Processing Facility.

There are 74 meat packing plants in Ohio. We believe that this technology will not only protect public health, but also the meat industry from lawsuits and potential financial ruin. We are already working with the Ohio Department of Agriculture and consultants in the meat packing plant to ensure that the design is adequate for industrial needs. Once the technology is integrated and tested, UES and EDaptive will utilize their financial resources to begin manufacturing both the sensors and the command control units. A joint venture will be created to install and monitor these systems for our customers. The State of Ohio will be the recipient of the projected 100-150 jobs and taxes on revenues associated with this venture.

November 3, 2009

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

Subject: Letter of Intent (LOI) – “Ohio Third Frontier Sensors Program”

To Whom It May Concern:

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

Prospective Lead Applicant: Lake Shore Cryotronics Inc.
575 McCorkle Blvd
Westerville OH 43082
614.891.2243

Contact Person: Philip Swinehart, VP R&D, pswinehart@lakeshore.com

Collaborators: Lake Shore is working with an integrated team composed of collaborators at The Ohio State University.

Proposed Project Title: Advanced Optical Sensors and Instruments for Alternative Energy, Aerospace and other Industrial Applications

Estimated funds: A \$2 million program, including \$1 million in State of Ohio funds.

Summary:

Lake Shore, along with its collaborator, is working on advanced optical sensors and instruments that have the potential to provide unprecedented cost-to-benefit ratios for customers in the automotive, aircraft, liquid natural gas, hydrogen, petrochemical and other industries. These optical sensors and instruments can be designed to provide measurement and control of multiple physical parameters, especially when explosion immunity, electrical interference immunity, high voltage compatibility, corrosion resistance, remote measurements and light weight are advantageous. In high volumes, the reading instruments will be competitive with common electronic sensor read-outs in price. Lake Shore and its collaborator will utilize the Third Frontier funds to provide immediate employment for R&D and design engineers and technicians and accelerate technology development to provide initial prototypes and first generation commercially available designs within two years.

Sincerely,



Philip R. Swinehart
Vice President, Research and Development

November 4, 2009

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

**RE: Ohio Third Frontier Sensors Program
Fiscal Year 2010 Request for Proposals**

To Whom It May Concern:

Our firm, i23D, LLC is pleased to provide you with this letter of intent to submit a proposal for the Ohio Third Frontier Sensors Program for Fiscal Year 2010. As the lead applicant for this effort, i23D will work with three collaborators to promote technology-based economic development in Ohio by commercializing proprietary software that transforms 2D videos into real-time, 3D models. Details of our proposed project are as follows:

- Our collaborators are Woolpert, Inc., the University of Dayton Research Institute, and Tidex Systems Ltd.
- We are seeking \$1 million in Ohio Third Frontier funds.
- Our proposed project title is The Development of Low-Cost 3D Models That Will Lead to Sustainable Advantage in Geospatial Markets.

The potential applications for transforming 2D videos to real-time 3D models are unlimited. A few of those applications are summarized below.

- For the military and defense industry, the software could be employed for battlefield targeting and machine vision required for navigation of unmanned aerial and ground vehicles.
- Homeland security and drug enforcement agents could use the technology for video alarms. Three-dimensional models generated from real-time video feeds could detect changes in movement that trigger system alerts.
- In the architectural, engineering and construction industries, the software could be used to more efficiently generate 3D Building Information Models (BIM) useful for conserving energy and maintaining structures throughout their life cycles.
- In the event of a terrorist attack or natural disaster, 3D models could help emergency responders locate victims more quickly while keeping police, firefighters and paramedics out of harm's way.
- In the geospatial and aerial mapping industry, the technology could provide a cost-effective method to acquire 3D datasets by reducing the costs of data acquisition and post-processing.



Taking video to
the next dimension.

i23D

711 E. Monument Avenue

Dayton, OH 45402

www.i23d.com

November 4, 2009

Page 2

- In the entertainment industry, this software could provide movie producers a way to dramatically lower costs by creating 3D models for animated films by computer instead of building 3D sets by hand.

These industries could generate billions of dollars in contract opportunities for i23D and its collaborators, creating a new industry in the State of Ohio.

The purpose of our Ohio Third Frontier proposal is to create jobs and generate revenue for Ohio by dramatically expanding the application of the proprietary visualization software. i23D and our collaborators propose to use Third Frontier funds to work with previously-identified end-users of the software to create custom applications. This will involve rewriting portions of the existing software and revising algorithms to provide these end-users with 3D modeling software that meets their specific technical, cost, and performance standards.

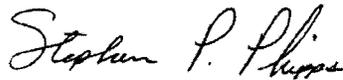
Additionally, we will use Ohio Third Frontier funds to identify other potential markets and interested end-users who can provide resources for the next level of commercialization. i23D and our collaborators will endeavor to identify the most interested end-users who can provide the best return on investment 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 2010 Request for Proposals. Our lead applicant contact information for this effort is as follows:

i23D, LLC
711 East Monument Avenue
Dayton, Ohio 45402
Phone: 937.609.4969
Contact Person: Stephen Phipps
steve@i23D.com

We look forward to submitting our proposal for the commercialization of software to transform 2D videos to 3D models.

Sincerely,



Stephen P. Phipps
President

November 4, 2009

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



4454 Idea Center Blvd.

Dayton, Ohio 45430-1500

937.461.5660

Fax: 937.461.0743

www.woolpert.com

**RE: Ohio Third Frontier Sensors Program
Fiscal Year 2010 Request for Proposals**

To Whom It May Concern:

Woolpert is pleased to provide you with this letter of intent to submit a proposal for the Ohio Third Frontier Sensors Program for Fiscal Year 2010. Woolpert, a remote sensing and engineering firm, is an industry leader in geospatial services and three-dimensional (3D) technologies.

As the lead applicant for this effort, Woolpert will work with two collaborators to promote technology-based economic development in Ohio by commercializing proprietary software that transforms 2D videos into real-time, 3D models. Details of our proposed project are as follows:

- Our collaborators are the University of Dayton Research Institute and Tidex Systems Ltd.
- We are seeking \$1 million in Ohio Third Frontier funds.
- Our proposed project title is The Development of Low-Cost 3D Models That Will Lead to Sustainable Advantage in Geospatial Markets.

The potential applications for transforming 2D videos to real-time 3D models are unlimited. A few of those applications are summarized below.

- For the military and defense industry, the software could be employed for battlefield targeting and machine vision required for navigation of unmanned aerial and ground vehicles.
- Homeland security and drug enforcement agents could use the technology for video alarms. Three-dimensional models generated from real-time video feeds could detect changes in movement that trigger system alerts.
- In the architectural, engineering and construction industries, the software could be used to more efficiently generate 3D Building Information Models (BIM) useful for conserving energy and maintaining structures throughout their life cycles.
- In the event of a terrorist attack or natural disaster, 3D models could help emergency responders locate victims more quickly while keeping police, firefighters and paramedics out of harm's way.

November 4, 2009

Page 2

- In the geospatial and aerial mapping industry, the technology could provide a cost-effective method to acquire 3D datasets by reducing the costs of data acquisition and post-processing.

These industries could generate billions of dollars in contract opportunities for Woolpert and its collaborators, creating a new industry in the State of Ohio.

The purpose of our Ohio Third Frontier proposal is to create jobs and generate revenue for Ohio by dramatically expanding the application of the proprietary visualization software. Woolpert and our collaborators propose to use Third Frontier funds to work with previously-identified end-users of the software to create custom applications. This will involve rewriting portions of the existing software and revising algorithms to provide these end-users with 3D modeling software that meets their specific technical, cost, and performance standards.

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

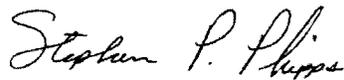
Again, we appreciate the opportunity to submit this letter of intent for the Ohio Third Frontier Sensors Program Fiscal Year 2010 Request for Proposals. Our lead applicant contact information for this effort is as follows:

Woolpert, Inc.
4454 Idea Center Boulevard,
Dayton, Ohio 45430-1500.
Phone: 937.461.5660
Contact Person: Stephen Phipps
steve.phipps@woolpert.com

We look forward to submitting our Ohio Third Frontier Sensors Program proposal.

Sincerely,

Woolpert, Inc.



Stephen P. Phipps
Senior Vice President



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

Reference: Ohio Third Frontier Sensors Program FY 2010 Request for Proposals, Letter of Intent

Dear Administrator,

Per the requirements of section 1.3.3 of the referenced solicitation, this letter will serve as our letter of intent.

Lead Applicant:	Essential Research, Inc.
Address:	6410 Eastland Road, Ste. D Cleveland, OH 44142
Phone Number:	440-816-9850
Contact Person:	C. William King
Email Address:	king@essential-research.com
Project Title:	A Triple Function Sensor for Hydronic Heating Control
Estimated Grant Funds:	\$1,000,000
Collaborators:	

R. W. Beckett Corporation
38251 Center Ridge Road
North Ridgeville, OH 44039
Attn: John Butkowski

The University of Akron
302 East Buchtel Avenue
Akron, OH 44325
Attn: Thomas Hartley

Lorain County Community College
1005 North Abbe Road
Room AT116A
Elyria, OH 44035
Attn: Kelly Zelesnik

A one page summary is attached. If you should have any questions please do not hesitate to contact the undersigned.

Sincerely,

C. William King

C. William King
President

A Triple Function Sensor for Hydronic Heating Control

Essential Research, Inc. (ERI) is requesting a grant to develop, transition to manufacturing, and market a micro-sensor with five active elements comprising three distinct measurement functions: temperature, pressure and the presence of water. This sensor will be utilized primarily to control hydronic heating systems.

ERI is a designer and manufacturer of a full line of commercial products to original equipment manufacturers, including infrared light emitting diodes (LEDs), photodetectors, micro-electrical-mechanical-system (MEMS) devices and micro-electrode sensor elements. The company was established in 1996 and is based in Cleveland, Ohio.

ERI has identified "multiple sensor elements on one micro-sized substrate" as a growth market. We have previously utilized this concept to produce over 15 different micro-sensor variations, accounting for more than \$1.5 million in sales to date over the last 18 months. This sensor fits well within our overall growth strategy. The technical feasibility behind this sensor has been demonstrated in prototypes. Further development of the sensor to meet customer specifications, while achieving quality, cost, and production scale-up targets, will be the main goals of this grant.

Essential Research has identified a local Ohio customer for this micro-sensor, who will also be a collaborator. This customer is R.W. Beckett Corporation (RWB), based in North Ridgeville, Ohio, who is in turn is a supplier to major residential and commercial heating, ventilating, and air conditioning (HVAC) manufacturers. RWB and its two subsidiaries produce oil burners, and gas burners for water heaters, boilers, fireplaces, gas dryers and warm air furnaces, and blower wheels that generate combustion air in gas-fired appliances.

RWB has identified HVAC electronic controls as a diversification and growth strategy for the company. Accordingly, it is now focused on creating a new line of HVAC controls that will utilize state-of-the-art load matching microsensor and microprocessor technologies.

In addition, two academic institutions will collaborate on the project: The University of Akron will develop system models, control algorithms, and sensor communication interfaces used in the controls and Lorain County Community College will provide rapid prototyping support to assist in product design.

The market driver for RWB's customers is the significant potential energy savings for end consumers. These smart controls will monitor both indoor and outdoor conditions and optimize boiler or furnace operation to save between 15-20% of the fuel cost.

The successful completion of the project will generate more than \$60 million in new product sales between ERI and RWB through 2016. In addition, it will generate 59 high-tech for-profit jobs for technicians, engineers, and product managers as well as in manufacturing and sales.

Also important, success will establish Ohio as a center of excellence for advanced HVAC controls in the United States. All collaborators will be pursuing an active patent strategy to protect this lead.

ERI is requesting approximately \$1 million for this project and will meet the cost matching goals required in the solicitation

=====BOARDMAN MOLDED PRODUCTS INC.=====

November 2, 2009

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

To Whom It May Concern:

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

Lead Applicant: Boardman Molded Products Inc.
1110 Thalia Ave., Youngstown, OH 44512

Administrative Contact: Ron Kessler, President
(330) 788-2400 x 102 rkessler@spacelinks1.com

Technical Contact: Dave Neill, Engineer, Boardman Molded Products
(330) 788-2400 x 140 dneill@spacelinks1.com

Project Title: Sensor Project to develop inspection sensor for zero defect quality control for specialized products.

Estimated Grant Funds to be Requested: \$250,000

Collaborators: Boardman Molded Products Inc.
Youngstown State University, STEM College
Omegacap Solutions Inc.
Molernaro Tool and Die Inc.

Employment implications: Project will help retain 5-10 jobs; commercial application will add another 10-25 in the Youngstown area.

=====BOARDMAN MOLDED PRODUCTS INC.=====

Description:

Business overview: Boardman Molded Products Inc. has been a plastic injection molded parts supplier to OEM since 1957. The company was founded in the Mahoning valley in 1936. BMP has been producing bottle caps for household chemical, medical testing and other related industries since 1963. BMP now has an opportunity to secure and increase jobs for Ohio. This business unit can grow to produce 2 billion caps annually, resulting in the retention or creation of approximately 25 personnel, in the following areas; trained production staff, supervisors, engineering and skilled quality inspectors.

BMP Inc. will manufacture a patented, light weight designed tamper evident milk bottle cap. This innovative cap uses less raw material than standard milk caps, saving plastic. Its design will also keep milk fresher longer.

This bottle cap will be able to be sold to every major dairy in the US. The key to growing this business, thus adding more jobs, is related to ensuring the quality of the bottle cap.

Project Description:

1. Research will provide development for a technology driven sensor and material handling area.
 - a. The sensing apparatus must be able to measure a tamper evident seal .020" thick and 060" wide.
 - b. The apparatus will have to measure approximately 24,000 pieces an hour.
2. Precision engineered cooling conveyor to eliminate shrinkage and warpage.
3. A high speed inspection station to guarantee 0 defects and packaging station will have to be constructed.
4. A climate controlled FDA approved clean room will house all work cell components.

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

Best regards,

Ron Kessler, President
Boardman Molded Products Inc.