

CCAT NEWSLETTER

San Diego

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CCAT News

CCAT AND DEPARTMENT OF HOMELAND SECURITY FORGE NEW PARTNERSHIP

In the Spring of 2010, CCAT and DHS TechSolutions formalized a new partnership along with SPAWAR Systems Center Pacific to assist DHS in identifying new technologies that could address critical mission capability gaps for the nation's first responder agencies.



The TechSolutions Program was created by the Department of Homeland Security's Science and Technology Directorate to provide information, resources, and technology solutions that address capability gaps identified by emergency response focus groups throughout the nation including Federal, State, Local, and Tribal groups. The goal of TechSolutions is to field technologies that offer at least an 80% solution to the operational requirement within a 12 to 15 month time frame.

TechSolutions looked to CCAT to help them identify new technologies for these needs by sponsoring national solicitations and executing the traditional CCAT evaluation and selection process, which is designed to mitigate investment risks.



In September 2010, the first national solicitation sponsored by TechSolutions was released. Examples of topics included: vehicle disablement, safe patient transport, weapons detection, bomb threat response information, and robotic end cap removal for pipe bombs.

The outcome of the solicitation resulted in the award of funding and services to three companies to support development of full-scale prototypes for testing in operational environments.

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Innovation For A Safer Nation

CCAT News (cont'd)

Semi-Autonomous Pipe Bomb End-Cap Removal System: RE2 - Pittsburgh, PA

During the past several years, the Bureau of Alcohol, Tobacco, Firearms and Explosives has investigated over 25,000 bombings and accidental explosions and more than 21,000 incidents involving recovered explosives or explosive devices. Pipe bombs are an extremely common form of homemade bomb. These devices are simple to make and can create a lethal environment both from the blast and fragments from the casing.

The goal of the project is to develop a tool that reduces an emergency responder's exposure to pipe bombs during disposal operations while at the same time preserving and collecting critical physical and video evidence of the bomb and its contents for further forensic analysis and litigation. This tool should be a low cost system that can be effectively operated remotely using techniques known to minimize sparking and heat generation, and preserves evidence through video and sample collection. Two hardened prototypes will be integrated onto a robotic platform to allow the operator to engage the end cap removal gear through a combination of unscrewing and cutting.



The final stage of the project will include a demonstration in real-world operational environments sponsored and coordinated by DHS TechSolutions.

DHS Bomb Threat Response Information: Applied Research Associates - Albuquerque, NM



A gap currently exists in bomb threat stand-off information in that much of this information is provided through a "deck" of quick reference cards distributed by DOJ, DOD, and DHS. First responders must carry these cards and perform calculations themselves in order to determine the areas that would be affected by the bomb, thus increasing reaction time and decreasing evacuation time.

The goal of this project is to design a digitized automated system that can be integrated onto smartphones, PDAs and laptop devices typically carried by first responders. The application would allow responders to input information such as type of explosive threat, projected geographical area impacted, and overlay this information on a map – highlighting the threatened area. The system offers the following capabilities:

- Identify evacuation zones
- Identify potential damage/injury levels (damage and injury contours)
- Identify optimal road blocks to seal off areas
- Bomb injury forecasts

Upon project completion the system will be inserted into a real-world operational scenario with first responders to validate its utility for use by first responders. DHS will sponsor and coordinate testing.

CCAT News (cont'd)

Backboard Cover: Advanced EMS Designs - DeBarry, FL

When first responders arrive at the scene of an accident, they often find that the situation calls for the use of a backboard to transport the victim to a location where they can receive further treatment. While most backboards are composed of plastic or wood, responders often do not have enough time between calls to fully clean and sterilize the backboards. Even if they are decontaminated they are often stored in a contaminated compartment of an ambulance, thus re-contaminating the backboard before the next use. A recent study of 55 backboards showed that 100% contained some type of contamination. Roughly 94% were contaminated with a common disease causing bacterium while 4% were contaminated with an infection causing bacterium that is resistant to treatment.

The goal of this project is to develop a disposable, absorbent material to act as a barrier between the patient and backboard, as well as to contain any body fluids to the cover, reducing ambulance contamination. Key features include an absorbent pad, which will run down the center of the cover to prevent fluids from spilling off of the backboard and onto the ambulance floor. Additionally, disposable straps will be designed to secure the victim's chin and to hold the oxygen mask in place.

Upon completion of the project, the backboard cover will be tested by EMS personnel to determine its effectiveness in solving the contamination problem. DHS will sponsor and coordinate testing.



CCAT Solicitations

Solicitations Under the Sponsorship of the Office of the Assistant Secretary Defense (OASD)



CCAT is completing its third year supporting the Office of the Assistant Secretary Defense (OASD) for Homeland Defense and Americas' Security Affairs in executing its Domestic Preparedness Support (DPS) Initiative. Formerly known as the 1401 Program, the goal of the DPS Initiative is to identify technology solutions for critical 1st responder capability gaps from technologies that have been developed with previous defense funding.



CCAT conducted a national solicitation seeking out eligible technologies for product modification support and business development services in Oct-Nov 2010. Two technologies were competitively selected for funding and services to advance the development of their technologies for insertion into real-world scenarios for demonstration and testing purposes. The ultimate goal is to transition the technologies to the 1st responder community as quickly as possible.

CCAT Solicitations (cont'd)

AlphaTRAC - AlphaACT HAZMAT: Based in Westminster, Colorado, the company has developed a software training program for hazardous materials personnel. The tool (AlphaACT HAZMAT) is a web-based solution that teaches 1st responders how to deal with releases of hazardous chemicals through training scenarios based on the experiences of emergency response experts. While developed for training, the system can also be used during real-time emergency response.



The system uses observed characteristics of a release to identify similar scenarios from a knowledge base of information, which includes combinations of events, observable indicators, and recommendations on how to handle the event. Funding for the technology is being used to establish an emergency responder advisory group to provide feedback on maximizing the capabilities of the system and to make needed product modifications.

Primordial - Ground Guidance for First Responders:

Based in St. Paul, Minnesota, the company has developed a ground guidance off-road routing system to assist with mission planning and execution for search and rescue operations. There are several applications for which the system can be applied. **Downed Aircraft:** Ground guidance could assist in the planning of access routes and rescue routes for vehicles and personnel to reach a downed aircraft. **Search Parties:** Could assist in rescue in off-road terrain. It can estimate the amount of area covered from the last point of contact to better assess the area in which the target could travel over time. **Chemical or Biological Spills:** Ground guidance could use the cordon function and quickly cordon off impacted areas so 1st responders could route around contaminated areas. **Road Routing for Emergency Vehicles:** In certain situations it may be necessary to identify alternate routes for emergency vehicles given road conditions and traffic.



Solicitations Under the Sponsorship of the Office of Naval Research (ONR)

CCAT, under the sponsorship of the Office of Naval Research, conducted a national solicitation seeking new technologies to help reduce the energy consumption for DoD installations and advanced technologies to support Naval Expeditionary forces such as 360 degree vision systems and buried IED extraction tools for use with unmanned ground systems.



ENERGY CONSERVATION AND EFFICIENCY SYSTEMS FOR DoD OPERATING BASES

Mobile Fusion - Multi-Agent Expeditionary Power System: Mobile Fusion is based in Pittsburgh, PA and has developed an energy conservation system that can be deployed at Forward Operating Bases (FOBs). The system can address inefficient usage of generators, inefficient load-generating matching, and inefficient loads. The system will help to significantly reduce fuel consumption, improve energy efficiency of existing equipment, and reduce logistics costs by reducing excess generation and refueling costs as well as exponentially improving the capability of FOB energy operators to manage and optimize the power system. Upon completion of this project, the system will be tested at NSWC-Crane.

CCAT Solicitations (cont'd)

360 DEGREE VISION SYSTEMS FOR UNMANNED GROUND VEHICLES

Remote Reality - *360 Degree Vision System for Robots*: Based in Westborough, MA, this company specializes in vision systems for robots. The ability of a robot to easily navigate through its environment is key to the success of its larger mission. Real time 360 degree panoramic cameras can improve the effectiveness of IED extraction missions by greatly improving the situational awareness for the operator. Today's vision systems on robots, using traditional narrow angle video cameras show only a portion of the environment at any one time. Adapting 360 degree camera systems for use on robots will greatly improve the operator's situational awareness of the environment, and improve navigation and mission success.

EXTRACTION SYSTEMS FOR BURIED IMPROVISED EXPLOSIVE DEVICE (IED)

Flometrics - *Supersonic Pulse-jet IED Excavator*: Flometrics, based in Carlsbad, CA, has design a system to allow a robot to unearth buried improvised explosive devices (IEDs). This is done by remote excavation using pulsed supersonic air jet. Pulses of supersonic air are compressed at the surface, which penetrates and breaks up the soil so that the IED can be examined to determine its origin and collect evidence. The system will allow for faster and more efficient route clearing operations and can be mounted on a robotic system such as PacBots and Talons.

CCAT Clients

DAYLIGHT SOLUTIONS - A CCAT Success Story

From New Start Up in 2004 to Today's World Leader in Mid-IR Solutions for Molecular Detection and Imaging

Daylight Solutions was co-founded in 2004 by two San Diego engineers (Dr. Timothy Day and Paul Larson) with deep experience in photonics, telecommunications, and microelectronics. After surveying the market for technology development opportunities, the partners determined that there was a bright future for new investments in mid-infrared (mid-IR) technologies for molecular detection and imaging that could be applied across multiple industries. Using their own resources, Daylight Solutions developed its core technology and IP around external cavity quantum cascade lasers (ECQCL™) that now serve as "building blocks" that can be applied to a variety of products for molecular detection and imaging applications.

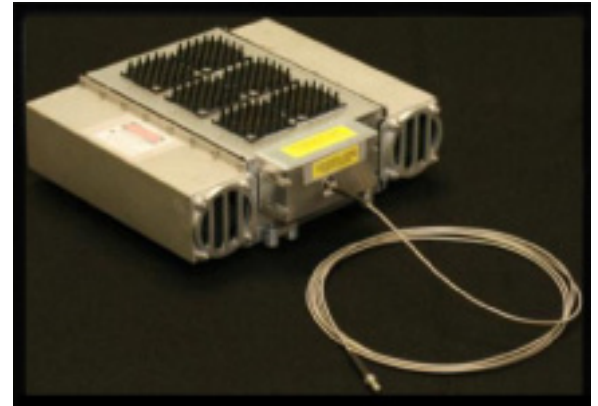
The young company responded to a CCAT national solicitation which was seeking new innovations that could address critical national defense needs. CCAT evaluated their proposal against numerous others and put them through a rigorous competitive selection process. The result was an award of funding to the company to further develop one of the key components that eventually led to the successful commercialization of their first quantum cascade laser system. In addition, they were awarded a market study conducted by the SDSU Entrepreneurial Management Center to help the company understand the competitive landscape and identify viable market sectors and entry points.

In the few short years since company formation, Daylight Solutions has developed and commercialized a number of products whose core technologies were developed in part through CCAT early support.

CCAT Clients (cont'd)

Products include:

- Compact portable sensors to detect chemical agent weapons; these miniaturized sensors capture the complete fingerprint of all surrounding molecules, which are then analyzed in real time to determine the presence of a threat
- High power lasers used in infrared countermeasures systems to defeat aircraft attacks by shoulder-fired missiles; i.e. man portable air defense systems (MANPADS)
- Breath diagnostics in medical applications
- Environmental and Industrial Monitoring
- Monitoring of anesthesia and blood glucose in operating rooms



In addition, the defense market views Daylight's high power lasers as the next generation technology. For example, Daylight's core technologies have been integrated into ruggedized laser systems for defense applications. These products form the backbone of the Defense Department's infrared countermeasure (IRCM) systems. Named "JamIR™", these products provide high power capability while offering order-of-magnitude improvements in lifetime, reliability, and cost.

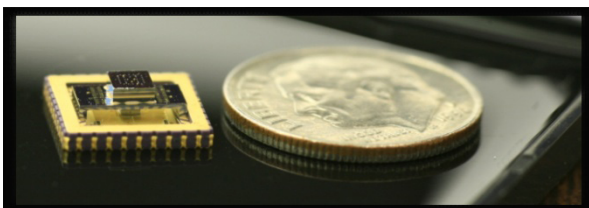
The company has grown 100% each year for the past 4 years in both revenue and employees. At the time of the CCAT investment, the company had 7 employees. Today, there are 75 employees with the company. Daylight Solutions is also the recipient of several awards including: 2009 National Prism Award for Innovation, 2006 PhAST/LFW Innovation Award, among others.

LUMEDYNE TECHNOLOGIES - A CCAT Success Story From Oil Prospecting to Space Exploration

The U.S. Navy began the development of a new generation of MEMS accelerometers in 2001 at its flagship laboratory – SPAWAR Systems Center Pacific headquartered in San Diego. Accelerometers are devices that measure acceleration of a device or system, also known as "g-force." They can be used to measure vibration on cars, machines, buildings, process control systems, and safety installations. They can also be used to measure seismic activity and used in guidance systems for satellites, airplanes, missiles, and unmanned vehicles.

By 2005, the MEMS accelerometer developed at SPAWAR Systems Center Pacific had resulted in the first two prototypes which could boast as having the world record for the smallest displacement ever measured by a MEMS device.

Since government laboratories are typically not experienced in taking new technologies to market, SPAWAR Systems Center Pacific turned to CCAT to assist in commercializing the new innovation. The CCAT program assists government laboratories, through its technology transfer program, by providing the technology's inventor the support to find a commercial licensing partner who can take the technology to the market.



Lumedyne AcXel Accelerometer Prototype

The MEMS technology (MEMS Ultra-Sensitive Accelerometer) inventor, Dr. Richard Waters, submitted an application to CCAT for technology transfer services. He was awarded a market study which provided SPAWAR with a strategy on advancing the technology to the marketplace. Shortly thereafter, one of Dr. Waters' colleagues – Brad Chisum – decided to start a company specifically formed to commercialize the MEMS Ultra-Sensitive Accelerometer technology. After having received an exclusive license, the company (originally called Omega Sensors – later changed to Lumedyne Technologies) submitted an application to CCAT and received funding to further advance the development of the technology.

CCAT Clients (cont'd)

The first target market is the defense market with applications for weapons guidance systems. The MEMS accelerometer was integrated into systems that included gyroscopes, GPS, and inertial measure units (IMUs) to track the movement and rotation of units over time and used primarily in navigation and guidance. Other applications include seismic imaging (oil exploration) and industrial and structural monitoring.

The Lumedyne technology is also scheduled to be tested in space with the upcoming launch of the Millennium Space Systems/Planetary Society's "Light Sail" satellite. The Light Sail satellite employs a revolutionary propulsion system from energy created through sunlight.

Lumedyne's other product lines are high performance MEMS-based displacement sensors and ultrasensitive vibration energy harvesters. Energy harvesting converts ordinary vibration into electricity. Applications for this futuristic technology include: unattended ground sensors, consumer electronics, and medical implants.

The company is now embarking on developing a third product line – MEMS based gyroscopes.

Last year, company revenues grew by 27% and they created 8 new jobs.

CCAT's Performance Highlights

The CCAT team has developed a series of metrics to help capture the program's performance since its inception in 2001. The essence of CCAT is to identify new technologies that address critical national defense and homeland security needs. This is accomplished through the sponsorship of national solicitations inviting industry, academic research institutions and government laboratories to submit applications that address these needs. The applications go through a rigorous yet streamlined evaluation and selection process. Those that represent the highest potential for rapid commercialization are awarded funding for product development and/or business development services.

The basic metrics that CCAT uses to gauge its success include:

- Product Sales
- Licenses
- Acquisition of 3rd party funding
- Mergers and Acquisitions

An assessment of these success metrics since program inception in 2001 is:

- Product Sales: \$83,909,251 involving 39 technologies
- Licenses: 18
- Acquisition of 3rd party funding: \$192,807,132 for 63 technologies
- Mergers and Acquisitions: 20 companies valued at \$56 million



The analysis has also shown a return on investment of 7.7 to 1 (each dollar of CCAT investment resulted in an additional \$7.70 in sales, investments, etc. revenue for the company/organization). In addition, the analysis showed a cumulative success rate of 46.7%. (46.7% of all awarded organizations achieved at least one of the above CCAT metrics.)

Other News

CCAT Business Model Used to Win SBA Grant



In September, 2010 the U.S. Small Business Administration (SBA) awarded a \$600,000 grant to the SDSU Research Foundation to execute the San Diego Advanced Defense Technologies Cluster (SDADT) initiative -- one of 10 awards out of 174 applications nation-wide. The SBA was seeking to fund existing regional clusters to support the growth and competitiveness of small businesses as part of their "Innovative Economies" pilot program. The pilot program supports small businesses' participation in regional economic "clusters" – collaborations between small businesses, the public sector, economic development and other organizations. As one of the three Advanced Defense Technology awardees, the SDADT Cluster will provide business training, counseling, mentoring, matchmaking, and other services to small businesses that focus on critical DoD technologies.

Given CCAT's 10-year success as a technology commercialization accelerator for DoD and homeland security, the SDADT is using the CCAT business model and its extensive network of regional partners and stakeholders as the foundation for this pilot program. Its team includes the SDSU Entrepreneurial Management Center (lead); SPAWAR Systems Center, Pacific; Foundation for Enterprise Development; CONNECT; several large defense prime contractors and regional industry associations; Technical Proposal Assistance Center; Small Business Development Centers; and other organizations in San Diego that are supporting economic development and small business growth.

Since inception, SDADT has enrolled 25 San Diego based small companies engaged in the research and development of advanced technologies that may address a DoD requirement and/or fill a capability gap in autonomous systems, cyber security, and C4ISR – Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance. Each company receives an "intake" session by a team of business professionals, the purpose of which is to ascertain the nature of each business and its primary needs for continued growth. A customized program of support services is developed with action plans for both the company and the cluster.

In addition to individual company support, the SDADT sponsors various events such as workshops, showcases, etc. For example, the first Technology Showcase was conducted on March 16 where 6 ADT cluster companies presented their technologies before a group of system integrators, angel and venture fund investors, and DoD representatives. The purpose of the Showcase was to present these technologies for potential partnerships, acquisitions, licensing, and investment opportunities.

A second event held on April 19 was a Small Business Training Workshop and Networking Event attended by over 50 individuals from 38 small defense oriented companies in San Diego. The workshop included presentations on various funding opportunities, federal procurement, intellectual property, networking, etc. This all day event was well-received by the participants, who collectively are looking forward to future workshops.



To learn more about the SDADT or apply for business services, go to http://www.ccatsandiego.org/sdadt_sol.html.

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