

Physical Sciences Inc.



TOTAL DHS SBIR INVESTMENT
\$1.15 million

SBIR AWARDS
DHS

PHASE III REVENUE
\$16 million

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Is it your dream to ring in the new year in Times Square? Have you ever considered what it takes to keep you safe in a crowd of millions, surrounded by the bustle of taxis, delivery trucks, pedi-cabs, and cars in one of the busiest environments in the world? Through the Department of Homeland Security (DHS) Small Business Innovation Research (SBIR) program, administered by the DHS Science and Technology Directorate, Andover, Massachusetts-based Physical Sciences, Inc. (PSI) is bringing advanced detection to keep you safe from radiological dispersion device threats, whether in a backpack on the sidewalk, or a vehicle passing by.

Radiation monitoring for security goes beyond simply detecting the presence of radiation. Once detected, radiation must be deemed a threat or non-threat, and the source must be localized quickly in order for follow-on action to be taken.

If there's limited activity in the area, this process can be easy, but more commonly, radiation monitoring is conducted in a cluttered environment like busy, urban areas with vehicles and people constantly moving in different directions at varying speeds. This scenario is where the mission becomes complicated. Once a threat has been detected and localized, it must also be adjudicated – creating a human-intensive, time-consuming operation in situations where neither people nor time are in excess. What if a system could not only identify radiation and its source but provide context to decide whether that radiation source is a threat in real-time, without the use of excessive manpower?



Given this, DHS recognized the need for radiation detection systems to be located in remote and urban environments with the ability to function fully without physical intervention from an operator. DHS SBIR published a topic envisioning a new system to conduct real-time monitoring and analysis at low power levels with the ability to acquire, synchronize, analyze, compress, and communicate data from multiple sensor components only during times of threat reduction to avoid saturating available communication bandwidth. The system would be used as an unattended, rapidly mobilized detection system for deployment in an outdoor environment for durations exceeding 24 hours. In 2017, PSI received a DHS SBIR award to develop a technology that became known as OWL (Optical Warning and Localization). What started as an unattended-only application, quickly became a dual-use capability optimized for both mobile and static deployments with real-time output available to end users. OWL is an onsite and 'in position' application with the addition of operator capabilities and mobile radiation sensors inside vehicles. An OWL-equipped radiation detection system not only detects a potential radiation source, but it can assess whether it is an actual threat or non-threat while additionally providing a contextual assessment of the threat space. PSI's OWL-equipped mobile and static platforms are able to detect radiation at a very high sensitivity level and provide

a decision-making context in a complex environment focused strictly on radiation sources. "With machine vision, they can now take a video feed and secure more detailed information to put into the algorithm," said Dr. Richard Bindel, DHS Technical Manager for the project. "Ultimately, to understand what the radiation detector is seeing, resulting in much increased environmental awareness." "DHS SBIR has been instrumental in helping us develop new, advanced technologies, but, most importantly, they've really helped us navigate the transition to the end user," said Dr. Bogdan Cosofret, Vice President of Detection Systems at PSI. "Not only did they support the initial development of the technology, they provided a springboard—a launching pad for the technology—that facilitated testing, evaluation, and, ultimately, introduction to the end user. We can't express enough gratitude to DHS for the overall support of this project."

OWL has been used by a number of DHS components and domestic law enforcement organizations as well as several state-level law enforcement agencies throughout the U.S. In the past three years, PSI has sold almost 100 individual OWL units, which are a core component of more than 50 larger, highly integrated radiological and nuclear detection systems.