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AEROSOL DYNAMICS, INC.

The recent success of Berkeley, California-based Aerosol Dynamics is all the more impressive when one discovers that it is merely a team of five tackling multi-million contracts and delivering solutions to the commercial sector and beyond. Twenty-five years ago, Dr. Susanne Hering had an imminent interest in studying air pollution and the resulting problems on the human respiratory system. Haze in the sky is formed by tiny particles, below a micrometer in diameter. When one inhales these particles, they deposit deep in the airways of the lungs, and are hard to remove from the body.

PHASE III SUCCESS

\$4 million in commercial sales and follow-on contracts. Technology licensed to Aerosol Devices, Inc.

AGENCIES

DHS, NIH, DOE

SNAPSHOT

Through a DHS SBIR award, Aerosol Dynamics' patented technology has led to a family of instruments for measuring the concentration of ultrafine and nanometer-sized airborne particles. This enables the accurate measurement of not only smog and other environmental pollutants, but also biological analysis for potential threats.

AEROSOL DYNAMICS, INC.

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Smog, which is common in large cities across the United States and around the world, is the result of both emissions from sources such as motor vehicles and chemical transformations that happen in the air. These conversions that happen in the air involve pollutants from a number of sources – some manmade and some natural.

In 2003, Dr. Hering developed a new way to measure these airborne particles. The process involved making the particles larger by condensing water on them in a continuous flow. This allowed for the particles to be counted through a condensation particle counter, and it was this process that interested the Department of Homeland Security.

DHS had a desire to collect particles in the submicrometer range, which had never been done before. The need was to provide a front-end collector that could be joined with other technologies that the agency was developing for biological analysis to identify potential threats. This vision had to start with the ability to capture these particles at such a small size. DHS attached this collector to a prototype system that included the collector and the analysis platform. They just completed testing in lab and field trials.

It was through this DHS SBIR-funded project that Aerosol Dynamics developed a new way to apply water to these particles in a continuous flow, enabling an analyst to look at the cloud of particles that were formed. A commercial instrument resulted from this work, and Aerosol Dynamics licensed the technology for further analysis in the chemical composition of particles.



◀ The Series 110 Liquid Spot Sampler instrument, sold by Aerosol Devices, Inc., collects a concentrated suspension of particles into a small liquid-filled vial. The vial is designed with inlet and outlet ports so the user can configure it for on-line batch sampling of the particle suspension directly into a chemical or biological analyzer. A non-ported sample vial is also included.

The Series 110 Sequential Spot Sampler instrument enables affordable, time-resolved characterization of particulate chemical composition at multiple locations. It provides an uninterrupted collection of particulate matter (PM) as concentrated dry deposits into small sample wells. PM deposits can be analyzed directly using spectrographic methods, or extracted for wet chemistry analysis. ▶



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**DR. SUSANNE HERING
PRESIDENT OF AEROSOL DYNAMICS**

“If you can collect directly into a liquid, and have that be something that you can handle – that opens the door to so many things,” explains Dr. Susanne Hering,

President of Aerosol Dynamics. “You can now analyze things that are difficult, or handle online analysis, skipping over a whole extraction step. These can now be delivered directly into your analytic system.”

Subsequently, Aerosol Dynamics did some follow-on SBIR work with the National Institutes of Health to take collection technology and apply it to the air pollution problems in environmental monitoring. The company has licensed this and it is now being launched as a commercial product. They have also worked with the Department of Energy on several instruments, one of which was recently deployed in the Amazon to look at biogenic and anthropogenic and manmade emissions and the effects of those emissions. Aerosol Dynamics has built a number of prototype low-volume

collectors to capture particles from air at flow rates of a few liters a minute for a biosensor company, and for universities and national laboratories, both here in the United States and abroad. The company hopes to provide a bridge between what comes out

of universities and their own ideas to meet commercial needs of interest for clients.

Because of the small size of Aerosol Dynamics, the company has implemented a business model in that they will stay a research and development firm. They do not have plans to directly commercialize, so instead they team up with instrumentation companies to take the products to market. Dr. Hering still sees enormous potential for this technology. One of these applications would be to provide a viable collection method of these particles. In other words, one could collect particles out of the air without killing them, so that they can be cultured and studied.

When Dr. Hering first started the company, she relied on the work she was getting from the utility industry, which had an interest in studying air pollution. However, when the power industry was deregulated, budgets tightened and Aerosol Dynamics turned to the SBIR program, and the funds she found enabled the continuing development of their technology.

“The SBIR program is absolutely critical for what we do,” explains Dr. Hering. “The program is targeted at developing technology – it’s not only a pathway for licensing, but also a pathway for doing research in areas of interest to us and to our university collaborators, and enables us to provide tools that we wouldn’t otherwise have to study the atmosphere.”