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Subcommittee on Contracting and Workforce
House Committee on Small Business

"Commercializing on Innovation: Reauthorizing the Small Business Innovation Research and Small Business Technology Transfer Programs Part II"

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Mr. Chairman and Subcommittee Members:

Thank you for inviting me to testify today about the effectiveness of the Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) Programs. My company, Aerodyne Research, Inc. (ARI), was founded in late 1970 as a contract research organization focused on improving the nation's strategic defense systems. We subsequently broadened our range of expertise to include energy technology and major environmental issues such as stratospheric ozone depletion, ambient air quality, acid deposition and climate change.

Until Congress passed the Competition in Contracting Act (CICA) in 1984, small high technology companies like ARI could submit unsolicited proposals to research and development (R&D) programs in relevant federal agencies and often win sole source contracts to pursue their best ideas. However, CICA regulations essentially eliminated unsolicited proposals. Also in response to CICA regulations many agencies greatly reduced the number of R&D contracts they issued to small businesses, relying instead on large and complex contract solicitations that required large company led teams to adequately respond. Businesses too small to credibly lead these more substantial requested proposals then had to sell their capabilities to large "system contractors" to be included in proposals. Further, even when small companies managed to join a winning proposal team, they might not receive the funding they expected, since the large prime contractors controlled the flow of project funds and often would prioritize funding distributions to their own employees.

After the CICA took effect the SBIR program, which had started in 1982, and the STTR program, started in 1992, became major sources of federal R&D funding for many scientists and engineers employed by small businesses (<500 employees). However, the federal government's expectations for "successful" SBIR and STTR grants or contracts are significantly different than expectations for normal research funding.

Normal federal research funding is generally deemed successful if a novel scientific understanding is achieved or a successful technological advance is implemented. These successful outcomes are traditionally documented in patents and/or peer reviewed archival publications, adding to the nation's reservoir of scientific and technological knowledge and capabilities. Of course, the purpose of R&D funding from a mission agency may be to produce information and/or capabilities applicable to some part of the funding agency's mission.

SBIR/STTR funding is expected to produce the same level of new scientific understanding and/or technological advances as normal federal R&D funding; all properly documented in scholarly articles and/or patents in both cases. However, it is also expected to produce an innovative product that either solves a mission agency's designated problem or can be easily engineered to compete successfully in commercial markets (ideally both mission agency adoption and commercial success are achieved). In addition, the "successful" SBIR/STTR company also hires additional, well-paid staff members or spins off new companies that commercialize the parent company's SBIR/STTR funded technologies.

At ARI we have adopted a strategy of using SBIR/STTR funds to develop proprietary technology that we can use to expand our own research capabilities as well as sell to our R&D peers worldwide. Our most successful tactic is to develop new and better ways to measure both gas phase and small aerosol particle pollutants in real-time and with very high sensitivity and specificity. Starting in the mid 1990s we have used SBIR/STTR funds to develop three lines of mobile, robust instruments that can be used in both laboratory and field experiments to measure the properties and concentrations of air pollutants. Initial versions of these instruments were tailored for skilled scientist users, while some subsequent models can operate autonomously and are suitable for routine pollutant monitoring stations.

Since 2000 the increases in the capabilities and sales of these three instrument lines have evolved dramatically. From 2000 to 2015 instrument sales have grown from less than 1 million to over 14 million $/year. In FY2015 instrument sales provided 65% of our corporate revenues and R&D projects 35%. Over the past 15 years we have earned $80 million in instrument sales to customers on six continents; with ~80% of the sales outside of the U.S., helping our nation's balance of payments. We have also hired a significant number of instrument engineers and assembly technicians to help develop, assemble, test and service our instrument product lines.

Some of our U.S. instrument sales have been to U.S. federal laboratories, including DOE National Labs, NASA Center Labs, DOD Laboratories, EPA Labs, and the NSF's National Center for Atmospheric Research. So our instrument products have not only been successfully commercialized worldwide, but they have also directly served the needs of the agencies whose SBIR/STTR funds enabled their development.

We are also proud of our scientific accomplishments, during the FY 2000-2015 period we were supported by other funding sources to perform over $18 million worth of laboratory

and field measurements using our instrument products. Recent sponsored research projects have measured methane emissions and other pollutants from oil and gas operations, including fracking well pads, gas plants, transmission pipeline compressors and gas storage facilities all over North America, including the recent Aliso Canyon gas storage facility's mega leak near Los Angeles. We have also recently mapped air toxic pollutant levels in poor neighborhoods near the Houston Ship Channel and measured trace gas and fine particle air pollution levels in Beijing. In fact, ARI has twice been named the Department of Energy's SBIR/STTR Company of the year (2006 and 2013) for our contributions to their environmental research programs as well as our equipping their scientists with important new research tools.

We also contribute to our nation's scientific reservoir; in 2015 ARI scientists published 75 peer reviewed scientific papers, most based on measurements using our instrument products. We also received three U.S. patents for innovations to improve instrument performance.

I believe that we have demonstrated that SBIR/STTR funding stimulates scientific discoveries and technological inventions that both meet federal agency needs and can be successfully commercialized, serving both national and international markets. Further, SBIR/STTR awards promote successful science based companies that provide well paying jobs to talented scientists, engineers, technicians and business staff employees.

At our company, and many hundred others, support from the SBIR/STTR programs has successfully stimulated the production of the range of scientific, technological and economic benefits envisioned when Congress created these programs. Reauthorizing these programs will serve our nation well.