Power Industry Emissions Testing is Getting Faster, Easier, and Safer

LIVONIA, MICHIGAN, UNITED STATES, October 18, 2022 /EINPresswire.com/ -- Airflow Sciences Corporation (ASC), a fluid dynamics engineering company, recently finalized a Department of Commerce Small Business Innovative Research (SBIR) project related to a novel flow measurement procedure. For the past several years, the company has partnered with the National Institute of Standards and Technology (NIST) to advance the state of the art in accurate flow measurement procedures and technology. The Phase II SBIR project completion is an important step towards industry acceptance and commercialization of this new testing methodology.

The Fluid Metrology Group at NIST developed a non-nulling test procedure, which eliminates the need to rotate a 3D probe during a flow traverse. “This change significantly reduces both the time to test a given traverse point and the potential for error due to inaccurate or inconsistent probe nulling techniques,” points out the lead project engineer, Matt Gentry. “Instead of rotating probes, test personnel only have to insert the probe to the desired location and record the pressures from the five sensing holes on the probe head.” With the NIST technique, the velocity vector is calculated using a detailed calibration curve developed through a rigorous wind tunnel testing procedure.

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ASC and NIST personnel have been working together on this research and development since 2016. ASC was the recipient of a 2019 NIST Phase I SBIR award to develop a prototype non-nulling data acquisition system. The Non-Nulling Data Acquisition System (NNDAQ) implements

the NIST methodology and achieves high accuracy flow measurement (expanded uncertainty of 2% or less) without needing to rotate or null the probe. ASC received a Phase II SBIR award in 2020 to follow-up on this hardware development and optimize it for stack flow testing use.

A typical RATA test includes four test ports and ten traverse points per port, so test personnel must position the probes forty times for a single test run. The original NNDAQ prototype, developed during the Phase I project, was configured to measure pressures at one single test port, requiring the user to move the equipment around the stack and increasing the overall test duration. The Phase II work that was just completed included the construction of additional NNDAQ measurement boxes, as well as the development of test software, which would allow a user to test on all four ports simultaneously. This eliminates the need to move any measurement equipment around on the test platform, greatly reducing test time.

Reduced test time not only makes emissions testing more cost-effective, it also reduces the risk of injury to test personnel. A shorter test time means less time spent at high heights, and with improved automation, personnel will no longer need to maneuver equipment around the stack platform.

Work continues under a separate Phase II SBIR project right now, with the goal of expanding the non-nulling test methodology to non-power industries, while improving the portability of the system.

About Airflow Sciences
Airflow Sciences Corporation specializes in the design and optimization of equipment and processes involving flow, heat transfer, combustion, and mass transfer. Airflow performs testing and simulation of air, gas, liquid, or particulate flows and manufactures standard and custom test equipment for a wide variety of industries and applications. The company also produces Azore®, a practical, affordable software for computational fluid dynamics (CFD) modeling.

For more information about Airflow Sciences Corporation, visit www.airflowsciences.com.

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