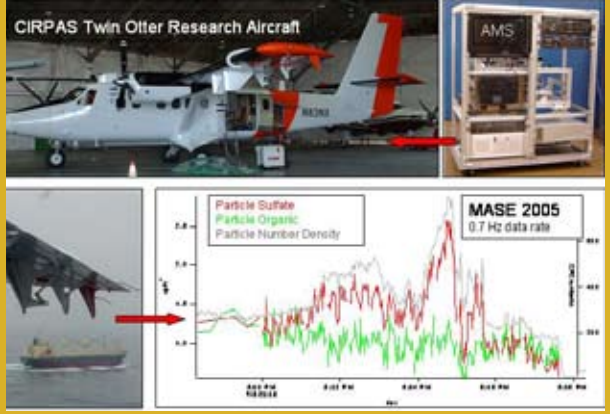

TOF-AMS on CIRPAS Twin Otter Research Aircraft Detecting Ship Plume

AERODYNE RESEARCH, INC.

TIME OF FLIGHT REAL-TIME AEROSOL ANALYZER FOR AIRCRAFT PLATFORMS

About the Technology

Atmospheric Particle Matter (PM), plays an important role in altering climate and visibility when scattering is absorbed by solar radiation. The PM and airborne matter may also pose security risks as shipboard combustion systems emit "ship track" clouds that reveal the position and heading of naval assets. Aerodyne Research, Inc. developed the Aerosol Mass Spectrometer (AMS), which measures both the size and chemical composition of PM. The AMS couples aerosol sampling and mass spectrometric techniques into a single measurement system. Airborne particulates, such as biological toxins and submicron combustion particles, are sampled in a high vacuum system called the "aerodynamic lens". The lens focuses the particles and creates a beam of particles that is directed through the vacuum system onto a resistively heated surface.

Aerosol constituents are vaporized, ionized (electron impact) and identified using a compact time-of-flight mass spectrometer to reveal chemical composition information. The AMS was successfully deployed on a Twin Otter research aircraft for the Naval Post Graduate School (Center for Interdisciplinary Remotely Piloted Aircraft Studies), in conjunction with the California Institute of Technology, during the Marine Aerosol Stratus Experiment.

Military and Commercial Significance

The AMS provides critical information for improved modeling and prediction of visibility in the environment and marine boundary layer. The spectrometer can be operated autonomously, and quickly measures aerosol size and chemical properties thereby enabling the development of proper control and/or avoidance strategies, and the creation of the data source needed to validate atmospheric models. The AMS rapid (1-2 Hz) measurement capability can operate on aircraft platforms where size, weight, power requirements, and fast data rates are important.

Topic Number: N03-227 (ONR)

SBIR Investment: $549K
Project Revenue: $3M

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APPLICATIONS

- Naval Post Graduate School Center for Interdisciplinary Remotely Piloted Aircraft Studies – Marine Aerosol Stratus Experiments
- DoE - Pacific Northwest National Laboratory Environmental, Molecular Sciences Laboratory Brookhaven National Laboratory Atmospheric Sciences Program,
- Environmental Protection Agency - Science to Achieve Results

About the Company

Founded in 1970, Aerodyne Research, Inc. (ARI) provides research and development services to commercial and government clients. ARI produces remote sensing, surveillance, image processing, tracking and recognition systems for commercial and environmental applications and national defense. Funding from the SBIR/STTR programs was instrumental in ARI's transformation, and the company now has 17 US patents and $3.6 million in revenue generated from the aerosol mass spectrometer technology.