

An Agile Aerial Sensor System Tailored for In-Situ Cloud Measurements, Phase I Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)



ABSTRACT

Barron Associates is proposing a novel atmospheric sensor platform that fills a gap in current sensing capabilities by providing a low-cost, portable technology that can be used for guided remote sensing applications such as cloud characterization, volcanic plume measurements, and polar atmospheric research. The proposed sensor platform consists of compact, tube-deployed UAVs equipped with atmospheric sensors and a custom launch system. Initial development of the sensor-UAV was performed during a NASA Phase I Contract in 2014. Barron Associates is proposing a development schedule that builds upon the prior Phase I technology to mature the sensor-UAV and launch system in preparation for Phase II cloud measurement tests.

ANTICIPATED BENEFITS

To NASA funded missions:

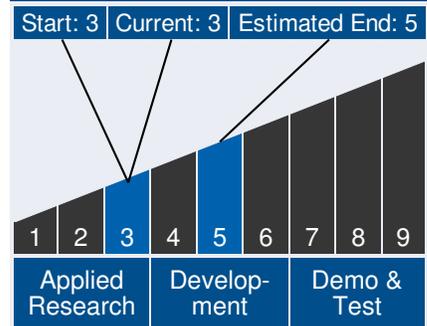
Potential NASA Commercial Applications: The sensor-UAS provides a low-cost atmospheric sensing platform option that requires minimal training for use. As such, the potential NASA applications include many of the atmospheric research areas of interest, as well as some atmospheric sensing applications. The Phase II demonstration application will be a cloud sensing mission for characterizing the cloud content by pressure, temperature, humidity, and wind speed. Hurricane research is a second NASA application, with Barron's UAS able to provide capabilities for wind and PTH sensing in turbulent environments. A third NASA application is volcanic research, measuring ash and particle concentrations, gas species concentrations and winds. Another application for NASA is for climate research, in particular the measurement of methane in the Arctic. Satellite calibration/validation campaigns represent an additional NASA application as programs such as OLYMPEX are frequently measuring specific atmospheric properties and coverage could be enhanced with the technology.



Table of Contents

- Abstract 1
- Anticipated Benefits 1
- Technology Maturity 1
- Management Team 1
- U.S. Work Locations and Key Partners 2
- Technology Areas 2
- Image Gallery 3
- Details for Technology 1 3

Technology Maturity



Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

Continued on following page.

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To the commercial space industry:

Potential Non-NASA Commercial Applications: Potential non-NASA customers include NOAA, DoD, DoE domestically, and international atmospheric researchers with similar interests to NASA. NOAA is a primary customer with several possible applications. Hurricane researchers at NOAA demonstrated in September of 2014 the use of tube launched, expendable UAVs for atmospheric science in a hurricane. Wildfire monitoring is a second application for NOAA. The DoE desires small UAV methane sensing capability. The DoD has ongoing interest in the use of small, expendable UAVs for reconnaissance, ordnance delivery and battlespace awareness. International agencies conducting atmospheric science for clouds, climate, volcanoes, hurricanes and the arctic would all be potential customers.

Management Team (cont.)

Principal Investigator:

- David Neal

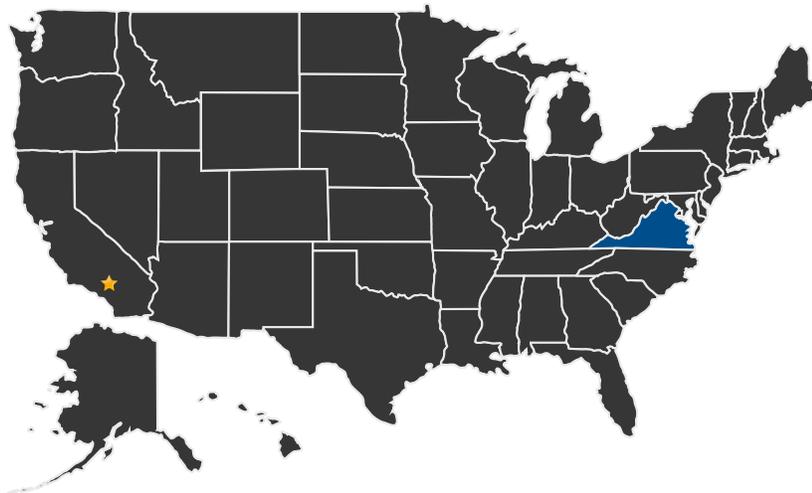
Technology Areas

Primary Technology Area:

Science Instruments, Observatories, and Sensor Systems (TA 8)

- └ In-Situ Instruments and Sensors (TA 8.3)
 - └ In-Situ (other) (TA 8.3.3)

U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States
With Work

★ Lead Center:
Armstrong Flight Research Center

Other Organizations Performing Work:

- Barron Associates, Inc. (Charlottesville, VA)

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PROJECT LIBRARY

Presentations

- Briefing Chart
 - (<http://techport.nasa.gov:80/file/23436>)

IMAGE GALLERY



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DETAILS FOR TECHNOLOGY 1

Technology Title

An Agile Aerial Sensor System Tailored for In-Situ Cloud Measurements, Phase I

Potential Applications

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