

# Innovation

**SBIR Topic Number:**  
AF06-246

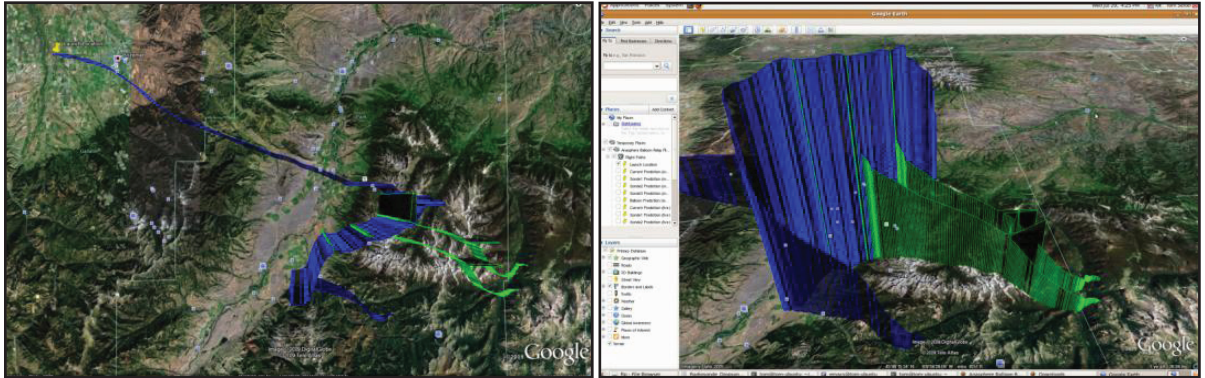
**SBIR Title:**  
Sensing of Upper  
Atmosphere

**Contract Number:**  
FA8718-07-C-0011

**SBIR Company Name:**  
Anasphere, Inc.,  
Bozeman, MT

**Technical Project Office:**  
AFRL Space Vehicles  
Directorate, Kirtland  
AFB, NM

This Air Force SBIR/STTR Innovation Story is an example of Air Force supported SBIR/STTR technology that met topic requirements and has outstanding potential for Air Force and DoD.



Left: Overhead view of three-dimensional (3D) plot of balloon (blue) and dropsonde (green) tracks from an actual flight. Right: Side view of 3D plot of balloon (blue) and dropsonde (green) tracks.

## Sensing of Upper Atmosphere

- Military planners need accurate specification and prediction of meteorological conditions
- Data from the dropsondes is received by the launcher payload and relayed via satellite to a remote server
- The balloon-borne payload releases dropsondes based on Anasphere's AnaSonde-2G radiosondes, which return pressure, temperature, relative humidity, and wind speed and direction data
- The payload is flown on a zero-pressure balloon, which is able to drift at high altitude for extended periods of time facilitating the remote release of dropsondes over distant target areas
- This new atmospheric profiling system will be of use any time atmospheric profiles need to be gathered over inaccessible areas

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## Air Force Requirement

Accurate specification and prediction of meteorological conditions at locations of interest provide important information to military planners. The system is designed to provide vertical profiles of the atmospheric state through direct measurement. It is useful for making observations without the need to deploy the instrumentation in the area being sampled. In-situ measurements ensure the precision and spatial detail required for any application.

## SBIR Technology

The balloon-borne payload releases dropsondes based on Anasphere's AnaSonde-2G radiosondes, which return pressure, temperature, relative humidity, and wind speed and direction data. Data from the dropsondes is received by the launcher payload and relayed via satellite to a remote server. Commands, including dropsonde release and balloon release, are sent via satellite to the payload.



Left: Launching the dropsonde system; the balloon is lifting the parachute at this time. Right: The dropsonde launcher system in flight under a zero-pressure balloon, viewed shortly after launch.

The payload is flown on a zero-pressure balloon, which is able to drift at high altitude for extended periods of time facilitating the remote release of dropsondes over distant target areas.

## Potential Air Force Application

The new atmospheric profiling system will be of use any time atmospheric profiles need to be gathered over inaccessible areas. The system should prove useful in acquiring meteorological conditions in tactical locations of interest in military operations.

## Company Impact

"The SBIR program supported Anasphere's growth over the first six years of its operations, and has continued to play a role in supporting Anasphere's ongoing development of new technologies," states Dr. John A. Bognar, company president. "With regard to Anasphere's technologies which were developed with SBIR funding, the present Air Force balloon-borne dropsonde launcher has been the most successful to date. The dropsonde system itself is expected to be a major product for us, and is ready for sales to users. Aside from that, the dropsondes and the satellite-based command and control system are each, in their own right, products or the foundations for other to-be-developed systems."

The primary goal of Anasphere is to improve upon current research, instrumentation and education in the fields of atmospheric and environmental science. A major area of focus is atmospheric and meteorological profiling extending from surface and tethered systems through high altitude balloons operating from low altitudes to the near-space environment.



# SBIR/STTR

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