HAWC-OAWL

High-Altitude Wind Collection using the Optical Autocovariance Wind Lidar

HAWC-OAWL builds on Ball Aerospace's OAWL interferometer to enable simultaneous Earth science measurements of winds and aerosols required for weather and air-quality forecasting. HAWC-OAWL adds the 532 nm wavelength wind measurements to existing 355 nm OAWL measurements

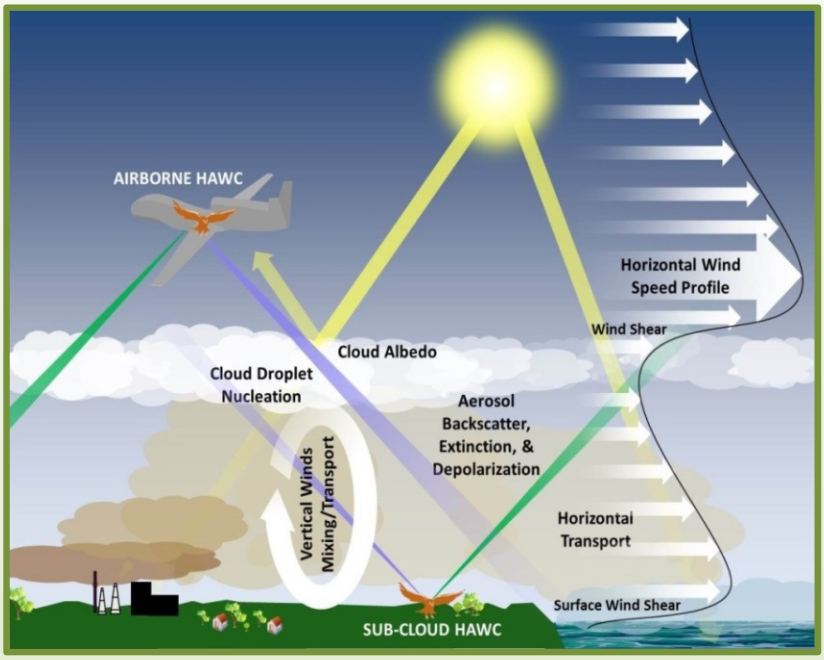
Science Objective

Provide co-located and concurrent profiles of wind and aerosol backscatter to study the impacts of dust and aerosol transport on global energy and water cycles, air quality, and climate.

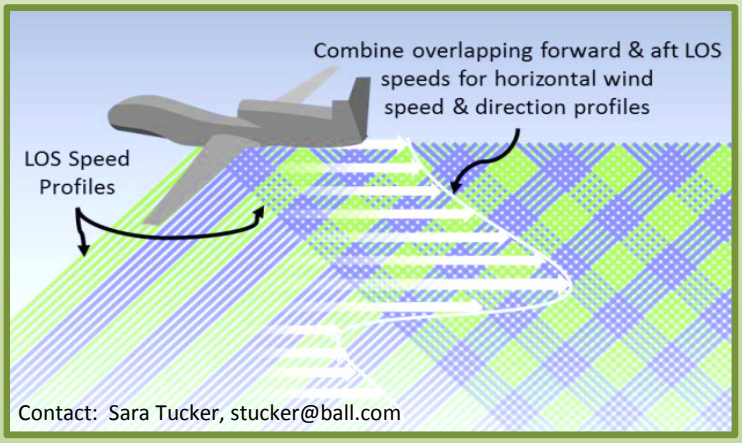
Cloud-Aerosol-Precipitation Initiative

"The cloud-aerosol-precipitation climate problem is complex and progress will probably require a coordinated combination of observation and theoretical techniques, platforms and vantage points, and strategies that explicitly plan for integration of the components. The rewards, however, are also extremely high and could include advances in issues of air pollution and human health, availability of freshwater, prediction of weather and extreme events, aerosol effects on climate, and cloud influences on climate."

- From Chapter 11 of the 2007 Earth Science Decadal Survey: *Water Resources and the Global Hydrologic Cycle*



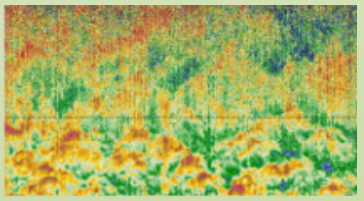
Innovative Technology	Benefit
Optical Autocovariance measurement with field-widened Interferometer	Interferometer fringe phase → Doppler shift measurements Interferometer fringe contrast → aerosol-to-molecular scattering ratio
Two telescopes	Two looks, one per wavelength May be alternated to provide coverage at both wavelengths
Fibertek laser: 532 nm, and 355 nm wavelengths	355 nm and 532 nm provide two LOS wind measurements to study winds and aerosol presence in the troposphere. 532 nm measurements may be used for in-water Doppler measurements.
FPGA-based Lidar Data Processor	Provides real-time on-board processing of LOS wind speeds/Doppler shifts



Contact: Sara Tucker, stucker@ball.com

Demonstrated Wind Measurements

The first OAWL system was demonstrated and validated in comparison ground tests with a NOAA coherent detection wind lidar.



In 2011, NASA WB-57 flights demonstrated and validated the original , autonomous , 355nm wavelength airborne OAWL.

HAWC-OAWL: Keeping both eyes on the wind