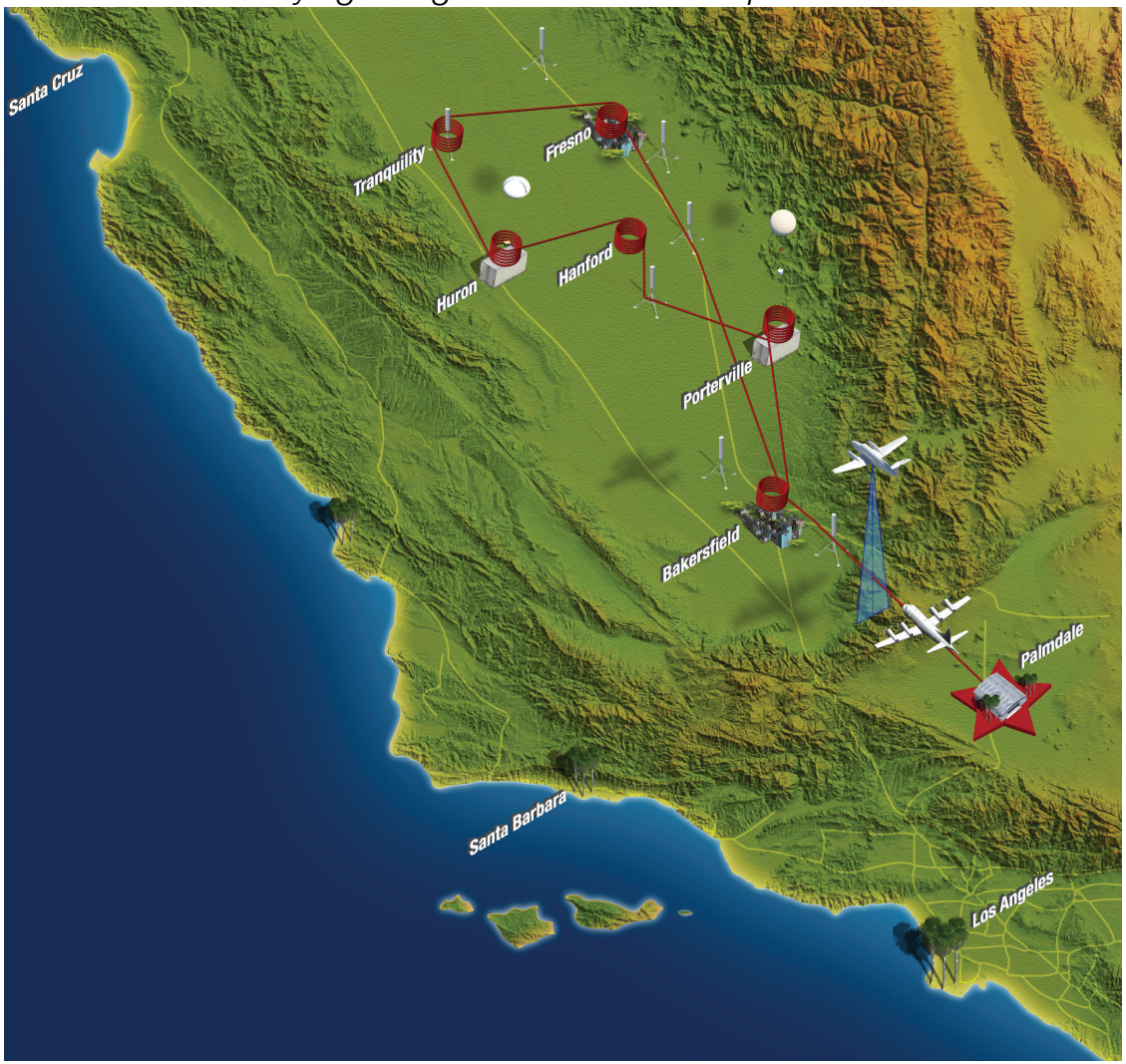
# DISCOVER-AQ: *Flying straight to the source of pollution to learn more about the air we breathe.*




**D**eriving **I**nformation on **S**urface conditions from **Co**lumn and **Ve**rtically **R**esolved Observations Relevant to **A**ir **Q**uality.

# DISCOVER-AQ: *Learning More About the Air We Breathe*

## *What is DISCOVER-AQ?*

If the air we breathe was visible to the human eye, what do you think we would see?

It's safe to say we'd see oxygen and nitrogen molecules floating around. But how much of the air would be filled with dust, ozone and other potentially harmful pollutants?

NASA recognizes the problems that air pollution can create for humans and agriculture and has begun a four-year field campaign called DISCOVER-AQ, which will take a closer look at the air we breathe and improve the use of satellites to monitor air quality for public health and environmental benefit.

Scientists working on the DISCOVER-AQ mission will install a suite of instruments on two airplanes and fly over cities across the U.S. to take measurements. While air pollution has been studied for quite some time with satellites, the fundamental challenge for satellites measuring air quality is their inability to distinguish between pollution near the surface where we live and breathe and pollution higher in the atmosphere.

To understand how to better diagnose pollution, scientists will coordinate their aircraft-based measurements with satellite- and ground-based measurements to see where there are differences. One of the planes will make measurements looking downward from about 26,000 feet, simulating what a satellite would see, while a second plane will fly beneath the first, spiraling up and down at selected points to measure pollution in the different layers of the atmosphere.

DISCOVER-AQ scientists will also connect their measurements with the U.S. Environmental Protection Agency's long-term measurement network in hopes of learning from and enhancing it. Sampling data from these different vantage points provides a unique, three-dimensional view of how air pollutants are distributed and transported between different levels of the atmosphere throughout the day. This allows scientists to learn more about air pollution at Earth's surface and how to measure it better, from the ground and from space.

DISCOVER-AQ is more than improving an instrument or tweaking an algorithm… The idea behind the mission is that the more accurate data scientists have at hand, the better society is able to deal effectively with lingering pollution problems.

## *Mission Details*

**Aircraft:**
NASA's Langley Research Center's King Air
NASA's Wallops Flight Facility's P-3B

**Ground Instrumentation:**
Instrumented trailers, tethered balloons, liars, ozonesondes and regulatory air monitoring networks

**Scheduled Flights:**
2011 - Baltimore, Md. and Washington, DC metro area
2013 – California and Texas
2014 – TBA

## *Why DISCOVER-AQ?*

DISCOVER-AQ will affect you by:

- Monitoring fluctuations in emissions throughout the day to gain a better understanding of why and how pollution changes
- Tracking down the origins of air pollution to understand the main sources
- Improving the capabilities of air quality forecast models used to alert you that unhealthy conditions are expected in your area
- Improving the ability to attribute poor air quality to specific causes and inform policy makers on the best strategies for improving air quality

**Partners:**
DISCOVER-AQ is a collaboration among NASA's Langley Research Center in Hampton, Va., NASA's Goddard Space Flight Center in Greenbelt, Md., NASA's Ames Research Center outside San Francisco, Calif., various government agencies and multiple universities.

DISCOVER-AQ For more information on DISCOVER-AQ, visit http://discover-aq.larc.nasa.gov/

LG-2012-09-0041-LaRC