

## DOE Summer 2002 Air Quality Campaigns

Aerodyne, Inc.  
 Argonne National Laboratory  
 Boston College  
 Brechtel Manufacturing, Inc.  
 Brookhaven National Laboratory  
 GSSL, Inc.  
 Northeastern University/Marine Science Center  
 Pacific Northwest National Laboratory  
 UCLA



## Objectives

- Make air-quality measurements on urban and regional scales
- Understand ramifications of energy production on air quality
  - To evaluate transport into the New England through a series of regional-scale sampling missions.
  - To evaluate chemistry and transport at night, over the east coast 'ozone corridor.'
- Disseminate peer-reviewed results essential for policy discussions

## Unique Capabilities

- The people:
  - more than three decades experience in field campaigns, modeling and instrument development
  - Extensive cooperation with public agencies and private organizations
- The tools:
  - Gulfstream-1 aircraft
  - Specialized, research-grade instrumentation for airborne, surface and remote sensing of:
    - Gas-phase species
    - Aerosol characterization
    - Meteorological parameters
  - Computer modeling to synthesize meteorology and chemistry



## The Atmospheric Chemistry Program Brings Together...

- Analytical chemists - unique measurement capabilities:  $\text{NO}_x/\text{NO}_2/\text{NO}_2$ , VUV-CO, aerosol speciation via state-of-the-art mass spectrometers and PILS
- Modelers - Eulerian models to test observations against theory.
- Meteorologists: to provide detailed information on vertical mixing and transport using remote sensing and meso-scale modeling capability.



## Multi-Disciplinary Information From Many Locations and Multiple Organizations

- Phoenix 2001: chemistry at the onset of mixing in a major urban area, with observations from G-1 aircraft, a sky scraper and surface sites
- Nashville 1999: ozone production in isolated urban region affected by regional influences and biogenic emissions
- Texas 2000: chemical and meteorological conditions associated with highest ozone in U.S., with hundreds of investigators, tens of observation stations and 5 aircraft
- Philadelphia 1999: photochemistry and aerosol production in an extended metropolitan region

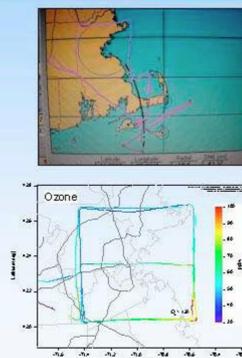
## NEAQS The Northeastern Air Quality Study Summer 2002 Field Campaign

- Examine influence of coastal circulation on the transport and chemistry of pollutants along the Northeast coast (Cape Cod- southern Maine)
- Provide chemical and meteorological data to assist in the development of a NOAA air quality forecast model for the Northeastern States
- Provide regional data on aerosol distribution/composition to aid in the development of regional haze SIP's for several of the Northeastern states.



## NAOPEX The Nighttime Aerosol/Oxidant Plume Experiment Summer 2002 Field Campaign

- The issue: Nighttime processes occur for approximately half the diurnal cycle, yet there is no data base against which changes to pollution aloft, at night, can be evaluated. As a result, there is a large degree of uncertainty in how well models handle nocturnal transport and chemistry.
- Objective: to make nighttime measurements in the Boston plume
- Strategy: under well defined wind-flow conditions, make repeated samples of the Boston plume, tagging the air with constant-altitude tetraons for sampling by the G-1 aircraft.



- DOE's Atmospheric Sciences Program has made measurements at many locations which are used to compare ozone production rates, the relative importance of transport vs. local chemistry and other processes at these locations.
- It provides a team of meteorologists, analytical chemists, and modelers bringing a wide range of capabilities to these field studies.
- It has the capability to field an extensive suite of research-grade instrumentation and is active in developing new techniques.
- It has taken the lead in organizing many of these campaigns, working side by side with institutions from both the federal, state and private sectors.



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