

Re-engineering the Photochemical Assessment Monitoring Stations Program

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Outline

- Background
- Need for Re-engineering
- Objectives
- Network Design
- VOC Measurements
- Nitrogen Measurements
- Meteorological Measurements

Background

- Enhanced ozone monitoring required by Clean Air Act
 - Section 182(c)(1) of the 1990 Clean Air Act Amendments (CAAA) required the EPA to promulgate rules for enhanced monitoring to obtain more comprehensive and representative data on ozone air pollution.
 - Section 185(b) of the CAA required EPA to work with the National Academy of Sciences (NAS) to conduct a study on the role of ozone precursors in tropospheric ozone formation and control.
- On February 12, 1993, the EPA promulgated the first PAMS requirements.
- In 2006, the PAMS requirements were revised to lower the minimum requirements for PAMS.

Need for Re-Engineering

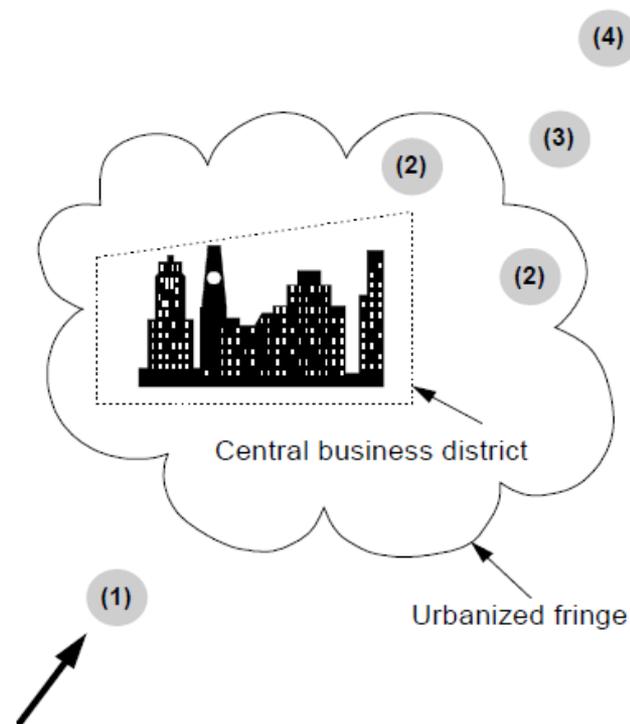
- Changes have occurred since PAMS program first started
 - Ozone standard has been revised to a level of 0.075 ppm based on 3-year average of the annual 4th highest 8-hour average
 - Ozone concentrations have decreased in many areas of the country
- Equipment is old and in need of replacement
 - New technologies available that should be considered
- Concerns about data not being used enough
 - Improvements may make data more useful

Re-examine Objectives

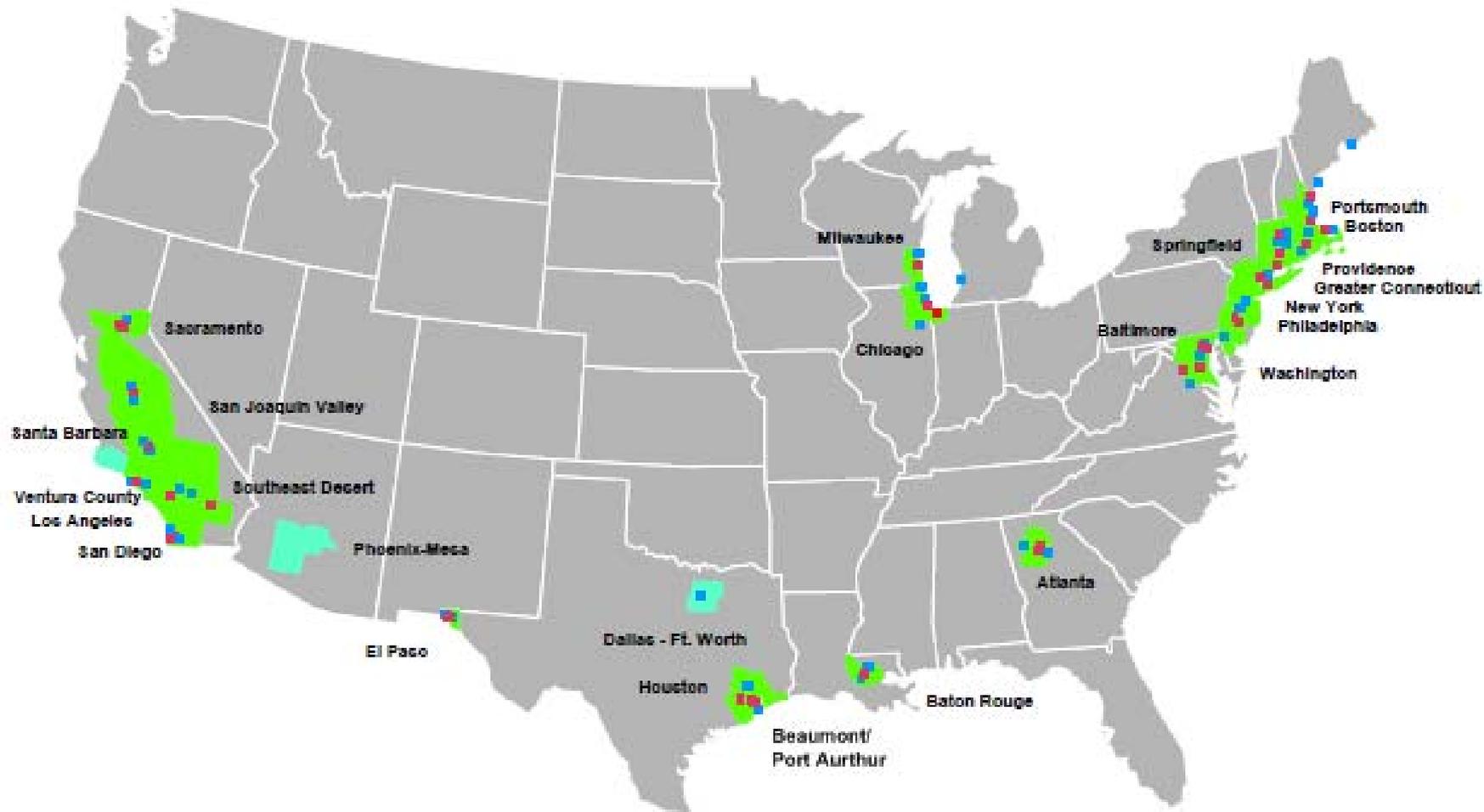
- Need to start with a re-examination of the objectives
 - Build database of speciated VOCs for evaluation of control strategies and local modeling efforts
 - Provide data for model evaluation
 - Support emission inventory improvements
 - Track trends and progress

Network Design

- Current design calls for up to 5 sites in each PAMS area
 - Type 1 Upwind
 - Type 2 Max emissions
 - Type 3 Max ozone
 - Type 4 Extreme Downwind
- PAMS Season June-August



Map of PAMS Areas



Issues with Current Network Design

- Poor spatial coverage
 - PAMS areas mostly in coastal areas
 - Limits value to model development/testing
- PAMS season is limited to summer months
 - Doesn't provide for extremes in variables
- Options under consideration
 - Add PAMS measurements to urban NCore
 - Lengthen the PAMS season
 - Mobile sites

PAMS Target List

- PAMS measures 58 “target” VOCs
 - Consider adding compounds
 - Biogenics
 - Air toxics
 - Consider dropping compounds
 - Low concentrations/Non-detects

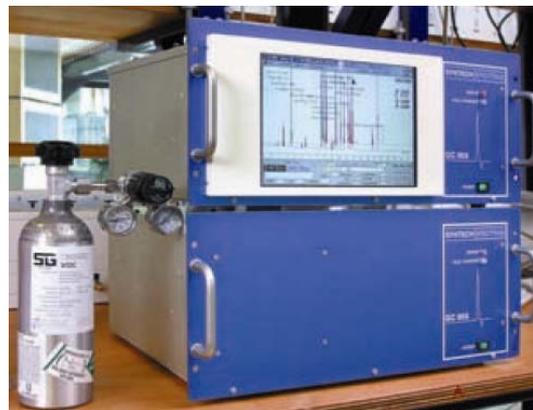


VOC Measurement Technologies

Canisters

vs

Auto-GCs

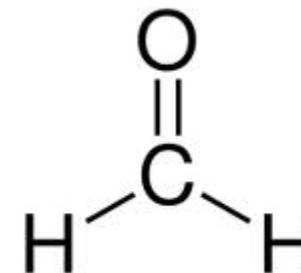


- Data averaged over sampling period
- Low capital cost
- Continuing lab costs
- Manually intensive

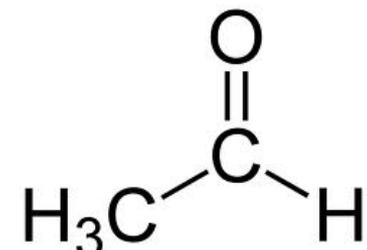
- Hourly data
- Higher capital cost
- Higher skill level required to run and analyze data

Carbonyls

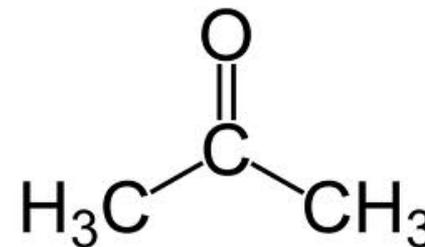
- Carbonyl sampling was removed from the PAMS requirements in all areas except those in severe and above non-attainment areas due to concerns about data quality
- Carbonyl data is important to ozone model evaluation
- Important air toxics
- We will be evaluating sampling and analysis method to determine if carbonyl sampling methods have been/can be improved



Formaldehyde



Acetaldehyde



Acetone

Nitrogen Measurements

- NO₂ plays a major role in ozone formation
- Standard NO_x measurement technology is known to have positive interferences from other non-NO_x species (HNO₃, PAN, mPAN, etc.)
 - NO₂ measurement = NO_{what}
- NO_y measurements don't give a NO₂ reading at all!
- New technologies are coming out that will provide a better NO₂ measurement
 - Direct NO₂ measurements
 - “true NO₂” photolytic converters
- Can we get NO/true NO₂/NO_y all in one box?

Upper Air Meteorology Measurements

- Current requirements state that one representative upper air site is required in each PAMS area
 - Details on what upper air data is to be collected is not defined!
 - Mixing height
 - Wind direction and speed?
- Most upper air systems used in PAMS are radar profilers with RASS temperature profilers
 - The systems at PAMS sites are old and VERY expensive
- Inexpensive ceilometers can provide continuous mixing height data
- Can NOAA profilers meet PAMS data needs?



Questions?