

Williams Tower

HC monitoring at three levels

(notes from April 17th meeting)

Expected Participants:

Carl Berkowitz, Xiao-ying Yu, Mike Alexander
Battelle Northwest/PNNL

Renyi Zhang
Texas A&M University

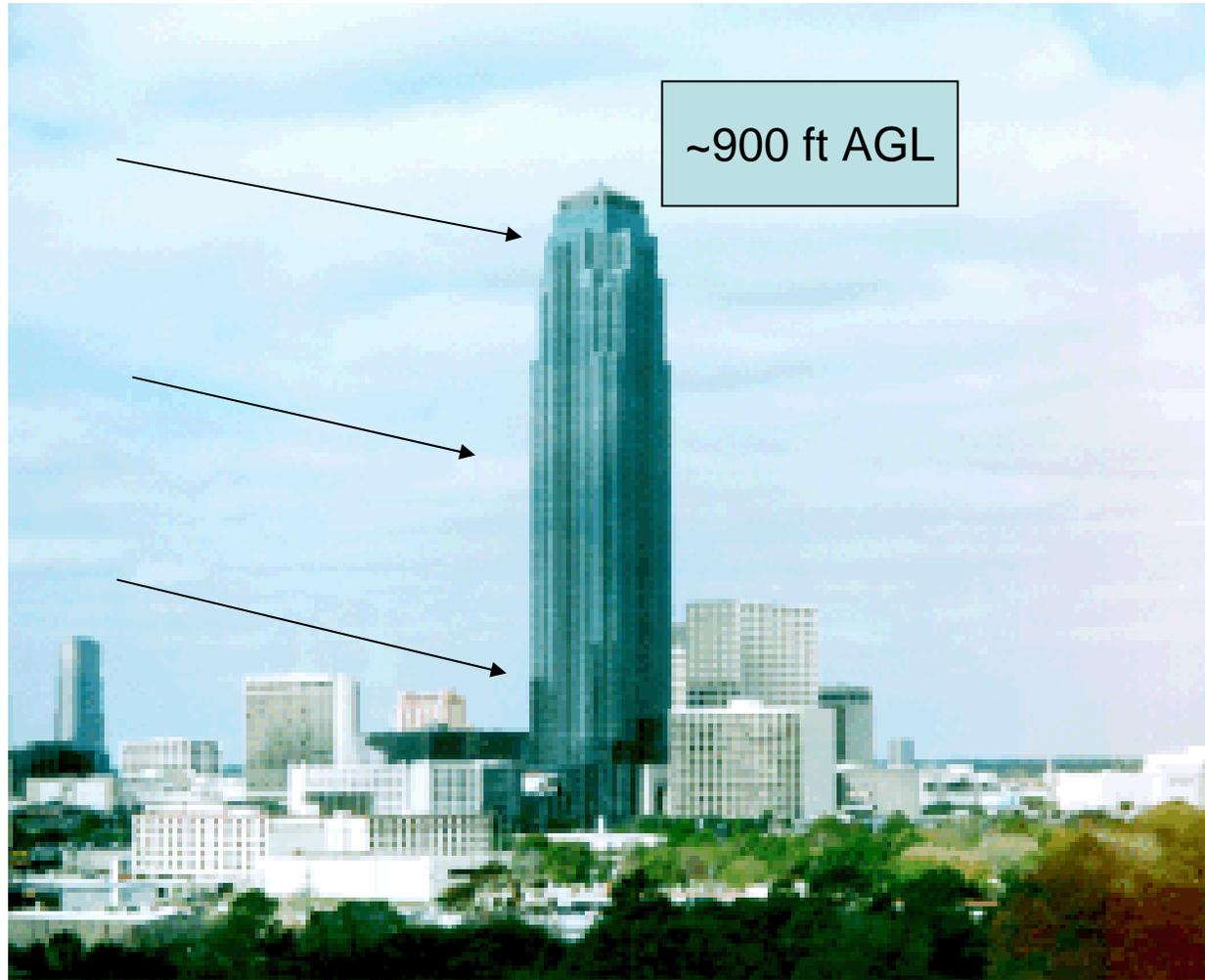
Tom Jobson
Washington State University

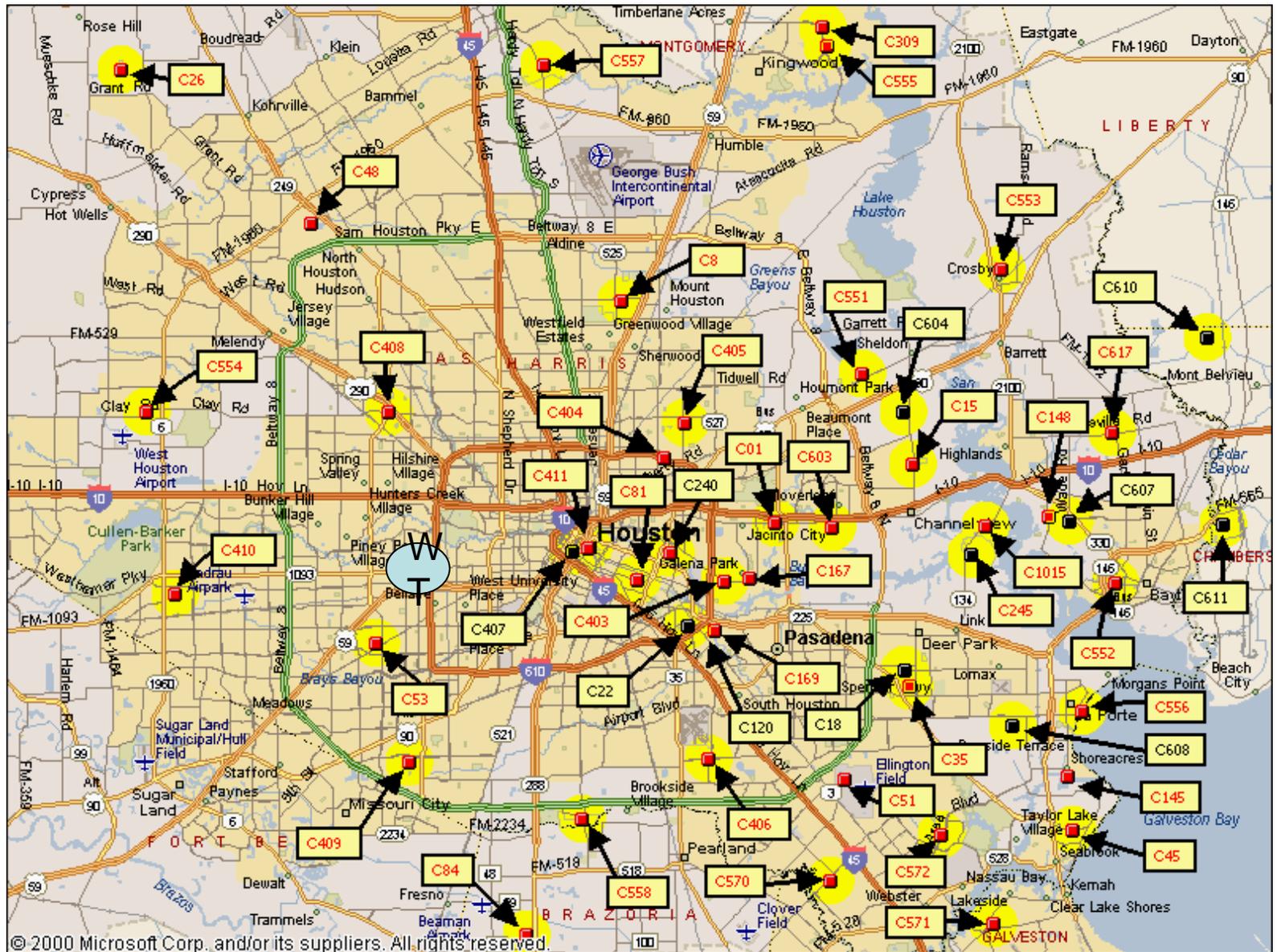
Support from the Texas Environmental Research Consortium and HARC

Science Drivers

- Uncertainty in model capabilities to simulate reactive hydrocarbons in growing mixed layer
- In particular, difficulties with biogenics
- Differences in VOC chemistry above and below nocturnal stable layer
- VOC conditions at sunrise

West side of Houston (near Galleria area)





Williams Tower: pros and cons

- Pros:
 - Relatively isolated skyscraper
 - Recent work has shown that sky scrapers amidst sky scrapers produce standing eddies
 - Sampling from a central downtown building is likely to produce 'canyon' measurements not representative of air outside that 'canyon.'
 - This feature is particularly prominent with any significant wind
 - Sampling from an isolated sky scraper will be more representative of air over the city than sampling from a skyscraper in a central location.
 - Focus of proposed work was vertical profiles of biogenic hydrocarbons
 - Williams tower on west side of Houston – TXAQs 2000 showed stronger biogenic influence here than eastern part of city
 - Relatively easy access to multiple levels as a result of
 - Patios scattered among upper levels
 - Many small windows are easily replaced for direct sampling to ambient atmosphere
 - Very cooperative and supportive management team
 - Good experience during 2000 campaign
 - Building engineers became very engaged in the project.
- Cons:
 - Unlikely to measure fresh emissions from Ship Channel (too far west)
 - All skyscrapers probably have some local circulation (e.g. chimney effect)
 - West side of Houston is not the main area of anthropogenic emissions
 - Difficult to make local meteorological measurements because of ground clutter (an issue for radar wind profilers) and glide paths into IAH (issue for 'sonde launches).

First Meeting with Property Owners

17 April 2006

- Barrett Cooke/Assistant Property Manager
- Very cordial reception
- Jack spoke well of our last visit and usage during TX2000 AQS!
- Only costs to project will be:
 - Replacing glass windows with plywood, ~\$350. Will require a few days to cut blanks, a few hours to do swap out
 - Insurance/liability
 - Would work with Environ/HARC to establish what needs to be done
- No reason we can't use building! Glad to help.

'High' altitude site

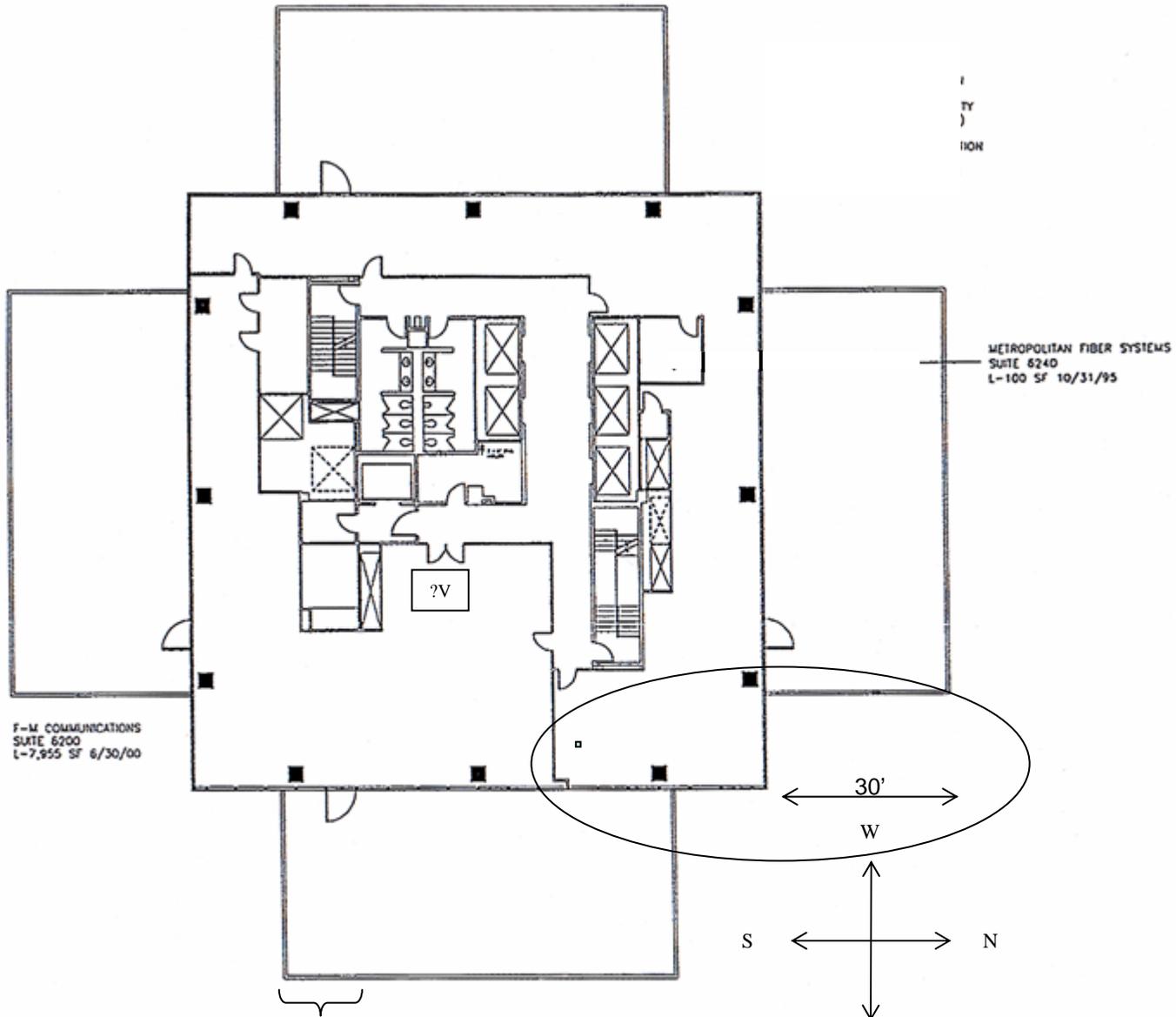
- 62nd floor, northeast corner
 - ~900 ft AGL
 - Can install wood cutout windows with access ports
 - Interior floor space 'vacant'
 - Can access exterior patios
 - Access only accompanied by building engineer
 - Safety walls
 - Need to weatherproof instruments
 - Many tie-down locations
 - Outside power

Intermediate Altitude Site

- 30th Floor ~ 400 ft AGL
- In process of renovation
 - Facility is empty. Can set up pretty much wherever we want.
 - They'd switch on power
 - No patios on this floor: would definitely need to add plywood template
 - Could set aside 'office' space (desks, coffee pot, etc. Would put lock on office and instrument room for us.
 - 24/7 access no problem
- Other floors available for 'intermediate' site include
- 49th
 - Patio access
 - This floor is 'home to Hines Corporate Offices = busy place
- Locations on 19, 20, 21, 22, 23, 31, 32, 34 and 35 floors.
 - No patio access.

'Surface' Site

- 6th Floor: ~100 feet AGL
 - Overlooking parking lot and pedestrian access to building
 - Hines Corporation Offices
 - Outside instrumentation only
 - Need to weatherproof instruments
 - Access through conference room: would need to work around schedule of others
 - Need window swap out
 - Lots of piping and tie-down sites on patio floor.
 - No significant safety wall (in contrast to 62nd floor)



LEVEL 62
 ← aerosols →

25 JULY 95



What Needs to be Done?

- Follow up meeting is scheduled for May 1st
 - Principals from each institute to meet with Barrett and Daren Kelly (chief engineer, Williams tower)
 - Tour 5th, 30th and 62nd floor sites
 - Discuss 'how to' with Daren.
 - » Window templates
 - » Special power, noise or heat related issues
 - » Discuss safety and related rules as visitors to the Tower
 - » How to get access to patios (need accompanying engineer)
- Note to Hines Corporation
 - When would we be there?
 - List of equipment, size and power requirements
 - Who would be there?
- Specific Logistical Issues
 - Black inlets = less apparent from outside (vs., say, white PVC)
 - Outside access only with building engineers
 - Freight elevator access for all instruments.
 - Onsite parking permits and 24/7 access will be granted.

Things to be addressed at May 1st meeting

- Cross calibration of instruments
 - PTR-MS units (one at each level)
 - CO, O₃, NO_x, NO_y
 - Temperature, moisture
 - ??
- Are samples representative of air mass at each level?
 - Is there a preferred side to sample from?
 - Can we define a 'tracer' that would give us a measure of how much local contamination is being measured?
- Getting insurance and liability issues squared away
 - HARC has contract with Environ Corporation
 - Environ helped with this issue in 2000
 - In touch with David Souten/Environ to get these discussions going

Expected Logistical Issues

- Building Access:
 - For insurance reasons, no card will be issued to undergraduate or graduate students; they can be in the lab only with a faculty or staff. 7.
- Parapet Access for Staff and Instruments
 - no access to the parapet unless Chief Building Engineer) has been notified in advance. They will unlock the half-height doors to let staff out. Any instruments on the parapets must be
 - b) sand-bagged to the satisfaction of Dave or his designate and
 - c) must be virtually invisible from the ground. The later means that anything sticking above the guard walls (e.g., the aerosol sampling inlet) must be a light gray/bluish color. Building management reminded us several times that this building is frequently on television via helicopter traffic reports and news events in downtown Houston. They are very sensitive to appearance. Camouflage is the key word for parapet instruments.
 - Be warned that it is blazingly hot when the sun is directly on the east parapet.
- Elevator Access
 - The first freight elevator goes to the 58th floor; a second freight elevator takes you to the 62nd floor.

Building Access

- Prior approval for each individual will need to be given by building management
 - Visitors are fine if accompanied by approved staff.
 - Will be issued 24/7 prox cards, parking permits by management.
- Set up/tear down will be done on weekends or after hours so as to minimize noise and related disturbances to building residents.
- Door/elevator widths and access
 - Access to the rooms requires going through a 33" wide door. The freight elevator is about 15 ft tall and has doors that open to 44 ½" .
- Safety:
 - No one on patios with direct supervision of building engineers
 - Twice weekly safety checks by building managers
 - Concern with compressed gas cylinders (e.g., cylinders secured, safety caps in place)
 - Will look for Material Safety Data Sheets and assess the general state of the laboratory.

Working Issues Based on Past Experience

- **1. Compressed Gases:**

- Building managers will be concerned about compressed gas cylinders in standard office space. We'll have to provide straps to fasten big cylinders to tables or pillars (with protection so we don't mar the paint on the pillars, e.g., foam liners).
- a) a list of the type of gas and the expected number of containers for each instrument. If the cylinder is not on our master list it may be precluded from entry to the building.
- b) a printed copy of the Material Safety Data Sheet on or near the cylinder. No MSDS = no building access. The building engineer told us that if his team has to move stuff around when no one is there they want to know what they're moving.

- **2. RF Radiation**

- Building managers will ask if any of the instruments generated significant levels (?) of RF radiation. Instruments will be removed from building if they interfere with communication systems.



