

A New Telemetry System; A New Way of Doing Business

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Ecology

The Starring Cast

- Ecology Staff – Kathy Sundberg, Mike Ragan, Sean Lundblad, Curtis Carpenter, James Theivagt, David Bumgardner, Joan McMillen, Mike Thompson, Greg Hannahs, Diane Bedlington
- Puget Sound Clean Air Agency - Ken Knowle
- Spokane County Air Pollution Control Authority – Ron Edgar
- Olympic Region Clean Air Agency – Jim Werner
- Northwest Clean Air Agency – Axel Franzmann
- Southwest Clean Air Agency – Jackie Brown
- Municipality of Anchorage – Larry Taylor

Other partners

- EPA
- Yakima Regional Clean Air Authority
- Benton County Clean Air Authority
- US Park Service
- US Forest Service
- Tribal Entities

Getting the NEIEN Grant

If at first you don't succeed.....

- Began planning process in 2001 with thought of funding a new system ourselves
- Money dried up while we were planning
- Staffing went from >150 to around 110
- Learned of the NEIEN (National Environmental Information Exchange Network) Grant process
- Submitted our first Grant request in Spring 2003

- Didn't receive a grant
- Applied again in 2004
- Awarded the grant in the Fall of 2004

We found it interesting that we didn't make any substantial changes in the request between years and were still awarded the grant

So the lesson isTry again

Our existing telemetry system

- Consists of leased lines, cell modems, and dial ups communicating at 1200 baud
- Using an ESC central system which was last updated in 1999 in preparation to deal with the Y2K scare
- Combination of 8800 and 8816 data loggers
- No integration of manual method data collection and data basing
- Ecology HQ, 3 regional offices, 7 local air agencies, 2 federal and 6 tribal users with monitoring sites

Hewlett-Packard Company
3000 Hanover Street
Palo Alto, CA 94304 U.S.A.

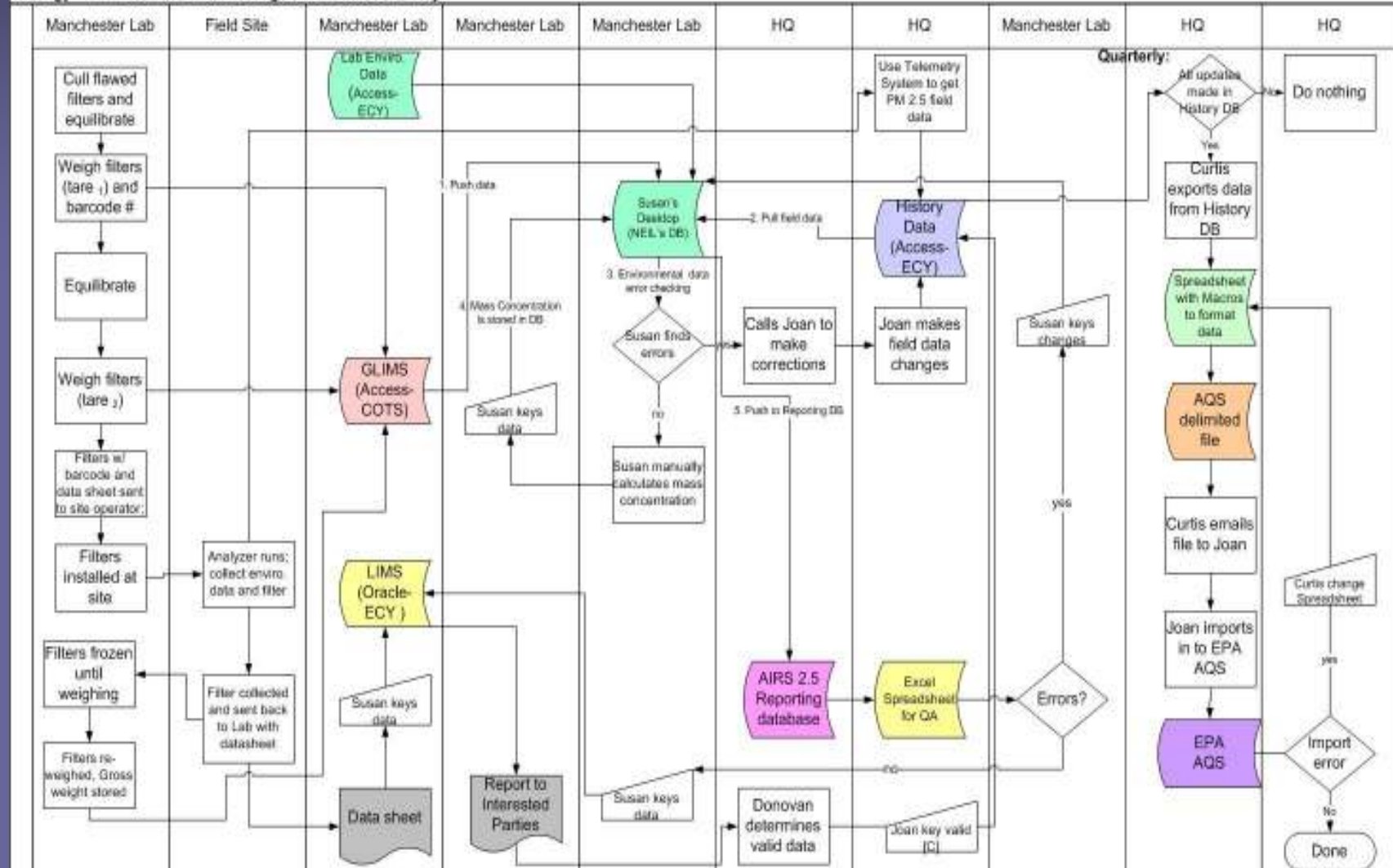
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Washington State Department of Ecology
Ambient Air Quality
Telemetry System

Developed by
Environmental Systems Corporation

Lab Data Flow

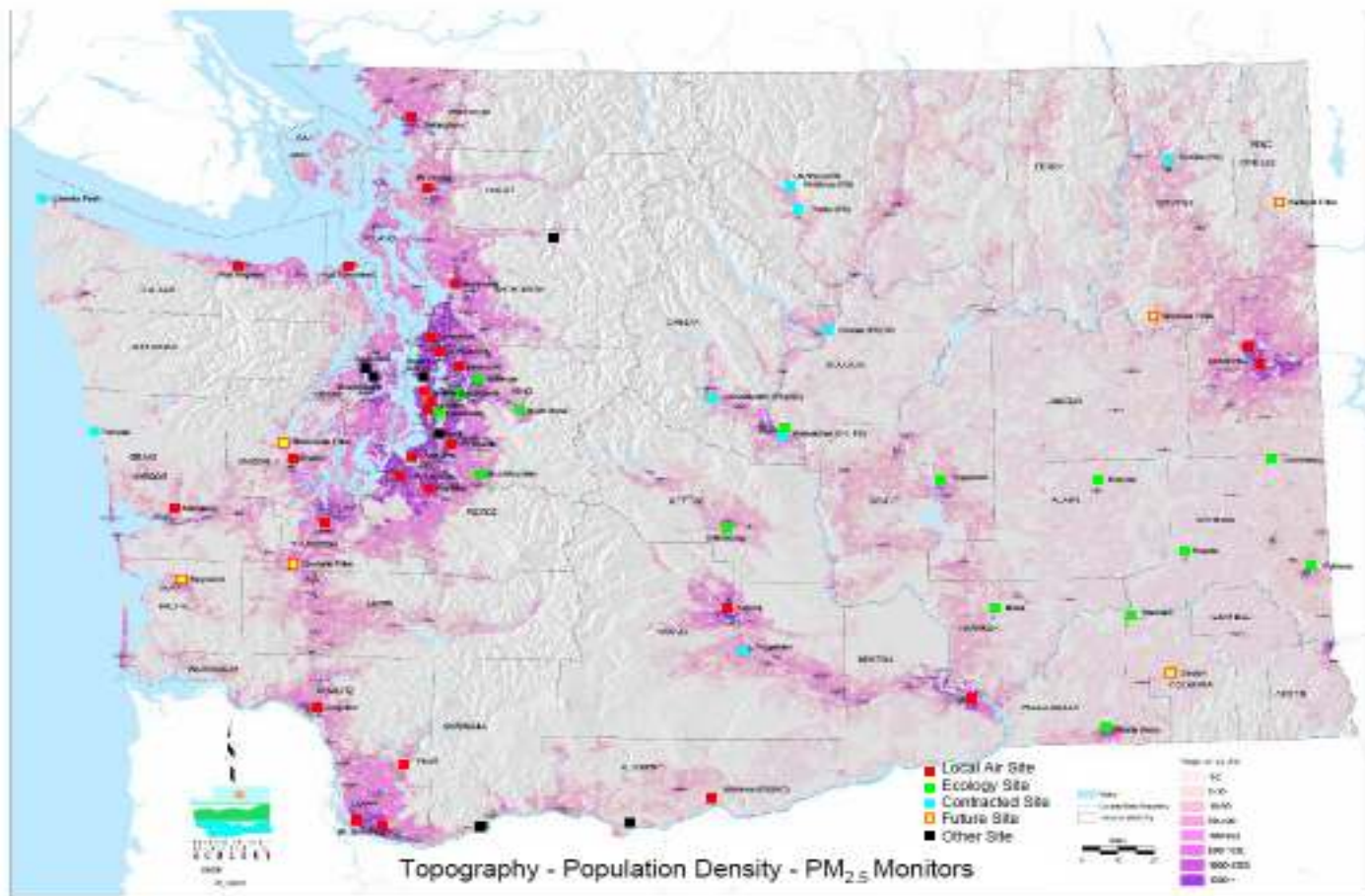
Ecology PM 2.5 Filter Processing and Database Entry



Our Monitoring Network

- Some multi-parameter sites, usually located in close proximity to each other
- Many single parameter sites in Eastern Washington located many miles apart
- Still using strip charts for primary record where monitoring for criteria pollutants and meteorological parameters

Washington's PM_{2.5} Network

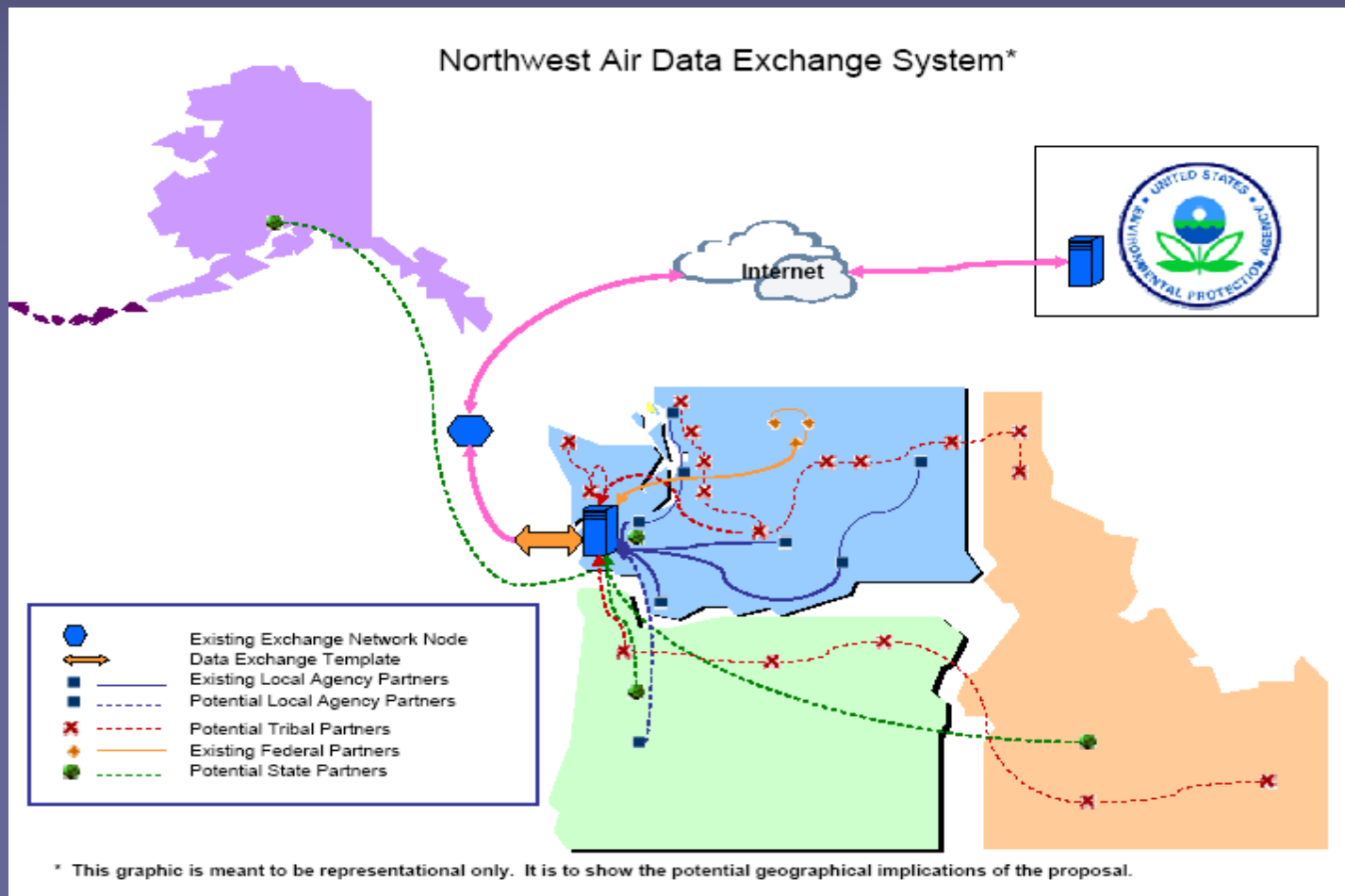


The need

- Share ambient air quality data on EPA's Central Data Exchange network node system
- Move the partners toward compatible systems and accommodate their needs where possible
- Maximize current investments
- Provide opportunities for growth of the system
- Minimize handling of data and take advantage of work efficiencies (get rid of strip charts, reduce staff and travel time)

- Improve information distribution to the public and partners
- Achieve a balance between operational costs and capital costs
- Faster communication
- Ability to collect instrument diagnostics
- Single application that handles automated and manual method data with hopes for an inventory data base too

The Concept



The Process

- Engaged all of our partners and formed a core team
- Developed/refined a list of needs
- Ranked them in order to determine if they'd be required or highly desirable
- Develop the Request For Information (RFI)
- Engage potential vendors in a pre-bid meeting to answer questions

- Developed a bid evaluation scheme
- Let the bid
- Evaluated the bid (we only received 1)
- Reference checks
- Award the contract

Throughout this process we used information from other states processes to help us refine our own (New Mexico, New York, New Jersey, others)

Some Core Requirements

- Internet-based
 - Remote access from anywhere
- Must leverage our existing system
 - Capable of using our existing loggers when necessary
 - Use all forms of communication – leased lines, cell modem, DSL & Cable, Intergovernmental Network, etc.
- SQL database

- Graphical data validation tools
 - Ability to catch instrument problems early
 - Discontinue use of paper, pens, recorders
 - Electronic strip chart annotation
 - Electronic station logs
- Expand existing capacity
- Access to all digital data stored within instruments
- 1 minute data acquisition

- Expanded reporting capabilities
 - Current AQS format
 - Stock & ad-hoc reports
 - Data for public websites
- Flexible AQI reporting
- Single integrated application
 - No separate applications for manual and automated data
 - Hope for an inventory database

The Result of the RFP

- Awarded to DR DAS
- Decided to go with servers at each site rather than standard PCs
- Approximately \$700k for hardware and software
- Costs does not include in-house staff time (we sucked it up)



Getting rid of these



Mostly rid of these

Now we have these



- Navigation Map
- State Map
- Regional Maps
- Dynamic Table
- Reports
- Information
- Publications
- Links
- About
- Languages
- Login

Close

Total:806
Current:2
User:Guest

Washington Air Quality Monitoring



- To begin generate report and graph follow these steps:**
1. Select station to work on by choosing 'station report' on 'reports' menu tab .
 2. Select dialog tab to define reports parameters.
 3. Click on 'Generate Report' button to process the request.
 4. Click Grid / Graph to change report viewing.

News

NEWS

- #### Related Links
- Haifa association
 - Ashdod association
 - Ashkelon association
 - Hadera association
 - Envitech

Installing a test site



Challenges

- Our Agency would not allow monitors and keyboards at sites.
 - Our work-around was using laptops to connect in the field.
 - Met with resistance, but remember a focus of the new system is to reduce site visits
- Multi-user sessions on the same server
- Application needed to be customized
- Difficulties dealing with service providers

An Unanticipated Challenge

- Air monitoring operator morale issues surfaced around decreased field work
- Apprehension around changes in responsibilities
- Apprehension around need to acquire a new skill set
- Concern about moving outside of one's "comfort zone" and doing work differently when the methods haven't clearly been defined

What seems easy, easily becomes difficult



Security Issues

Ecology IT & Dept. of Information Services Requirements

- Link from central server to each site uses the Internet
- Secure link from central server to each site
- VPN use from partner agencies to central server
- Access to site server via central server only
- Site link can only reach central server, no Internet access
- Sites use DSL modems with firewall capacity
- Site access uses ports 443 (https) and 3398 (terminal server)

Successes

(but we're not done yet)

- Installed 4 test sites
- Testing the central system, now polling data
- All instrument manuals on line and available at sites
- Will have VPN capability so operators can remotely access sites, control instruments, perform QC, make logbook entries

The way we do things now:

Automated Methods (continuous samplers)

Operator:

- Drives to the site (this is where there are no returns on resources expended), frequency of visits depends. Some operators visit site weekly, some visit every 2 weeks. Some sites are a 3 hour trip one way.
- Performs QC, possibly calibration and routine maintenance, annotates log book, collects strip charts
- Returns to the office to process strip charts and perform other work

Manual Methods

Operator:

- Depending on the sampling schedule and type of pollutant installs and retrieves filters. This may be weekly for PM_{10} or every fourth day for $PM_{2.5}$
- Collects field data and programs the sampler
- Performs QC, calibration, and maintenance

The Future:

Operator:

- Drives to site only once per month (more or less if necessary)
- Daily, remotely accesses their sites from computer – office or home
- Performs online QC checks, calibrations, data reduction, and Level 1 Data validation without leaving their computer.
- May need to know more about peripherals; PCs, new communication devices and new technologies
- May need to be trained to diagnose different problems
- May need to have additional skill sets

The Payoff

- Reduced travel time
- Reduced vehicle costs
- Faster data validation
- Resources (staff and dollars) to redirect
- Improved information distribution to the public and partners
- Other agencies can access/use the system to collect data