HRSD - Bringing Time and Space Together for Operational Awareness in Waste Water

Kimberly Peterson, Data Analysis Manager, HRSD
Clay Wise, Chief of IT Operations & Support, HRSD

18 FEB 2016

OSIsoft.

HRSD
Cleaning wastewater every day for a better Bay.

Agenda

- Outline
  - Who is HRSD
  - Operational Data Issues / Concerns
  - PI System Deployment
  - Real-time Data is Geospatial Context
  - HRSD Data Center
  - HRSD's Future Goals

HRSD - Introductions

- **Kimberly Peterson**
  - Data Analysis Manager

- **Clay Wise**
  - Chief of IT Operations and Support

Who is HRSD

HRSD - Mission

- We protect public health and the waters of Hampton Roads by treating wastewater effectively.

  - HRSD is recognized as a leader in the industry, with an impressive record of environmental permit compliance.

HRSD - Vision

HRSD VISION:

Future generations will inherit clean waterways and be able to keep them clean.

HRSD - History

- 1920s – Estimated 25 mg of raw sewage ente local waters daily
  - By mid-1920s, over 10,000 acres or oyster beds were condemned
- 1927 - VA General Assembly created a commission to investigate and survey the seafood industry
- March 27, 1934 - Hampton Roads Sewage Disposal Commission (HRSDC) is established
- November 5, 1940 - the referendum to create HRSD was approved.
- Now – HRSD treats 249 million gallons per day

Read the fascinating history of HRSD's creation by public referendum at www.hrsd.com/history

HRSD A Political Subdivision of the Commonwealth of Virginia

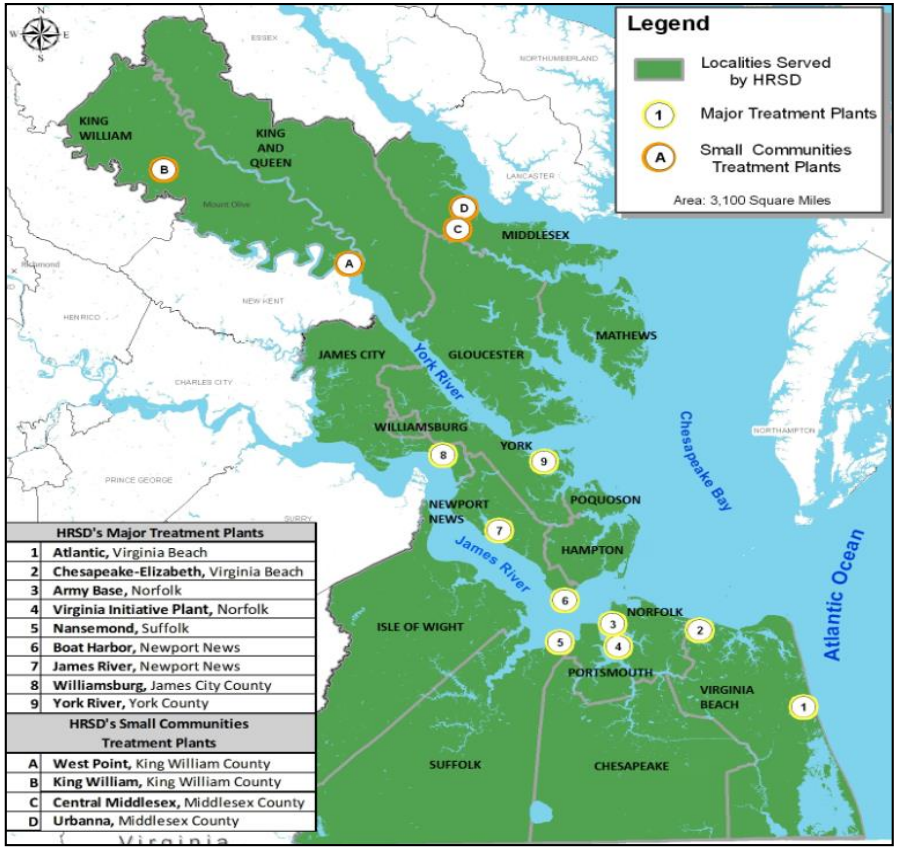
HSRD serves 17 counties and cities.

Serving the Cities of:

Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, Williamsburg

And the Counties of:

Gloucester, Isle of Wight, James City, King William, Mathews, Middlesex and York



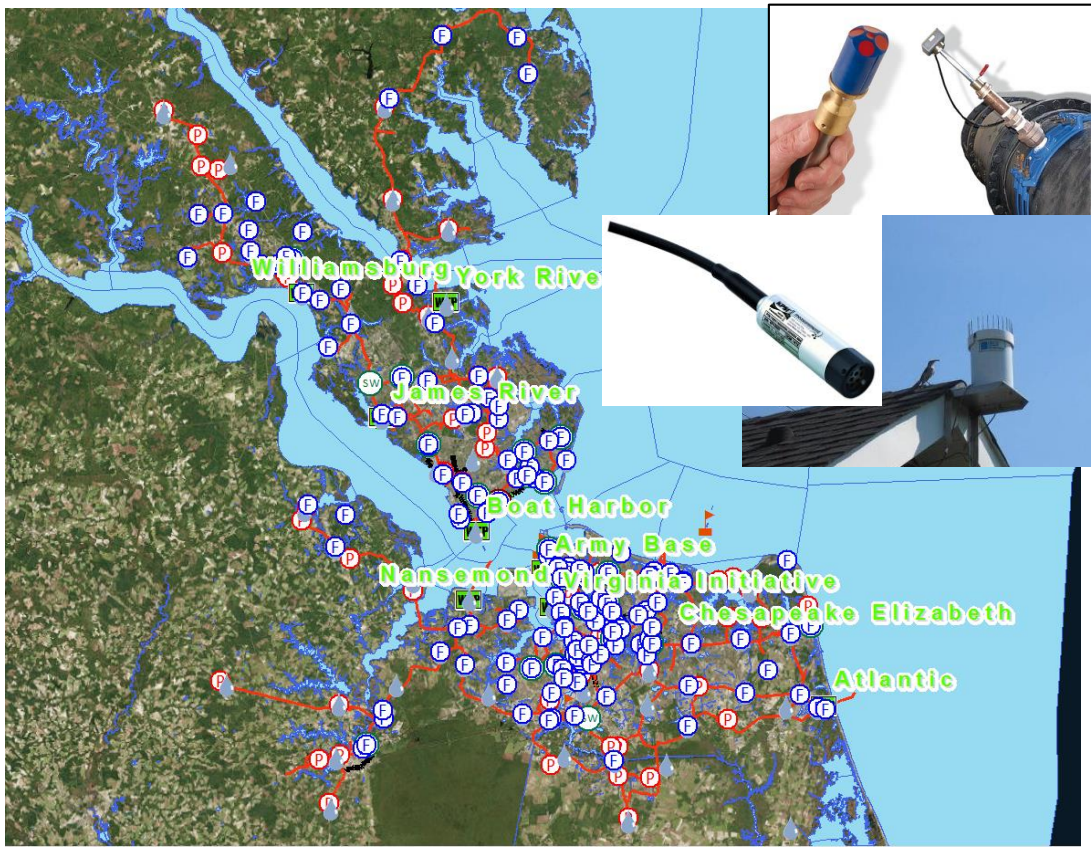
HRSD – Fast Facts

- **Year Created:**
  - 1940
- **Type of Agency:**
  - Governor-appointed political subdivision of the Commonwealth of Virginia
- **Population Served:**
  - 1.7 million (nearly 1/4th of VA's population)
- **Collection System:**
  - More than 500 miles of pipes, 6 to 66 inches in diameter
- **Pump Stations:**
  - ~ 112
- **Treatment Plants:**
  - 9 major plants in Hampton Roads and 4 smaller plants on the Middle Peninsula
- **Combined Capacity:**
  - 249 million gallons per day

HRSD Operational Data

HRSD's Monitoring Network

- 160 flow meters
- 156 pressure sensors
- 74 rain gauge
- 21 groundwater shallow well sensors
- NOAA Tide Data
- Multiple Weather Stations
- Collecting Pump Station data
  - RPMs, Drive Outputs, Wet Well Level



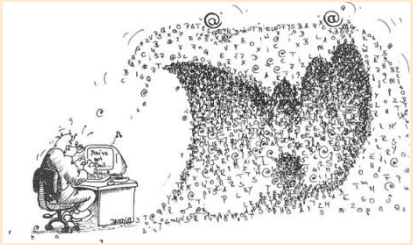
HRSD's Monitoring Network

- Data collected through telemetry and ethernet / ip protocol
- Most data collected at 2-min intervals
- Data is collected by Telog® recorders in the field
- Data is collected by the PI Server from the Telog® server through a PI Interface for RDBMS.

Challenges for HRSD

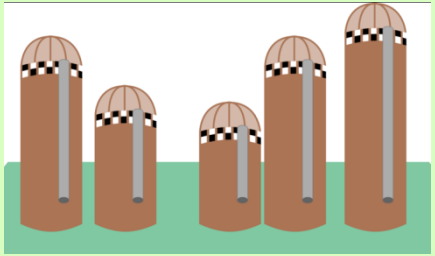
Need to Protect the Data

Regulatory compliance data growing too large in current SQL database



Growing Data Monster

Current data growth and the need to keep large amounts of “raw” data.



Too Many Data Silos

The same information is in many different databases and available for viewing for customers in different applications.

Planning for the Future

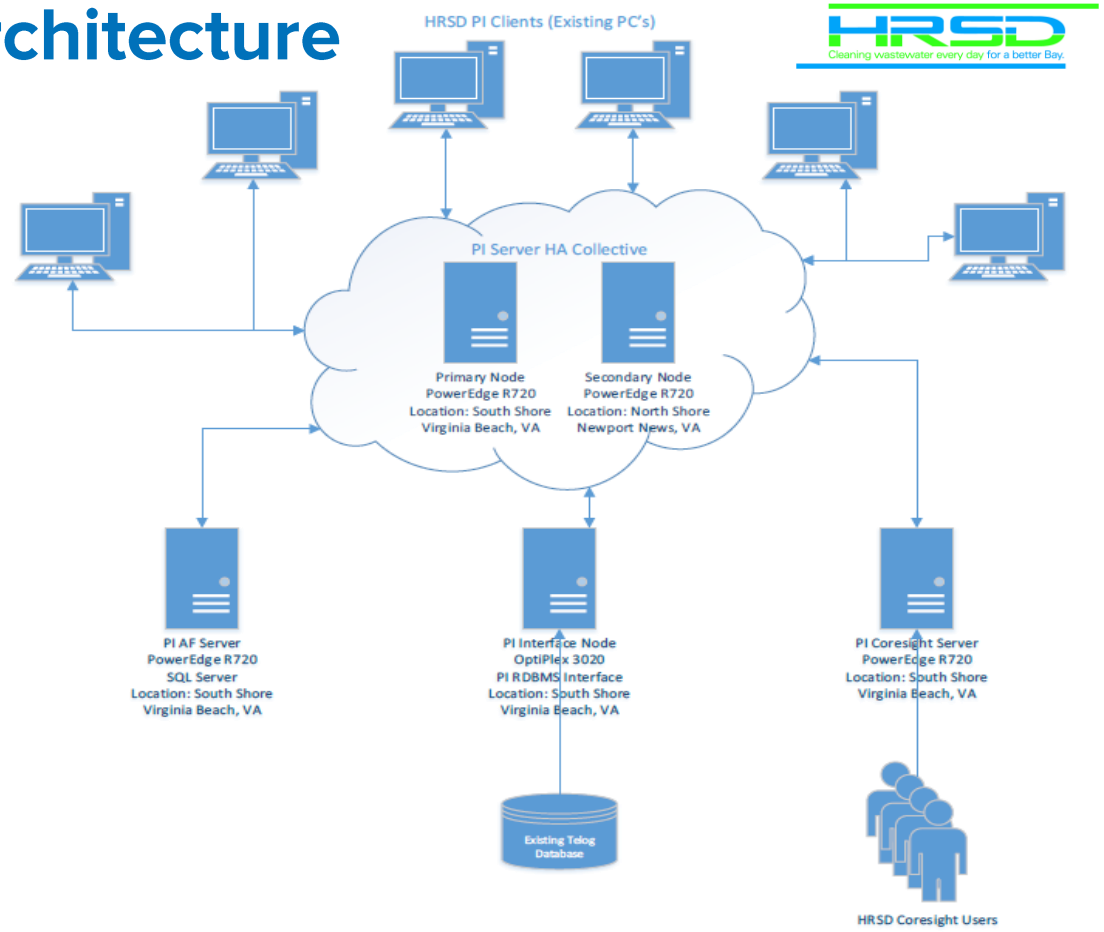
HRSD saw a need to plan for future expansion of data collection

PI System Deployment

HRSD – PI System Architecture

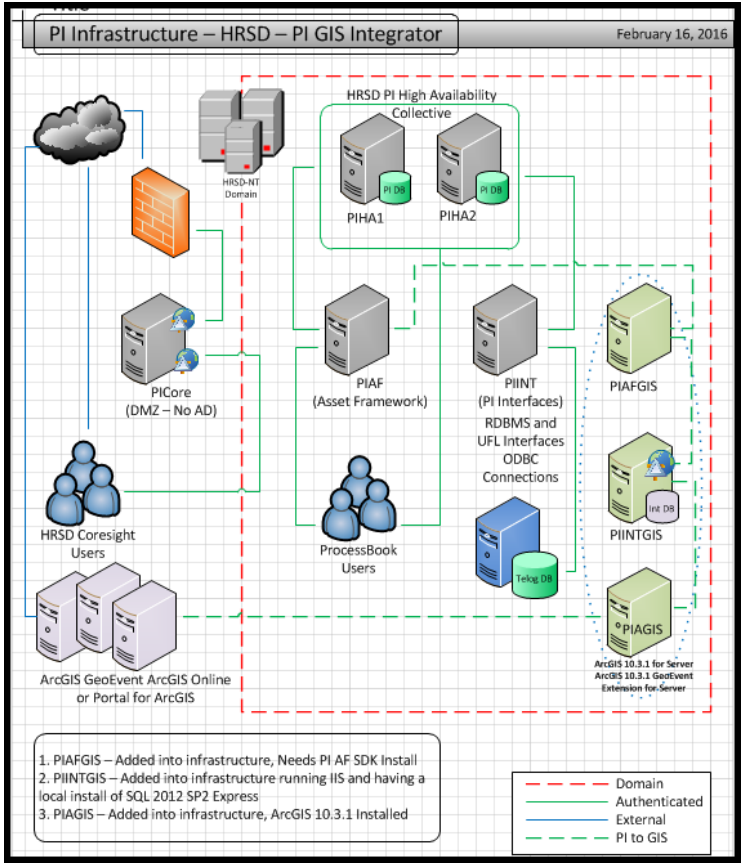
Built for:

- Redundancy
- Visibility both internal, and external clients.
- Transparency
- Web based solution to maximize user base.



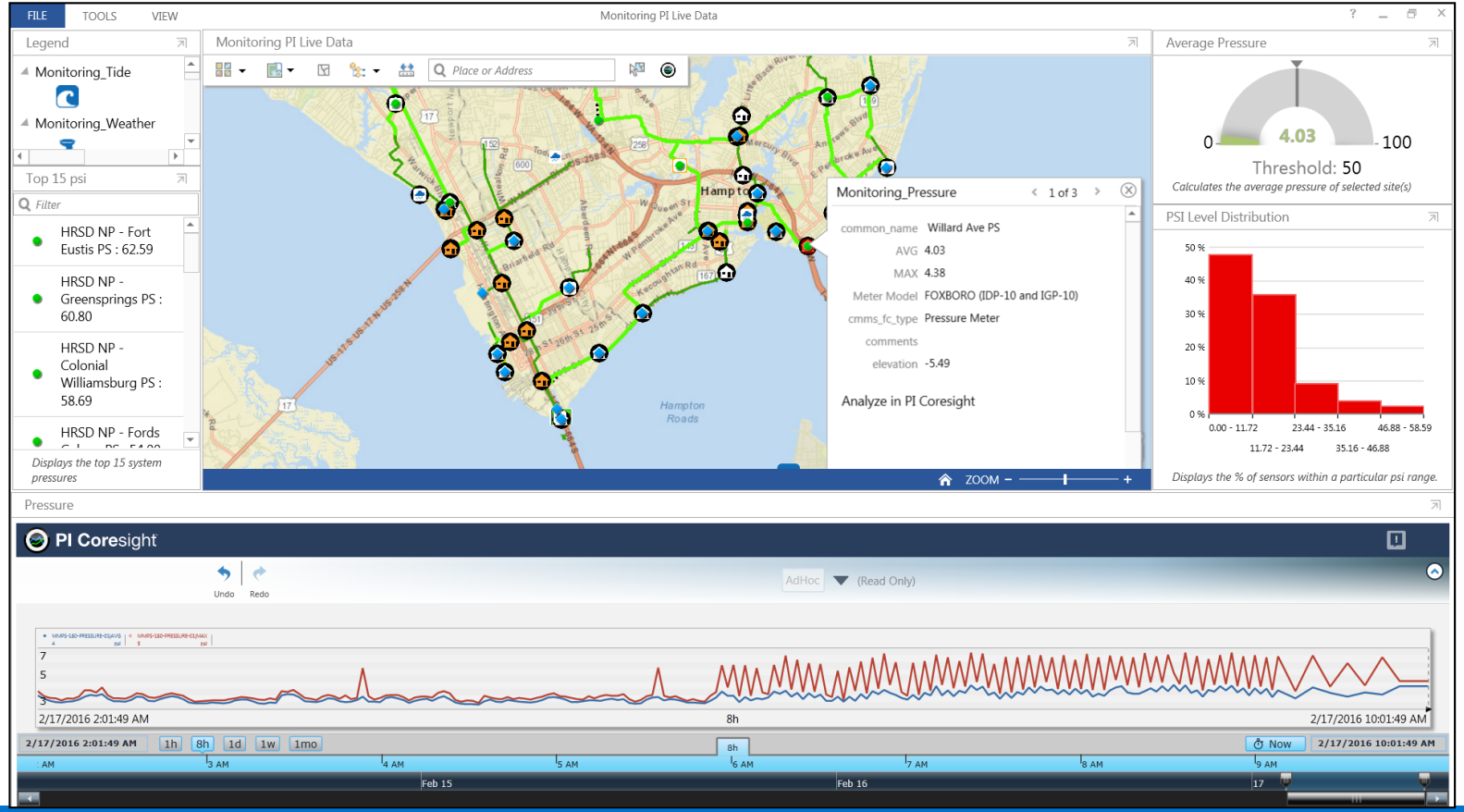
HRSD – PI System / ArcGIS Architecture

- HA – High Availability
- PICore – Web based solution for non spatial data
- PIINT – Location data
- PIAF – Asset-based data
- Web based through ArcGIS Online.



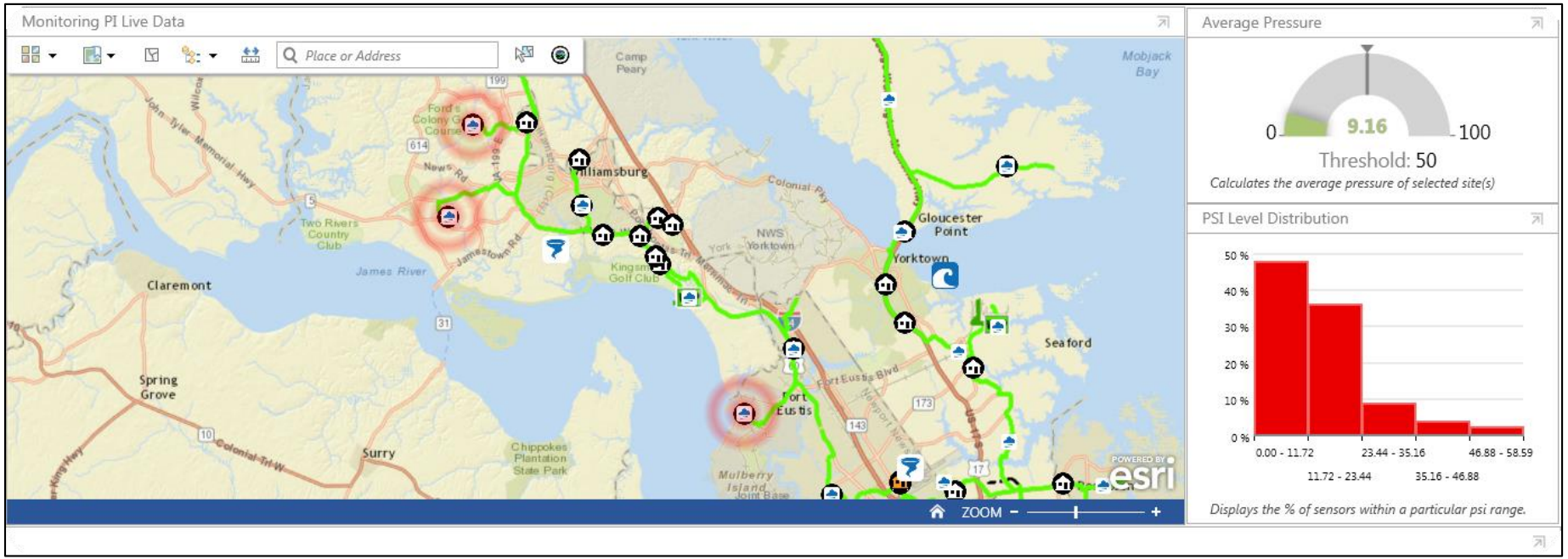
Real-time Data in Geospatial Context

HRSD – PI Integrator for Esri ArcGIS



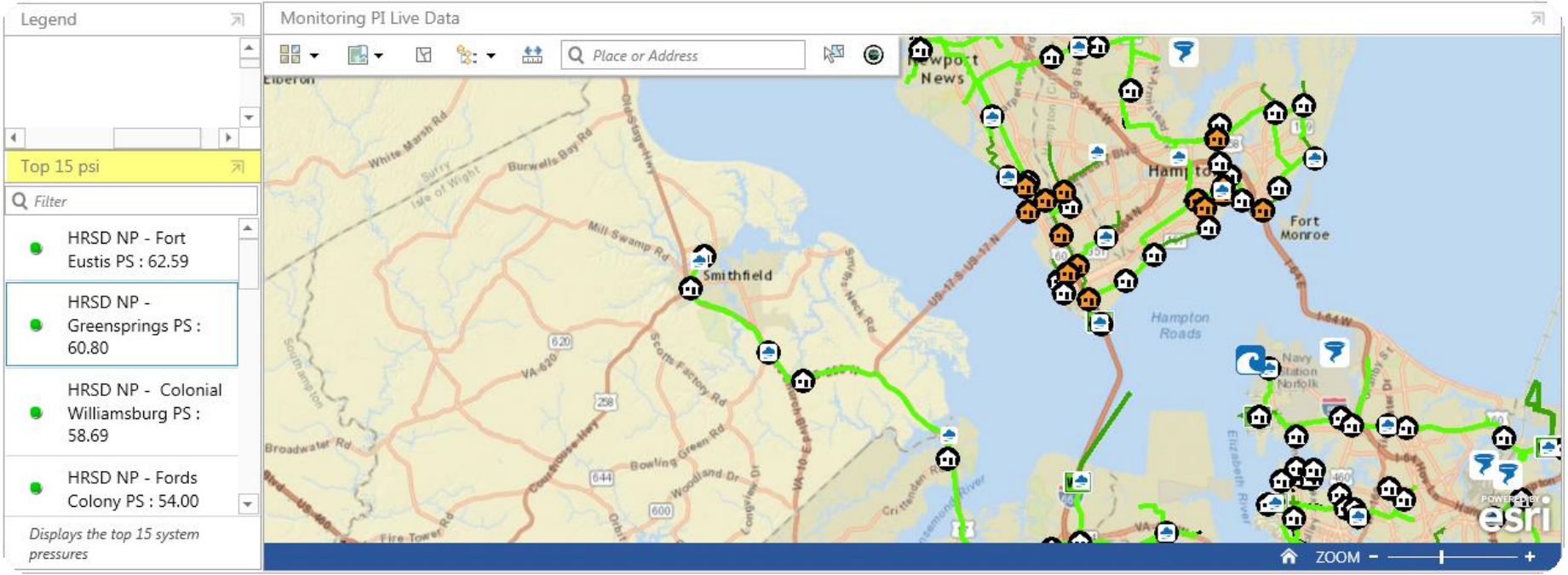
HRSD – PI Integrator for Esri ArcGIS

Histogram quickly displays distribution of pressure in the system.



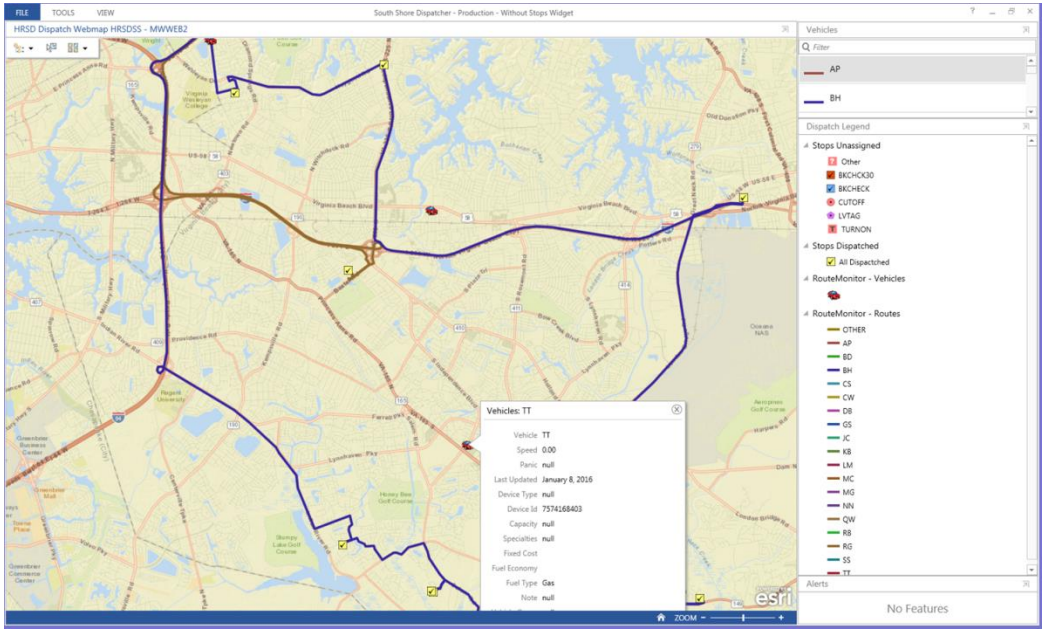
HRSD – PI Integrator for Esri ArcGIS

Widget displays Top 15 Pressures in the system.



Future Goals

- Mobile Workforce
- Interceptor Crews
  - React faster to system issues.
  - Increased safety during inclement weather events.



HRSD Data Center

HRSD Data Center

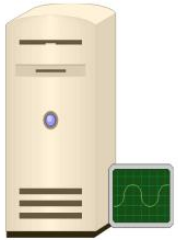
IT Data Centers

IT On-Call Phone:

North Shore Data Center

NS IT Data Center

	Alarm Level (°F)	Current Temp (°F)
East	74.00	69.94
West	74.00	69.52



South Shore Data Center

SS IT Data Center

	Alarm Level (°F)	Current Temp (°F)
Rack 101-6	83.48	78.56
Rack 104-1	77.63	72.70
Rack 104-11	76.64	71.25
Rack 107-5	73.08	66.75

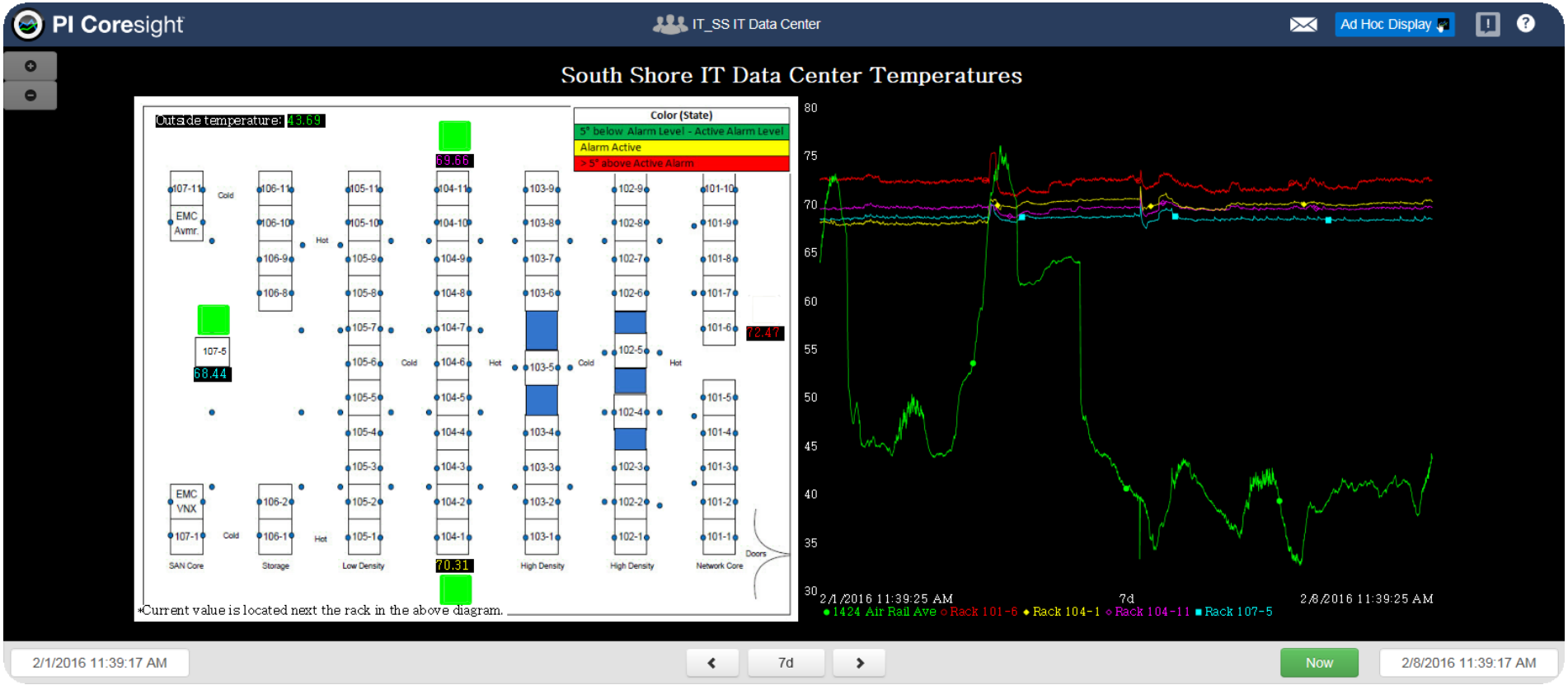
IT Emergency Contact List

	Home Phone	Mobile Phone
Nick Boardman		
John Peake		
Robert Walling		
Amy Wood		
Shawn Williams		
Clay Wise		

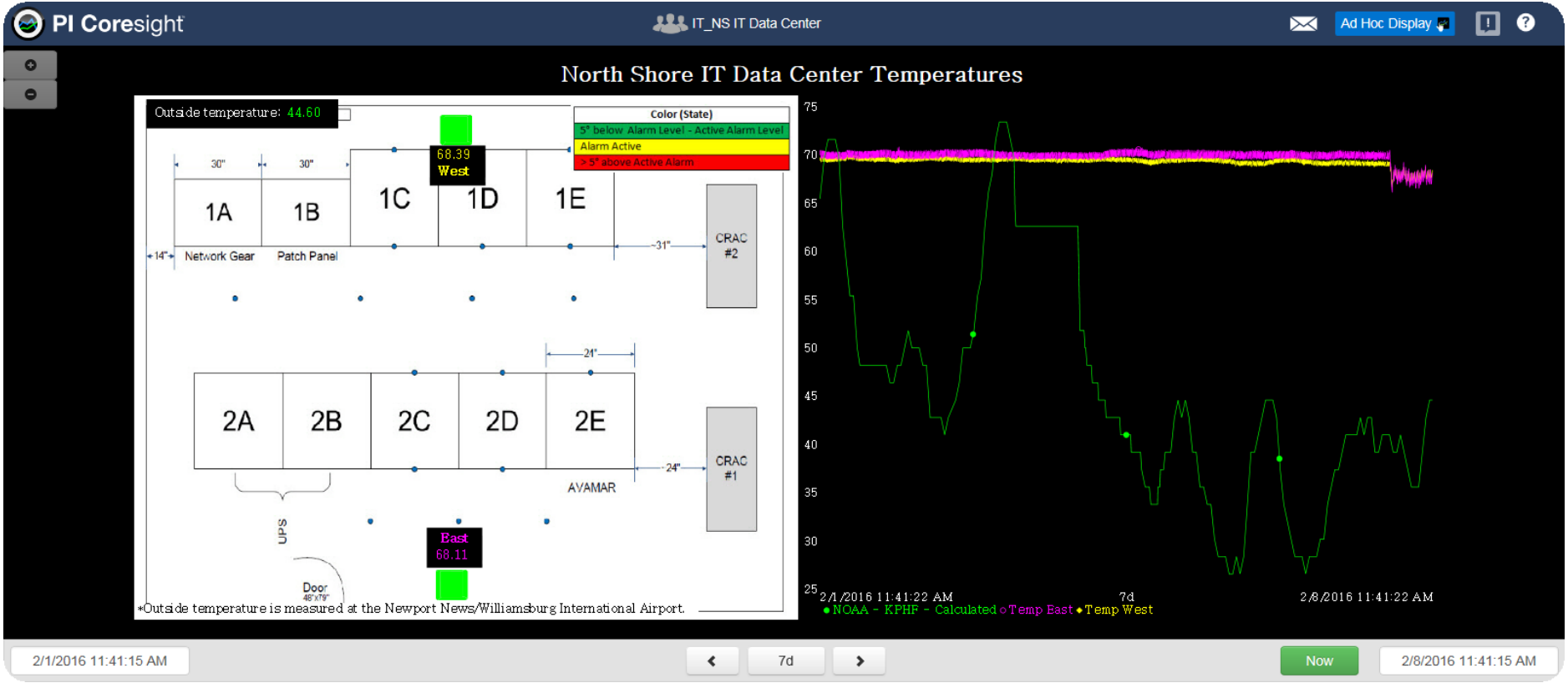
Useful Websites and Local Weather

- HRSD's Telog Web Module
- National Hurricane Center
- WunderMap
- NWS Forecast for Norfolk, VA

HRSD Data Center – South Shore

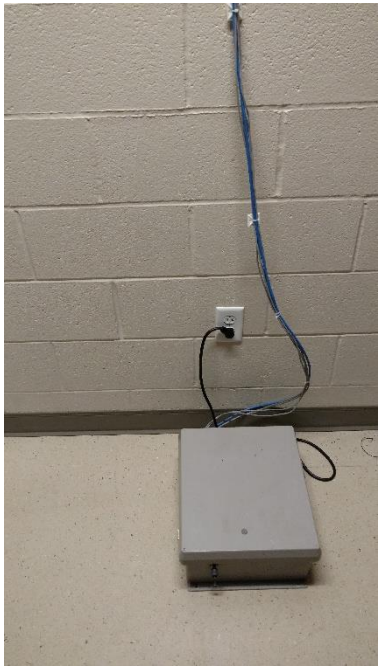


HRSD Data Center – North Shore

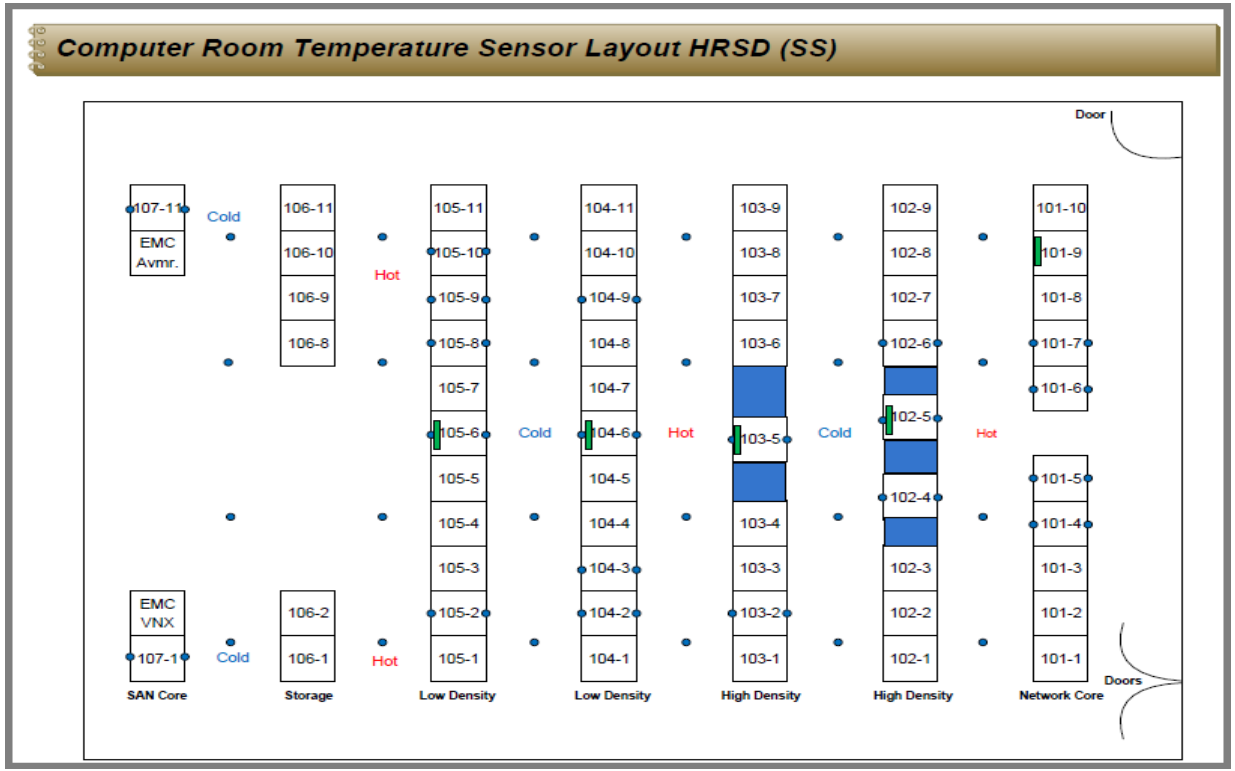


Data Center Sensor Implementation

- Current Sensors
  - Collected by Telog® Recorders
    - 4 Ambient Temperature Sensors in SS Ops DC.
    - 2 Ambient Temperature Sensors in NS Ops Server Room.

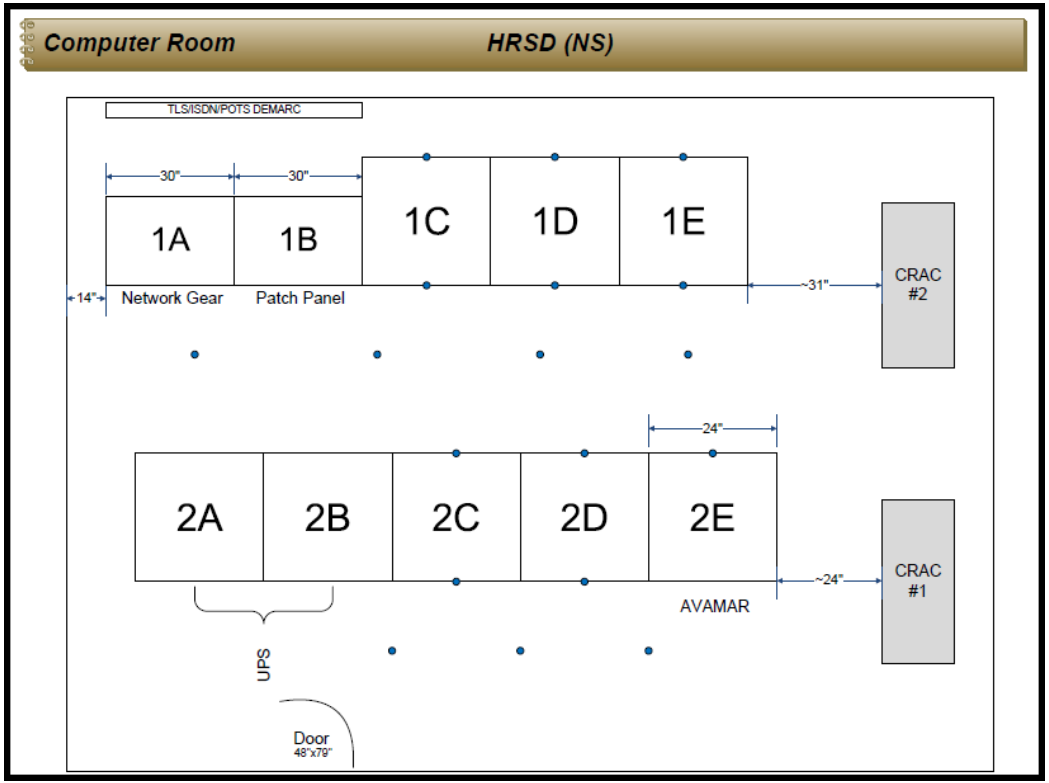


Data Center Sensor Implementation



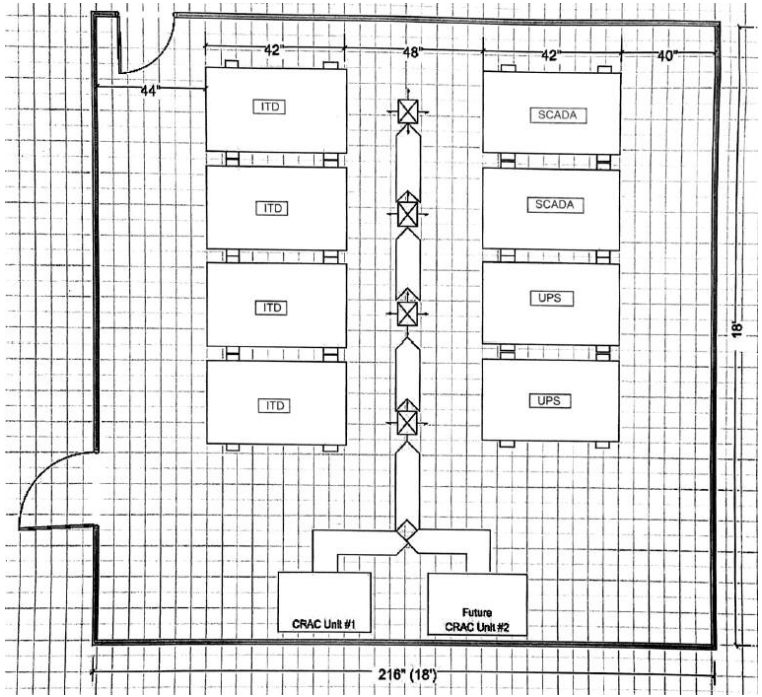
- Up to 60 RF Sensors are being installed.
- They will each collect temperature and humidity every 10 seconds.
- Alarming is very helpful to minimize the impact of thermal events.

Data Center Sensor Implementation



- 5 year battery life.
- 18 sensors for the North Shore Server Room.

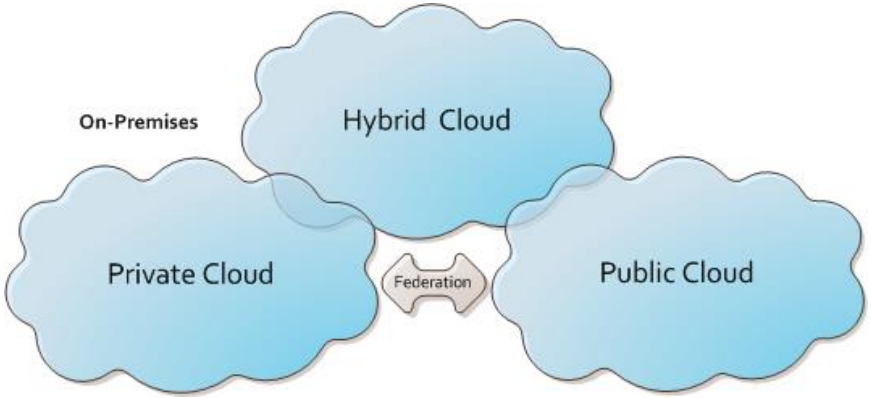
Data Center Sensor Implementation



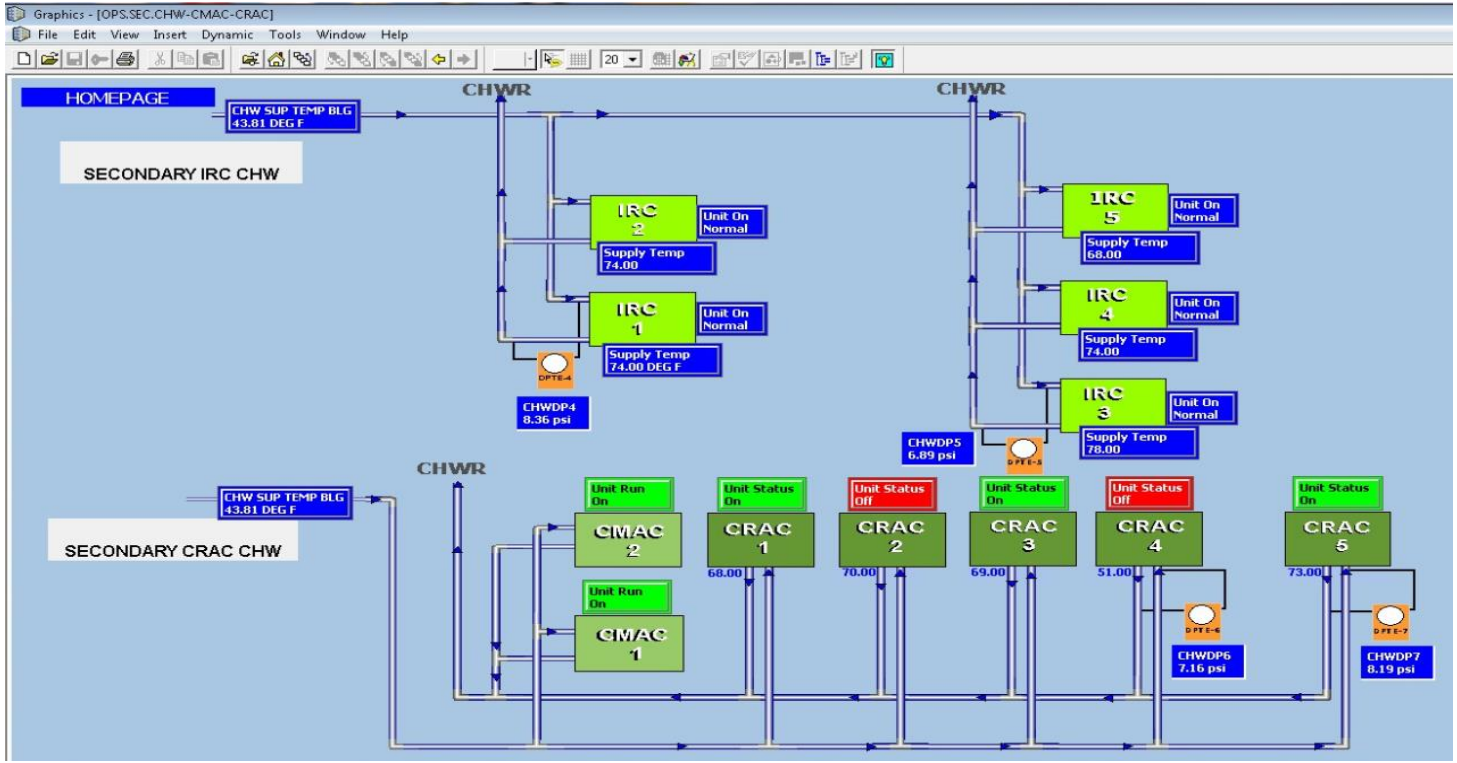
- Small Communities Division
- In design phase.
- Plan to design space using a lessons learned approach.
- Estimating 16 sensors at this location.

Ultimate Data Center(s) goals

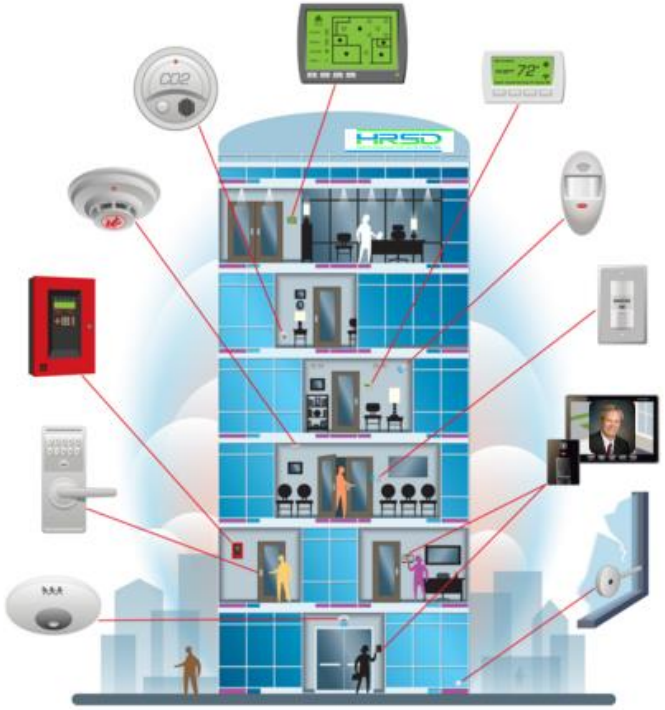
- To be responsive.
- True high availability.
- A private cloud.
- Plan for the future of HRSD.
  - VDI
  - More jurisdictions
  - SCADA



Building Automation



Building Automation



- Monitoring
  - Across departments
- Alarming!
- Preventative maintenance
- Web-viewing of Data

Summary

COMPANY and GOAL

HRSD protects public health and the waters for 17 cities and counties in Hampton Roads, VA by treating wastewater effectively.

Our vision is that future generations will inherit clean waterways and be able to keep them clean.

CHALLENGE

HRSD saw a need to plan for future expansion of operational data collection

- Regulatory compliance data was growing too large in the current SQL database
- Current data growth and the need to keep large amounts of “raw” data
- Too Many Data Silos

SOLUTION

The OSIsoft PI System as a data infrastructure offered the most robust solution evaluated

- Performance, scalability, availability, security and functionality

RESULTS

Ease of deployment, speed of data delivery and connectivity standards

- Fast deployment of the system
- Expansion in scope for future proofing operational data
- Improved awareness and efficiencies in Operations

Contact Information

Kim Peterson

kpeterson@hrsd.com

Data Analysis Manager

HRSD

Clay Wise

cwise@hrsd.com

Chief of IT Operations and Support

HRSD

Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

Thank You