

SCADA

in

Water & Wastewater Systems

Scott Fausneaucht

PRO-TECH
SYSTEMS GROUP



The Operator Training Committee of Ohio, Inc.

SCADA

What does it mean?

S **Supervisory**

C **Control**

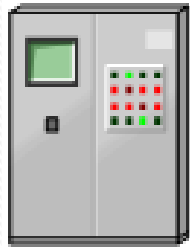
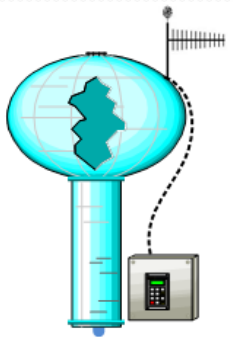
A **And**

D **Data**

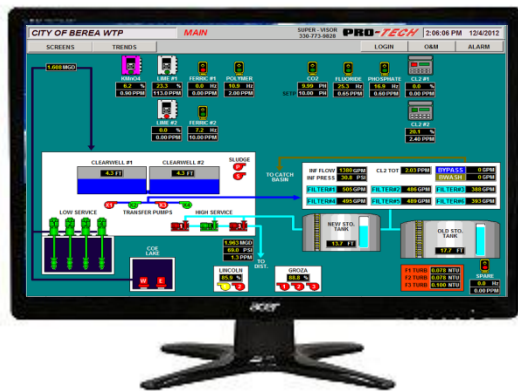
A **Acquisition**

Three elements of a SCADA system...

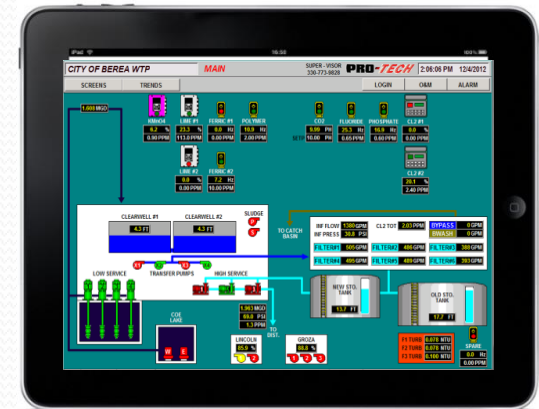
- RTU – Remote Telemetry Units
- Sensors
- Instruments

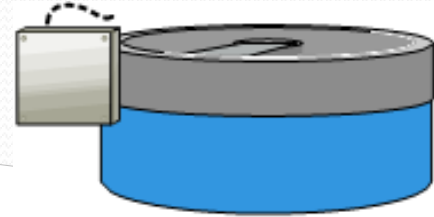
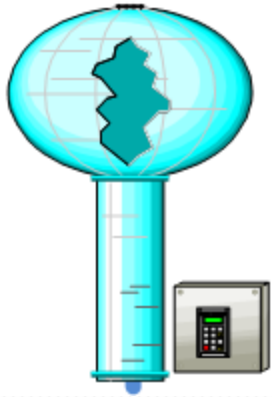


- Communication Networks
- Wired or Wireless



- Main Console
- OIT– Operator Interface Terminals

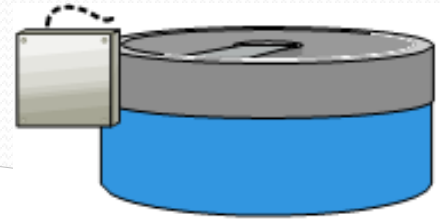
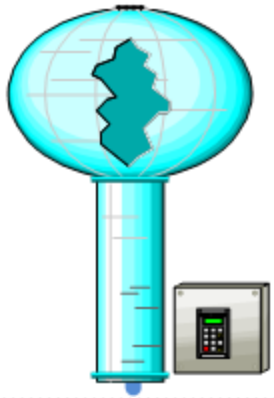




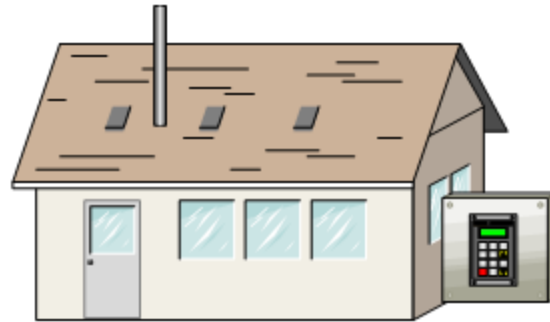
RTU – Remote Telemetry Units

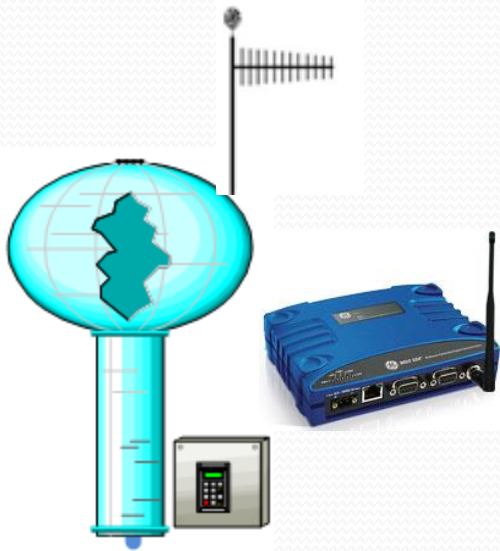
Collects Information at remote locations



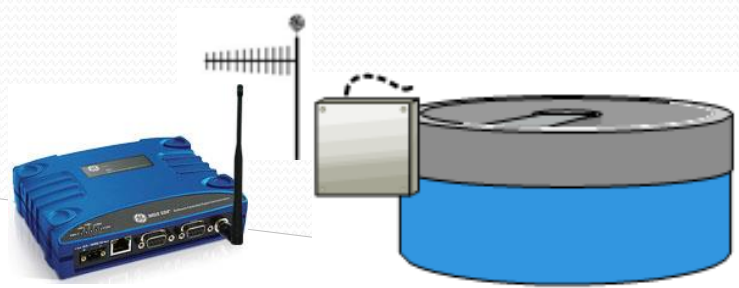


**Communication Networks—
Transmits information**



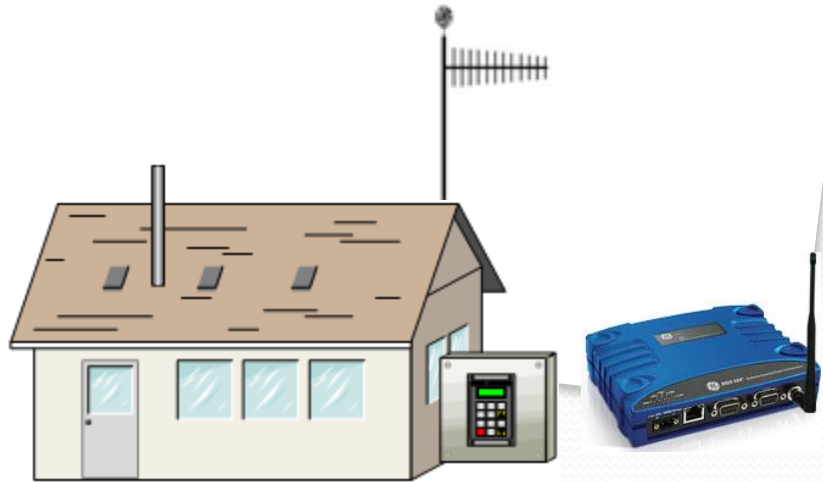
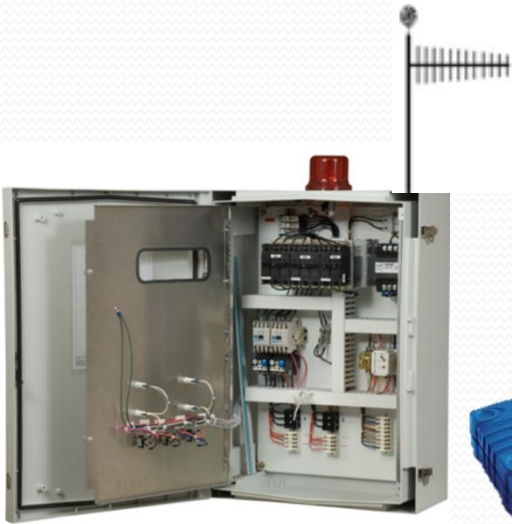


Licensed - Unlicensed

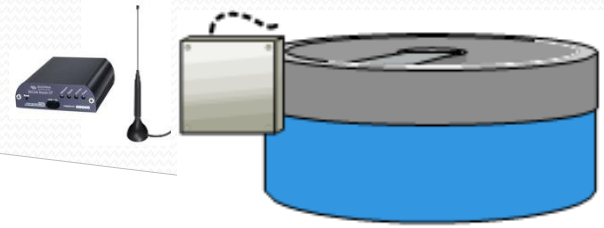
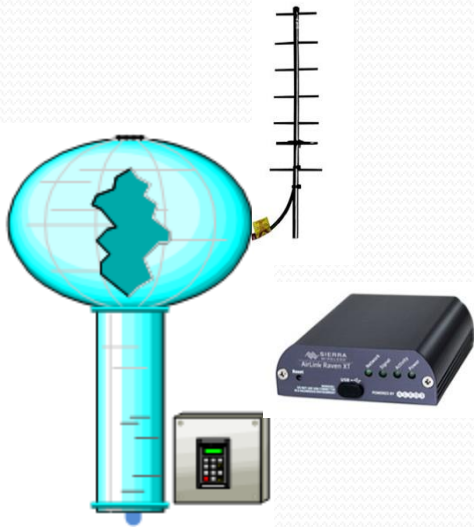


Communication Networks—
Transmits information

RADIO TELEMETRY



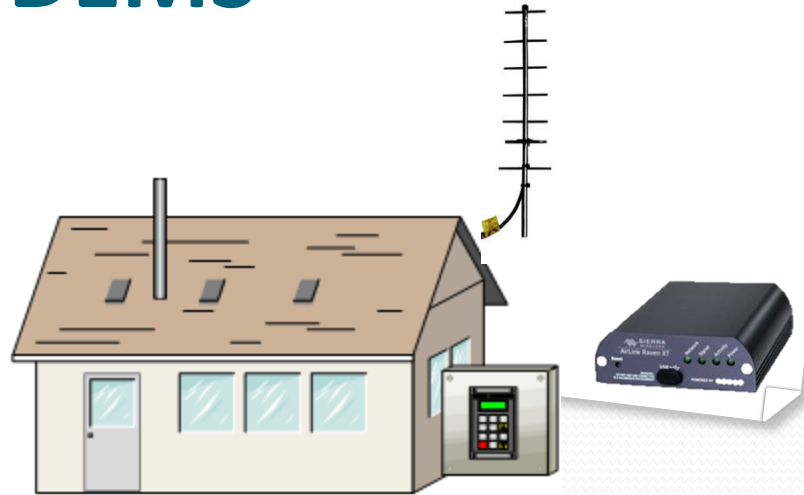
Spread Spectrum – Narrow Band



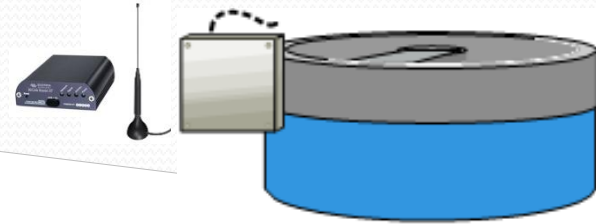
Communication Networks—
Transmits information

CELL MODEMS

Very cost effective with
small amounts of data



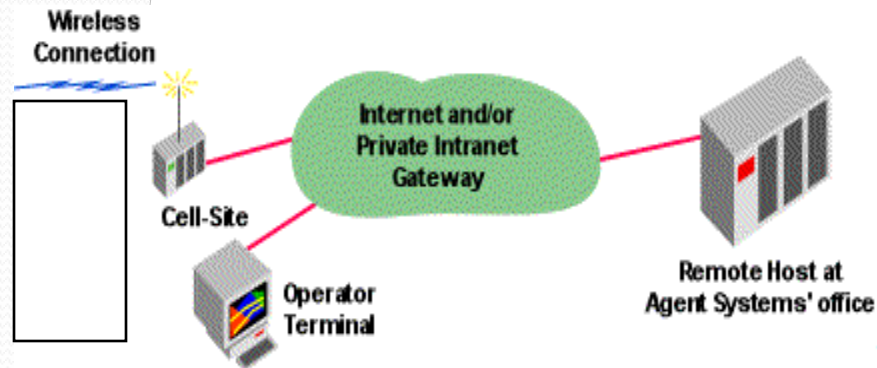
System is maintained by SP



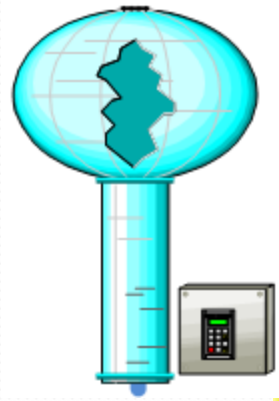
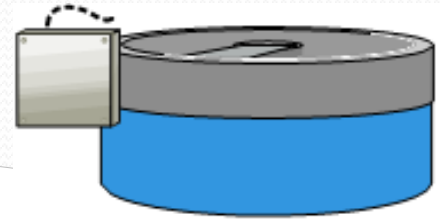
- Are an excellent backup
- Emergency as required
- Full Redundancy for critical assets
- Portability

**Communication Networks—
Transmits information**

CELL MODEMS

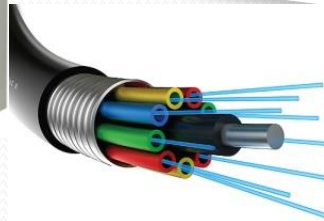


Can handle large amounts of data - Bandwidth

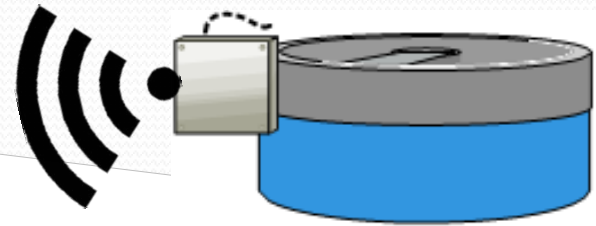


**Communication Networks—
Transmits information**

FIBER OPTIC CABLE



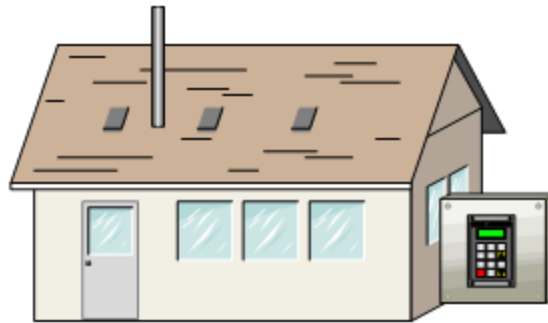
Something New!!!

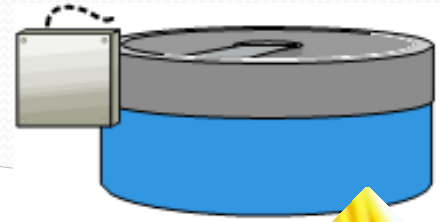
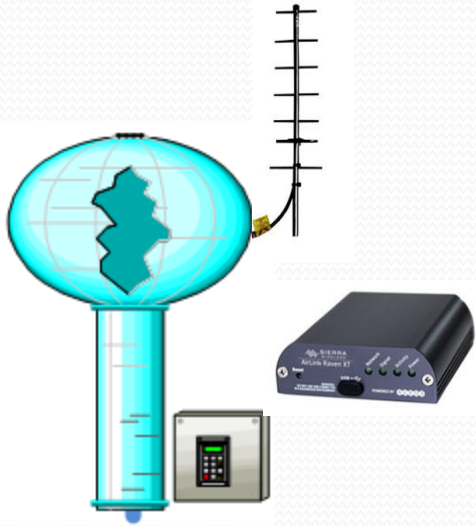


Communication Networks—
Transmits information

Wi-Fi Networks

Featuring Wi-Fi 802.11n, the UniFi® AP-Outdoor is ideal for outdoor deployment. The UniFi AP-Outdoor+ model operates in the 2.4 GHz radio band, and the UniFi AP-Outdoor5 model operates in the 5 GHz radio band.

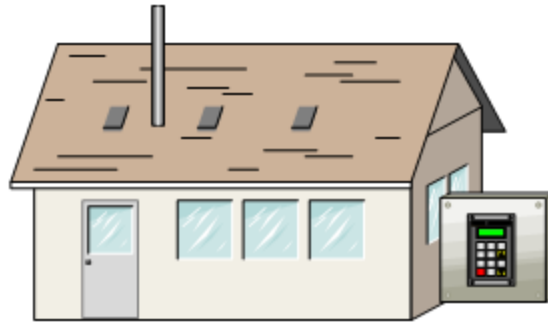




Communication Networks—
Transmits information



COMBINATIONS

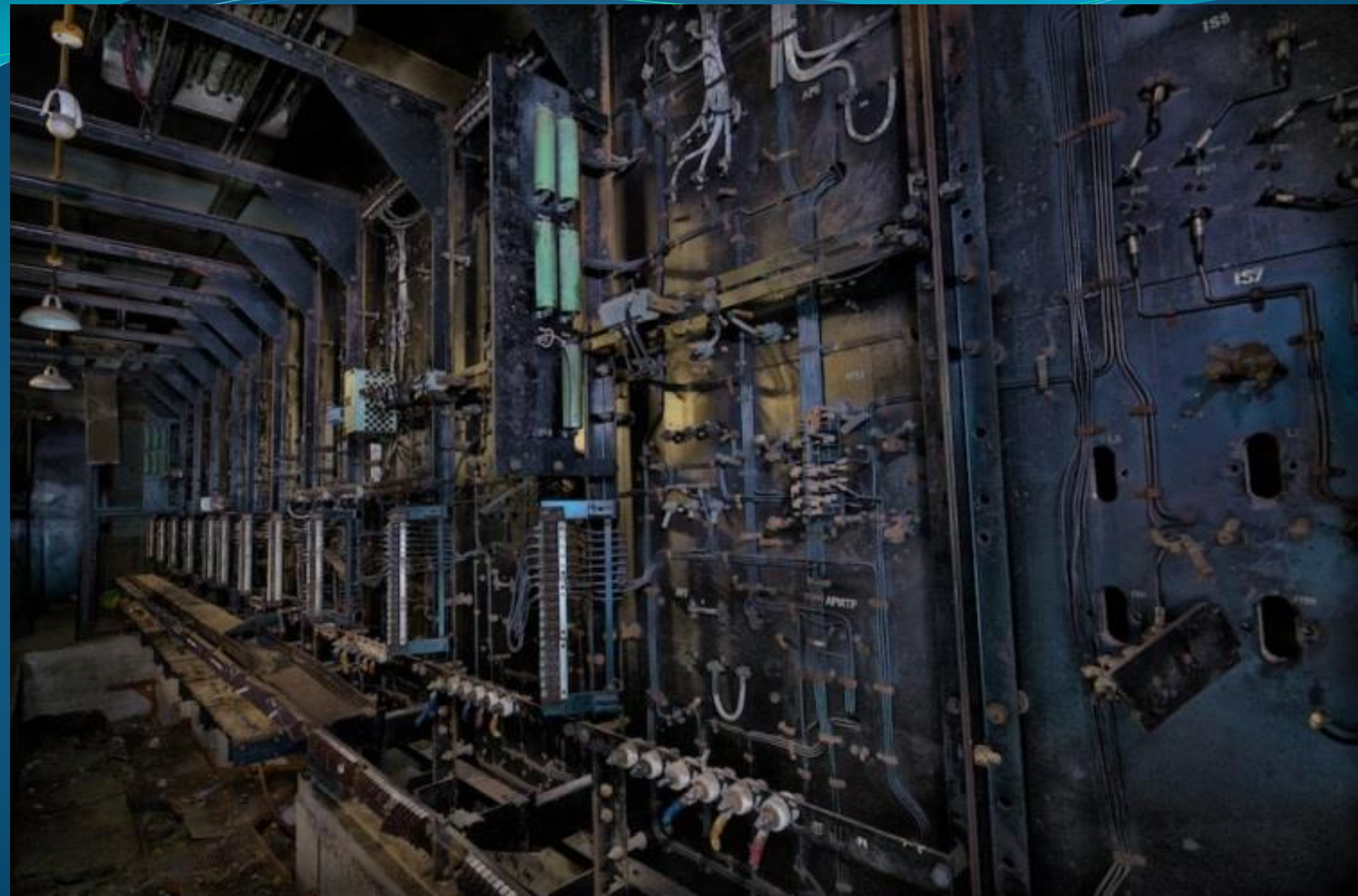


SCADA

In the Beginning.....



The Operator Training Committee of Ohio, Inc.



RTU – Remote Telemetry Units



SCared Alarmists Demand Action!!

Low Tech
High Labor \$\$
Red Light Alarm



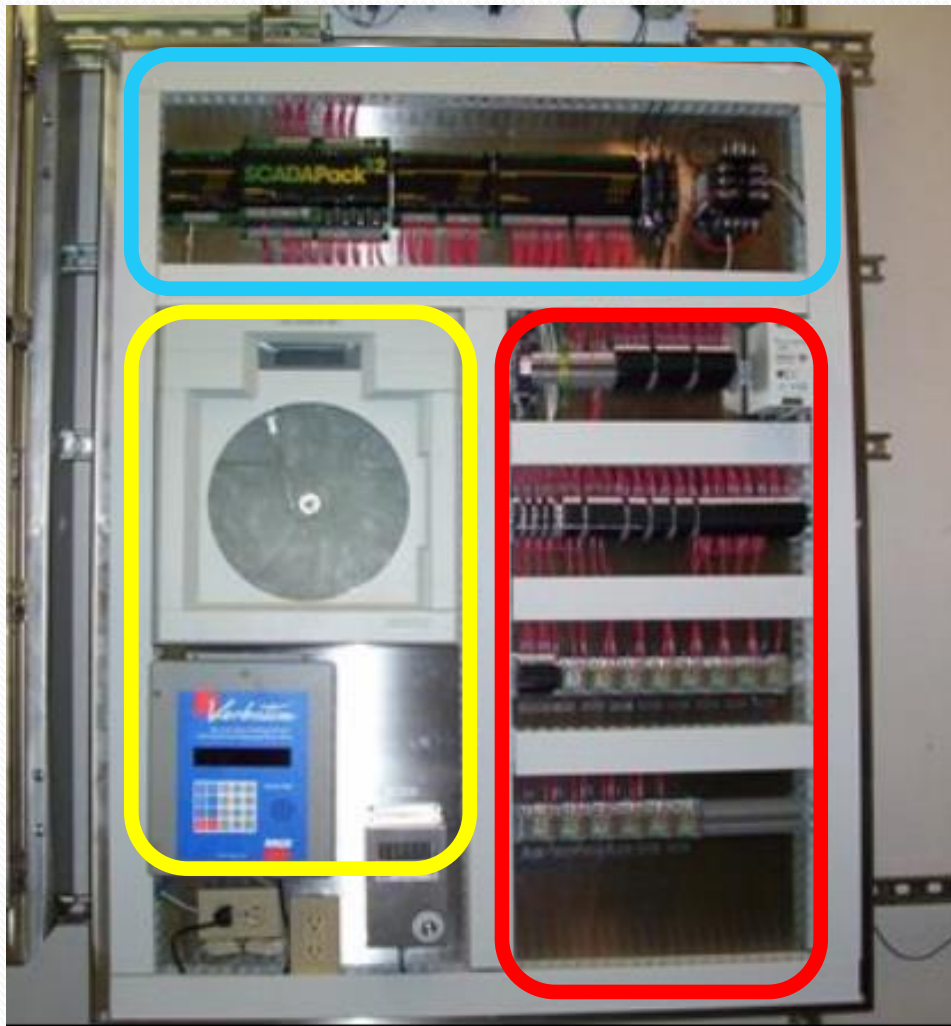
Manual Interface

**Field termination
Interface/power**

Control

RTU – Remote Telemetry Units

PLC Control



Control

**PLC instead of
Alternating Relay
For more robust
operations**

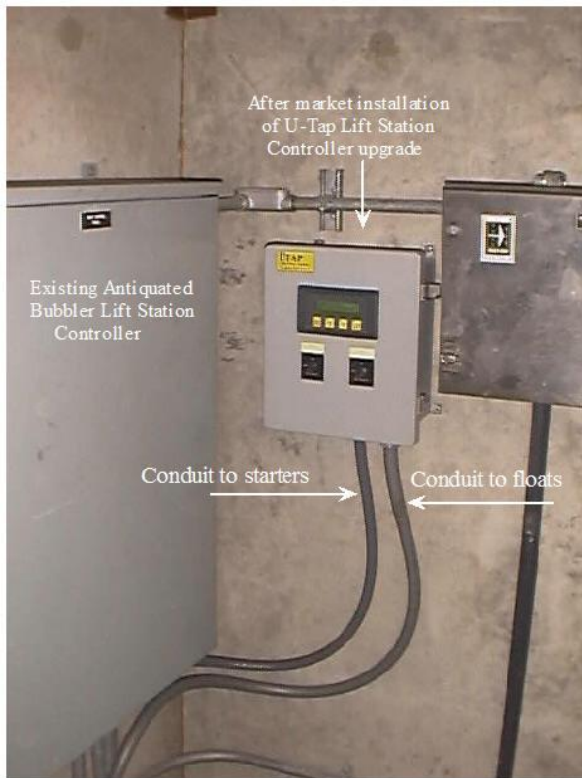
**Field termination
Interface/power**

Pretty much the same

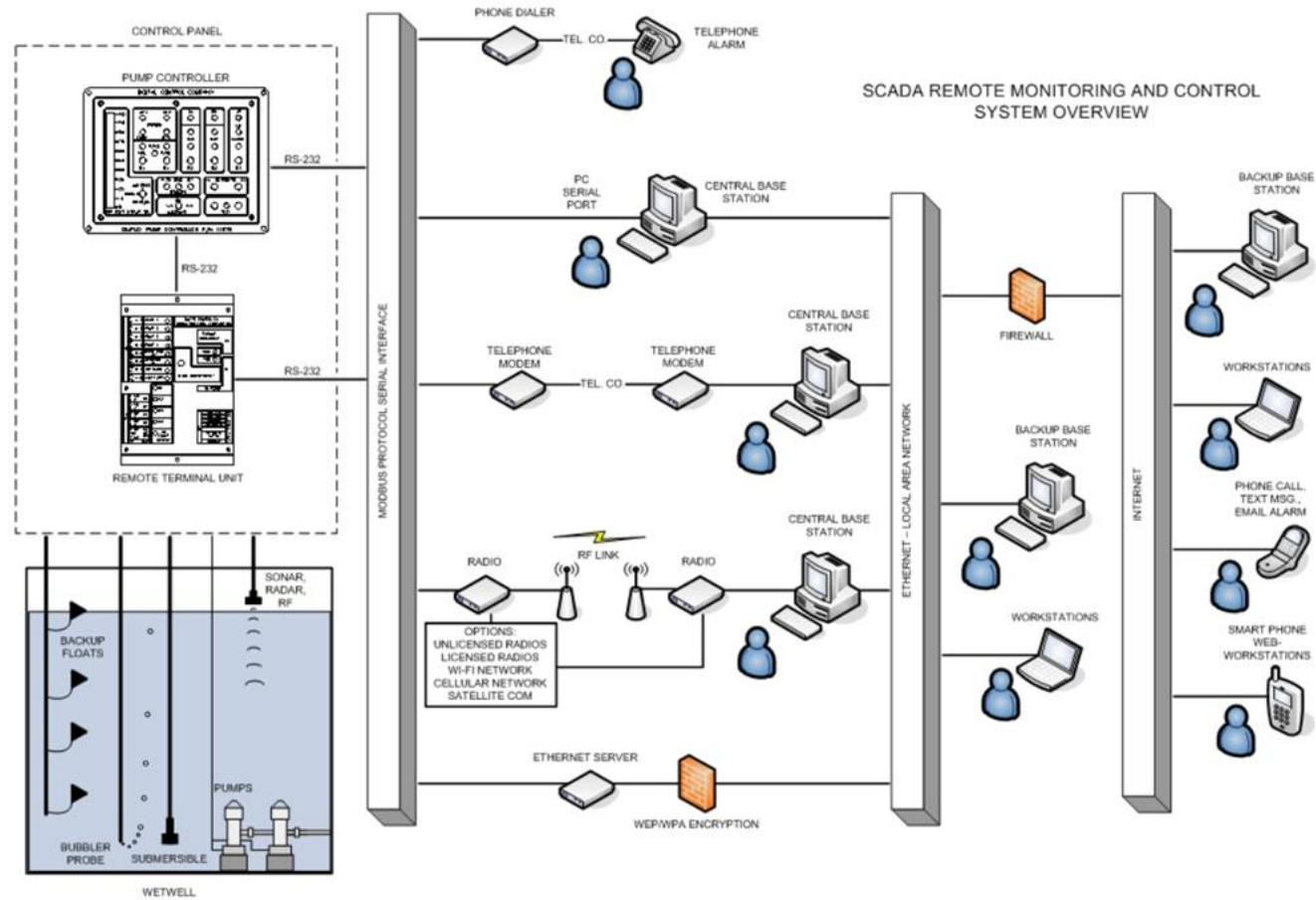
Data Acquisition/alarming

**Chart recorder for history
Alarm dialer for remote alarming**

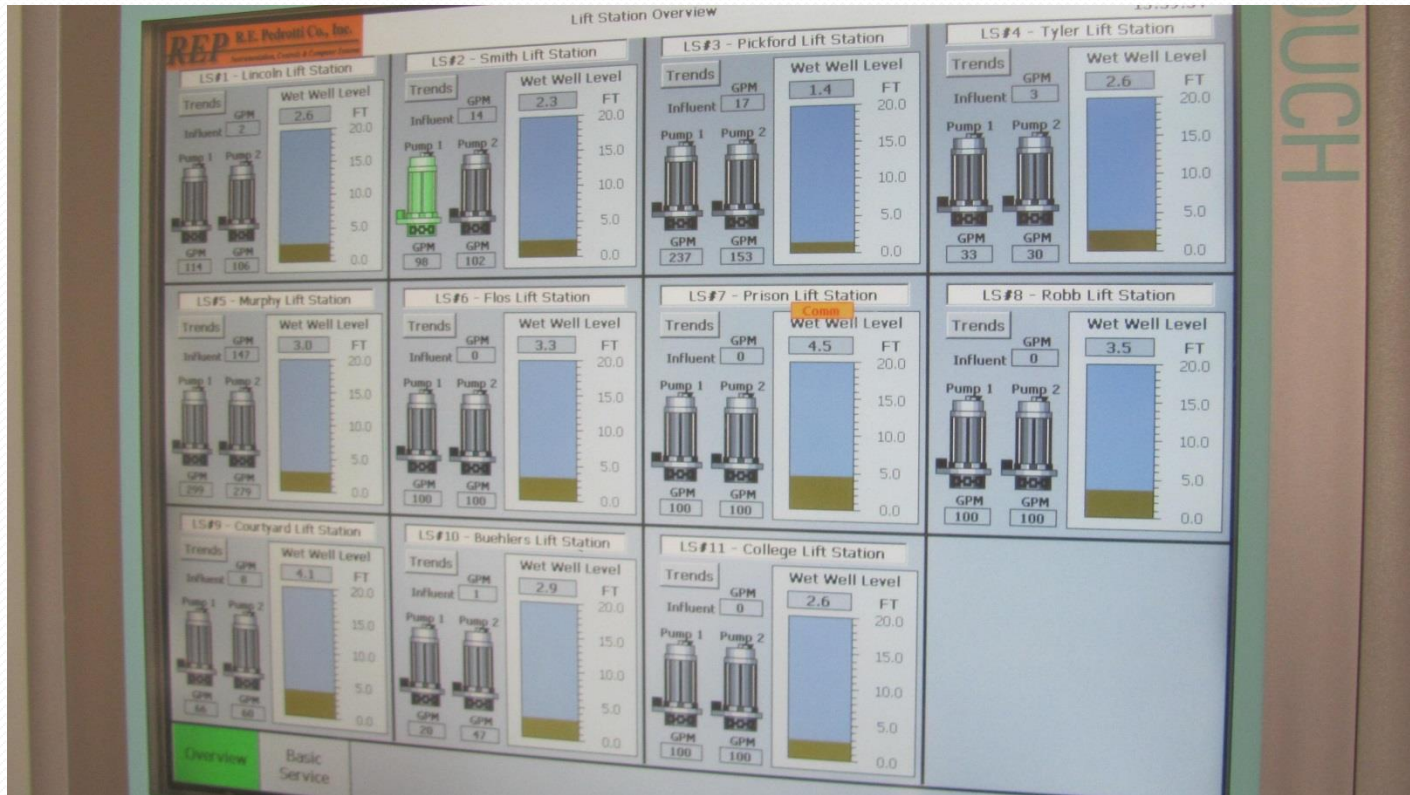
Local operator interface added HMI - OIT



Then came SCADA



Then came SCADA



Then came SCADA



Then came SCADA

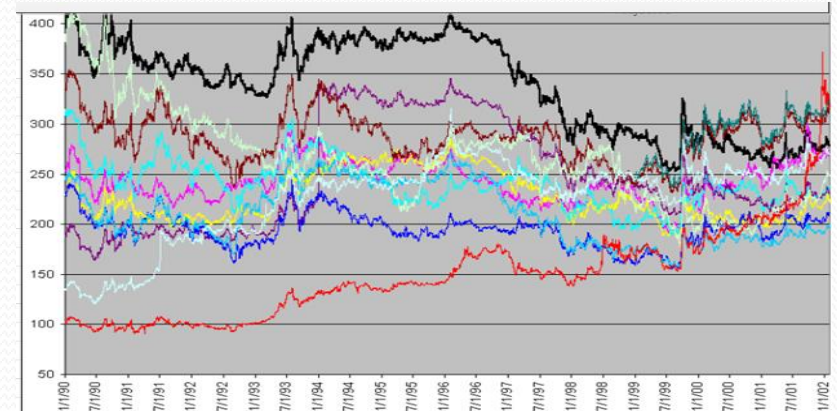


Then came SCADA

What to do with all that Data?

Now we have Data History:

- ON/OFF Cycles Frequency & Duration
- Pump Motor Current Draw
- Continuous Level VS Float
- Flow
- Rainfall Affect

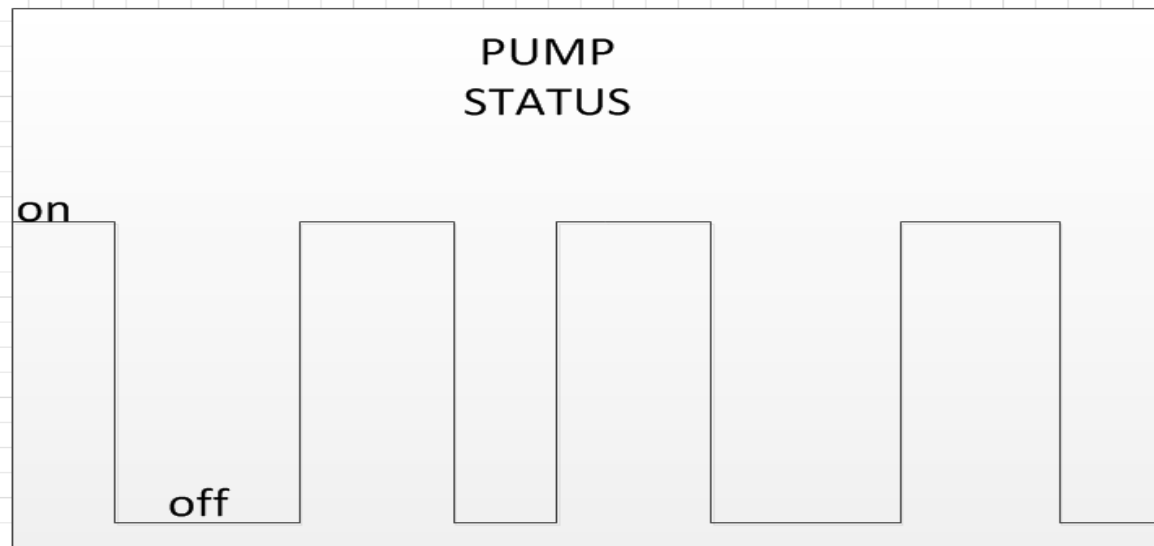


Then came SCADA

What to do with all that Data?

Now we have Data History:

- ON/OFF Cycles Frequency & Duration



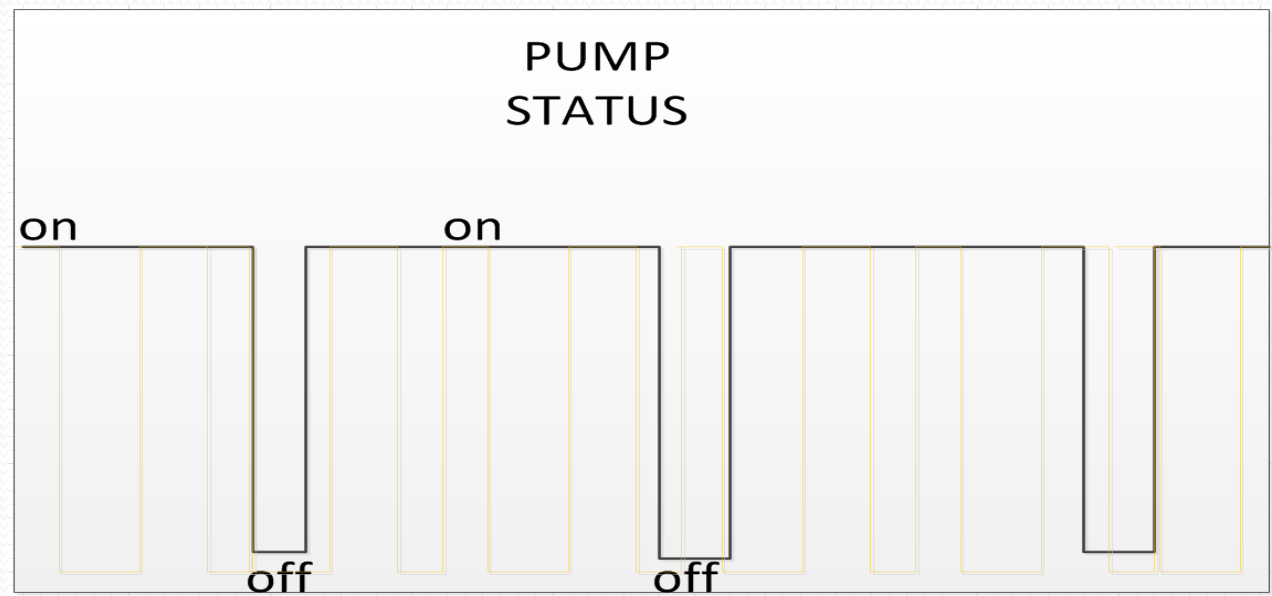
Then came SCADA

What to do with all that Data?

Now we have Data History:

- ON/OFF Cycles Frequency & Duration

Longer “ON” cycles and similar “OFF” cycles are an indicator of poor pump performance



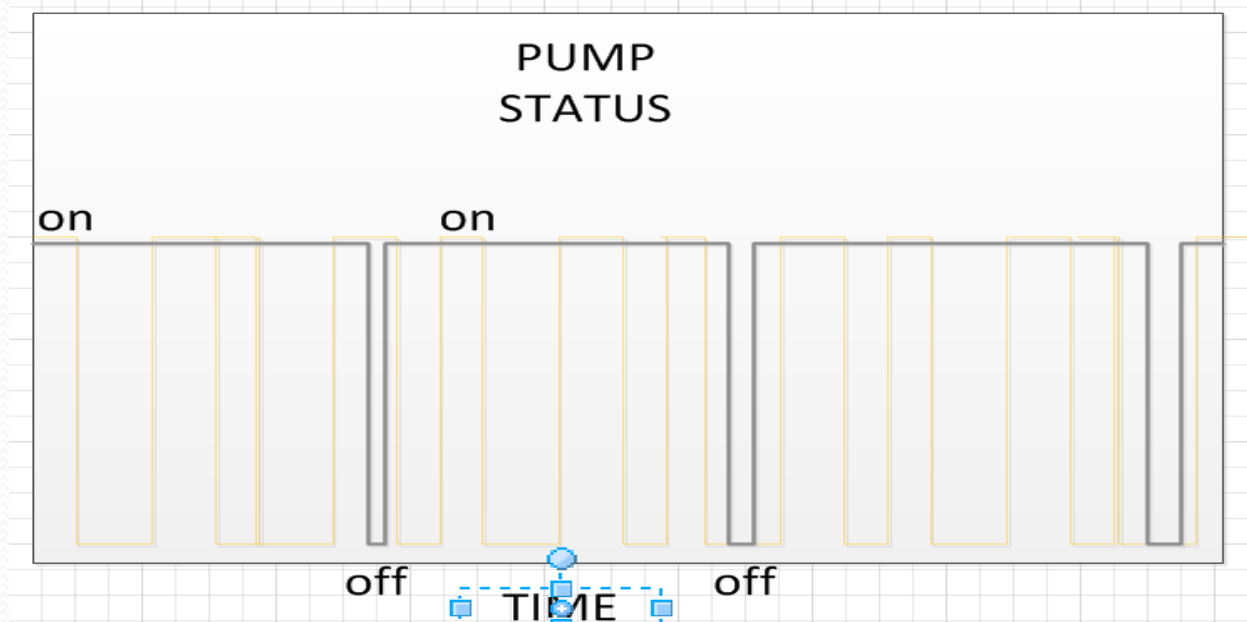
Then came SCADA

What to do with all that Data?

Now we have Data History:

- ON/OFF Cycles Frequency & Duration

Longer "ON" cycles and *shorter* "OFF" cycles are an indicator of higher influent flow



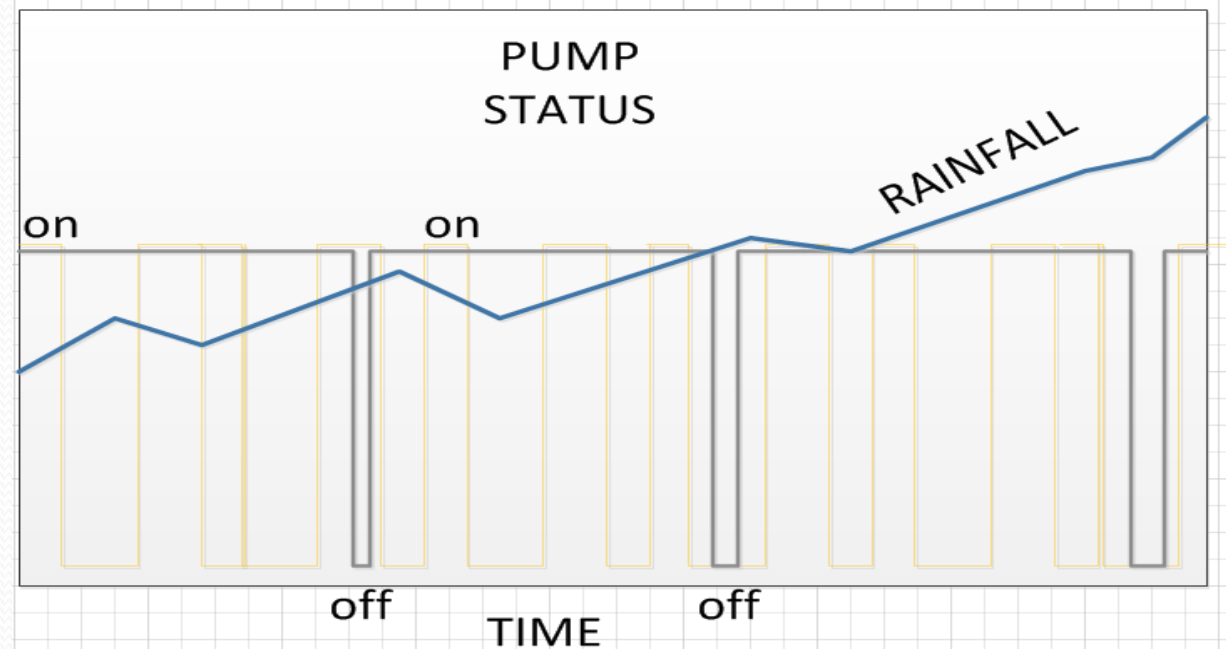
Then came SCADA

What to do with all that Data?

Now we have Data History:

- ON/OFF Cycles Frequency & Duration

Longer “ON” cycles and shorter “OFF” cycles are an indicator of higher influent flow. But compare to Rainfall – Possible Infiltration?



Then came SCADA

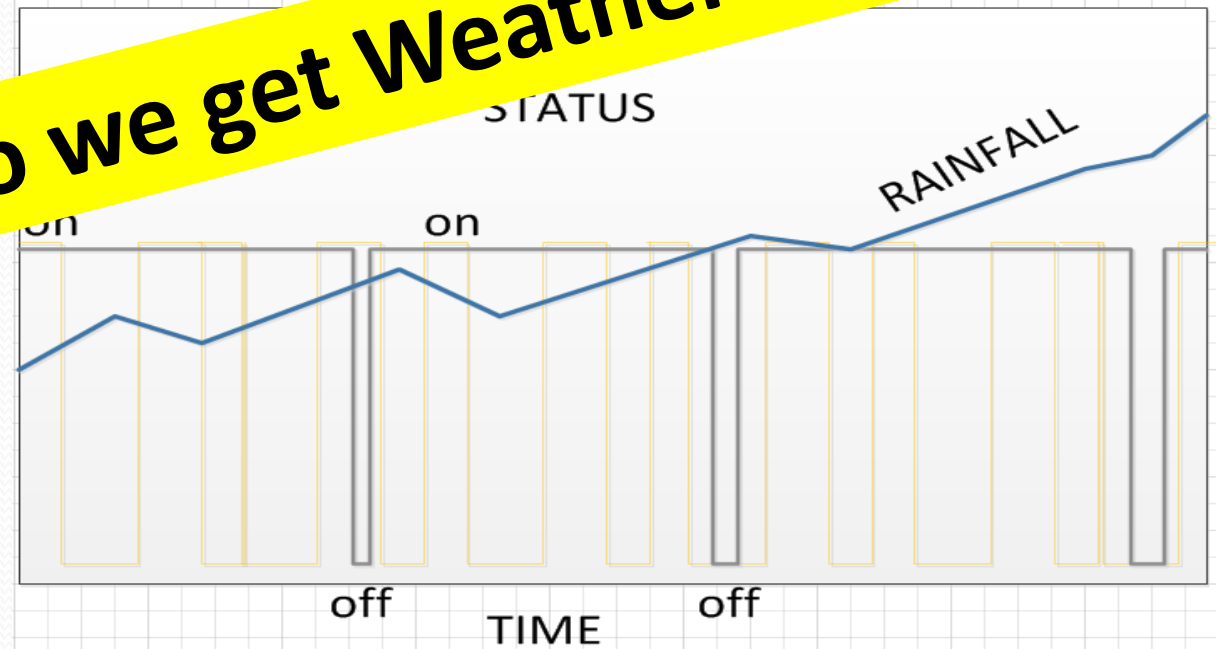
What to do with all that Data?

Now we have Data History:

- ON/OFF Cycles Frequency & Duration

Longer "ON" cycles
shorter "OFF" cycles
an indicator of higher
influent flow. But
compare to Rainfall –
Possible Infiltration?

Where do we get Weather Data???



Then came SCADA Weather Station



Sign In | Sign Up for Email | New C

Catalog | Find a Branc

PRODUCTS

RESOURCES

SERVICES

WORLDWIDE

REPAIR PARTS

Enter keyword or part number

[Test Instruments](#) > [Temperature and Humidity Measuring](#) > [Weather Stations](#)

DAVIS INSTRUMENTS Wireless Weather Station, Basic

☆☆☆☆☆ | [Write a Review](#) | [Read all Reviews](#) | [Read all Ask & Answer](#)

[Share This Product](#)

Wireless Weather Station, Indoor 32 to 140 Degrees , Outdoor -40 to 150 Degrees Temp. Range (F), Relative Humidity Range Indoor 10 to 90 Percent, Outdoor 0 to 100 Percent, Wind Velocity 2 to 180 mph, Rain Fall 0 to 99.99 In., accuracy +/-4 Percent, Special Features Onscreen Graphing, Indoor 0 to 60 Degrees , Outdoor -40 to 65 Degrees Temp. Range (C), Dew Point Yes, Wind Direction Yes, Wind Chill Yes, Heat Index Yes, Barometric Pressure 26 to 32 InHg (880 to 1080 mbar)Alarms Yes

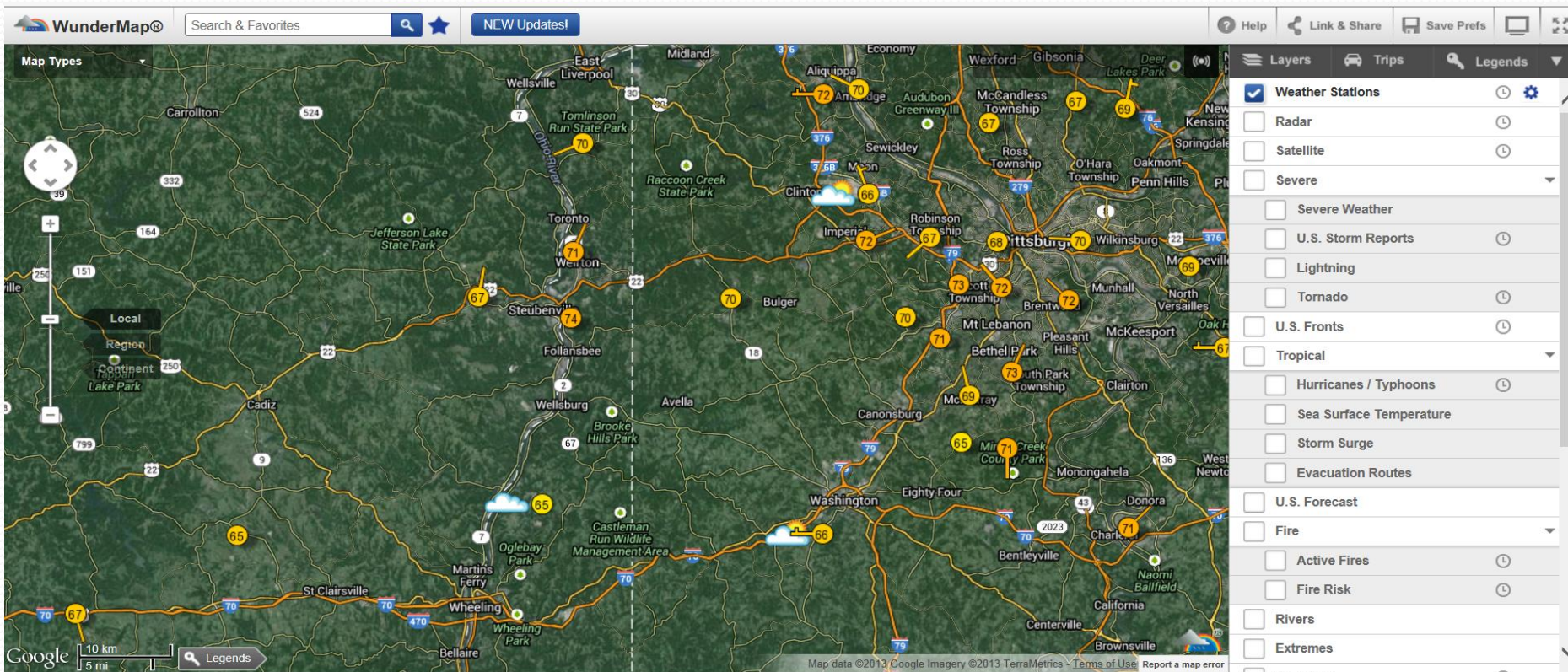
Grainger Item #	4JRH4
Price (ea.)	\$700.00
Brand	DAVIS INSTRUMENTS
Mfr. Model #	6152
UNSPSC #	41114410
Ship Qty.	1
Sell Qty. (Will-Call)	1
Ship Weight (lbs.)	13.0
Availability	Typically in Stock
Catalog Page No.	880
Country of Origin	USA
(Country of Origin is subject to change.)	

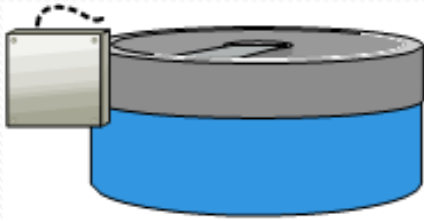


[Enlarge Image](#)

Then came SCADA

Weather From the Internet





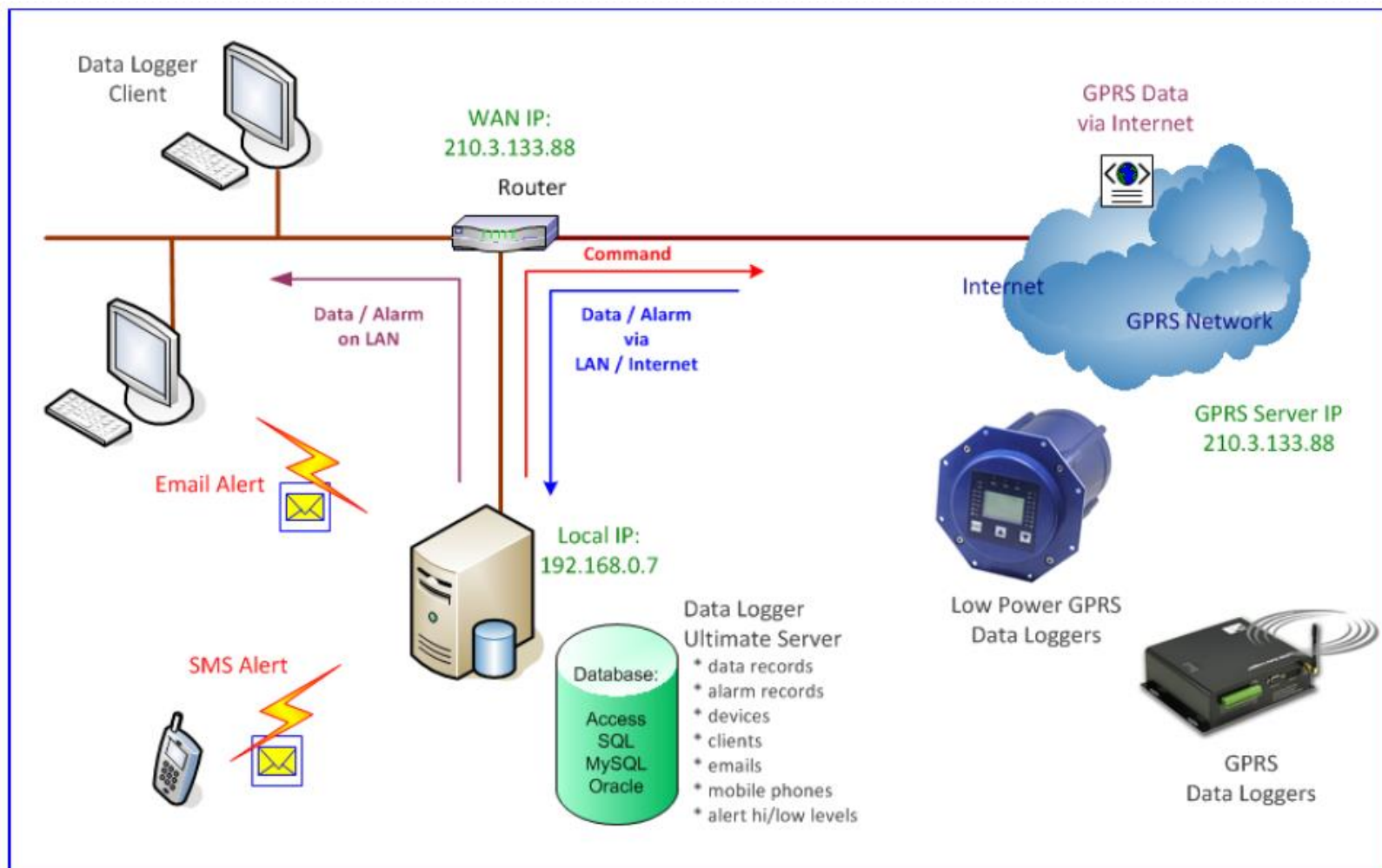
Another Type of RTU...

DATA LOGGERS



GPRS and SMS Data Logger

Primarily for Monitoring and Data Collection



Low Power Modbus GPRS Data Logger

GPRS – General Packet Radio Service

General Packet Radio Service is a packet-switching technology that enables data transfers through cellular networks. It is used for mobile internet, MMS and other data communications. In theory the speed limit of GPRS is 115 kbps, but in most networks it is around 35 kbps. Informally, GPRS is also called 2.5G.



Low Power Modbus GPRS Data Logger

SMS – Short Messaging Service

Short Messaging Service allows users to send and receive personal text messages directly between mobile phones or sometimes to email addresses. Each message can be up to 160 characters long (when using the default character set) and can be sent to and from users of different operator networks. All mobile phones support SMS.



1..3..5 years



Low Power Modbus GPRS Data Logger

- ✓ Low Power Data Logger supporting sleep mode
- ✓ Continuous operation for 5 years with internal battery
- ✓ Upload Data via GPRS and SMS on schedule
- ✓ Programmable data logging and upload interval
- ✓ Packet Data supports one time upload for multiple logged records
- ✓ Internal power for meters or sensors



Low Power Modbus GPRS Data Logger Applications

- ✓ Water Meter Telemetry
- ✓ River / Reservoir Level Monitoring
- ✓ Water Pipeline Remote Monitoring
- ✓ Temperature
- ✓ Humidity
- ✓ (Your Imagination!!)

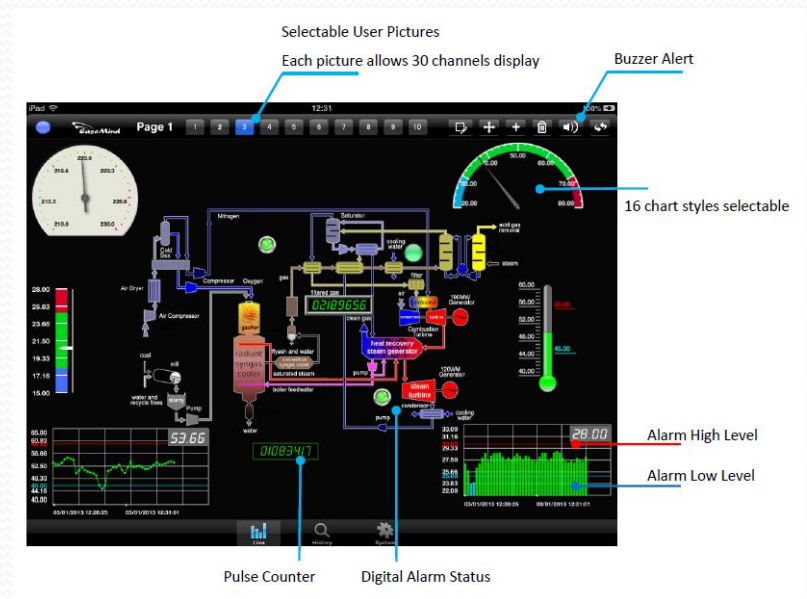
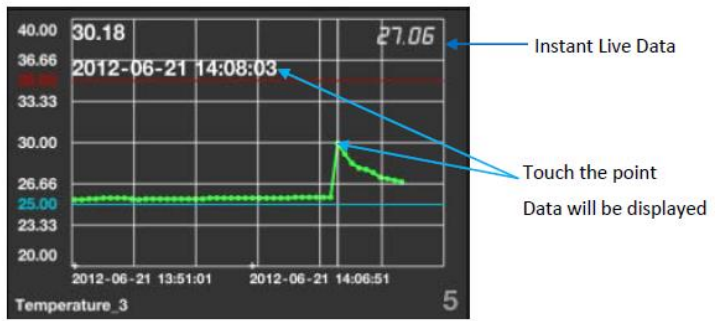
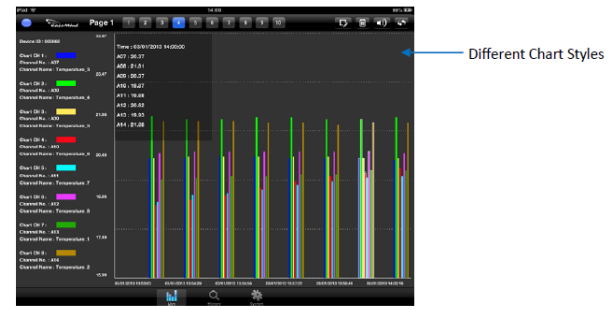
1..3..5 years



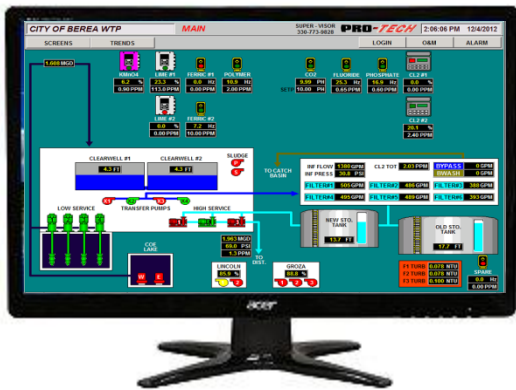
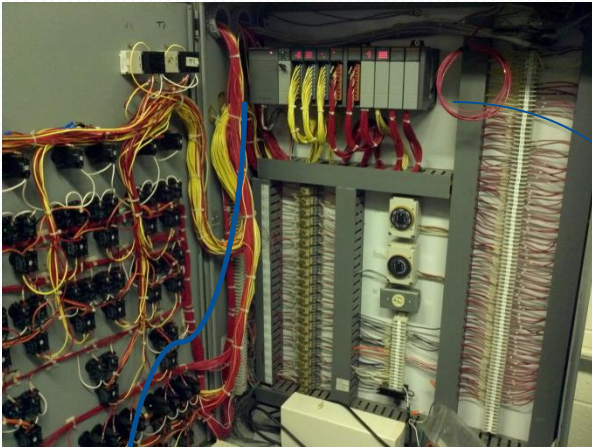
Client Software

- ✓ Monitor a number of Data Loggers
- ✓ Alert users when readings are out of spec
- ✓ Alert staff with email or SMS
- ✓ Data trend review
- ✓ Web based

* Same channel from 8 different data loggers



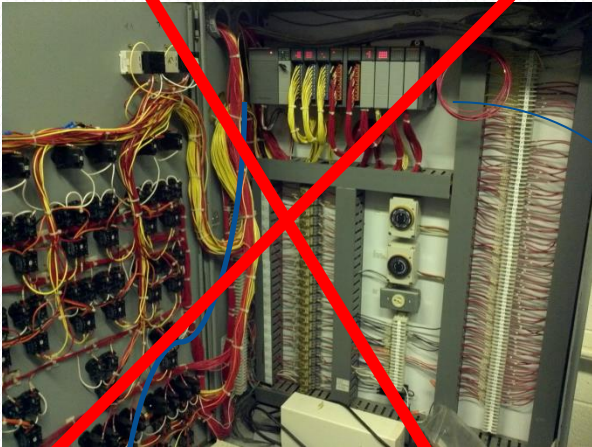
What's Changing in the Plant?



- ✓ High Material Costs
- ✓ High Labor Costs
- ✓ Restricts Future Enhancements

The "Old Way"

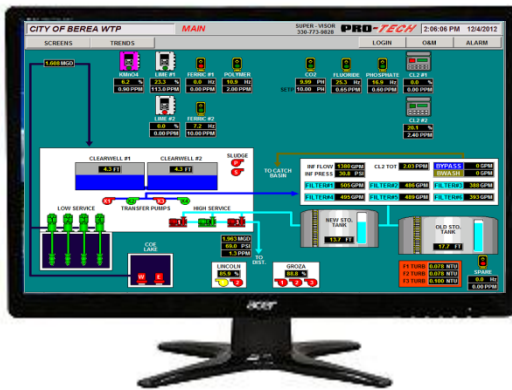
What's Changing in the Plant?



~~Conduit & Wire~~



- ✓ High Material Costs
- ✓ High Installation Labor Costs
- ✓ Restricts Future Enhancements

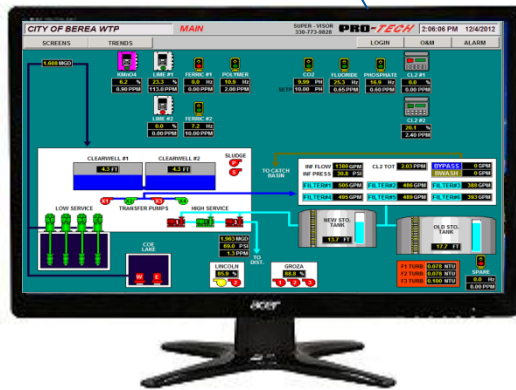


The "Old Way"

What's Changing in the Plant?

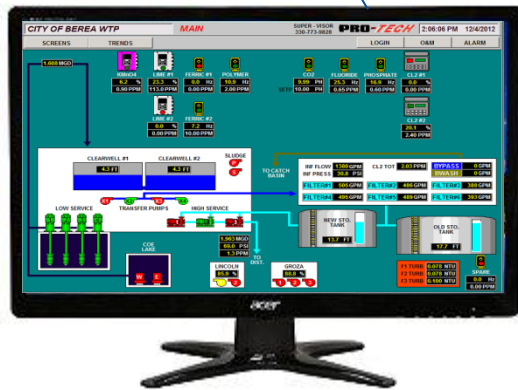


- ✓ Lower Material Costs
- ✓ Lower Installation Labor Costs
- ✓ Adapts to Future Enhancements

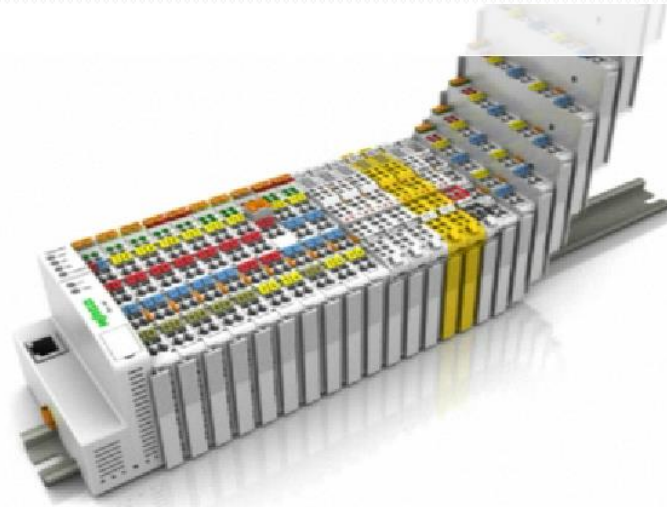
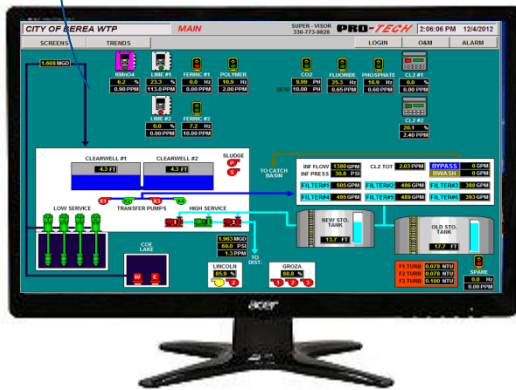


The “New Way”
Distributed I/O

Add an iPad and Walk Around with an HMI



Connect to the Device Directly



Connect to the Device Directly No PLC Needed

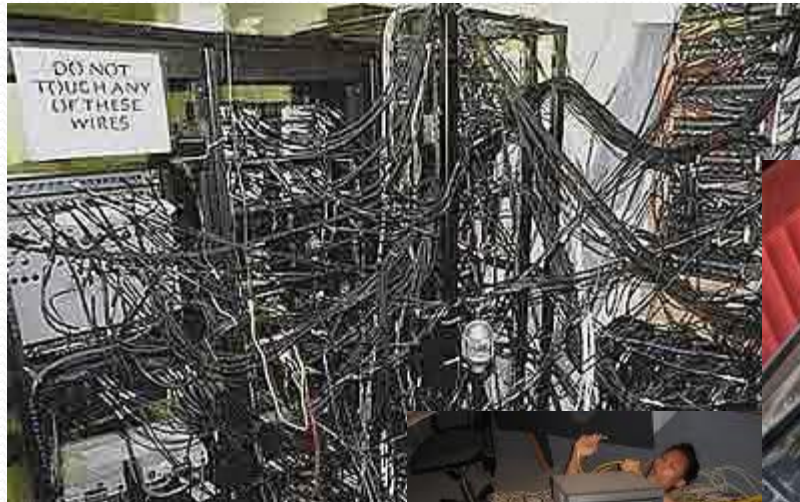


This – Rather than.....



WAGO-SPEEDWAY 767

... This!!!



Smaller footprint – Direct wire terminations

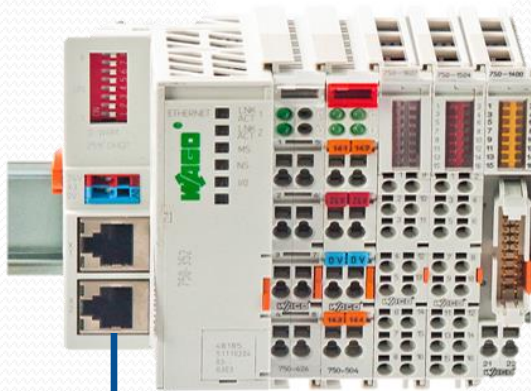


PLC's with Imbedded Web Pages

Remote Connections direct to imbedded web pages. No need for a PC.

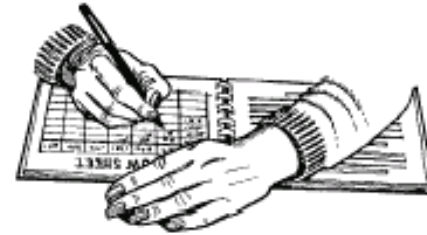


Remote Connections direct to imbedded web pages. No need for a PC.



Display Values		Setpoints	
Display Name			Value
DO #1		OPEN	
DO #1 - NO LOAD/SHORT +24		NORMAL	
DO #1 - SHORT GND / OVERTEMP		NORMAL	
DO #2		OPEN	
DO #2 - NO LOAD/SHORT +24		NORMAL	
DO #2 - SHORT GND / OVERTEMP		NORMAL	
HEARTBEAT			335

DEALING WITH MANUAL DATA



• What about the good old **LOGBOOK ????**

Op 10

XL Reporter

DataView - Operator10@ Wastewater - [- WasteWater Sample Data - Plant Effluent Monthly]

Monthly	Plant Effluent Meter Number Daily	Plant Effluent Flow Mgd Formula	Plant Effluent pH SU Hourly	Plant Effluent Temp Water C Degrees C Daily	Plant Effluent Diss Oxygen MG/L Daily	Plant Effluent BOD 5 MG/L Daily	Plant Effluent Solids TSS MG/L Daily
1 Wed	65878279	4.2690	7.5	7.5	6.00	2.30	
2 Thu	65878322	2.8110	7.5	8.2	6.80	3.20	
3 Fri	65878350	2.3900	7.4	8.5	10.10		
4 Sat	65878374	2.2300	7.7	9.3	5.40		
5 Sun	65878396	1.9300	7.6	10.0	8.40		
6 Mon	65878415	2.1000	7.4	11.5	9.50		
7 Tue	65878436	2.2000	7.4	11.3	8.50	2.20	
8 Wed	65878458	2.2200	7.7	10.2	10.50	2.60	
9 Thu	65878481	2.5900	7.4	10.3	10.70	2.60	
10 Fri	65878507	2.5900	7.1	10.5	10.00		
11 Sat	65878532	2.5300	7.4	9.5	10.20		
12 Sun	65878558	2.7800	7.5	9.8	9.40		
13 Mon	65878586	2.7300	7.6	9.4	8.50		
14 Tue	65878613	2.8400	7.4	9.8	9.50	3.29	
15 Wed	65878641	2.5200	7.9	9.7	8.70	2.50	
16 Thu	65878666	4.6200	7.9	10.1	8.80	2.25	
17 Fri	65878713	8.1400	7.4	10.5	7.90		
18 Sat	65878794	10.8200	8.1	10.4	9.80		
19 Sun	65878902	7.4400	8.2	10.3	9.80		
20 Mon	65878977	4.8700	7.9	10.7	9.60		
21 Tue	65879025	4.3700	7.4	10.5	10.20	3.10	
Sum		123.9870	236.5	309.9	285.60	55.94	17
Avg		3.9996	7.6	10.0	9.21	4.00	1
Max		10.8200	8.2	11.5	10.70	11.50	6
Min		1.9300	7.1	7.5	5.40	2.20	
Count	31						

cnt=1; sum=65879336; avg=65879336; max=65879336; min=65879336; gmn=65879336; std=0



WHY NOT MANAGE DATA INSTEAD OF JUST DEALING WITH IT?



Welcome Elyria!
[Log Out]

LAB ANALYSIS REPORTS

Home
Samples

Export to Excel

Search Report:

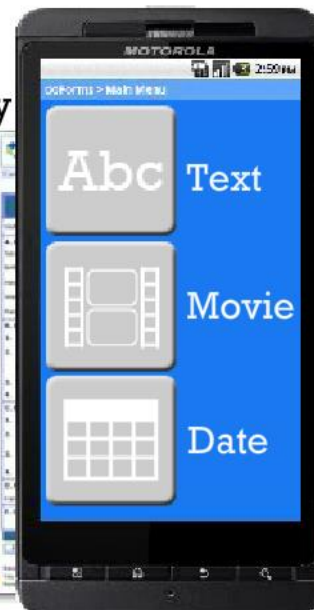
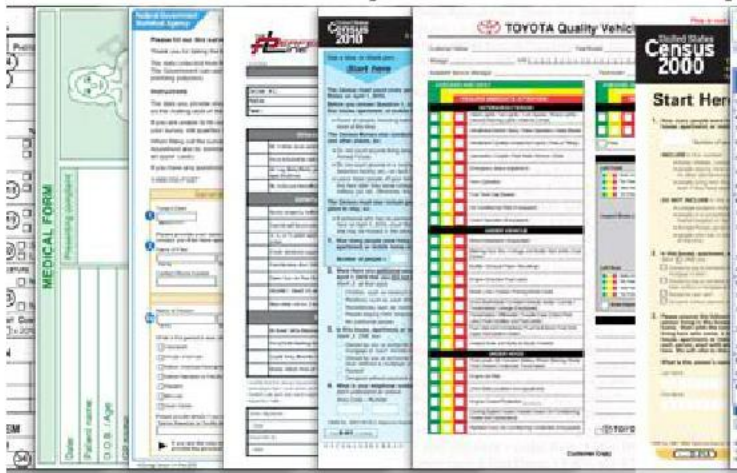
Search Dates:

Lab_ID	Date_Collected	Date_Incub	Time_Incub	Analyst	Sample_Location	Test_Method	CL2_Free	CL2_Total	Total_Coliform
848-84	23								
85-86	85-86	85-86	85-86	85-86	85-86	85-86	85-86	85-86	85-86
4-0868	4-0868	4-0868	4-0868	4-0868	4-0868	4-0868	4-0868	4-0868	4-0868
58658	58658	58658	58658	58658	58658	58658	58658	58658	58658
67675466894	67675466894	67675466894	67675466894	6.768E+10	67675466894	67675466894	67675466894	67675466894	67675466894
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7590734057	7590734057	7590734057	7590734057	7.591E+09	7590734057	7590734057	7590734057	7590734057	7590734057
505490579	505490579	505490579	505490579	505490579	505490579	505490579	505490579	505490579	505490579
79079097	79079097	79079097	79079097	79079097	79079097	79079097	79079097	79079097	79079097
779788	779788	779788	779788	779788	779788	779788	779788	779788	779788



"Smart-forms" for smartphones and tablets

Provides a ready-to-use forms library



Or easily create your own forms.

Easy to export and integrate data with your other office apps and business systems.



Use Your Existing Mobile Device Hardware

Android (OS version 2.1 and higher - models from Motorola, HTC, Samsung, Sony Ericsson, LG, Acer, Dell; Garmin)

Blackberry (OS version 5.0 and higher - all Bold, Curve, Tour, Storm, and Torch models)

iPhone - Available Soon

iPad - Available Soon



Use Mobile Forms in Both Connected or Disconnected Environments

Workers can still collect data when Internet connectivity is slow, unreliable or unavailable

Data are stored on the mobile device until Internet connection is available, then deleted after successful transmission

Use cellular, WiFi, satellite or wired Internet connections based on availability and cost



Forms (13)

Review (3)

Send (2)

Settings

Update

doFORMS™



Elyria



Elyria Lab Analysis Report P1



Elyria Lab Analysis Report P2



Elyria Lab Analysis Report P3



Elyria Lab Analysis Report P4



Employee Initials P2



*Required

Furnace Street Tank

Have Cell phone and City radio on in Vehicle



Today's Date

Current Date and Time

Save as Incomplete

Save as Complete

Exit Without Saving

Furnace Street Tank Report > Swipe the screen vertically to navigate page, then tap on a question. Or swipe page horizontally to navigate between pages.

iPad 8:12 PM 60%

doFORMS™

Grounds *

- Clean up Down Branches and Debris
- Check Gate and Barbed Wire

Grass needs to be mowed

Yes
 No

Weeds need trimming

Yes
 No

Road or Drive In

Yes
 No

Before leaving *

- Locked Valve
- Closed Tank
- Closed Radiator

Any Problems to Report Problems to

Sorry, this answer is required!

OK

← Close →

Save and Exit Form Remember Answer Clear Answer

Exit Without Saving Delete Section Form View

Furnace Street Tank Report > Tap previous or next, or swipe the screen horizontally to navigate between question.



*Required

Chlorine 1 pressure

Make sure this is the tank and Gauge for the next answer (example of inserted pictures)



Save as Incomplete

Save as Complete

Exit Without Saving

Elyria > Swipe the screen vertically to navigate page, then tap on a question. Or swipe page horizontally to navigate between pages.



Enter PSI reading on the guage 1a *

must be between 30 and 60 psi

GPS location

just for fun if you are

GPS location

just for fun if you are

color of backwa

pick a color

- Brown
- pink
- tan
- purple
- clear
- green

if not sure take a

Enter PSI reading on the guage 1a *

must be between 30 and 60 psi (try something else!)

Input number must be greater than or equal to 30 and less than or equal to 60

<input type="button" value="Save and Exit Form"/>	<input type="button" value="Remember Answer"/>	<input type="button" value="Clear Answer"/>
<input type="button" value="Exit Without Saving"/>	<input type="button" value="Delete Section"/>	<input type="button" value="Form View"/>

iPad 8:13 PM 60%

doFORMS™

Brown
 pink
 tan
 purple
 clear
 green

if not sure take a pic

Capture Image

Sketch

if not sure take a

please enter time
look at your watch time

Please email this
should email you the

Email Report to:
mark@pteinc.co

Optional Message
here is the report

Save and Send t
just press the button

Save and Send

Save and Exit Form Remember Answer Clear Answer

Exit Without Saving Delete Section Form View

Elyria > Tap previous or next, or swipe the screen horizontally to navigate between question.



- Yes
- No

Road or Drive In Need of Repair? *

- Yes
- No

Before leaving *

- Locked Valut Door
- Closed Tank Door
- Closed Radio Enclosure and/or Building

Any Problems to Report?

Report Problems to Supervisor when back inform them of items that need done.

Email to:

Email Report to:

Optional Message:

Submit Report

Flushing Sheet

Flushing Program Report Forms

To save report without sending exit form. When prompted save form for later retrieval.

Flush Program Reading Location

If location is not in list choose One Time Reading

Address

Site address

Time Flushing Started

Beginning Chlorine Free Reading

Begin Chlorine Total

Time Flushing Ended

End Chlorine Free Reading

End Chlorine Total

Total Time Flushed

Minutes

Notes

Save & Send Reports

Today's Date

Initials

First, Middle, Last of person flushing.

Report Email

Save and Send Report

Save & Send

Chestnut S.E. Tank R2

Chestnut S.E. Tank
Have Cell phone and City radio on in Vehicle

Today's Date

Current Date and Time

All Tanks, Vaults, And Buildings *

- Monitor Air Before Entering
- Opened Vault Door
- Opened Tank Door
- Opened Radio Enclosure Or Building

Check Off List *

ONLY ENTER VAULT WHEN TWO OR MORE WORKERS PRESENT

- Checked Sump pumps
- Checked Lights
- Change any burned out lights
- Checked Radio's Battery Backup
- Checked for water leaks
- Mopped Up any water on floor
- Cleaned up any debris in tank and/or building
- Check Generator
- Checked fuel full in generator

Sensor *

DP Transmitter

Grounds *

- Clean up Down Branches and Debris
- Check Gate and Barbed Wire

Grass needs to be cut? *

- Yes
- No

Weeds need trimmed? *

- Yes
- No

Road or Drive needs to be repaired? *

- Yes
- No

Before leaving *

- Locked Vault Door
- Closed Tank Door
- Closed Radio Enclosure and/or Building

Any Problems to Report? *

Report Problems to Supervisor when back inform them of items that need done.

Initials *

First Middle Last

Email to:

Save and Send Report

Save & Email Report

Elyria.pdf - Adobe Acrobat Pro Extended

File Edit View Document Comments Forms Tools Advanced Window Help

Create Combine Collaborate Secure Sign Forms Multimedia Comment

1 / 1 Find

Sticky Note Text Edits

Chlorine 1 pressure

Make sure this is the tank and Gauge for the next answer (example of inserted pictures)



Enter PSI reading on the guage 1a: 44
must be between 30 and 60 psi (try something else!)

What are these markings called?



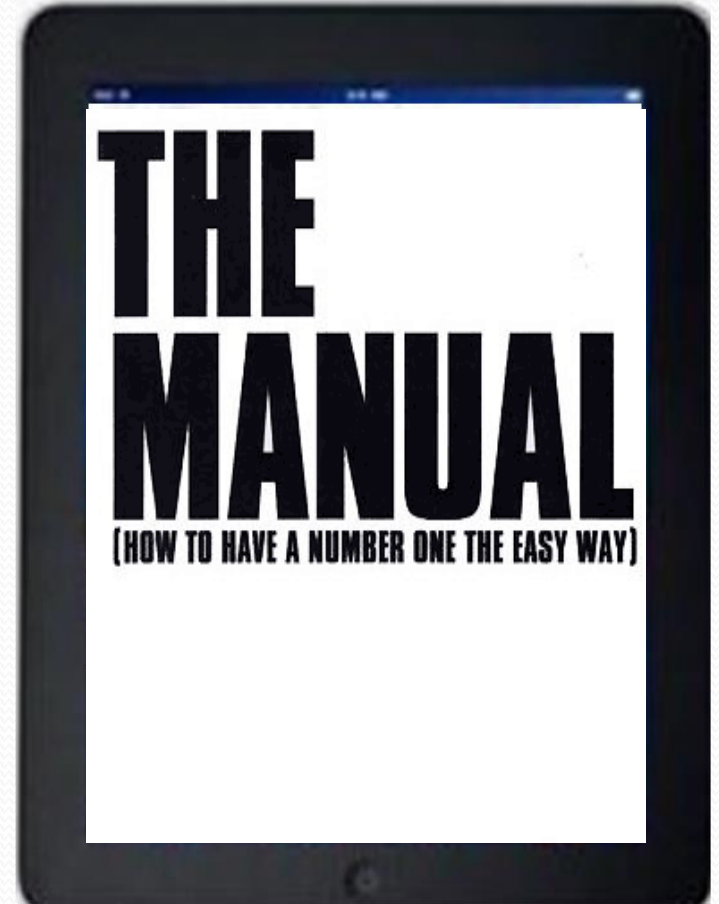
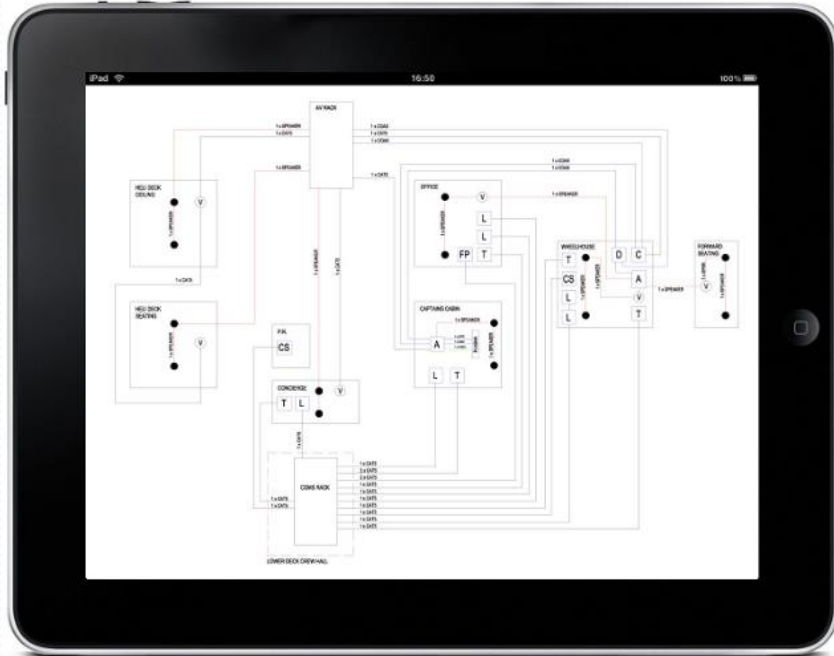
QR codes

Quick Response codes



Prompted data entry
Time Stamped
Photographic backup
Database Synchronizations





**2 way
synchronization**

INTERNET



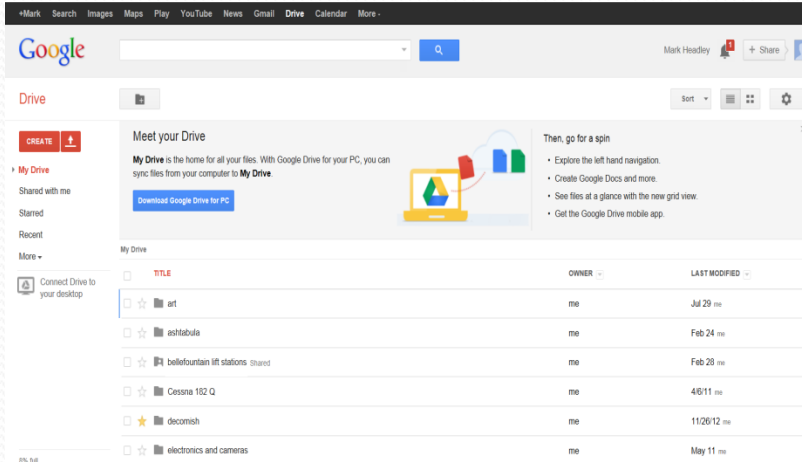
Find everything in Google Drive you've recently opened or edited.

TITLE	OWNER	LAST OPENED BY
googledrive04242012 Offline: My Drive	me	11:43 am
IPV6-04232012 Offline: My Drive	me	Apr 23
Linuxdesktop04232012 Offline: My Drive	me	Apr 23
googleplus04192012 Offline: My Drive	me	Apr 19
FCC04182012 Offline: My Drive	me	Apr 18
FAQ for ZDNet 'Great Debate' Participants Shared Offline	David.grober	Apr 18
ubuntu12132012 Offline: My Drive	me	Apr 13
Netscape04112012 Offline: My Drive	me	Apr 11
ChromeOS04102012 Offline: My Drive	me	Apr 10
cloudstorage04092012 Offline: My Drive	me	Apr 9
linux-kernel-04032012 Offline: My Drive	me	Apr 3
os2-04022012 Offline: My Drive	me	Apr 2

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TITLE	OWNER	LAST OPENED BY
googledrive04242012 Offline: My Drive	me	11:43 am
IPV6-04232012 Offline: My Drive	me	Apr 23
Linuxdesktop04232012 Offline: My Drive	me	Apr 23
googleplus04192012 Offline: My Drive	me	Apr 19
FCC04182012 Offline: My Drive	me	Apr 18
FAQ for ZDNet 'Great Debate' Participants Shared Offline	David.grober	Apr 18
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Netscape04112012 Offline: My Drive	me	Apr 11
ChromeOS04102012 Offline: My Drive	me	Apr 10
cloudstorage04092012 Offline: My Drive	me	Apr 9
linux-kernel-04032012 Offline: My Drive	me	Apr 3
os2-04022012 Offline: My Drive	me	Apr 2





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Linuxdesktop04232012 Offline: My Drive	me	Apr 23
googleplus04192012 Offline: My Drive	me	Apr 19
FCC04182012 Offline: My Drive	me	Apr 18
FAQ for ZDNet 'Great Debate' Participants Shared: Office	David.grober	Apr 18
ubuntu12132012 Offline: My Drive	me	Apr 13
Netscape04112012 Offline: My Drive	me	Apr 11
ChromeOS04102012 Offline: My Drive	me	Apr 10
cloudstorage04092012 Offline: My Drive	me	Apr 9
linux-kernel-04032012 Offline: My Drive	me	Apr 3
os2-04022012 Offline: My Drive	me	Apr 2

INTERNET

Mobile operations



Remote Office



Home

Security?



Security?



Web -Based SCADA

Advantages WEB-BASED SCADA

- Wide area connectivity
- Routable
- Parallel Polling
- Redundancy and Hot Standby
- Large addressing range
- Integration of IT to Automation and Monitoring
- Networks Standardization
- Cost Savings



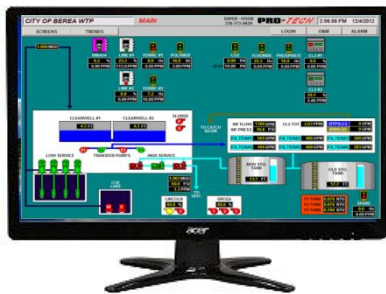
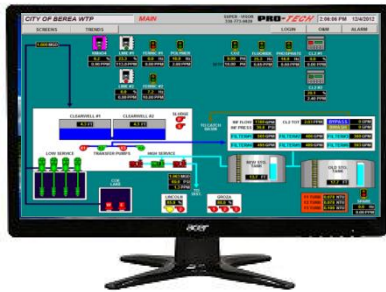
Disadvantages of WEB-BASED SCADA

- IP Performance Overhead
- Security concerns
- Not Universal browser capable

Traditional SCADA PC



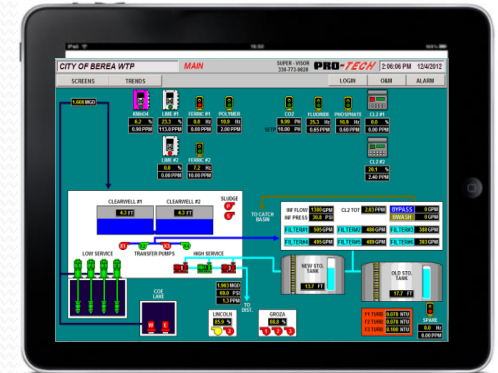
Other PC Nodes



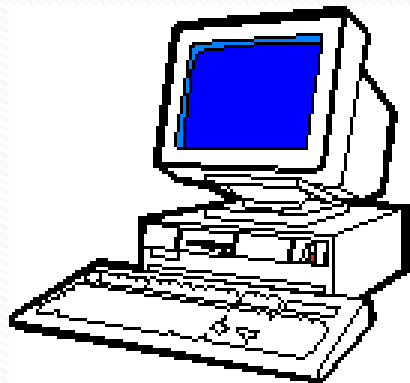
Remote Devices



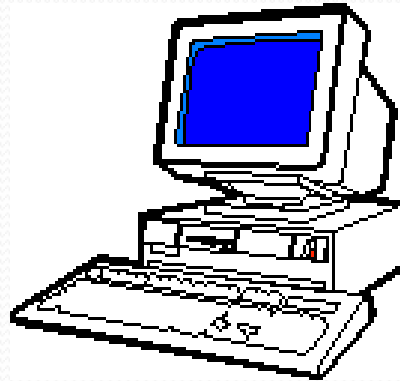
Wired
Or
Wireless



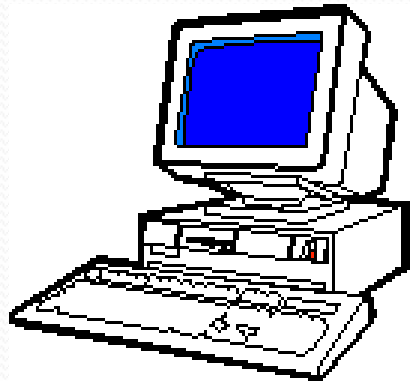
Traditional SCADA PC License



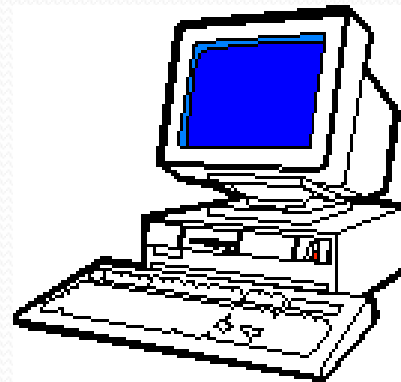
SCADA 1
\$3k-\$10K



SCADA 3
\$3k-\$10K



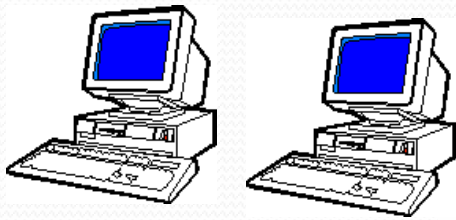
SCADA 2
\$3k-\$10K



SCADA 4
\$3k-\$10K

Had to Reside on Local network

Web based SCADA



SCADA



**Web
Browser
machine**

Web based SCADA

SCADA



Local Area Network



Local Office

Web Browser machine

Firewall

internet



Remote Office

Mobile operations



Home



Wireless Networks



Wireless Networks



Wireless Networks



Wireless Networks



Wireless Networks



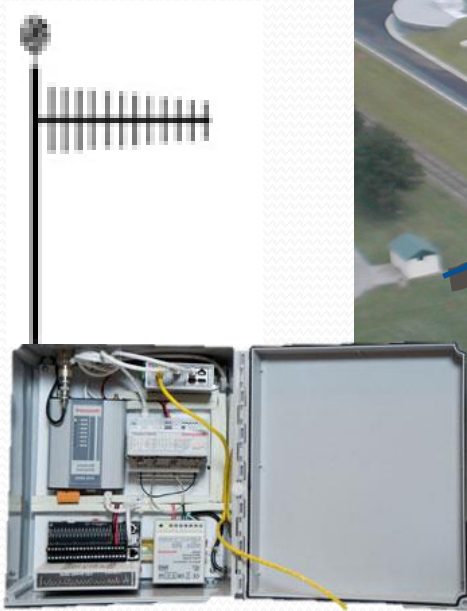
20 Years ago
\$20,000

Wireless Networks



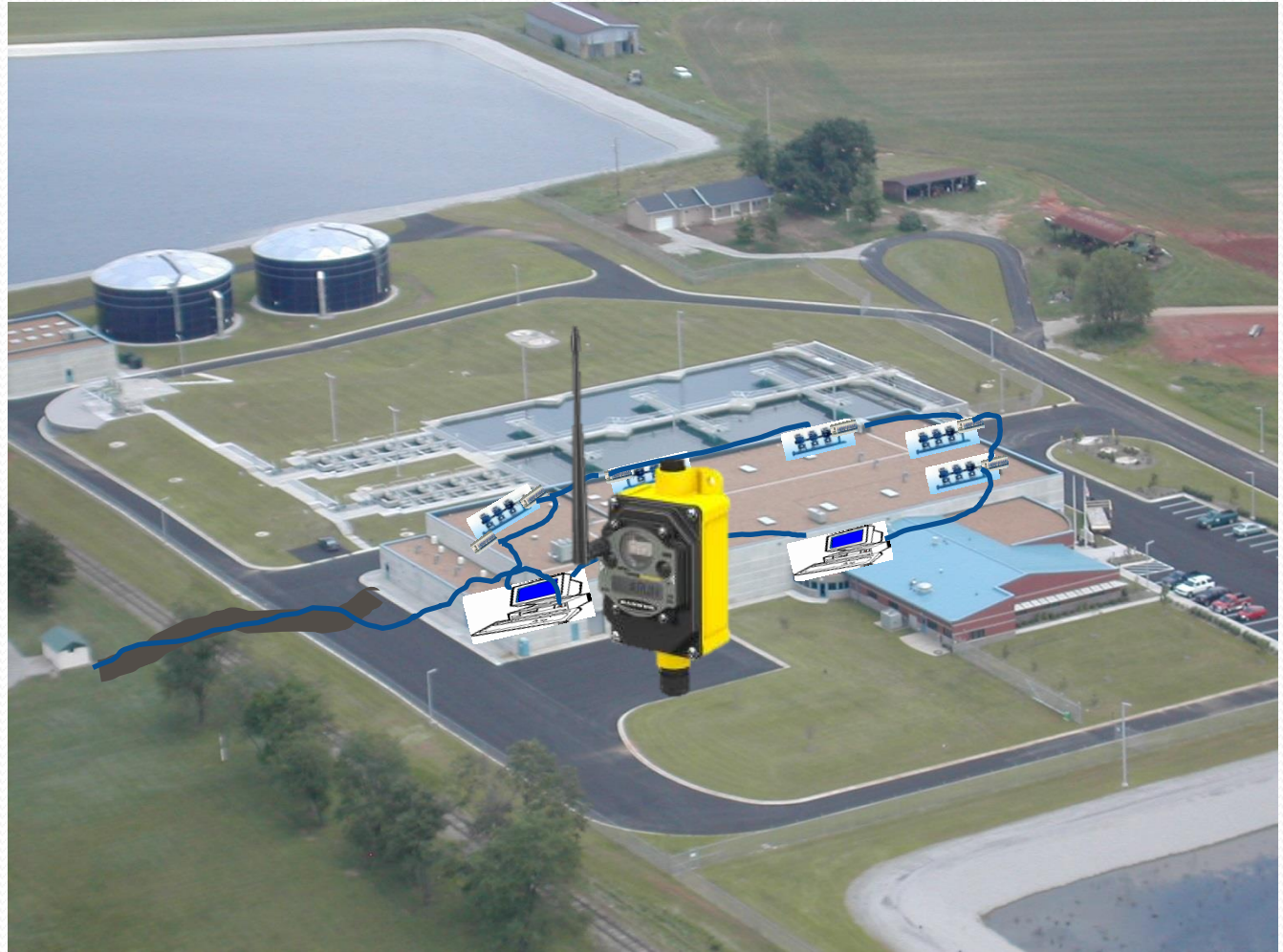
10 Years ago
\$6,000
RTU / Radio

Wireless Networks



Today -
\$1,500

Wireless Networks

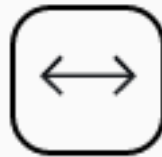




Wireless Networks



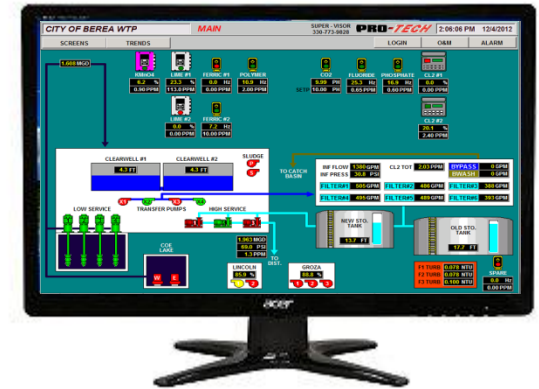
1.0+ GBPS



50+KM RANGE



5 GHz

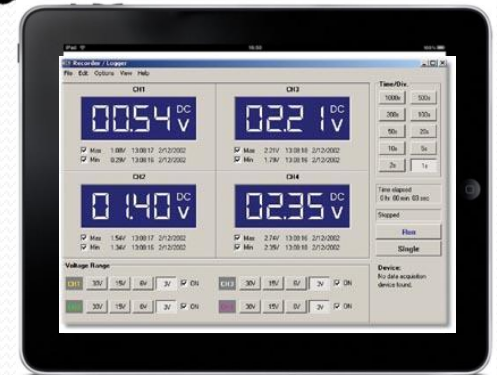


airFiber
High-Performance Wireless Backhaul

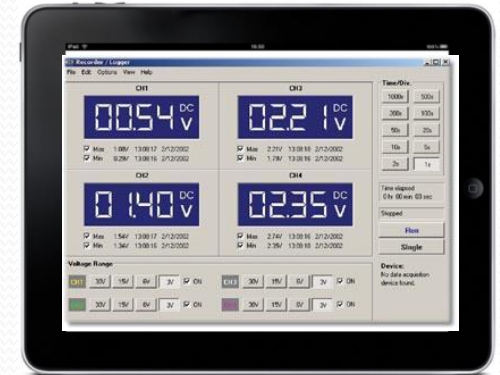
Up to 30 Miles!



WiFi Networks



WiFi Networks



Something New!



Cellular/WiFi Data Logger

Water Quality, Pressure, Flow, Level, Weather Remote Monitoring



- ✓ Battery Powered, 6 Times Data Upload per Day for 5 Years.
- ✓ IP68 Continuous Submersible to 5 m of water, Solution without Cabinet.
- ✓ -30~85°C Operating Temperature, 0~100% RH Operating Humidity
- ✓ Cellular, WiFi Communication.
- ✓ Simultaneous Acquisition of Multiple Process Parameters
- ✓ Seamless SCADA Software and Database Connectivity.
- ✓ Cloud Configuration, Operation, Monitoring, Alarm and Data Analysis Software Service.



Cellular/WiFi Data Logger

Water Quality, Depth, Flow, Weather Remote Monitoring

- ✓ Solar Powered, 15 minutes Continuous Communication for 5 Years.
- ✓ IP68 Continuous Submersible to 5 m of water, Solution without Cabinet.
- ✓ -30~85°C Operating Temperature, 0~100% RH Operating Humidity
- ✓ Cellular, WiFi Communication.
- ✓ Simultaneous Acquisition of Multiple Process Parameters
- ✓ Seamless SCADA Software and Database Connectivity.
- ✓ Cloud Configuration, Operation, Monitoring, Alarm and Data Analysis.



ENERGY



Why Conserve Energy?

- Save Money
 - Better to save energy than cut staff
- Straight to Bottom Line
- No Lost Value to Product or Service
- Carbon Risk Mitigation
- Public Relations

Sizing the Opportunity

Program/Activity	Potential Savings
Energy Efficiency	5-30% subject to current operations
Rate Optimization	Typically 10-15% for small accounts (less or none for large)
Power Shopping	Varies by account and utility 5-20%
Demand Response	\$0 – 30,000 / MW yr
Power Factor Correction/Demand Controls	5-15%
Renewables	0-10%
Total	Typically 5-25% overall

CONCLUSION

- Let your *Automation* system grow

FOOD for Growth

- New Technologies
 - Software
 - Hardware
- *Imagination*

Thank You!



The Operator Training Committee of Ohio, Inc.

Scott Fausneacht

