

# TELEMETRY & SCADA 101

How to Alarm, Monitor, and Control  
with Today's Tech





AT GASVODA GROUP, WE TAKE IMMENSE PRIDE  
IN DELIVERING UNPARALLELED SOLUTIONS FOR  
THE WATER AND WASTEWATER INDUSTRIES.

**TRANSFORMING CHALLENGES INTO SOLUTIONS.**

# AGENDA



**Telemetry vs. SCADA**



**Alarm, monitor & control**



**Equipment & communications**



**Budget & existing equipment**



**Cybersecurity & future trends**

# Telemetry

- the remote monitoring of equipment and processes at facilities, often spread over large geographic areas, a City, or a plant



Water tower levels

Reservoir levels

Pump status (running, stopped, faulted)

Flow rates

Pressure

Chlorine residual

pH

Turbidity

Tank levels

Lift station wet well levels

Generator status

Power outages

# Telemetry vs. SCADA

| <u>Telemetry</u>                                                                                     | <u>SCADA</u>                                                                                                   |
|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Moves data from remote sites to a central location</li></ul> | <ul style="list-style-type: none"><li>• Monitors and controls the entire system</li></ul>                      |
| <ul style="list-style-type: none"><li>• Focused on communications and data collection</li></ul>      | <ul style="list-style-type: none"><li>• Focused on operations, visualization, alarms, and control</li></ul>    |
| <ul style="list-style-type: none"><li>• A component of a SCADA system</li></ul>                      | <ul style="list-style-type: none"><li>• The complete management system</li></ul>                               |
| <ul style="list-style-type: none"><li>• Answers: "What's happening out there?"</li></ul>             | <ul style="list-style-type: none"><li>• Answers: "What's happening, and what should we do about it?"</li></ul> |

# Alarm, Monitor, Control

Three levels of capability – most systems start with the first and grow



## ALARM

Tell me when something is wrong

- High wet well / low level
- Pump fail, power fail
- Generator run, intrusion
- Call, text, or app push

Typical gear

Dialer or cellular alarm unit



## MONITOR

Show me what is happening

- Levels, flows, pressures
- Run times, starts, amps
- Trends and daily reports
- Every site on one screen

Typical gear

Cellular RTU + web dashboard



## CONTROL

Let me change it from here

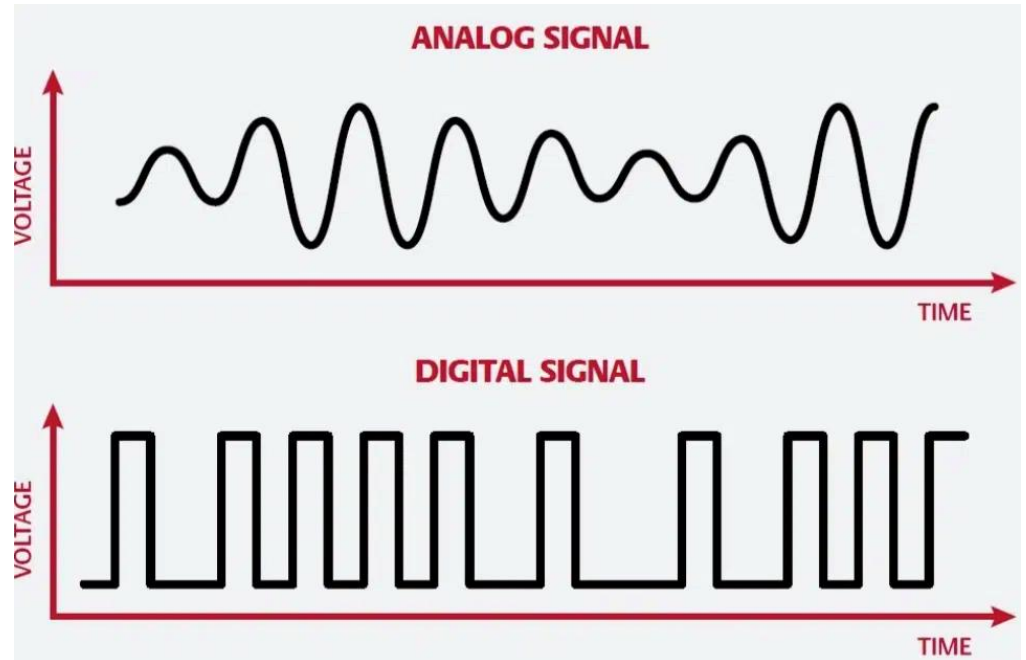
- Start/stop, reset a fault
- Change setpoints
- Adjust VFD speed
- Automate between sites

Typical gear

PLC/RTU + SCADA software

# Analog vs Digital

Analog (4-20mA) = continuous



Digital = on/off signals

# Analog or Digital?

Pump OT relay?

Pump run Float?

Pump Fault?

Generator Run?

DO level?

Amps?

Level transducer?

High water alarm float?

Power Fail?

Flow meter?

Water pressure?

Voltage monitor?

# Communication Options

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- Signal wiring (digital or analog)
- Landline – copper is being retired
- Radio – licensed & unlicensed
- Cellular – LTE, LTE-M, 5G
- Wireless Wires (point-to-point)
- Fiber optic / Ethernet
- Satellite for the hard-to-reach site
- Protocols
  - Modbus, EtherNet/IP, DNP3, MQTT, Hart



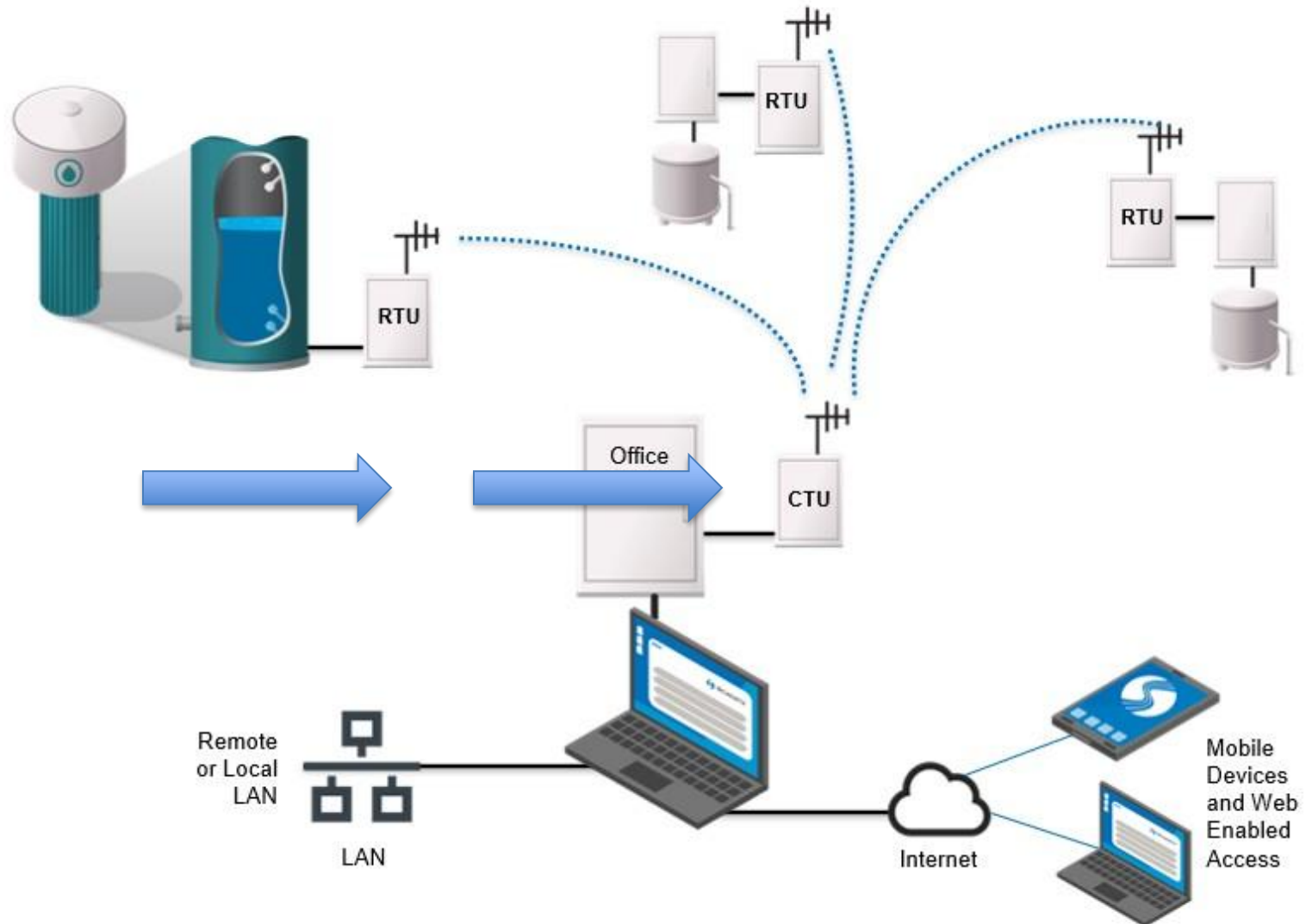
# Comparing Communication Methods

| Method                      | Best fit                            | Watch out for                       |
|-----------------------------|-------------------------------------|-------------------------------------|
| Hardwire / fiber / Ethernet | Within a plant or campus            | Trenching cost over distance        |
| Landline (copper)           | Legacy alarm dialers                | Being retired – plan a replacement  |
| Licensed / unlicensed radio | Utility-owned network, fast polling | Line of sight, path study, towers   |
| Cellular (LTE / LTE-M / 5G) | Lift stations, towers, remote sites | Monthly fee; check carrier coverage |
| Satellite                   | No cell or radio coverage           | Cost, latency, clear sky view       |

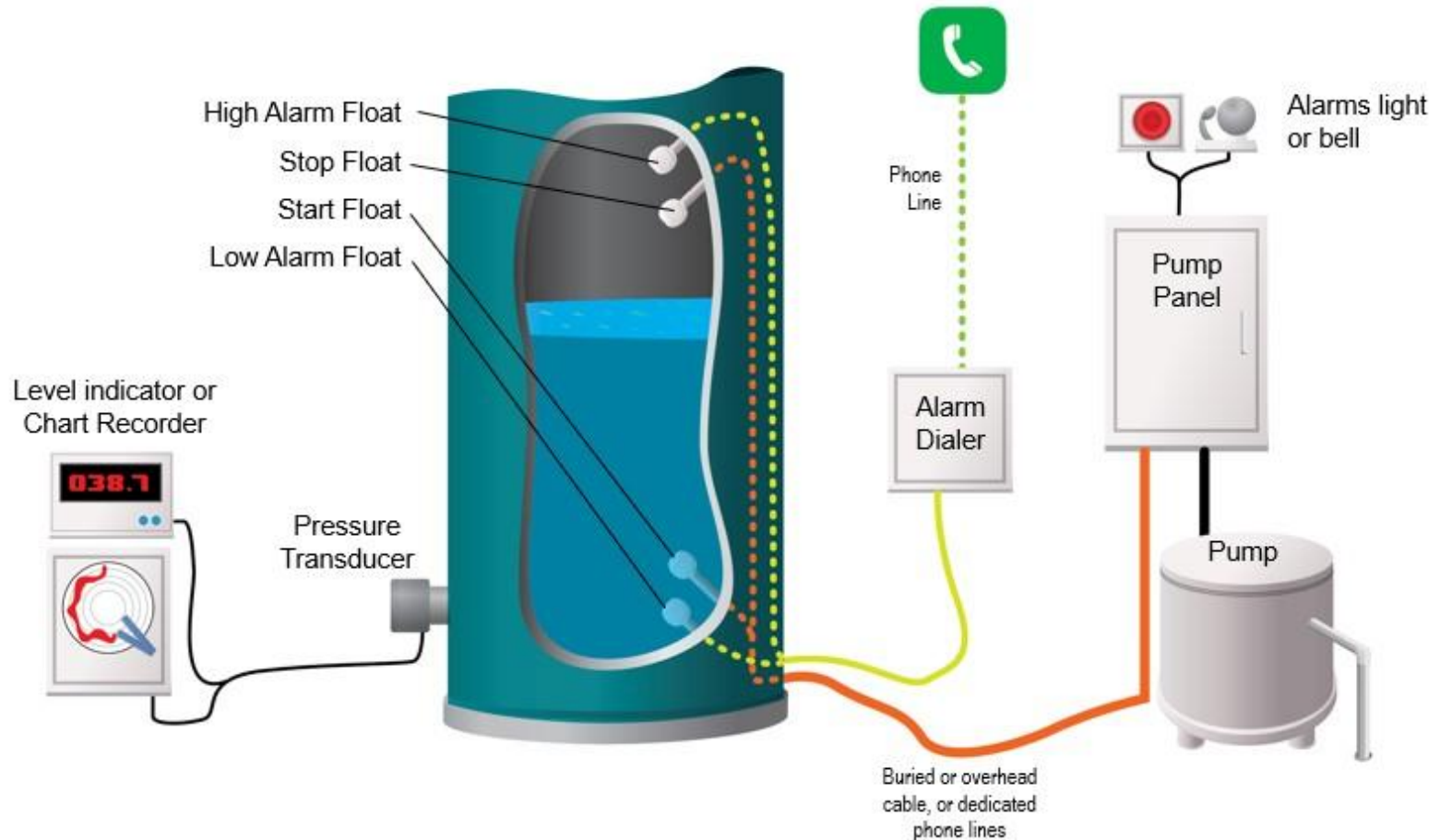


**Still on a phone-line dialer?** In March 2026 the FCC dropped the federal approval step for retiring copper lines – carriers now only need to give notice, as little as 90 days. Inventory your dialer lines now.

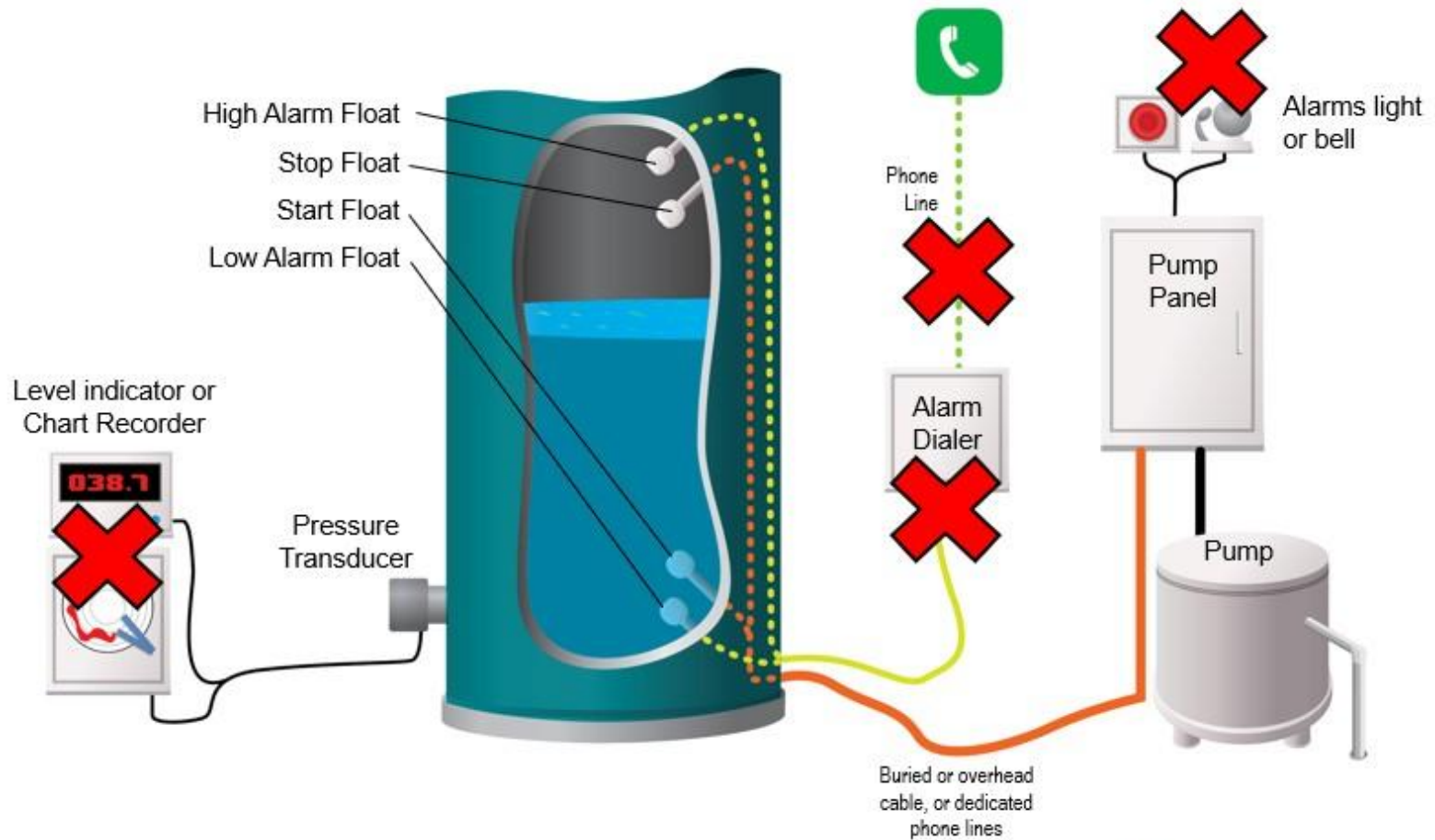
# What is a SCADATA System?

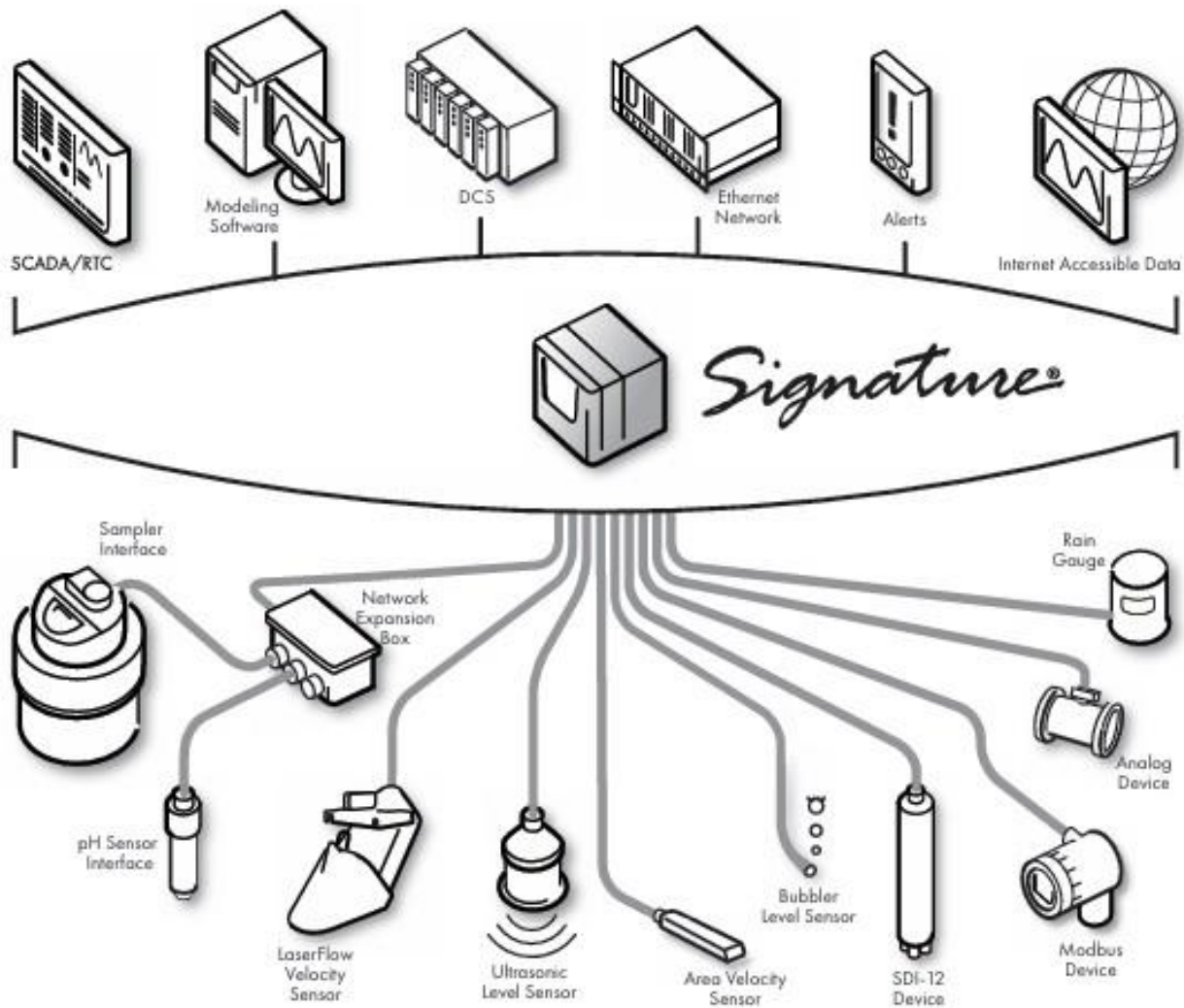


## Remote Site without SCADATA

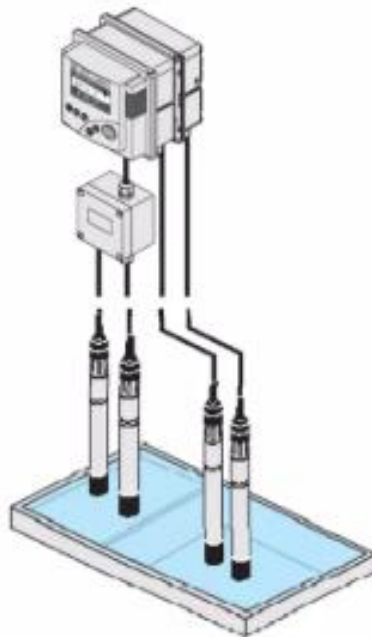
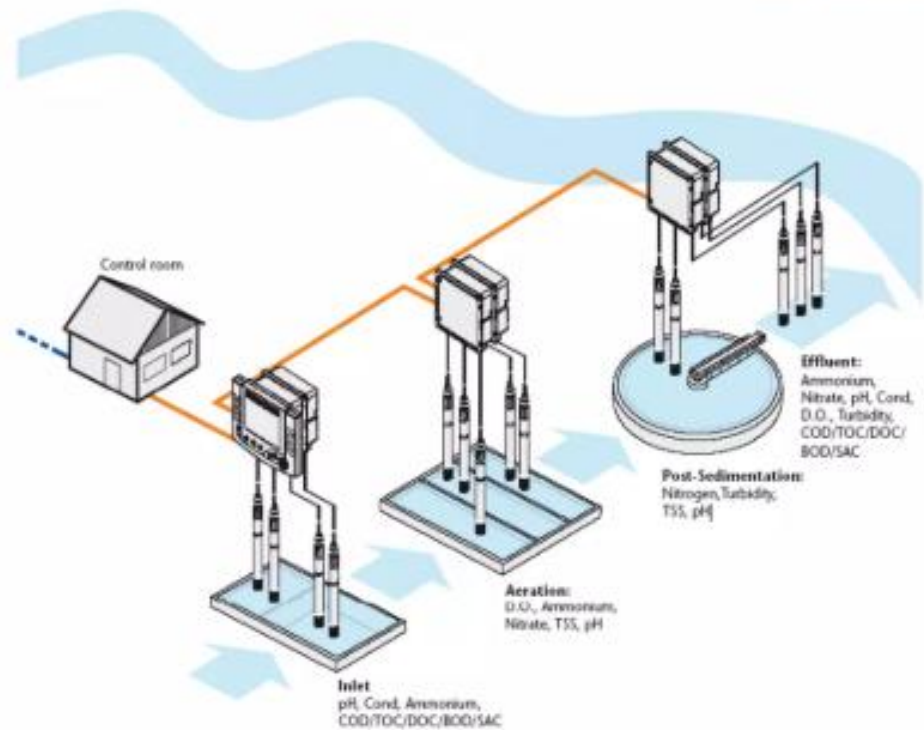


# Remote Site with SCADATA





# IQ SensorNet Systems



## 182 Controller System

- 1 - 4 parameters

## 2020 XT Controller System

- Sensor network
- 1 - 20 parameters

# What Gets Installed?



Digital and Analog input cables



Amp Probe



Sealtite plastic conduit



Sealtite connectors



Pre-landed terminal for power



Accessory bag



Radar Sensor

OR



Submersible Level Transducer

# Operator View

[Main](#) [Reports](#) [Setup](#) [Back To Dashboard](#)

Control

90214)



Last update 06/14/26, 07:03:58 PM

Get Status

## ALARMS

Abnormal  
Level



Station Flood



Pump 1 Fail



Pump 2 Fail

POWER



23 GPM

6 [Ft]

Xdcr

2

Xdcr Low

[Ft]

46 GPM

46 GPM

2.8 Ft

## PUMP 1

| Parameter          | Value | Unit |
|--------------------|-------|------|
| P1 High Amps       |       |      |
| P1 Dry Run Alarm   |       |      |
| P1 Runtime Alarm   |       |      |
| P1 Amps            | 7.4   | A    |
| P1 Cycles          | 18    | /Day |
| P1 Runtime Minutes | 567.1 | /Day |

## PUMP 2

| Parameter          | Value | Unit |
|--------------------|-------|------|
| P2 High Amps       |       |      |
| P2 Dry Run Alarm   |       |      |
| P2 Runtime Alarm   |       |      |
| P2 Amps            | 7.8   | A    |
| P2 Cycles          | 18    | /Day |
| P2 Runtime Minutes | 332.6 | /Day |

Relay

Ack. Fault

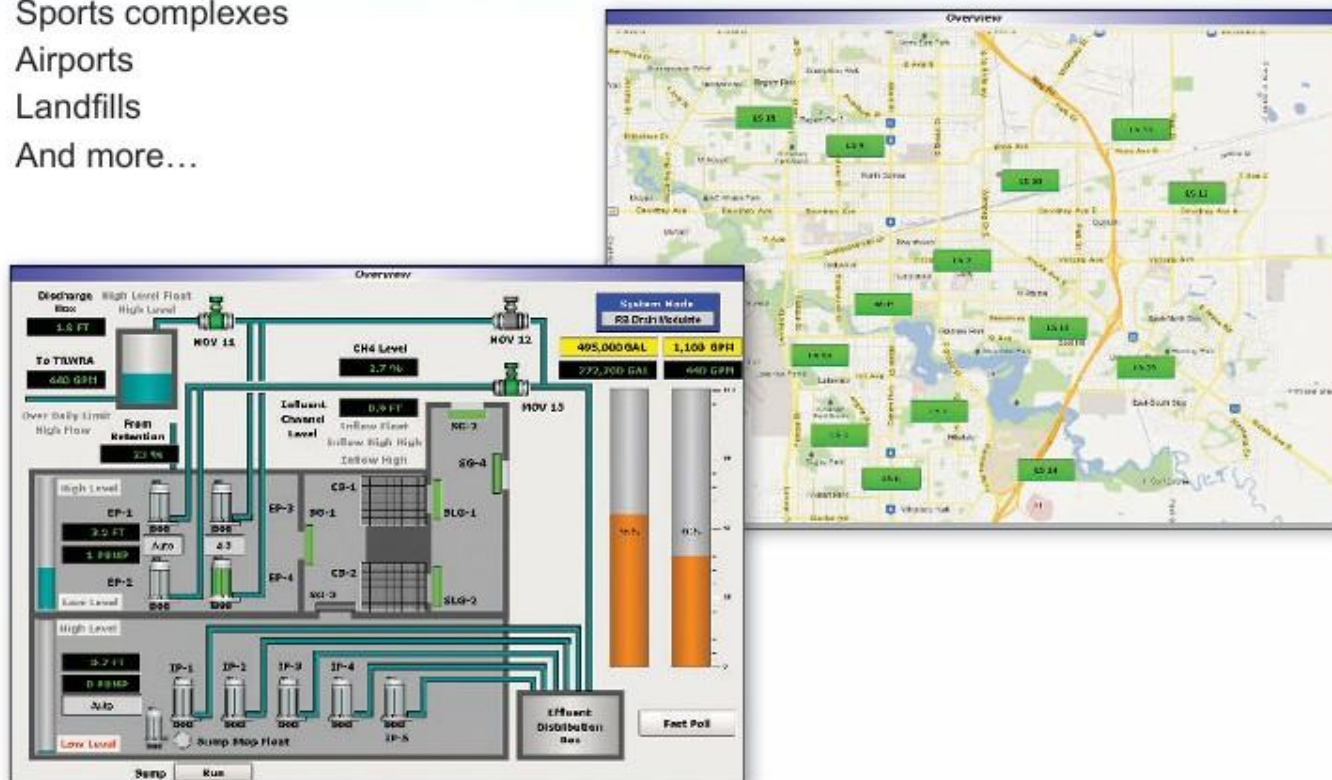
OK



# CUSTOM SOLUTIONS FOR LARGE AND COMPLEX SYSTEMS.

icontrol has also been developed to handle systems of any size or complexity. The open-architecture and multiple communication options make it possible to **integrate with nearly any PLC or existing system.**

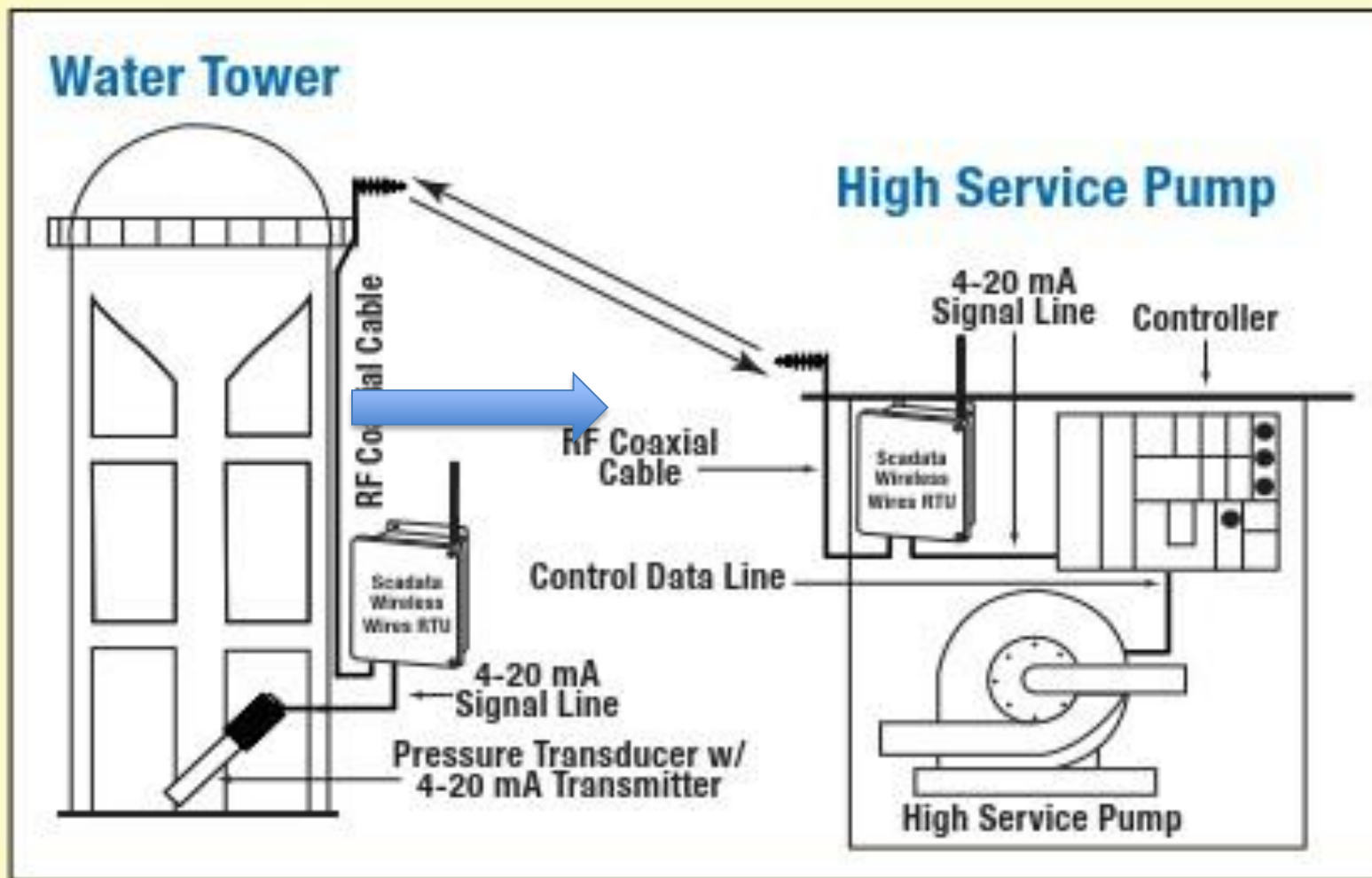
- Water treatment processes and plants
- Water distribution systems
- Wastewater collection systems
- Wastewater treatment processes and plants
- Industrial applications
- Sports complexes
- Airports
- Landfills
- And more...



## Example of a Scadata Wireless Wires Setup

Wireless Wires packages use radio frequency to broadcast application data converted from 4-20 mA signals.

operator  
notes



# Start With What You Already Have

Most sites already have the signals – telemetry just carries them farther



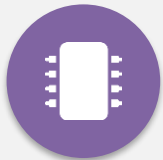
## **Floats & dry contacts**

High level, pump run, and fault relays wire straight into alarm inputs



## **4-20 mA instruments**

Existing level transducers and flow meters become trended data



## **VFDs & PLCs**

Read amps, kW, faults, and run hours over Modbus – no new sensors



## **Radios, conduit & fiber**

Reuse existing paths; add cellular only where they don't reach



## **Your current SCADA**

Add remote sites one at a time to the screens operators know



## **Phones you already carry**

App and text alerts replace the dialer and pager

# Why Telemetry Matters



REDUCE  
FAILURES



REDUCE  
LABOR



IMPROVE  
VISIBILITY



IMPROVE  
COMPLIANCE



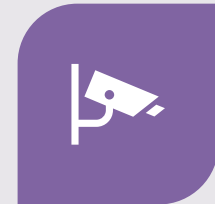
SLEEP AT  
NIGHT



VACATION



PUBLIC SAFETY



SECURITY

# Operational Benefits



24/7 visibility



Faster response



Lower risk



Time to focus on other priorities



Better data tracking



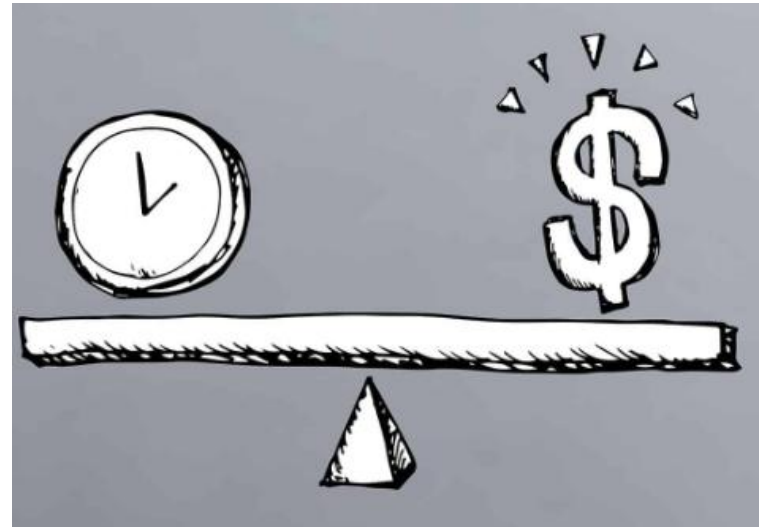
Actual flow/operation info



Public perception/confidence

# Cost of Failure

- Pump: \$10k - \$80k
  - Overflow: \$10k-\$50k
  - Callouts: \$200 - \$5k
  - Basement backups?
  - Public outcry?
  - Your job?
- 
- Typical cost of telemetry is \$3k – 15k/site
    - One failure pays for system
    - ROI < 2 years



# Without Breaking the Bank

Match the system to the site – not every station needs full SCADA

## GOOD

Cellular alarm unit

- Replaces the phone dialer
- Alarms by call, text, app
- Basic status and run times
- Self-install at many sites

Fits

Small lift stations

## BETTER

Cloud-hosted telemetry

- Everything in Good
- Trends, reports, history
- All sites on one dashboard
- Limited remote control

Fits

Collection systems, towers

## BEST

PLC / radio SCADA

- Full remote control
- Plant-wide integration
- Historian and HMI screens
- Utility-owned network

Fits

Treatment plants, large systems

**Stretch the budget:** phase in by risk, reuse sensors, pick open protocols, and ask about SRF / grant eligibility

# Remote Access, Done Safely

Connecting a site to the internet means protecting it



## **Change default passwords**

On every PLC, HMI, modem, and router



## **Use multi-factor login**

For remote access and cloud dashboards



## **Keep controls off the open internet**

Use a VPN or vendor-secured cloud, not open ports



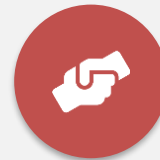
## **Know what you have**

List devices, IPs, and who has access



## **Update and back up**

Firmware, software, and PLC programs



## **Use the free help**

CISA vulnerability scanning and EPA assessments

# Future Trends

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Condition based  
monitoring



Cameras



Process advice

# Condition Based Monitoring

## Using your VFD

- Amps increase
- Motor windings change
- Vibration (external)



## IT SPECIFICATIONS



### 4 LED 2 COLOR INDICATORS

-  SUFFICIENT POWER SOURCE
-  INSUFFICIENT POWER SOURCE (UNDER 12VDC OR OVER 24VDC)
-  COUNTER-CLOCKWISE ROTATION
-  INSUFFICIENT POWER SOURCE
-  MACHINE HEALTH GOOD, NO ALERTS

### CALCULATED FAULT OR SYSTEM ALARM

- |                                                                                                   |                                                                                                    |
|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
|  UNBALANCE       |  TEMPERATURE      |
|  CAVITATION     |  GEAR MESH LEVEL |
|  VIBRATION RMS |  BEARING FAULT  |

Get started at  
[CORNELLPUMP.COM/CO-PILOT](http://CORNELLPUMP.COM/CO-PILOT)

### TECHNICAL SPECIFICATIONS

#### SENSING CAPABILITIES

##### VIBRATION

- 0-7.8 in/sec (0-200 mm/sec)
- 3D axis vibration (x, y, z-axis)
- Vibration RPM

##### MAGNETIC FIELD

- Magnetic RPM
- 0-2,000  $\mu$ T

##### TEMPERATURE

- -40°C to 110°C

#### OPERATING PARAMETERS

- -40°C to 90°C
- Chemical resistant
- Dirt repellent
- Built out of stainless steel
- IP68

#### WIRING

- 4 wire, shielded cable
- Power +/-
- Modbus: A+, B

#### COMMUNICATION

- Modbus (RS-485)

#### DIMENSIONS/ MATERIALS

- 2.15" (Ø56 mm)
- 12 m of cable

#### POWER

- 12-24 VDC power required
- 60 mA current draw

#### COMPUTING CAPABILITIES

- Slip
- Unbalance
- Cavitation
- Vibration RMS
- Dynamic Alerting
- Bearing Fault
- Slip Gear
- Tri-Axial Vibration
- RPM

CORNELL PUMP COMPANY

## MARKET & PRODUCT LINE



WINGs unit  
detects an  
alarm

1



2

Camera sends  
video and audio  
clips



# Know whether that 3 AM high-Level alarm is real before you ever put on your boots.

OmniSite WINGs sends a  
20-second video and audio  
clip directly from your wet well, so  
you can see and hear exactly what's  
happening before heading to site.

3

Instant  
notification  
on your phone



3:00

# The Virtual Microbiologist + Process Advisor

**Sample Details**

**History**

**Microscopic Samples and Metadata**

| Sample Name | Date       | Time  | Location |
|-------------|------------|-------|----------|
| Sample 001  | 2023-10-27 | 10:00 | Lab 1    |

**Metadata**

| Parameter        | Value | Unit   |
|------------------|-------|--------|
| pH               | 7.1   | -      |
| Dissolved Oxygen | 8.5   | % Sat. |
| Temperature      | 25.0  | °C     |

**Analytical Data**

| Method              | Result | Unit |
|---------------------|--------|------|
| ATP Bioluminescence | 1.2e6  | RFC  |

**Associated Data/Related Documents**

| Document Name   | File Type | Size   |
|-----------------|-----------|--------|
| Protocol_V1.pdf | PDF       | 1.2 MB |



# System Options

- Primex Pump Watch - Cellular pump stations
- Grundfos Connect - Cellular pump stations, generators, power quality, flows and collection system levels
- SCADATA – Entry-level custom. Onsite hosting with Cloud/mobile option. Radio, cellular, PLC/ethernet...mix and match.
- Primex iControl: Small to large. Custom solution. Cellular or internet.

# Additional Insight



Data-driven operations improve efficiency and reliability and enhance public support & trust



Telemetry = visibility



SCADA = visibility + control

# Discussion



WHERE ARE YOUR  
BIGGEST ISSUES?



WHAT WOULD YOU FIX  
FIRST WITH THIS DATA?



WHAT'S THE BEST THING  
YOU EVER PUT IN A  
TELEMETRY SYSTEM?

Thank you!

Sam Cole  
scole@gasvoda.com  
217-799-4411  
www.gasvoda.com

