

# The Times They are a-Changin'

Technology does not stand still.



Solid planning, superior solutions



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# The Times They are a-Changin'

- Technology does not stand still.
- Some of the instrumentation and control system capabilities available today didn't exist even five years ago. Or if they did, they were not reliable, or they were cost prohibitive.
- And what about the wireless revolution?
- Remote access?
- Municipal wastewater and water plants are not insulated from the "changin' times." And that's a good thing, because these changes can have a positive impact on your operation if you understand what is available and how to make the most of it.



# The Times are Changing

This presentation will focus on recent developments to help you decide how to put the right tools and information into the hands of supervisors and operators.

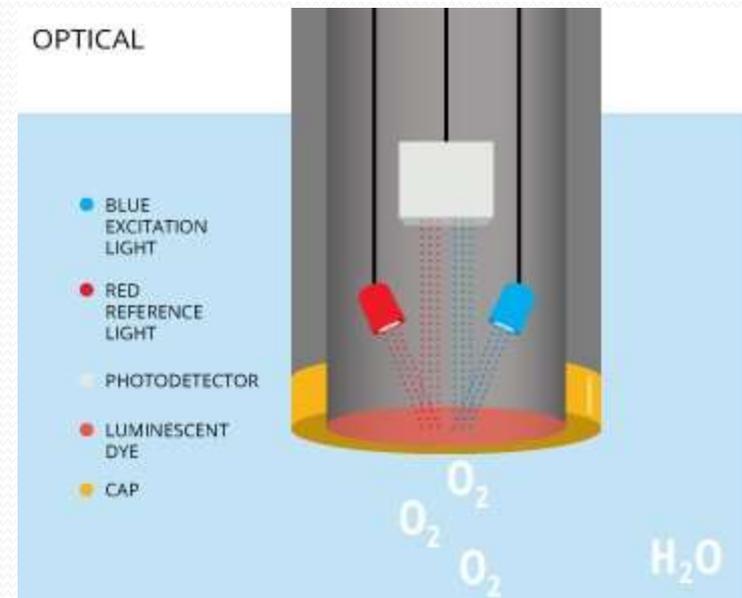
Presentation will cover three areas:

- Developments in Instrumentation
- Developments in Human-Machine Interface (HMI)
- Key Remote Software Applications (Apps)



# The Times They are a-Changin' Innovation in Instrumentation

- Newer technology that is more reliable, requires less maintenance, and costs less
- Fluorescent (optical) DO, in case you didn't know
  - What used to require regular calibration, is now available with replacement cartridges
  - Optical technology replaces chemical-based analysis
  - Wireless connected versions are also available, which can be especially beneficial for retrofit applications.
- Infra-red (IR) combustible gas sensors require less maintenance than catalytic bead-type sensors.



# The Times They are a-Changin' Innovation in Instrumentation

- Optical Floats
  - Environmentally friendly
  - Intrinsically safe by design
  - Uses light from an LED over fiber optic cable rather than an electrical signal.
  - Some municipalities are considering this new product as an alternative to a traditional float.



# The Times They are a-Changin' Innovation in Instrumentation

## Radar technology

- Narrower beam angle than ultrasonic.
- Loop powered, suitable for hazardous locations.
- Superior performance in difficult applications such as the presence of foam and fog
- Radar is now allowed by waiver of FCC rules for exterior applications, where it was previously not approved.
- This technology is suitable for many applications:
  - Chemical Tank Level
  - Influent Channel Flow
  - Silo Level
  - Digester Level



# The Times They are a-Changin' Innovation in Instrumentation

Sludge blanket analyzers: You be the judge (or not)



Old Way

- Online analyzers can provide reliable, hands-free, real-time data.
- Advances in signal processing technology at the instrument level greatly improves reliability and accuracy.



New Way



# The Times They are a-Changin' Innovation in Instrumentation

- Wireless instruments are filling the market
- Practical applications
  - *Outfall Temperature*
  - *DO/ORP Retrofit*
- Security is a consideration.
- Can be tied in to SCADA with the right communication protocols.



# Net Everything



**Connect everything behind a firewall.  
Isolate the control network from the world.**

# Net Everything



- We'll say it again, *connect everything behind a firewall, and isolate the control network from the world!*
- Be connected, but be safe.
  - The firewall should be just for your process system that lets in only authorized traffic.
  - Isolate process network from office network.
  - Create strong passwords and use them.
  - Include security in the design up-front.
  - Standardize on widely accepted protocols.

# Net Everything

- This one also bears repeating:  
*Standardize on widely accepted protocols.*
  - Ethernet IP is a widely used industry standard.
  - Avoid proprietary protocols that can only be serviced by limited personnel, or by a company that may go out of business.



# Net Everything

## The Network We Know

- Typical connected equipment in a plant SCADA network has built-in connectivity:
  - Computers
  - PLCs
  - HMIs
  - Radios
  - Cameras
  - Motor control: Drives, Overload modules



# Net Everything

## The Network Grows

- But there's more that can be added:
  - Analytical Transmitters
  - Generator Controllers
  - Weather Stations
  - UV Systems
  - Entrance gate systems
  - Modulating Valves
  - Magnetic Flow Meters
  - Hazardous Gas Detection Systems
  - Motor Controllers



# HMI: Window to Your World

## Human-Machine Interface

- SCADA computer screen or Control Panel Touchscreen
- Touchscreens have evolved.
  - Models now have Built-In Enhanced Functionality:
    - *Data Logger*
    - *Alarm Logger*
    - *Connect to a networked hard drive for data storage and access.*



# HMI: Window to Your World

- They also have functionality formerly just in computers:
  - *Web Server for remote access*
  - *Print Server for daily report printing*
  - *Data Logger: Can download data to a memory stick or even a hard drive*
  - *Internet Browser*



# HMI: Window to Your World

- High Brightness Screens are legible even in full sunlight.



# Remote Access: There's an App for That

- SCADA on your Phone
  - React in real-time
  - Apps provide instant data designed to give you pertinent information on easy-to-access screens.



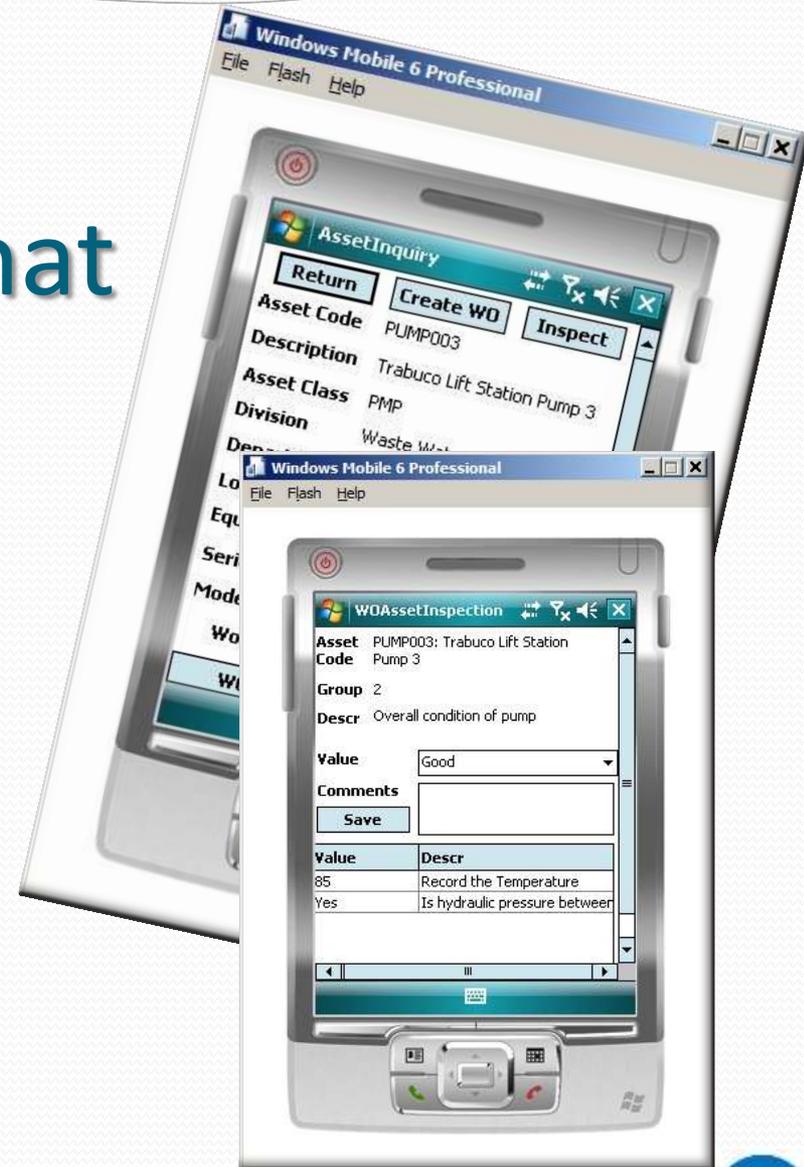
# Remote Access: There's an App for That

- SCADA on your Tablet
  - Tablets can provide window to your SCADA and even take the place of a traditional HMI
- *Software and data reside on server in your plant, not on the tablet.*
- *Easily upgraded or replaced*
- *Relatively inexpensive*



# Remote Access: There's an App for That

- GIS on your Tablet or Phone
  - Programs can integrate SCADA, GIS data, and maintenance applications.
  - *Track equipment, asset locations, run-hours, and lab data.*
  - *Use for reporting, maintenance, issuing and completing work orders, etc.*



# “To Cloud or not to Cloud, that is the Question”

*--William Shakespeare*

- Apparent simplicity, lower initial cost
- Consider
  - *Long-term cost of ownership*
  - *Ultimate reliability of system*
  - *Ultimate security of information*



# SCADA ON YOUR FRIDGE

- You could probably do it, but then again, *is it really a good idea?*



# Actions

Times and technology are always changing.



# Actions

- Keep abreast of trends.
  - *Learn* about the latest in technological advances, such as instruments, that improve data gathering.
  - Always **remember** that security threats are constant.
  - **Know** that improvements to control systems can help you to run your plant more effectively, and make access to your control system easier and more user-friendly.



# Actions

- Optimize use of technology for what it does best:
  - *Data collection and management*
  - *Data Analysis*
  - *Remote Control*
  - *Maintenance Management*
  - *Asset Management*
  - *Keeping track of everything you need to manage*
    - *Put YOU in control of your plant.*



# Conclusions

- Technology never ceases to move ahead, offering ways to make your life better.
- Pick and choose which improvements will best enhance your productivity.
- Always be on top of security for the technology you choose to use.

Not sure? Don't guess. **Ask** your engineer.



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