



Install SCADA-ready equipment now...

Preparing for SCADA

...to get the full experience of SCADA.




B&M Technical Services




- Family owned and operated
- 11 years old
- Full service process control integration for water and wastewater treatment plants
 - Controls and SCADA systems
 - Allen Bradley System Integrator
 - Wonderware System Integrator
 - Instrumentation devices
 - Mechanical equipment like pumps, blowers, microstrainers, etc.

What does SCADA stand for?




S
C
A
D
A

What is SCADA?



Supervisory
Control
And
Data
Acquisition



SCADA and Me: A Book for Children and Management Paperback by [Libby](#)

What is SCADA?



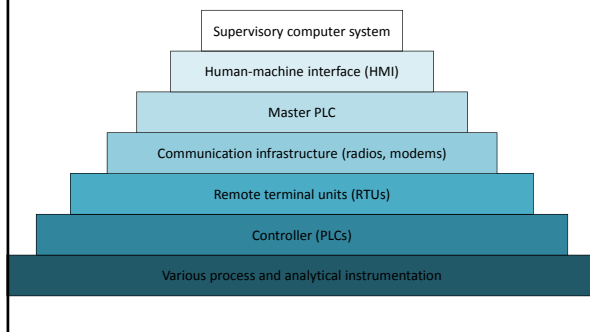
Computer controlled systems that monitor and control industrial processes that exist in the physical world.

Who uses SCADA?

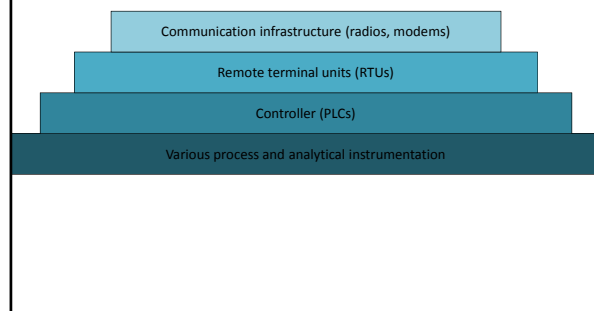


- | | |
|--|--|
| Manufacturing | Oil and gas pipelines |
| Production | Electrical power transmission and distribution |
| Power generation | Wind farms |
| Fabrication | Civil defense siren systems |
| Refining | Large communication systems |
| Water treatment and distribution | Airports |
| Wastewater collection and treatment | Ships |
| | Space stations |

What makes up SCADA?



Prepare for SCADA



Why prepare for SCADA?

START NOW


BE READY LATER





4-20 mA

- Very important!
- 4-20 mA = analog = current loops

Digital signal




Analog signal



4-20 mA

- Gives us more information.
- 4 mA = lowest end of range.
- 20 mA = highest end of the range.

Digital signal




Analog signal



4-20 mA

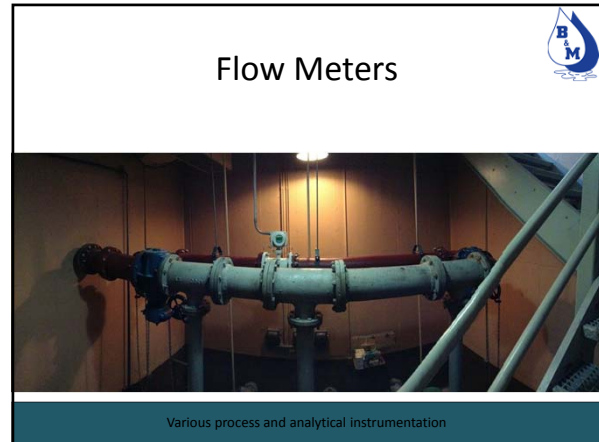
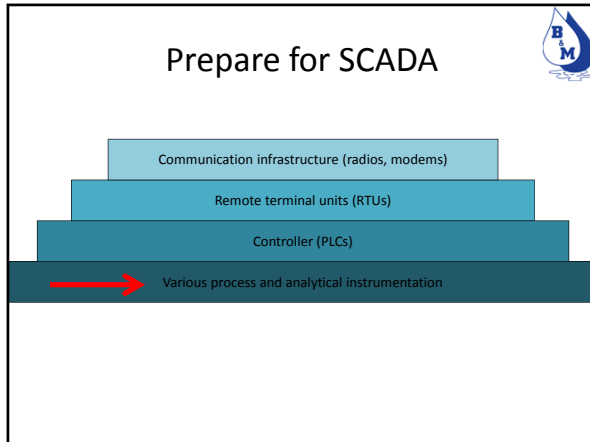
What kind of information would you want to send back with an analog signal?

Digital signal



Analog signal







- ### DO Analyzers
- Pick DO analyzers that will be able to allow SCADA to drive your oxidation operations
 - Add VFD operation to DO analyzers
- Various process and analytical instrumentation

VFDs


- Install in water wells
- Pace running of wells off of tower levels




Various process and analytical instrumentation

Monitor Relays

- Pump monitor relays
- Motor relays






Various process and analytical instrumentation

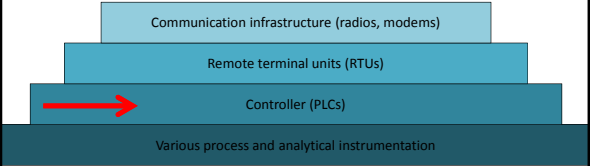
Flow switches

- Update flow switches
- Thermal dispersion



Various process and analytical instrumentation


Prepare for SCADA



Various process and analytical instrumentation

Pressure transducers

Use the power of the 4-20 mA signal!




Levegage Submersible Transmitter

Just two of the many transmitters in our product line

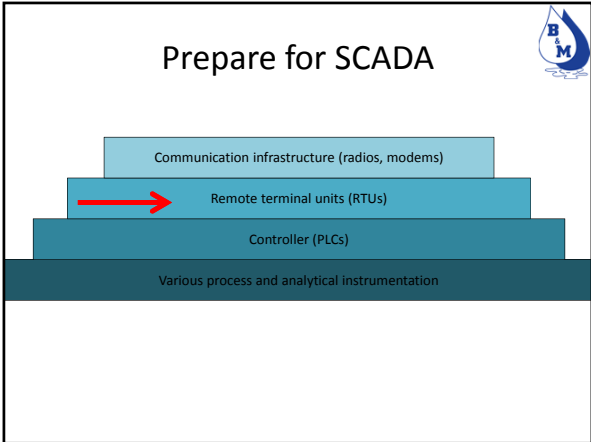
Controller (PLCs)

Pump station/water station controls


- Necessary inputs and outputs



Controller (PLCs)

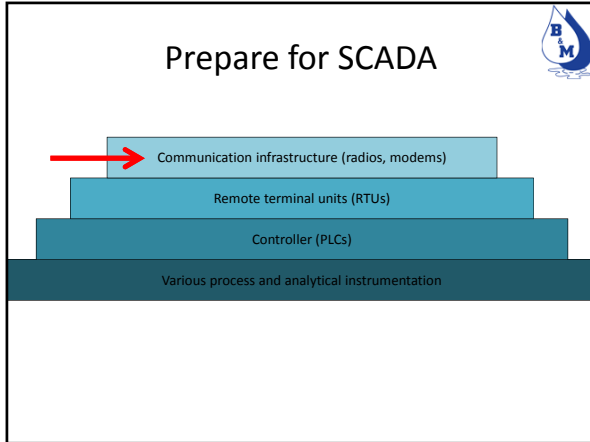


RTUs





Remote terminal units (RTUs)

Controller (PLCs)



Dialers

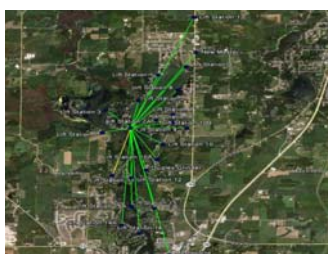
- Expandability and plan for reuse


vs.


Communication infrastructure (radios, modems)

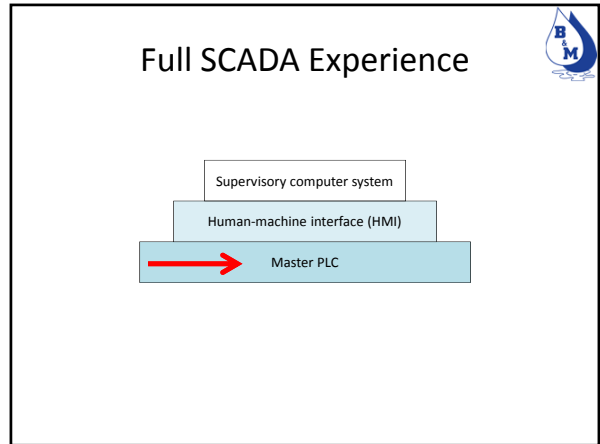
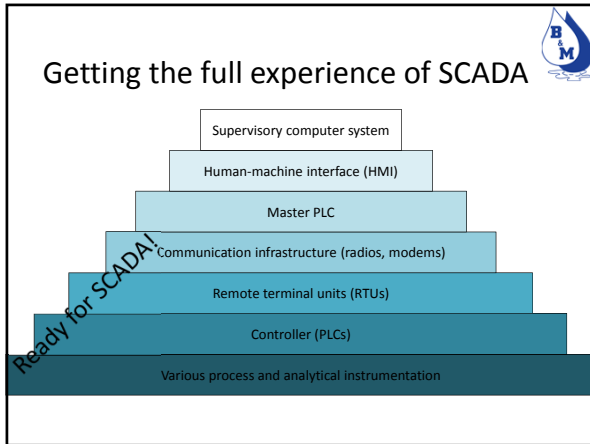
Radio Study

- What can you learn from a radio study?



Communication infrastructure (radios, modems)

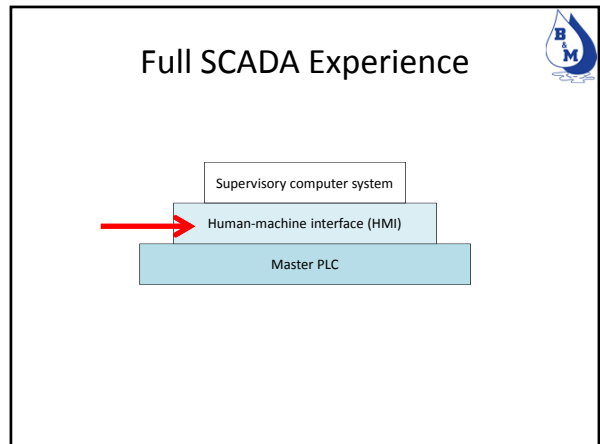
	Master (Pump House 1)	Site 3 (Water Tower)
Latitude	43 22 20.10 N	43 22 35.82 N
Longitude	089 32 28.92 W	089 32 40.74 W
True azimuth (°)	331.26	151.25
Vertical angle (°)	-3.17	-3.18
Elevation (ft)	792.62	928.38
Antenna model	MF8915 (TR)	BMOY8905 (TR)
Antenna file name	mf8915	bmoy8905
Antenna gain (dBi)	5.00	5.00
Antenna height (ft)	50.00	15.00
Antenna azimuth (°)	0.00	0.00
TX line model	LDF4-50A	LDF4-50A
TX line unit loss (dB/100 ft)	2.23	2.23
TX line length (ft)	75.00	
TX line loss (dB)	1.67	
Connector loss (dB)	1.50	1.50
Frequency (MHz)	915.00	
Polarization	Vertical	
Path length (mi)	0.34	
Free space loss (dB)	88.57	
Atmospheric absorption loss (dB)	0.00	
Field margin (dB)	15.00	
Net gain (dB)	87.94	87.94
Radio model	Transnet 900	Transnet 900
Radio file name	transnet 900	transnet 900
TX power (dBm)	30.00	30.00
ERP (dBm)	33.98	39.65
RX threshold criteria	115.2 KBPS	115.2 KBPS
RX threshold level (dBm)	-105.00	-105.00
RX threshold level (dBm)	1.26	-1.26
Receive signal (dBm)	-57.94	-57.94
Receive signal (µV)	283.32	283.32
Receive field strength (µV/m)	3222.46	2777.46
Thermal fade margin (dB)	47.06	47.06
Annual location unavailability (min)	0.00	0.00
Annual multipath availability (%)	99.99803	99.99803
Annual multipath unavailability (min)	10.35	10.35

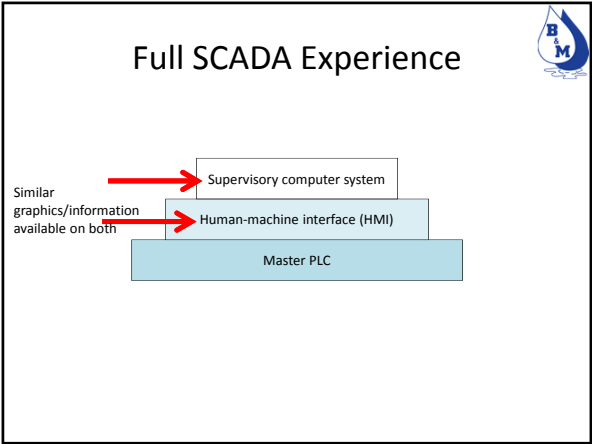
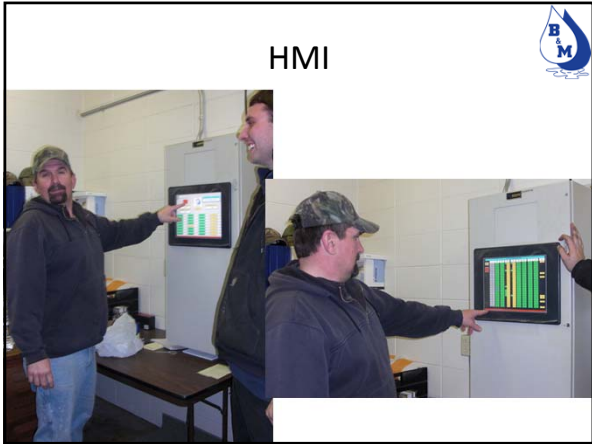


PLC

- When replacing PLCs, ask:
 - Could this PLC become redundant in a SCADA system?
 - Where can I use this in a SCADA system?
 - What will I need it to do?

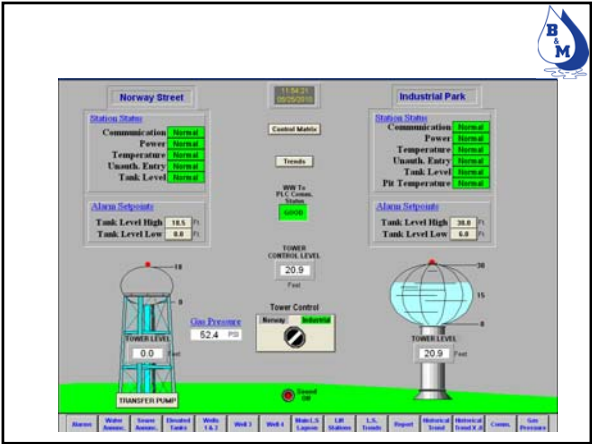
Master PLC

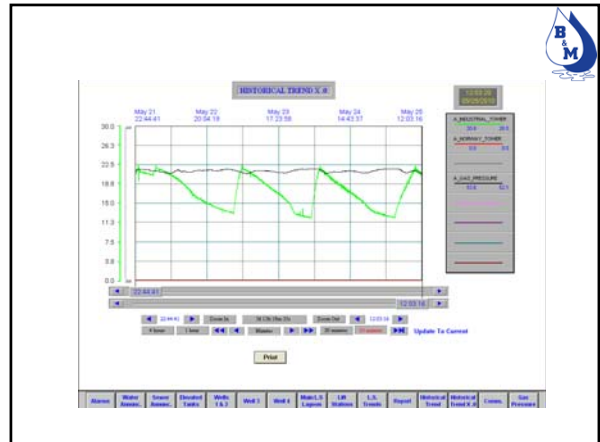
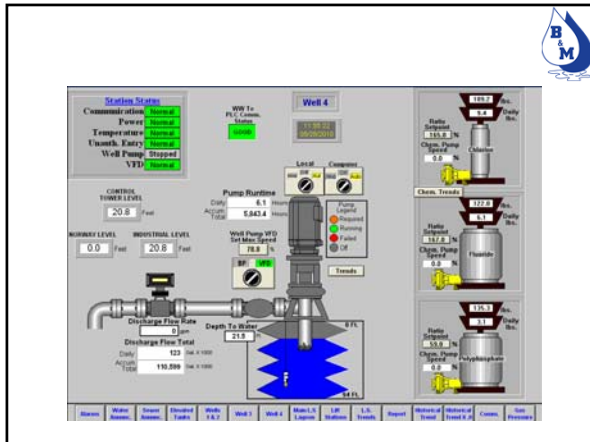
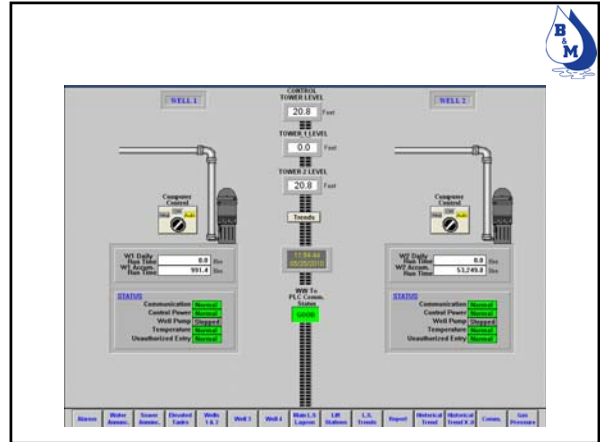
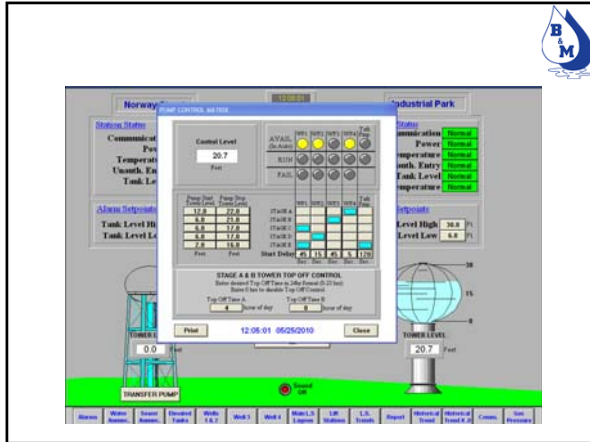


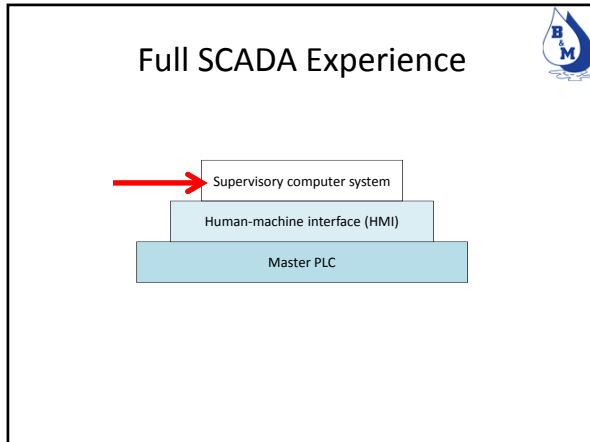


Meet your programmer!

- Direct communication between operator and programmer
- Site visit prior to programming
- How will you actually use the system







- ### Supervisory Computer System Options
- Traditional software – ClearSCADA, Wonderware, Citech, etc.
 - HMI software to computer
 - External internet based system
- Supervisory computer system

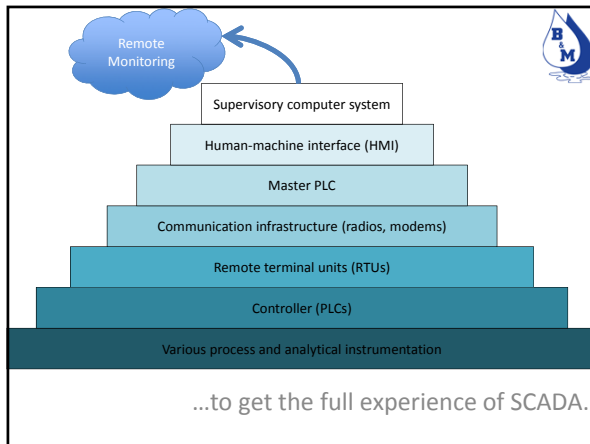
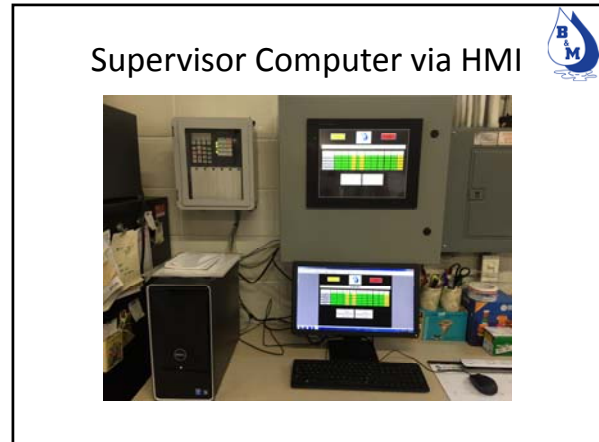
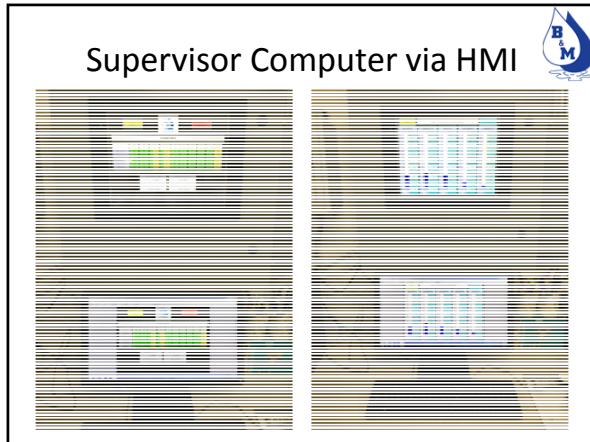
- ### Clear SCADA (and Cmore HMI)
- Integrated platform includes:
 - Polling engine
 - Real-time database
 - Historian
 - Integrated event-based historian
 - Alarm and event journal
 - Reporting package
 - Web server
 - Alarm redirection
- Supervisory computer system

Clear SCADA (and Cmore HMI)

- Reporting package
 - Data exports
 - Complex to configure


"Betcha didn't know ClearSCADA exports daily reports to EXCEL."

Supervisory computer system

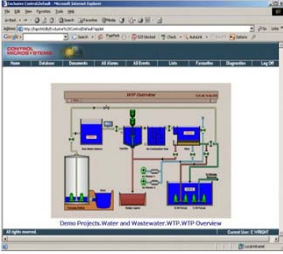


- ### Remote monitoring
- SCADA Software
 - 3rd Party Software
 - HMI Smart Phone App
 - Master Dialer
-
- A blue cloud icon with the text "Remote Monitoring" inside it, positioned at the bottom right of the slide.

Remote monitoring




- Clear SCADA
 - WebX
- Cmore HMI
 - Browser based



Remote Monitoring


Remote Monitoring



- WebX client and Cmore HMI
 - Real-time graphics
 - Control and set-point changes
 - Alarm acknowledgement
 - Trend chart displays
 - Execute and display reports

Remote Monitoring


Remote monitoring





- 3rd Party Software
 - Remote view computer
 - Teamviewer, PC Anywhere
 - Software installed on both ends

Remote Monitoring

Remote monitoring






- HMI Smart Phone Apps
 - Sends email
 - Remote access and controls

Remote Monitoring

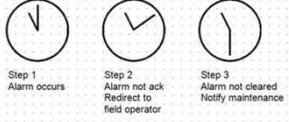


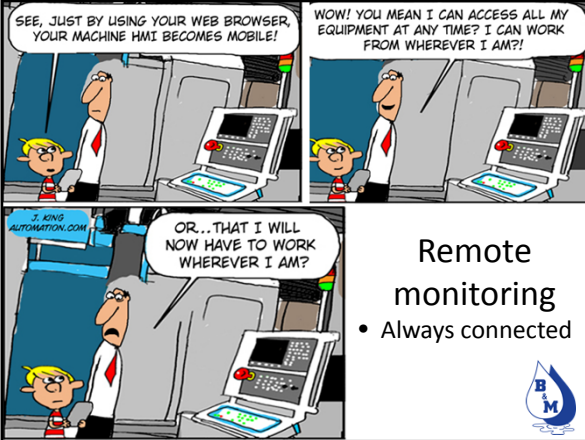
Remote monitoring

- Master Dialer


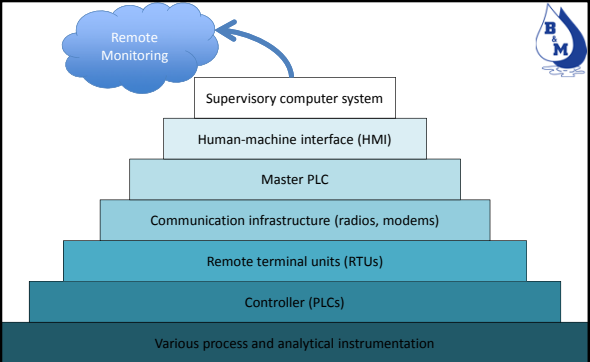
Remote monitoring

- Clear SCADA Dialer
 - Alarm notification – calls, texts, emails
 - Alarm redirection







Remote monitoring

- Always connected

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Questions?

...to get the full experience of SCADA.

