Doing SCADA
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Overview

I. Wireless Options and Other Considerations

II. Productivity Opportunities.

III. Discussion of Pros and Cons of D-I-Y vs. Engineered System
PURPOSE

• To provide municipal personnel
  • An overview of the many technological options in the world of SCADA
  • Consideration of factors that may come into play when considering a DIY approach.
Radios

What types are out there?

- Radio to radio
- Radio to control systems
Radio to Radio - Licensed

- UHF
- VHF
Radio to Radio - License Free

- 900 MHz
- 2.4 GHz
- 4.9/5.8 GHz
Radio to control systems

- Serial
- Ethernet
- Cellular Band
- Wi-Fi
Radio Path
The Importance of a Radio Path Study

“Desktop” Study vs. Field Study

- Seasonal Considerations
- Different radios behave differently
  - UHF
  - 900 MHz
  - Ethernet
Types of Networks

- Public
- Private
- LAN
- WAN
In-Plant or Local Area Network (LAN)

- A Local Area Network (LAN) is a computer network covering a small physical area, like a home, office, or small group of buildings, such as a school, an airport or a water/wastewater treatment facility.
Wireless Instruments

- Process Monitoring
  - Flow
  - Level
  - Pressure
  - Temperature
Wireless Instruments

- Weather Station
Wireless Instruments

- Cameras
Wireless In-Plant

- Wireless I/O
- Conventional telemetry radios - for SCADA expansions at existing facilities without cable/fiber
- Wi-Fi
Wide-Area Network (WAN)

- A Wide Area Network (WAN) is a computer network that covers a broad area, that is, any network whose communications links cross metropolitan, regional, or national boundaries.

WANs connect towers, well houses, and Master control units.
Wide-Area Network Radio Types

- Serial
- Ethernet
- Cellular Channel
- Ethernet Mobile
Typical WAN Utilizing MDS Radios
Expanded/New Technology

- Wi-Fi Equipped handheld devices
- Ethernet Radios in Mobile applications
- Laptop/Notebook/Netbook access via Cellular Modem
- Smartphone based Access
DIY Options

- 900 MHz radio network based
- More like the engineered systems, but components and radios are essentially “pre-engineered” with fixed I/O.
- Can be configured with a Master.
- Can be configured with PC based visualization software and reporting.
- It can’t be that hard, can it?
900 MHz Radio Based

- SCADADATA is an example
Cellular Based / Cloud Systems

- Pre-engineered units installed with fixed I/O
  - Status of I/O is transmitted via Cellular service to the System central monitoring location.
  - Reporting/Status available via Internet connection to the central monitoring location.
  - Real-time status, Alarm Dialer Functions, Reporting Functions available.
  - Monthly fees per site based on cellular data demands (daily/alarm only, or continuous real-time.)
Cellular Based / Cloud Systems

- OmniSite (Crystal Ball) and Mission Wireless are examples.
Productivity Improvements

- The greater variety of communication channels, many built on existing technology, provides more options for placing information and real-time access to the SCADA system into the hands of operators and supervisors.
Performance Improvements

- Well designed systems are not simply exercises in gee-whiz technology.
- Properly designed they are systems which use the technology best suited to the application and provide precisely the right information for operators and supervisors.
Real-Time remote access to System SCADA
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Real-Time Operational Monitoring

- 24/7 remote access to monitor plant/system operation.
- 24/7 remote access for alarm notification and response.
Real-Time Operational Monitoring

- Immediate access to security status of remote facilities.
- Immediate access to camera images where remote facilities are equipped with surveillance cameras.
Real-Time Asset Management

- Identify Critical Loads
- Load Shedding through Plant PLC
- Hard-wired Control
Real-Time Asset Management Linked to GIS

Access to Maintenance Data from the field
Real-Time Access to GIS Data

- Access to GIS data – linked to asset management database.
- Facilitate CMOM reporting and record keeping.
DIY or Engineered System

- Simple needs to monitor a limited number of locations and conditions
- More complex monitoring and control needs over a wider area.
- Availability of Staff time an opportunity cost of that time.
- Documentation of the Systems.
- Industry standard components or proprietary.
- Total System Cost, accounting for staff time.
- Staff turnover and impact on long term support.
- Security vulnerability
- Uptime, reliability in adverse weather.
- Thorough analysis of needs and options
Conclusions

- SCADA systems can be fairly basic, or very complex.
- Some applications may lend themselves to a DIY approach.
- Risk and opportunity must be carefully weighed to decide what is best for your system and community.
Any questions?

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