What is SCADA?
WHAT are SCADA and I&C?

• SCADA is a term for a type of system. The acronym stands for **Supervisory Control And Data Acquisition**

• I&C describes a field or specialty. The acronym stands for **Instrumentation & Controls**

• SCADA is a control system used to monitor and control operation of equipment (pumps, valves, sensors, etc.) in a plant or facility

• A SCADA system uses computers, networks and industrial processors to read field devices, make decisions, and control other field devices.
WHERE are SCADA systems found?

- Water Plants
- Wastewater Plants
- Remote Pump Stations
- Industrial Plants
OTHER Markets that use SCADA

- Renewable Energy
- Correction Facilities
- Oil and Gas
- Food and Beverage
WHAT equipment does SCADA monitor and control?

**Monitor**
- Tank levels
- Flow
- Pressure, Temperature
- PH
- Conductivity
- Valve Status

**Control**
- Pump Start/Stop
- Valve Open/Close
- Variable Frequency Drives

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HOW does SCADA monitor and control?

01 One or more PLCs (Programmable Logic Controller)
- The PLC is an industrial grade computer processor
- The equipment in the field is wired to the PLC
- The PLC reads the input signals wired to it, solves logic according to the program loaded in it, and turns on or off output signals as needed to control devices.

02 One or more HMIs (Human Machine Interface)
- The HMI is a desktop computer with a screen, keyboard and mouse
- Pictures are drawn and loaded onto the HMI depicting the process
- Pictures are animated to show whether pumps are on or off, valves are open or closed, values of flow, pressure and temperature instruments, etc.
- Buttons and data entry fields are programmed in the HMI to allow the operator to start and stop things, open and close things, and enter set points and alarm values.

03 One or more networks to tie them together
- The PLC and HMI are connected by networks
- Some are Ethernet, some are serial, some are proprietary
- Some are wired, some are fiber optic, some are wireless
- The networks give the PLC and HMI the ability to pass information and commands to each other to monitor and control the system.
PLC(s)

MANUFACTURERS
- Rockwell
- Allen-Bradley
- Schneider
- Modicon
- SCADAPack
- Siemens
- GE
- AutomationDirect
- Emerson
HMI(s)

MANUFACTURERS
- Rockwell - FactoryTalk
- Schneider - Citect
- Wonderware
- VTScada
- GE - iFix
- OpenSCADA
- Ignition
Networks

Fiber Optic

Copper

Radio Wave Propagation

Radio

Cellular
A Typical SCADA System

Remote Station

Remote Station

Remote Station

Remote Station

Plant #1

Cellular Cloud

Radio

Plant #2

- FCC Licensed
- Unlicensed
- 200-900Mhz
- Point-To-Point
- Point-To-Multipoint
Typical I&C/SCADA Tasks

**ENGINEERING**
- SCADA Master Planning
- SCADA System Analysis
- Budget Development
- ROI Justification Development
- Radio Surveys and Planning
- Hardware and Software Specifications
- Instrumentation Selection & Specifications
- Wiring Schematic Design
- Control Panel Design
- RFP/RFQ Development
- Submittal Review
- Construction Oversight
- Disaster Recovery Planning

**INTEGRATION**
- Functional Description Development
- PLC Programming
- HMI Programming
- Network Configuration
- Instrument Calibration
- Factory Acceptance Testing
- Startup
- Commissioning
- Training

**TURN KEY DELIVERY**
- Engineering/Design/Programming
- Procurement
- Installation (with partners)
- Startup and Commissioning