What does SCADA mean?

SCADA is an acronym and stands for ***S***upervisory ***C***ontrol ***A***nd ***D***ata ***A***quisition.

This is also an explanation of what they purpose of the system is:   
-to provide control of equipment or processes.  
-to collect and usually display historical data about the equipment or process.

The SCADA System sits in and on top of a control system. For example, imagine you have a light switch in your home for your living room lamp. That is a *very* simple control system for turning the light on and off. Now imagine that you want to be able to see on your computer if your light is currently on or off, toggle it on/off, and see a historical log of when it was turned on and off. That is where a SCADA System fits. It provides that additional layer to what would otherwise be a manual process (like having to get up off the couch to turn your light off).

A SCADA system integrates hardware and software components, each with their own specific function, to comprise a rich-feature control and monitoring system. This *integration* concept is so crucial that a company or person who designs, installs, or maintains a SCADA System is often called a ‘Systems Integrator’. To learn more about the components in a SCADA system, check out the Components page.

Where do you find SCADA Systems?

EEEeeeeeeverywhere…

But seriously, nearly every production or industrial process utilizes some flavour of SCADA system to monitor their controls.

Manufacturing  
 Food & Beverage  
 Pharmaceutical

Factory / Production  
Utilities  
 Water / Wastewater  
 Oil & Gas  
 Electrical  
Transportation  
 Airports  
 Logistics  
 Rail and Subway

Elevator / Escalator

Traffic lights  
Telecommunications

HVAC

SCADA History Lesson:

SCADA Systems started being implemented in the 1960’s to allow for more control and visibility to the equipment and processes. The term was first coined in the 70’s. There are 4 main ‘generations’ of SCADA approach that have evolved with the availability of newer technologies.

*Monolithic* (single main-frame control)

*Distributed* (localized controllers ‘distributed’ through the process)

*Networked* (controllers and equipment communicating over a local network)

*Web-based* (control data made accessible through web-browsers, data can be displayed from global sources)

SCADA is a flavour of automation that is differentiated by its focus on *operator input* and *data collection*. Complete automation is often associated with the elimination of the need for people to be involved in the process. SCADA Systems *enable* operators/personnel to be more effective in their duties.

SCADA Components

Instrumentation

A SCADA System is only as valuable as the data it can collect and the things you can control with it. The instruments interface with the physical environment to collect data and operate the equipment.

PLC / Controller

Programmable Logic Controllers are placed in the system to collect data from the instruments and translate them into a format that can be used in the programming and issue controls to the equipment.

Communication / Telemetry

The data from the local control system needs to be brought back to the servers or ‘command centre’. If the whole system is in the same location, these can be directly connected to an ethernet network. For systems where there is a distance to cover, wireless radios or cellular data will transmit the data from location to location.

HMI

Human Machine Interfaces provide users with a way to view and input information on the system. It will often have an overview the whole system status as well as screens to display and control specific portions/parts of the system.

Historian Server

The SCADA System will be collecting data from the instrumentation and storing it in a database (usually a server). This allows users or other programs to access that data for display and analysis.