



SCADA Antenna Applications

Antenna Considerations for SCADA Applications

For decades, the [supervisory control and data acquisition](#) (SCADA) framework has been used for the purpose of remotely monitoring and controlling industrial systems. SCADA architecture is widely used in a variety of industrial settings, such as wastewater treatment facilities, nuclear power plants, oil and gas refineries, and so on.

Over the years, SCADA has evolved to incorporate modern, open architectures, and real-time communications features. It is a far cry from the early days of SCADA, back in the 1970's, where companies had to deploy massive, standalone mainframe units at each site.

SCADA is still evolving, too. Today, SCADA is being integrated with next-generation technologies related to the industrial internet of things (IIoT), mobility, cloud and edge computing, and software-defined wide area networking (SD-WAN).

As such, SCADA will likely continue to be a main fixture in industrial networks throughout the foreseeable future. Research shows the SCADA market will continue growing at a CAGR of [6.7 percent](#), increasing from \$11 billion in 2019 to \$15.2 billion by 2024.

In this article, we will provide a high-level overview of SCADA, along with some key considerations as to how industrial operators are connecting their systems.

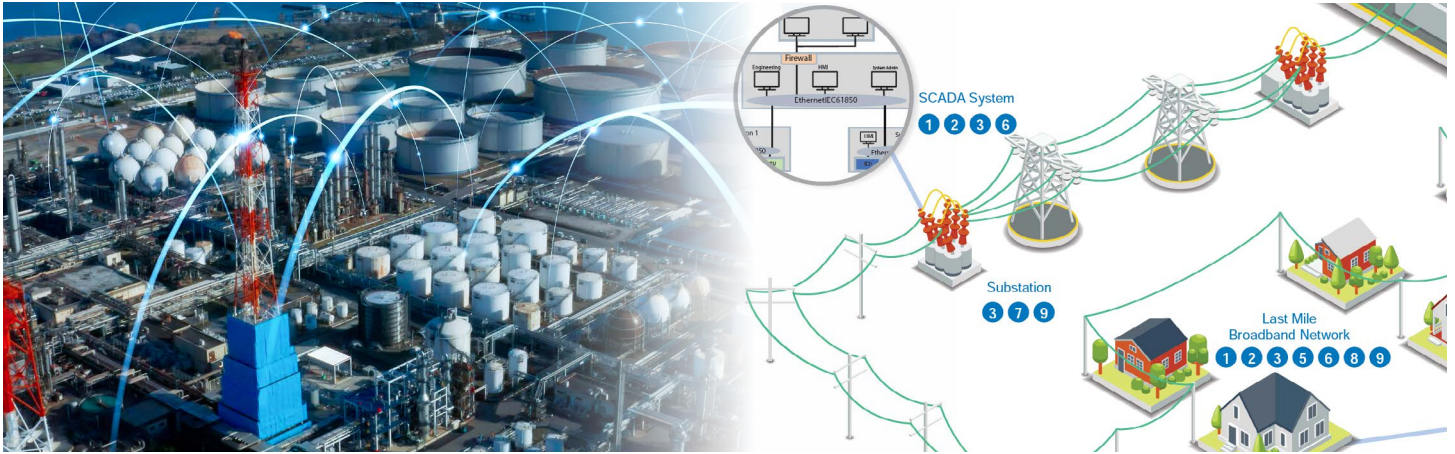
First, let's examine the basic parts of a modern SCADA system.

How does SCADA work?

A typical SCADA system contains both hardware and software components, including wired and wireless communications; remote terminal units (RTUs); and programmable logic controllers (PLCs).

RTUs and PLCs communicate directly with field devices like pumps and valves. Data is transmitted over a SCADA network, eventually reaching end user machines where it can be analyzed and interpreted by operators from a central location.

Antenna Considerations for SCADA Applications



SCADA Ultimately Has Two Main Purposes:

SCADA allows operators to remote control industrial equipment like valves, pumps, switches, breakers and other critical functions. SCADA enables remote monitoring and reporting for industrial sensors—collecting, processing and examining data in real-time.

Key considerations for SCADA

Industrial data can be transmitted to operational control centers in a variety of ways such as Ethernet, fiber, satellite, or wireless, networks.

The appropriate transmission method will ultimately depend on a plant's location, surrounding area, and budget. Fiber, for instance, is very costly and in some cases—like remote regions—impossible to deploy. For this reason, organizations in remote areas typically utilize point-to-point and point-to-multipoint RF, and microwave links to establish connectivity.

Here are some key considerations:

- Microwaves are capable of transmitting data over large geographical distances, and can be paired with cost-effective tower-mounted antennas like the [KP-5PDN-2 parabolic antenna](#) with N-type connectors (covering 4.9 to 6.4 GHz). Another example is the [YA 17KPPD industrial Yagi antenna](#) (880 and 948 MHz).
- The KP-5PDN-2 offers a highly directional pattern for reduced interference and with high gain to allow a link path that can span several miles. The YA17KPPD, meanwhile, is better suited for non-line of sight, dense foliage environments in which its black powder-coating surface and thin profile can survive both icy and windy conditions.
- Point-to-point microwaves are used to provide backhaul and telemetry to substations connected to a T1 backbone. Frequency in this case is shared over the FCC's Citizens Broadband Radio Service (3.5 GHz).
- As IoT continues to proliferate, we expect to see more localized low-speed, low power networking at 900 MHz. These will require high gain sector antennas that provide coverage over large areas, such as KPPA-900-120-11.5, a 120deg sector antenna with 11 dBi gain (824-928MHz).
- The 6 GHz (5.925- 7.125) band is commonly used for a variety of mission-critical SCADA and emergency management systems. The FCC is currently considering opening the band to unlicensed operation, however, which would require a large-scale migration for industrial organizations. If this happens, we expect the 8 and 11 GHz bands will be used for SCADA and similar deployments.
- KP Performance offers a variety of [solutions](#) to enable fast and reliable SCADA coverage. For additional information visit www.kpperformance.com or contact us at 1 (855) 276-5772.