MOSCAD

The Innovative SCADA Solution

The control you demand

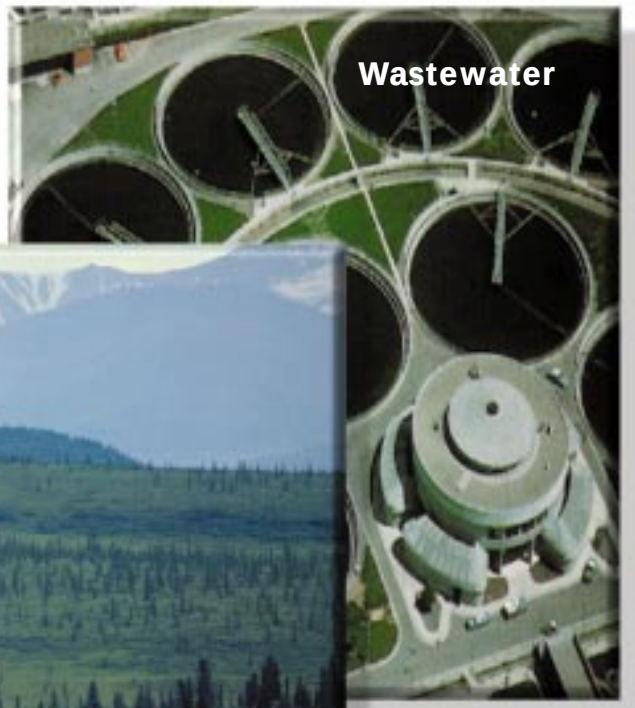
The information you need

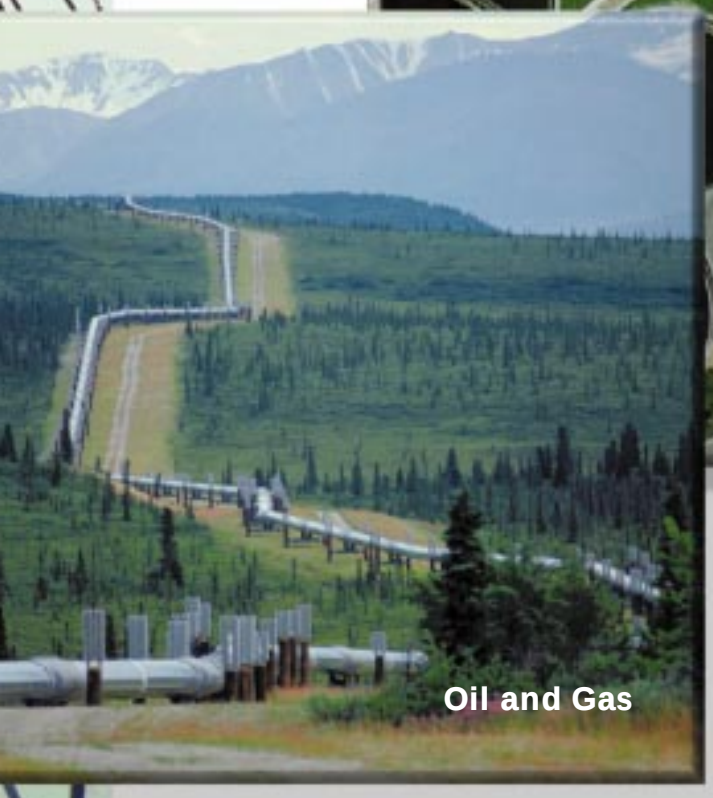
MOTOROLA


Network
Fault Monitoring
Electric Utilities
Siren Systems

MOSCAD™– Delivers Turnkey SCADA Solutions to Match your Requirements

- In today's highly competitive world, it's the difference that counts – and Motorola makes the difference. The thousands of Motorola SCADA (Supervisory Control and Data Acquisition) systems installed worldwide, and thirty years of experience, are evidence of Motorola's ability to offer you powerful SCADA solutions. MOSCAD RTUs (Remote Terminal Units) and SCADA systems utilize innovative technologies which allow integrated turnkey installations tailored to applications in utility, energy, telecommunication, public safety, transportation, and other industries.
- MOSCAD's best-in-class performance and high quality can result in increased cost benefits. With the introduction of automation and remote control, your investments in equipment and trained personnel may be fully utilized. Motorola SCADA solutions combined with reliable communications can help enhance performance of the installed equipment by creating new dimensions of intelligence and operating flexibility.
- MOSCAD allows you to integrate new SCADA systems or expand existing ones, using your present communication media, Master Control Center software and the most suitable data protocol. Then, as your operating needs grow, intelligent upgrades to your MOSCAD system may be added to further enhance its operating performance.





MOSCAD Applications

Motorola designed MOSCAD as an expandable SCADA system, that can help enhance the performance and operational reliability of remote installations. Thousands of MOSCAD systems are operating around the world, serving the oil and gas industry, electric and water utilities, public safety agencies as well as performing fault monitoring at communication sites. Customers throughout the world, have experienced the unique MOSCAD features that simplify their maintenance procedures, help to reduce operating costs, and help to make their crews more efficient.

Electricity Distribution

Computerized control of the Medium Voltage (MV) power grid enables electric utilities to achieve higher reliability of supply while helping to reduce their operating and maintenance costs.

Sectionalizer switches, reclosers and capacitor banks connected to the MV power grid were originally designed for operation without remote control. Using the MOSCAD RTU provides an easy-to-integrate solution for upgrading substations and other electrical equipment.

At some locations, MOSCAD includes an AC power analyzer to achieve a higher level of service. It performs measurements via direct connection to a variety of MV level sensors. Based on these measurements, the AC power analyzer and MOSCAD RTU calculate key parameters including voltage, current, loading balance, energy consumption, harmonic distortion and power factor.

Water and Wastewater

Goals commonly cited by municipalities and water utilities are to reduce maintenance costs, detect lift station failures, reduce cost of energy, defer investments of expansions and reduce losses due to unaccounted for water. Motorola's MOSCAD provides the solutions in all these areas. MOSCAD RTUs monitor the water flow along the pipe lines, helping to achieve better regulation of water pressure, reduce unnecessary consumption and assist in eliminating water losses.

The water level in reservoirs is monitored so that pumps may be controlled in the most efficient manner. MOSCAD RTUs collect real time information to ensure reliable supply and stable pressure which would otherwise require additional pumps, storage tanks and pressure regulation equipment.

Oil and Gas Industry

Oil and gas operation is characterized by production wellheads, long pipelines and valves located at difficult-to-access sites. MOSCAD RTUs calculate the gas flow according to AGA-3 (American Gas Association), AGA-7, AGA-8 and other standards, monitor the operation of pressure reduction equipment and Cathodic Protection rectifiers and more.

This industry must maintain the strictest safety measures to prevent leakages, fires and explosions in installations where oil and/or gas are present. Thus each site must be constantly supervised from one or more control centers.

Intrinsically safe connections to MOSCAD from field sensors in restricted zones may be obtained by adding barrier devices, registered for use in these industries, to the discrete Input/Output and RS-232 serial data cables.

Siren Control Systems

Electronic sirens serve as public warning in cases of severe weather, pollution, radiation alert and other dangers. Thus, siren control operators require a reliable method of control and up-to-date information on the condition of their warning system. MOSCAD RTUs can provide the needed reliable communication between the sirens and the siren control center. MOSCAD RTUs are capable of selecting combinations of tones and pre-recorded voice messages to expand the usage options of the system.

The use of one or more PCs connected in a network, combined with MOSCAD RTUs, offer advanced functions such as activation of sirens in selected groups, backup communications, silent test and download of recorded public warning messages.

Fire Station Alerting

The dispatch of fire trucks and ambulances from the many fire stations in a city is an important requirement of all fire departments. This must be done quickly to reduce fire loss and maximize the responsiveness to the community.

MOSCAD provides an excellent solution to this need. A single message from the dispatch center is received in all fire stations; the intelligence within MOSCAD determines which station will respond to the message. In the fire station MOSCAD can automatically turn on lights in selected areas, connect the voice dispatch message to the building public address system, open the doors in front of the needed fire vehicles, send a message to Dispatch when the apparatus has left the station, activate the in-building intrusion alarm system and turn off the appliances.

Computer(s) at Dispatch will permit the easy selection of the fire station(s) and items of equipment with each station. These same computers may also provide the Motorola voice dispatch capability. MOSCAD also supports a Computer Aided Dispatch (CAD) interface with text messaging to printers in the fire stations, and may provide redundant two-way radio communications.

Communication Network Fault Management

MOSCAD based Network Fault Management systems enhance the operational reliability of remote communication installations and help reduce the downtime in case of a fault. Network Fault Management systems are employed to monitor conventional and trunked radio base stations, analog and digital cellular systems, microwave radio and wireline communication systems.

In the Network Fault Management application, MOSCAD is programmed to monitor the remote sites thereby allowing your operator to receive quick, meaningful alerts about unusual operation of communications equipment, power generators, air-conditioning, station battery and fire and security sensors.

Modern network monitoring applications such as FullVision-OmniLink™ based on HP OpenView™, or UNO based on SUN Solstice™, communicate with remote sites using SNMP (Simple Network Management Protocol) with a predefined MIB (Management Information Base). The MCP-S (Motorola Communications Processor for SNMP) Gateway enables supervision of communication equipment that is not SNMP compatible. The Gateway converts between SNMP, used at at the control center, and the MDLC (Motorola Data Link Communications) protocol which is used when communicating with standard MOSCAD and MOSCAD-L RTUs installed at the remote sites.

Whatever the serial interface of the monitored equipment, with Motorola's rich protocol library, the MOSCAD RTU provides a reliable interface to a range of communication network elements and environmental sensors:

- Base station equipment
- Site controllers
- Channel banks
- Microwave radios
- Backup generators
- Uninterrupted power supplies
- Backup batteries
- Security sensors

Transmission of Images

Motorola's RIX™ (Radio Image Transfer System) provides an innovative means for visual confirmation of events detected at remote sites. It includes single or multiple cameras which are interfaced to the MOSCAD RTU via the Motorola VRU (Video Remote Unit). It captures the picture upon a polling command or an instant event, performs data compression and prepares the image for transmission via the MOSCAD network.

MOSCAD handles the transmission of images on the same communication link already used for SCADA system and voice communication. The RIX-MOSCAD system is suitable for visual monitoring of electric installations, detection of fire, early indication of flooding and security violation. A unique benefit of the integrated RIX-MOSCAD system is that operators of SCADA control centers will no longer rely only on the information initiated by a simple sensor at the remote site. They can reconfirm the alarm via still images captured at the moment the event occurred.

Advanced SCADA Control Center Connectivity

MOSCAD systems are designed for reliable, versatile and easy to implement connectivity to SCADA MCC (Master Control Centers). Motorola offers multiple interface options to SCADA control centers.

Motorola Communication Processor for TCP/IP Networks (MCP-T)
The MCP-T plugs into the standard LAN (Local Area Network) of your Ethernet-based SCADA system and allows wide area coverage utilizing a single or multiple communications media. Via the MCP-T, the Master Control Center has instant access to a large number of MOSCAD RTUs.

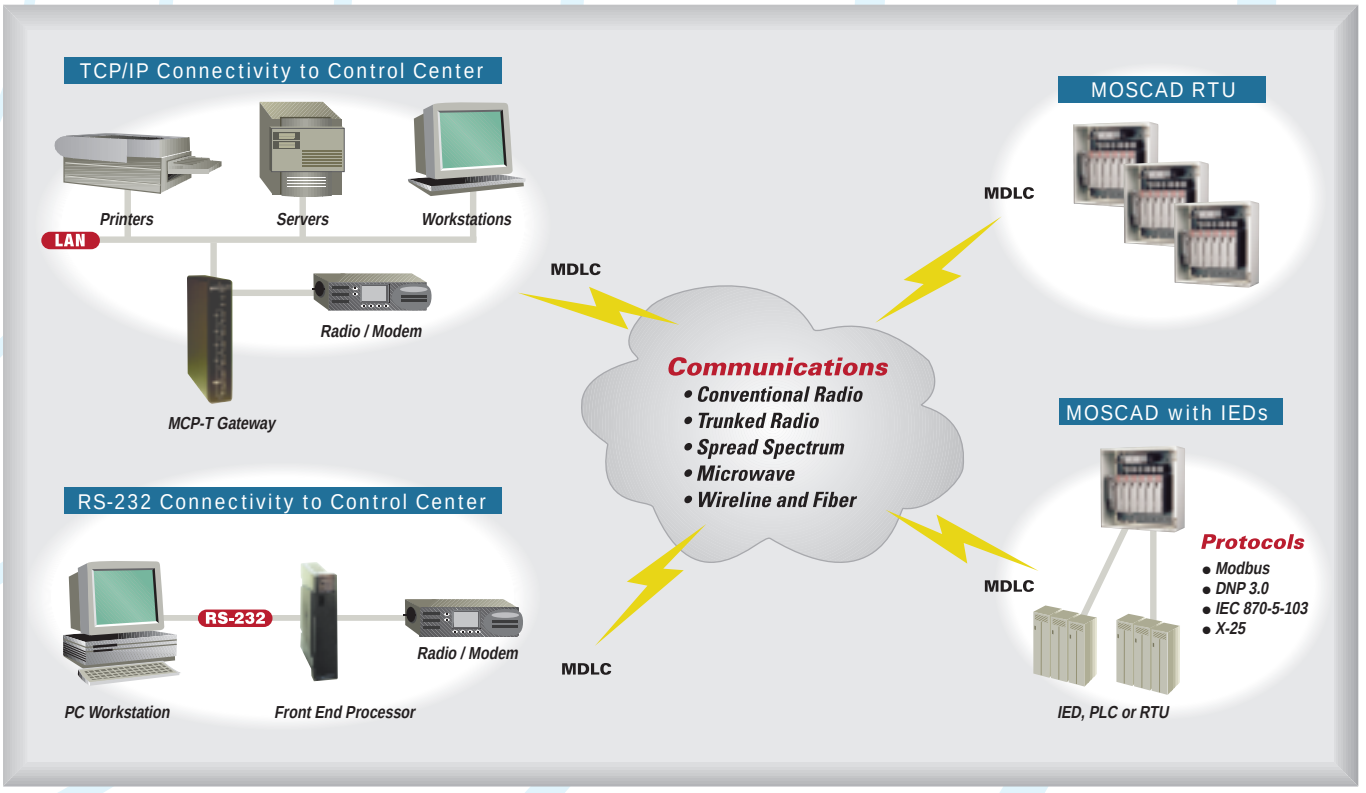
Therefore the Master Control Center will have up-to-date and reliable information. Its Client/Server architecture allows the MCP-T to distribute data to multiple clients – the SCADA Master Control Center and to all MOSCAD RTUs in the field.

The MOSCAD Gateway's API (Application Programming Interface) provided by Motorola allows easy implementation of a driver to be included with the SCADA application software. Via the API, the MCP-T Gateway seamlessly integrates with virtually any MCC that utilizes industry standard operating systems such as UNIX, Windows 95, and Windows NT. Several vendors of SCADA application software programs have already implemented their driver for MCP-T connectivity.

Motorola Communications Processor for Modbus Networks (MCP-M)
The MCP-M provides excellent connectivity between a wide range of control centers utilizing the Modbus protocol and MOSCAD RTUs. The MCP-M stores updated field data which is made instantly accessible to the computer. The MCP-M manages the communications with MOSCAD RTUs to significantly reduce the load on the SCADA Master Control Center.

Front End Processors (FEPs) for other protocols
Additional FEPs are available for SCADA centrals that utilize IEC 870-5-101, DNP 3.0 or other protocols. These centrals, when used with a FEP, provide improved system performance. The upgrade also enables more effective system maintenance procedures.

MOSCAD Means Connectivity



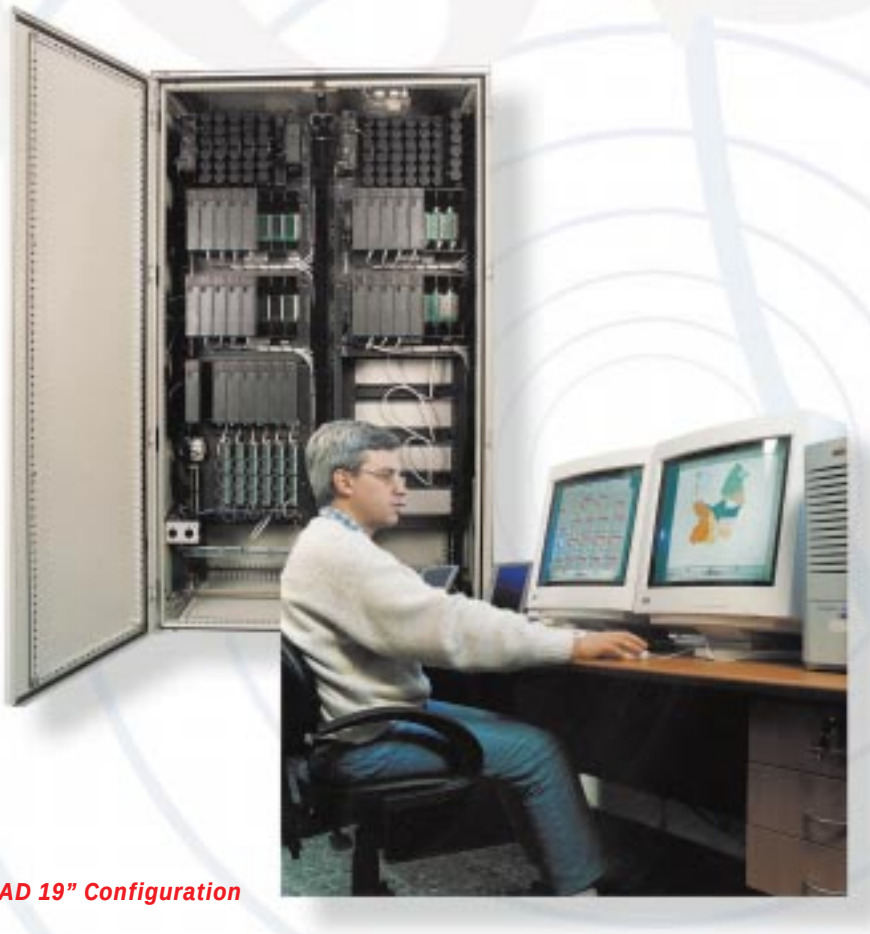
MOSCAD – Versatile RTU for SCADA Solutions

With MOSCAD, Motorola can supply you with turnkey systems that include a large number of RTUs, versatile control centers, third party smart sensors and virtually any process controller.

At the heart of the MOSCAD RTU is the Central Processing Unit, with its built-in intelligence and powerful communications capability. On-site decisions may be made based on local as well as system-wide conditions using data imported from RTUs at other sites. MOSCAD's modularity and a large selection of Input/Output modules allow you to configure each remote site to run a specific application program. Protocol conversion code may be loaded into any Central Processing Unit to allow integration of new and existing sensors through their RS-232 ports.

The MOSCAD RTU is packaged in a rugged housing that withstands outdoor environments. Enclosures are available in 3-module and 6-module sizes. A standard 19" rack-mount frame that accepts 8-modules and that is expandable to 63-modules is also available.
RTU enclosures are made from high quality materials, such as painted metal, stainless steel, plastic and fibreglass.

MOSCAD 6-Slot Unit



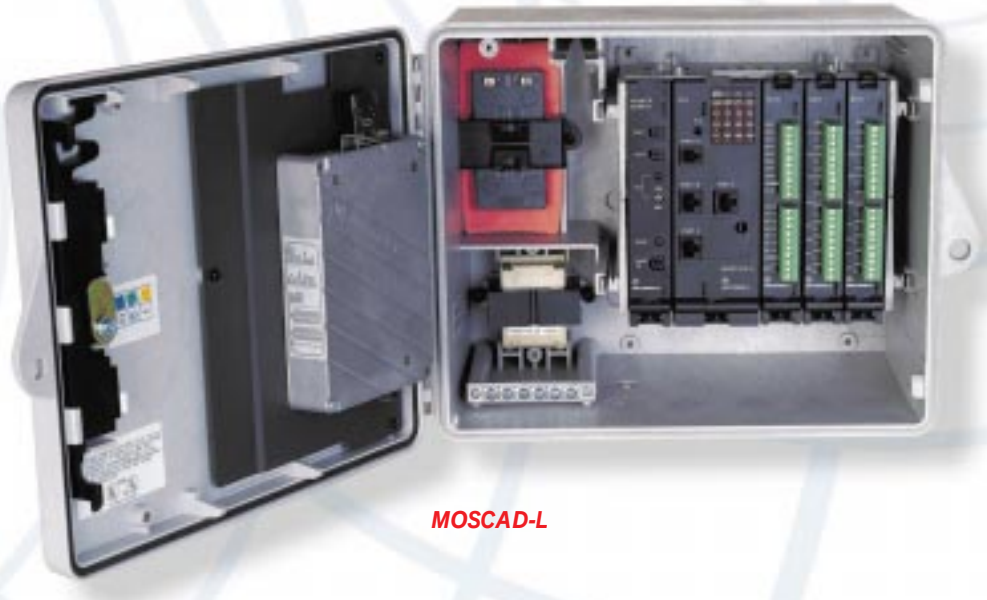
MOSCAD 19" Configuration

MOSCAD-L is a smaller member of the MOSCAD family. It complements its bigger brother, the MOSCAD RTU, by providing a lower cost RTU when reduced I/O count matches the customer's needs. It is built into a smaller NEMA 4 or 4X level enclosure and includes the MOSCAD-L Central Processing Unit module and up to three I/O modules. MOSCAD and MOSCAD-L may be used in the same system to provide a powerful SCADA solution at an affordable price.

MOSCAD was designed as an expandable SCADA system to enhance the performance and operating reliability of remote installations. Both MOSCAD and MOSCAD-L RTUs contain an integrated power supply with backup battery to ensure uninterrupted operation.

After integrating a new system or upgrading an existing one, Motorola provides field training to ensure reliable system operation. Such support is provided by Motorola's local service teams, or by local system integration firms, who speak your language and understand your operating conditions.

MOSCAD-L Central Processing Unit with built-in Spread-Spectrum Radio



MOSCAD-L

MOSCAD Communications Network

Motorola's unparalleled experience in SCADA systems and data communications enables MOSCAD to support a large selection of communications media. Your SCADA system, no matter how widely scattered or complex, can operate through radio, microwave, fibber optics, dedicated or switched wirelines, RS-232/RS-485 serial links, or a data network combining these media.

MOSCAD connects directly to VHF, UHF, 800 and 900 MHz trunked and conventional radios, MPT 1327 modems, PLCC (Power Line Carrier Communication) modems, MAS (Multiple Address System) radios in the 900 MHz and UHF bands, or 900 MHz and 2400 MHz Spread Spectrum data radios.

MOSCAD RTUs communicate with other vendors' PLCs (Programmable Logic Controllers), IEDs (Intelligent Electronic Devices) and RTUs, using Modbus, DNP 3.0, IEC 870-5-103, or other protocols.

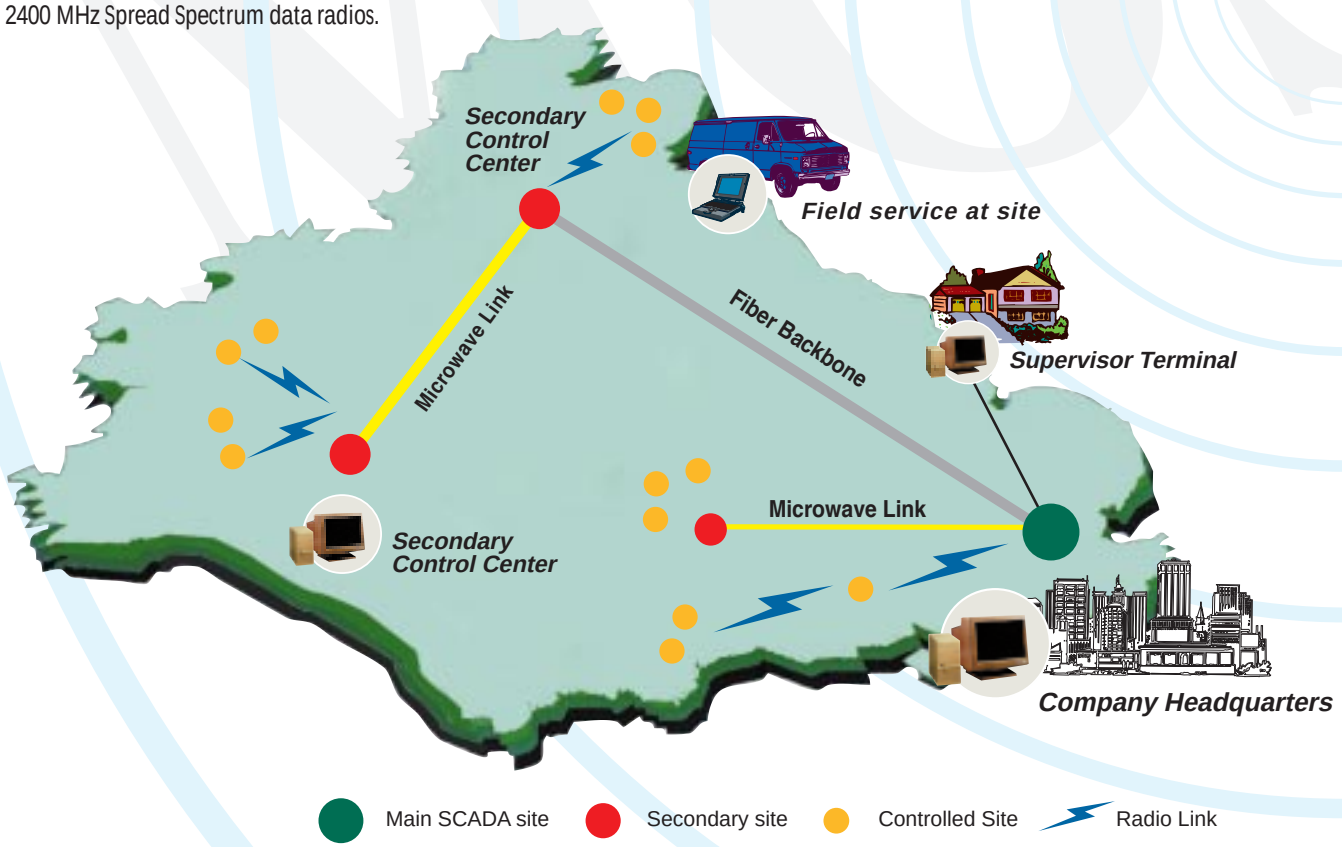
Using MOSCAD features such as remote diagnostics, application program and parameter uploading and downloading, and transmission of time-tagged messages leads to a significant enhancement of the monitoring and control capabilities of your SCADA system.

Motorola Data Link Communication (MDLC) Protocol

MDLC is a powerful data communications protocol that creates major benefits for a SCADA system. Its seven-layer OSI/ISO compatible structure allows powerful communication functions.

Unlike most other protocols, MDLC supports:

- Integrated networks with wireline and wireless communication links
- Remote control utilizing both polling and transmission of unsolicited messages
- Synchronous and asynchronous data communications, as applicable
- RTU-to-RTU communications, as well as RTU links to multiple control centers
- Multi-session communications, allowing execution of simultaneous operations
- Store and forward (S&F) and routing of data using RTUs as nodes in the network
- Accurate time synchronization and reporting of time stamped events with 2 ms resolution



MOSCAD ToolBox for Application Development

MOSCAD ToolBox programs are a set of powerful PC tools that the operator can use for application program development, system setup and system diagnostics. Multiple functionalities are provided by the ToolBox programs:

Programming ToolBox: for MOSCAD application developers. It includes tools for complete RTU applications programming and debugging, system setup and system diagnostics.

Setup ToolBox: for MOSCAD application users. It includes tools that allow setting up a MOSCAD application program according to specific needs without going through a complete programming process. It allows defining operational parameters and configuring the hardware and communication attributes for each RTU in the system.

MCP-M, MCP-T, and MCP-S ToolBox: for setting up the communication attributes of the MOSCAD Communication Processors (MCP-M, MCP-T and MCP-S).

ToolBox programs run on a PC Pentium platform using Windows 95™ or Windows NT™ operating system. The user may connect his PC to any site in the network in order to remotely set up, diagnose or reprogram any of the system's MOSCAD or MOSCAD-L RTUs.

MOSCAD application programs may be written in "C" or in "Ladder Diagram" programming language. The ToolBox allows the programmer to download these application programs to the flash memory of the MOSCAD RTUs. It also allows your maintenance person, via local cable or remotely through the communication network, to read the error logger in any RTU, perform a hardware test, calibrate the RTU's I/O modules and set the RTU real-time clock.

Motorola provides the ToolBox software with backward compatibility.
All versions of ToolBox software may operate with MOSCAD RTUs that use earlier versions of the operating software.

MOSCAD Makes the Difference

Motorola is one of the world's leading providers of computer components, communications and control systems. Motorola is committed to the highest quality of products, services and system solutions, and delivers Six Sigma quality level. Motorola provides you with best-in-class solutions to match your growing needs.

- **Worldwide support.** By trained Motorola engineers and representatives.
- **Enhanced performance**. MOSCAD allows you to get the most from your existing installation.
- **Industry standards.** Motorola Data Link Communications (MDLC) protocol can work seamlessly with most standard SCADA systems.
- **Total Solutions**. MDLC interfaces with other protocols to create cost-effective turnkey SCADA systems.

Cost-effective and efficient operations are vital to your organization, Motorola has the solution: MOSCAD

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