INTRODUCTION TO M O S C A D AND SCADA

THE SCADA SYSTEM : SCADA - Supervisory Control and Data Acquisition is a broad terminology for equipment, systems and solutions that allow central controlling and monitoring of functions, devices or equipment installed in remote sites. A variety of SCADA systems may be designed for the various applications (water, electricity, siren, communication, security, etc.) and match the target budget and operating concepts as requested by the customer. SCADA remote control solutions may be as simple as pair of wires with a switch connected at the far end, to a complex network of computer based Radio controlled RTUs, communicating with a powerful minicomputer installed in the center.

REMOTE TERMINAL UNIT: The Remote Terminal Unit (RTU), is the electronic equipment installed at the remote site to monitor or measure the sensors or devices installed at the remote site. The RTU converts the measured status or signal to a form of data that can be transmitted over the communication media. It also converts the data received from the central to a form of command, that can control the function at the device.

RTU IMPLEMENTATION: The remote site of the SCADA system may be implemented with a variety of hardware and software solutions, depending on the nature of the controlled site, the complexity of the system, the request for digital data communication solutions, real time alarm reporting, the required accuracy of analog signal measurement, status monitoring, control of analog devices, control of switches, etc.

CENTRAL CONTROL: The central control is the most important part of the SCADA system. It is usually implemented with a simple PC or powerful Minicomputer, Display board or computer screen and keyboard which serve as the Man - Machine - Interface (MMI). The central control handles all the data accumulated in the field, performs the processing of the data, and makes Real Time decisions and managing the system.

DATA COMMUNICATION: The contact or communication between the central and the remote site can be done in many ways, depend on availability of infrastructure and customers preference. Examples include telephone lines, dedicated wirelines, variety of radio systems, satellite, fiber optics or any other media capable of transferring digital data and or analog signals.

MAJOR SCADA BENEFITS:

* Reducing the cost of and time to perform maintenance, and helping to assure customer satisfaction, due to Utility providing better, lower cost and uninterrupted service.

* Implementing advanced SCADA systems with radio to make the manpower utilization more efficient and far less risky, since the problem correction is often done from the center through radio.

  Improving profitability of the Utility due to receiving not only early warning, but also detailed

information on system. This makes the repair faster and safer, and often less costly.

* Integrating SCADA systems with Radio, allow to increase in geographical coverage without the need to use and depend on costly and often unreliable phone lines.

* With the Radio controlled SCADA, 'more mileage' is received from the existing system, without the need to invest in upgrades new solutions or major expansions

COMMUNICATION NETWORK: The type of communication channel between the central SCADA and the field RTUs is normally selected according to the customer's preference or availability. The following solutions are possible:

- Public telephone switched network (PTSN)
- Leased line or dedicated wireline
- Conventional FM radio system
- Trunked radio system
- Microwave communication network
- Fiber optics direct link or network
- Satellite communication network
- Available Data communication LAN's

Motorola's advanced SCADA system may combine any of the above in one system, to provide maximum flexibility, reliability and cost effective solution.

SCADA APPLICATIONS: The following are a list of the main applications where SCADA solutions are implemented:

*** Water & Wastewater** We are addressing here all SCADA systems dealing with the water distribution and waste water treatment (Fresh water reservoirs, water pumps, waste water lift stations, etc.) all which are remotely monitored and controlled with Radio from the central computer of the Local Utility or the Municipality.

*** Electricity:** The Electricity SCADA is a broad market including Electricity Generation systems, Electricity Distribution Automation, Energy Management Systems, etc. The segments, targeted by the Radio controlled SCADA, are a "subset" segment of the main Electric SCADA, and includes applications such as Pole Top reclosers, Circuit Breakers, Capacitor Banks, etc. The importance of Radio communication in these applications is significant, since no wireline system is available at the sites where this equipment is installed. Motorola's presence in this market is supported by many successful projects.

*** Siren systems** Advanced siren systems use radio RTUs and software. Modern industrial facilities such as nuclear plants, must now comply with new regulations, and install early warning systems to reduce the damage in case of serious trouble. Early warning in case of tornado or hurricane may also save lives.

*** Security systems** Here we deal with the mid and high tier security systems (schools, camps, hospitals, government facilities, etc.) where the sensing points are reporting to central computers. The advantage of a Radio RTU system is based on the unreliability of and dependence on physical lines.

*** Irrigation**

Used by Municipalities for parks, for golf areas, for Greenhouses, agriculture irrigation, etc. Motorola is a pioneer in the Radio controlled irrigation system solution. Now, more than ever before, the water saving issue is important and Utilities require their customers to pay special attention to this issue.

*** Communication control**

The MOSCAD for communication SCADA systems is designed to "overview" the normal operation of the main network. For example radio control SCADA can be implemented in applications as:

- microwave link networks
- Cable TV - CATV repeaters
- trunking networks
- Motorola's repeater sites, etc.