Motorola’s MOSCAD for Monitoring Communications Systems – an Overview: Fault and Configuration Management Solutions for Two-way Radio Systems

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General Overview

The Motorola Land Mobile Products Sector (LMPS) is widely known for its two-way radio communications systems such as, VHF, UHF, 800 MHz, 900 MHz, analog, digital, SmartZone™, ASTRO SmartZone, simulcast, or conventional radio systems. These Wide Area Network (WAN) radio systems are vital to providing critical voice communications throughout the United States and the world. It is vital for the end-user and the radio system service facility to have an alarm monitoring and control system that provides continuous information on RF backbone and remote site (element / environmental) equipment. Such an alarm system provides an invaluable tool to efficiently maintain the daily integrity of the communications infrastructure and backbone network.

Motorola's communications monitoring system is the perfect tool and solution for such a radio network system requirement. It allows for complete and efficient communications infrastructure integrity and the flexibility to adapt to all system requirements. It also provides the complete interface and real-time alarm monitoring and control of remote RF sites equipped with various configurations and quantities of T1 transmission equipment (microwave radios, SONET, leased copper, etc.), Base Stations (QUANTAR™/ QUANTRO™ & MSF 5000™), comparators (DIGITAC™, ASTRO-TAC, OmniTac™), channel banks (TeNSr), RF networks, and other site support devices. Motorola's system is currently being utilized to provide alarm monitoring, control and diagnostics on a variety of two-way communication systems, with significant savings by decreasing downtime.

MOSCAD products and systems are standard Motorola manufactured solutions that meet Motorola's 6-Sigma standard of quality. A MOSCAD network control solution is technologically superior and more cost-competitive than other similar products.

The MOSCAD Network Communications system solution offers the following additional features and capabilities:

- Motorola's MDLC ISO/OSI 7-Layer Protocol
- Store & Forward
- Contention Reporting
- Remote Programming
- Modular Input/Output
- Direct Serial Connection to RF Devices
- Communications Redundancy
- Integration with other MOSCAD systems/markets (i.e., Utility, Public Safety, Fire Dispatch)

Overview of Network Management

Network Management (NM) is the process of controlling a complex data network composed of multiple elements in order to maximize the network's efficiency. The NM system collects data automatically, processes that data, then presents it to the system users – engineers and systems operators. The data is used to operate the network, analyze the data flow, offer system solutions and handle predefined alarm

situations automatically. The system provides reports to engineers and the operators to help administer the network. NM systems typically provide fault, configuration, accounting, performance and security functions as established by the International Standards Organization. The MOSCAD system focuses on the fault and configuration functions and provides a path to the accounting, performance and security functions:

- NM Level – The MOSCAD TCP/IP Gateway; interfaces to high level accounting, performance and security functions
- Element Manager Level – The Master Central & MOSCAD Front End Processor; for fault and configuration functions
- Element Level – The MOSCAD Remote Terminal Unit

I. Network Management Level

The Network Management level is usually designed to be the administrator of systems that use multiple Element Managers (i.e., Voice/Subscriber Manager, Mobile Data Manager, Fixed Data Manager, etc.). It generally runs on a high-level software platform (i.e., HP OpenView, Sun Solstice, etc.). These third-party platforms usually incorporate a Local Area Network (LAN) configuration of servers, workstations, printers, and various LAN support peripherals.

The MOSCAD TCP/IP Gateway provides a seamless interface between the NM level and the "fixed data" element levels. The Gateway includes an ANSI "C" Application Programming Interface (API) that is operating-system-independent. The interface to TCP/IP is performed with the user-friendly Sockets Library functions, based on UNIX Berkeley Standard (BSD) for establishing a connection and transferring information. This allows third party Network Management developers to easily interface to the MOSCAD world.

II. Element Manager Level (System's Central)

The "Fixed Data" Element Manager level addresses these actions:

- Discover the problem
- Isolate the problem
- Notify the operator(s) of the problem
- Fix the problem (auto recovery, if possible)
- Provide independent management of the Element Manager level without impeding the Network Management level.

The Element Manager level is where remote site environmental information is brought for collection, storage, historical retrieval, display, and printing. The Element Manager Central may be used for administrative purposes, but is intended for the more technical "corrective action" purposes associated with maintaining the communications system. The Central is a Windows™-based PC with a software package that allows viewing and controlling of the entire element system.

The Central component of Motorola's communication monitoring is available in both a Low-Tier Master Central (LTMC) and a Graphic Master Central (GMC) configuration. The LTMC is text-based and provides simple text alarms and text printouts. The GMC uses a graphical software package to allow viewing and controlling the Element system.

III. Element Level

The "fixed data" Element level is where environmental sensors and RF components are located. The MOSCAD RTU is the heart of the Element level. It collects and controls the various digital and analog signals through a variety of Input/Output (I/O) modules. The RTU serially interfaces to RF devices and is able to speak their native protocol. This allows the RTU to not only monitor alarms, but to configure and

change parameters as well. By using its interface capabilities to serially connect to the local digital microwave radio service channel or the TeNSr Channel Bank SRU port, the RTU can communicate over the digital backbone to the Element Manager (system's central) level and to other MOSCAD RTU sites.

Summary

Motorola two-way radio systems include a complete end-to-end solution for voice users, and MOSCAD provides a similar capability for fixed data users. MOSCAD RTUs may be added to all two-way radio systems to add alarm and control capabilities for telecommunication maintenance purposes. The following is an excerpt of a memo from Jim Widick, Vice President of Motorola LMPS that endorses this capability:

"There has been significant interest this past year from customers wanting to purchase network monitoring capabilities, i.e., alarm and control with fault management, as part of their Motorola communication system. We believe our MOSCAD systems match, and often exceed, competitive offerings. Further, it makes good business sense to sell Motorola. The Fixed Data team has successfully implemented network monitoring capabilities on recent large customer systems, and they have shown that Motorola's MOSCAD system has significant advantages over other solutions such as increased processing power, I/O capability and cost, local programming, etc. Most important is MOSCAD ability to communicate directly with other Motorola products such as QUANTAR, so that our customers will have a robust, integrated system solution... I am confident once the advantages are communicated to our customers, they will agree that Motorola offers the right system solutions."

Jim Widick
Vice President, Land Mobile Products Sector