Communications Monitoring for Howard County's Microwave System

By Brian Radmer, Motorola

Howard County, Maryland, uses a microwave infrastructure as a backbone for their radio communications system that serves their police, fire and emergency agencies. County authorities wanted a monitoring system to alert the dispatch center of any failures within the microwave system. They needed immediate notification of the location and nature of any problem so that technicians could respond immediately with the correct equipment.

Motorola proposed and installed its communications monitoring system that utilizes the existing microwave interconnection infrastructure communication to provide remote access to every microwave site from the central computer.

The Howard County Microwave System consists of 14 Telestar™ microwave radios located at seven sites throughout the county and is arranged in a "loop" configuration, utilizing 6.7 and 10 GHz microwave frequencies. With "smart" MOSCAD RTUs located at each microwave radio site and MOSCAD's Change Of State (COS) method of transmission, the system ensures that important alarm data will be transmitted immediately to the Front End Processor (FEP) located in the Howard Building. The benefit of such a "loop" system is that in the event one of the microwave paths from an RTU site fails, the RTU will automatically send the COS transmission through the alternate microwave path. MOSCAD's utilization of the powerful MDLC protocol will successfully route the transmission through the MOSCAD network to the FEP via the alternate link. This is a definite advantage over the standard "star" configuration, where each RTU is connected by one link only to the FEP.

Protocol Interfacing Flexibility

The Howard County Microwave Network Management system utilizes a combination of the following communication protocols:

- MDLC (Motorola Data Link Communications) – MOSCAD Seven-layer Protocol.
- California Microwave Alarm and Control Unit (ACU) interface protocol RS-232, Three-layer Protocol.
- Modbus – Master/Slave RS-232 Protocol between the WonderWare InTouch central computer and the MOSCAD FEP.

MOSCAD has brought together, into a single FEP, a collective database of all Telestar Microwave Radios in the Howard County Microwave Radio System. Access to the FEP database is made possible through an InTouch Graphical User Interface (GUI) Graphic Master Central processing terminal. Its custom graphic screens depict current system status where the user can easily navigate from a macroscopic system view down to the individual site details. All system alarms, COS and controls are time stamped, stored in the alarm history file, and printed for hard copy record keeping. History files allow for retrieval of important information at all times.

How the System Works

The FEP unit located in the Howard Building, consists of three Series-300 CPUs, two 60 – Digital Input (DI) modules and one 16 – Digital Output (DO) module. One CPU is defined as the actual "FEP". It is responsible for managing the system polling whereby each RTU is interrogated to verify healthy communication. The FEP also maintains a complete system database whichincludes alarm information

from each of the Telestar microwave radios, miscellaneous environmental data collected by MOSCAD RTU I/O modules, and the necessary registers allowing the FEP to initiate remote controlling to each RTU.

The other two CPUs act both as alarm and communication interfaces to the two local microwave radios. RTU-to-RTU communication between the MOSCAD RTUs located at each microwave hop, is made possible via a 9600 bps RS-232 interface to a dedicated microwave service channel so that the MOSCAD alarm system does not interfere with customer voice traffic. MDLC communication between MOSCAD CPUs in the same rack is accomplished via a multi-drop RS-485 connection at 9600 bps.

Each RTU site includes one Series 300 CPU unit for each microwave radio. Utilizing MOSCAD's flexible modular approach to I/O control, the appropriate combination of
I/O modules is employed at each RTU site. Status inputs and controls exchanged between the RTUs and the Telestar microwave radio are via RS-232 interface directly from the ACU module of the radio. This eliminates the use of the Telestar SCE module that would convert RS-232 serial information from the Telestar ACU module into discrete status inputs and control outputs. One of the clear advantages of the MOSCAD/ACU serial interface is that input status and control outputs may be easily exercised without external wiring.

Motorola's MOSCAD technology provides the flexibility to meet the growing needs of Howard county.