State of Maryland (Maryland FiRST) P25-TDMA Mission Critical Radio System

Location:
State of Maryland

Business Needs:
A statewide public safety communications system supporting interoperability among state and neighboring agencies.

Customer Profile

Known as "America the Miniature," the State of Maryland packs a large punch into a relatively small area. Maryland is the 9th smallest state by area, but the 19th most populous and the 5th most densely populated of the 50 U.S. states. It is located in the center of the Atlantic seaboard and has a total area of 10,467 square miles and a population of more than 5 million residents.

MARYLAND FIRST
First responders Interoperable Radio System Team

Customer Challenge

The State of Maryland had a vision for a statewide public safety wireless communications system that would support interoperability among state agencies and localities, and ultimately across state boundaries with neighboring states. The need for this state-of-the-art system became apparent as interoperability between agencies was hindered by the use of different operating frequency bands, legacy technologies and system architectures. A statewide system would better support inter-operable communications, for first responder and public safety entities, ensuring all agencies would successfully coordinate with one another, and provide a quicker and more effective operational response to emergency situations. Maryland made the decision to implement a radio system that could provide statewide, secure, coordinated real time voice and data communications across public safety agencies and government boundaries, and as a result, the Maryland First Responder Radio System Team (FiRST) was founded.

Commdex Solution

- Conduct coverage map generation for entire state
- Full design and lead construction/project management of tower and command centers
- Turnkey systems engineering

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Commdex Roles

Interoperable Communications Planning and Development

Commdex first met with Maryland state agencies to understand their detailed operational needs and identify areas for improving operational procedures, response times, escalation, performance, and logistics procedures that would need to be incorporated into the new system design. Commdex provided valuable recommendations for specific changes to the communications plans to maximize voice and data performance and meet the objectives for state, regional, and local interoperability.

Through meetings with state agencies, Commdex identified shortfalls in the existing operational procedures. In order to enhance survivability of all Commonwealth dispatch operations centers, Commdex recommended a state-of-the-art IP-based, multi-channel communications plan that would improve command and control operations, day-today, and emergency and tactical functionalities. In order to ensure redundancy, geographically separate master control sites on a fault tolerant private network backbone were recommended to ensure wide-area communications connectivity and sustain operations. Commdex worked with the agencies for planning of primary and secondary dispatch systems, providing the ability to patch and multi-select multiple agency talk groups and channel resources, covering all federal, statewide, regional, tactical and interoperable environments.

Design for Interoperability on MD- FiRST

Interoperability design took into account providing direct communications capabilities for the MD-FiRST users with counties and municipalities, as well as adjacent state, public safety systems, and VHF Federal and aviation operations. The design and implementation was incorporated into the new APX Product Line Dual and Single Band Radios, negating the legacy requirements of users having to carry multiple radios.

Frequency Planning/RF Studies and Analysis

Commdex led the critical effort of coverage map generation, which included the review and update of coverage maps and channel plans. Commdex worked closely with the state on the frequency plan for the 167 site mission critical network for 700MHz. channel usage. During the development of the frequency plan, Commdex reviewed candidate sites to determine channel capacity at each site. The review considered careful spectrum planning, to include detailed site analysis and RF studies, plus IM, co-channel and adjacent-channel interference. These studies were performed efficiently and effectively in advance of deployment and system build, contributing to the State of Maryland not incurring costly post installation field modifications, while also sustaining the customer's coverage requirements.

Tower Infrastructure Development

Working with Maryland state agencies and counties, the State Interoperability project utilized existing sites in a collocated fashion to build out the P25- 700 MHz system. This network build-out strategy resulted in a lower density of towers for the state, and a less costly network build-out, which served as a major cost savings for Maryland. Commdex served as a liaison and bridged the gaps between the project team and the site owners, developing construction plans, compiling structural assessments of the existing towers, and obtaining Notice to Proceed (NTP) notifications to implement site work.
Following Motorola's R56 guidelines, Commdex designed the routing, size, and placement of the new electrical systems and managed their installation.

Fleetmap Planning and Subscriber Programming

Commdex met with State Agencies to provide design and operational insight into the new P25 TDMA Phase 2 capabilities, infrastructure and subscriber features, including interoperability, and priorities, as well as operational guidance for planning and enhancing emergency response and day-to-day and communications. Also included in Commdex's presentations and planning sessions were demonstrations pertaining to efficient use of resources, including network bandwidth management that was achieved through channel partitioning of the TG resources operating on the network.

Command Center Design

The Commonwealth needed to continue to operate their legacy radio system during the statewide infrastructure build-out and subscriber installations. Commdex evaluated their existing system, produced studies that highlighted the technical concerns, and made recommendations to eliminate potential problems.

The evaluation incorporated a unique phased engineering and implementation approach, integrating their legacy network to the P25 IP-based consoles, while maintaining existing functionalities to include; system transmitter signaling, receiver voting, conventional radio voice operations and emergency alerting. This design permitted the upgrade of the legacy dispatch center's primary and secondary radio systems to the new P25 IP-based operations, with improved end user functionalities for IV&D systems of the upgraded subscribers, while sustaining the legacy operations.

Comprehensive Audio Logging Solutions

Commdex provided the state with audio logging solutions from NICE Systems to capture, analyze and a centralized MCC7500 IP Logger was used to record the trunked radio traffic for all agencies and counties on the system. The state required different audio retention times, in which Commdex implemented the NICE Storage Center solution. This solution gave the state the ability to set up different retention times, on a talk group by talk group basis, and a 4-year logging retention period. This design also gave the state the ability to record phone lines and conventional radio audio locally at each site. These features of the audio logging solutions will provide crucial data that can improve both day to day operations, as well as allow for better response in emergency situations.

The NICE Inform Matrix solution incorporated user access of trunked radio and local radio analog recordings. This application facilitated connection to their local Inform server, which made it possible to retrieve recordings on both local and statewide NICE loggers over the entire network. This solution will greatly improve emergency response, as this system manages multimedia incident information effectively and efficiently, capturing all vital data and ensuring that it is available for review by first responders at real-time speed. Connectivity design and implementation of the
logging system required thorough integration with the private and multiple state agencies' IT backbones.

Project Management

Commdex managed and administered the asset and configuration databases for the MD-FiRST, State of Maryland Project. Commdex created a database tracker and the associated upload processes in order to capture contract- required information for placement on the customer database. These calculated measures reduced time spent on manual input of data, streamlined processes, and minimized the probability of human error. Commdex satisfied asset management concerns, creating a barcode asset tagging system, which was applied to the state's equipment. Commdex also created processes for tracking distribution of site construction equipment and systems (coax antennas, TTA's, etc.) installed by contractors, from the warehouse to the sites. Further, Commdex designed and implemented a site audit checklist and site placards, which resulted in a systematic process to identify equipment and manage valuable assets. Commdex performed all project management functions, including the scheduling of meetings, completion of contractual documentation, material orders, and tracking and management of all assets.