



A. Cover Page

2008 NASCIO Award Submission

**Title: New York Statewide Wireless Network: SWN
Rapid Application Mobile Emergency Response Vehicle (RAMER)**

Category: Information Communications Technology Innovations

New York State

Executive Summary

New York recognizes the need to provide state and local emergency responders with a high quality, reliable communications system and has committed the resources to create a statewide radio network to improve emergency and day-to-day communications. The Statewide Wireless Network (SWN) is a wireless radio network for safety and public service agencies that moves the State from an obsolete and failing infrastructure to a state-of-the-art digital trunked land mobile radio system.

The SWN project is led by the New York State Chief Information Officer/Office for Technology (CIO/OFT) and in September 2005, a contract was awarded to M/A-COM Inc. to design, build and maintain the system. Through its design, the SWN will provide interoperability, or the ability to share voice and data communications between various groups of emergency responders across multiple jurisdictions. The fully integrated digital land mobile radio system will provide reliable and robust voice and data communications and is designed to operate even during natural disasters or man-made incidents.

While SWN is being designed as a public safety system with extremely high reliability, it is recognized that a localized disaster or targeted terrorist event could damage or destroy a portion of the network infrastructure. To solve issues of disruptions in operations and communications, the Rapid Application Mobile Emergency Response (RAMER) vehicle program was initiated.

The RAMER program consists of a fleet of vehicles designed to act as mobile command systems for public safety use in all types of emergencies where communications restoration and interoperability are vital. RAMER vehicles are able to deploy quickly to the scene of a disaster and re-establish SWN infrastructure connectivity in an area. The RAMER project utilizes three (3) identical vehicles outfitted with necessary radio equipment to be able to fulfill the requirement of providing mobile emergency radio solution during a crisis. Utilizing three identical vehicles affords the State the flexibility in deployment, allowing one large disruption to be covered by multiple vehicles or the deployment of each vehicle to multiple incidents occurring simultaneously.

The RAMER vehicles also carry extensive engineering test equipment and computer assets specifically designed for the SWN acceptance testing process. The RAMER vehicles will assist New York State in performing mobile testing of the system throughout the State during the five-year build-out of the network.

Description of the System

Background

The funding for the RAMER vehicle project was part of a U.S. Department of Justice grant awarded to CIO/OFT in 2002 and consisted of approximately \$2.6 million. The grant funds were used to purchase the three (3) vehicles (Ford Excursions were chosen to serve as the platform for the RAMER vehicles); all the mobile and portable radios to provision with the vehicles; multiple computers, servers, routers and power supplies, racks and mounting solutions, cell site equipment, interoperability switches, antennas, specialty vehicle equipment and all the tools, fabricating equipment and parts necessary to complete the project.

The purpose of the RAMER project was to design, construct and equip mobile communications vehicles that serve (1) to perform mobile testing of the network throughout the State during the five year build-out of the network; (2) to act as a back-up cell site during network outages or malfunctions including damage to or loss of towers or transmission equipment; and (3) to provide a communications gateway at the scene of a natural or man-made disaster to provide interoperable communications for first responders.

The RAMER vehicles are an essential resource to furthering the critical public safety mission of the SWN. First responders and public security officers cannot adequately respond to crisis or address the myriad demands of providing security without a reliable and effective communications network. In order to properly develop this statewide network, the RAMER vehicles will be deployed in each region of the State during the infrastructure build-out to test coverage, traffic loading, interoperability and interference. Further, the RAMER vehicles will assist SWN in performing acceptance testing for each subsequent SWN region.

Technology

The RAMER vehicles use a fully interoperable trunked digital multicast technology from M/A-COM, Inc., based on time division multiple access (TDMA) for spectral efficiency. Each vehicle is equipped with four (4) legacy radios that are pre-programmed with radio frequencies used by public safety officials. In addition to the legacy radios, there are two (2) OpenSky digital trunked radios and a vehicular tactical repeater (VTAC) to allow for extended coverage of the network. Three (3) gateways are installed to provide interoperability along with two (2) SUN servers to allow access to the OpenSky network. A collapsible 35-foot mast acts as a cell tower, if needed. There is also a Panasonic Tough book laptop to enable on-site radio re-programming, transmission of data from scene to the network and system operations center and local network control.

RAMER vehicles have the capability to create a local-area gateway, interconnecting SWN users at the scene of a disaster or crisis to other users operating on separate radio systems that do not possess a network gateway to SWN. Using its NetworkFirst switch and Cell-on-Wheels capability, the RAMER vehicle will have maximum flexibility to connect first responders in ways necessary to accomplish their mission.

Every radio system suffers malfunctions, outages and damages from natural and man-made events, especially at towers and transmission sites. The RAMER vehicles are capable of

responding to any non-functional site location and assuming the role of that site until repair crews remedy the outage. The off-road capability of the RAMER vehicles is critical to this effort, as many tower sites are inaccessible except by four-wheel drive.

The RAMER vehicles will also carry extensive engineering test equipment and computer assets specifically designed for the SWN acceptance testing process. The off-road capability they possess allows the vehicles to conduct much of the geographic area testing to ensure 95% area-wide coverage and limit the amount of testing to be done by teams of testers hiking off road with portable test equipment, which can be time consuming and a much more subjective testing method.

Current status

A SWN RAMER project team was created to develop equipment specifications and vehicle configuration designs. In Spring of 2007, the design and construction of the RAMER vehicles was completed and the RAMER vehicles became operational. SWN acceptance testing is currently taking place in Erie and Chautauqua Counties in western New York. The State is obligated by contract to perform acceptance testing and formally accept or reject each SWN region from the State's primary vendor, M/A COM Inc. In order to properly develop this statewide network, the RAMER vehicles will be deployed in each region of the State during the infrastructure build-outs to test coverage, traffic loading, interoperability and interference.

Business Problem and Solution

Clear and reliable communication is fundamental to a successful emergency response, as well as day-to-day public service operations. Whether facing a natural disaster or other emergency event, New York's first responders must have the tools necessary to perform their jobs in crisis situations and those tools include an interoperable wireless radio network.

Need for mobile command post

New York is a large state with highly varying terrain and density of population, ranging from the metropolitan area on New York City to the mountainous terrain and sparse population of the Adirondacks. Agencies with statewide service responsibility require both an extended network of facilities and a high degree of mobility to carry out their missions, in turn requiring reliable and effective statewide communication to control and coordinate resources. At the scene of a disaster, the RAMER can provide interoperability to digital P25 and analog systems and provide a source for Internet Protocol (IP) voice and encryption. The RAMER vehicle will also provide on-board computer network control and IP link to the world.

Redundancy of infrastructure

In the event of a cell site outage, the RAMER vehicle can serve as a regional system operations center to back-up the cell site until the site is once again operational. Currently, New York State has three (3) operational RAMER vehicles ready to be deployed to re-establish SWN infrastructure connectivity. These three (3) identical vehicles allow for flexibility in deployment, where one large disruption can be covered by multiple vehicles or the vehicles can be deployed to multiple incidents occurring simultaneously.

Assist in acceptance testing

The RAMER vehicle will aid in the technical analysis for SWN. Currently the vehicles are deployed in Erie and Chautauqua counties to assist with the identification of coverage degradation due to foliage, verification of "dead-spots" and site-specific propagation analysis. With this information, the SWN will ensure a reliable network that will be used by local and statewide public safety officials for the next generation.

Significance to the Improvement of the Operation of Government

True interoperability is achieved when all first responders are operating on the same network. The SWN project aims to have a significant impact on the operation of state and local government agencies.

The SWN project office is working closely with a variety of state and local agencies. More than 70 government agencies and emergency response organizations from across New York are active contributors of the SWN. The on-going participation of these organizations will result in a communications system that will continue to meet the state's needs well into the future. Should disruptions in service and communications occur in a specific region, the RAMER vehicle will aid these government agencies and emergency response organizations by acting as mobile command post. Since RAMER vehicles are maintained in a constant state of readiness, they are able to deploy to a scene of incident within hours and set up interoperable communications. RAMER vehicles have the ability to set up communications between public safety, service and support providers, law enforcement, firefighters, EMS, emergency management and others to communicate with staff from other responding agencies, to exchange voice and/or data communications on demand and in real time.

Realized Return on Investment

The three RAMER vehicles addressed the enhanced functionality and equipment needs of the SWN project. The scheduled time to completion and operational status was August 2007.

The total U.S. Department of Justice grant budgetary outlay was \$2,524,500, or \$841,500 per vehicle. Comparable platforms often run as high as \$1,000,000 each. Accomplished on-time and within budget, the vehicles participated in operational testing in Erie and Chautauqua Counties. The full impact of the RAMER system deployment on the daily operation of Statewide Wireless Network has yet to be realized. Because of this, a full assessment of return on investment is an exercise that awaits completion of development and transition of agencies to use of the new system. However, based on the lessons learned of Hurricane Katrina and Rita, the need for rapidly deployable interoperable off-road ready communications platforms was amply demonstrated. The RAMERs can each function as "cell-on wheels," and can therefore be used to restore urgent needed communications for incident command and first responders on the SWN network.

The strategic requirement of three RAMER vehicles allows for their use in different regions of New York State or the co-location of vehicles for large scale events. In an effort to realize specific cost

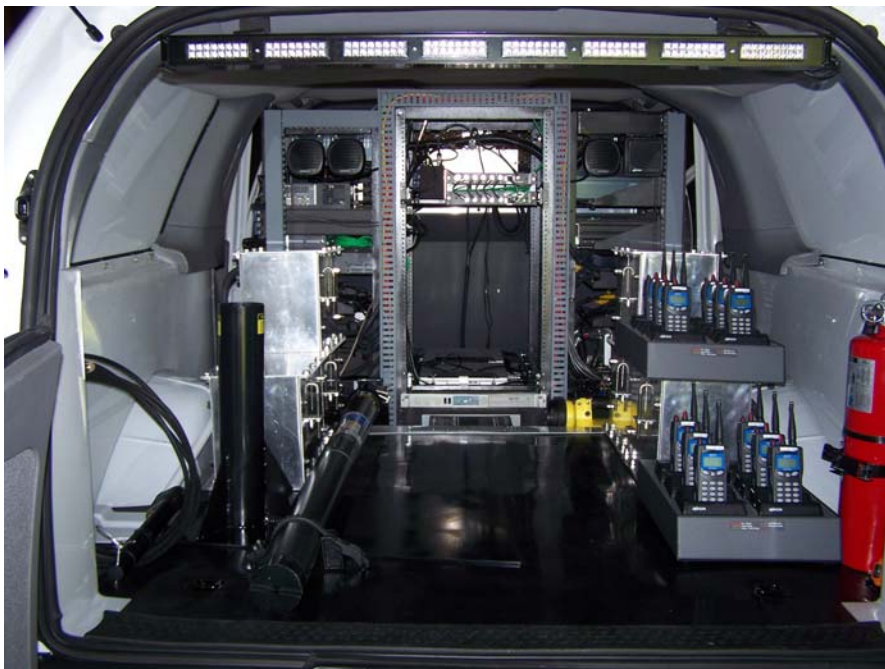
savings, increasing the return on investment on the RAMER vehicles themselves, a comparative study of commercial service contracts providing voice and data services during emergency situations, would be required. Finally, as agencies and local governments make the transition to use of the SWN, the RAMERS can serve “double duty” being used as a training mechanism to offset any requirements that may surface, thereby mitigating additional use of outside contractors.



RAMER vehicle in action with the 35-foot collapsible antenna mast at the Helderberg Cell Site, Thatcher Park, NY.



Center console showing legacy radios (front) and OpenSky radios (rear)



Rear view of RAMER showing back-up battery power and interoperable portable radios