



Nation's Largest Military Installation Goes Green During Project 25 Network Expansion



Situation: Fort Bliss and White Sands Missile Range combine to create the largest U.S. Army training and testing area, covering nearly 5,000 square miles. This massive area in Texas and New Mexico includes some of the most rugged, remote and isolated terrain within the continental United States. As a result, enormous challenges are faced by first responders who are dispatched to both of these installations, and also to nearby Holloman Air Force Base and the NASA construction and launch facility at White Sands.

The Fort Bliss command conducts live fire exercises using nearly every type of military weapon, hosts joint military exercises with other U.S. and foreign units, and monitors missile launches conducted at White Sands. As one of the Army's foremost bases for test-driving tanks and other equipment used in desert warfare, it is home to an incredible array of maintenance and supply units and houses thousands of vehicles and personnel. At the same time, White Sands hosts the nation's premier missile testing and range operations, as well as ground support for the Tracking and Data Relay Satellite network of communications satellites. As might be expected for such military areas, huge expanses of both Fort Bliss and White Sands are "off-blacktop" and difficult to access.


But emergencies can occur anywhere, and in a military complex, they can come with the added hazards of unexploded munitions and heightened security concerns. To assist with a safe response to an emergency, responses are coordinated from the Project 25 Land Mobile Radio Master Site in El Paso. Fire, security forces and medical units are dispatched quickly and efficiently wherever they are needed ... even without the conveniences of roads or street signs. For their own safety, each responding team needs to fully understand the nature of the situation they are approaching, especially when the risks can include live missiles and live fire training. With these ever-present dangers, a reliable, effective and secure communications system truly is a matter of life and death.



Challenge

In 2007, in response to the influx of additional military units and new responsibilities assigned to Fort Bliss, a Request For Proposal (RFP) went out for the installation of a new secure wide area, digital narrowband, trunked land mobile radio system to cover Fort Bliss, White Sands Missile Range and its NASA construction and testing facility, and Holloman Air Force Base. The Fort Bliss project would be an all-encompassing, state-of-the-art Project 25 communication system designed to link the Fort Bliss Master Site to first responders and other units involved in hazardous testing and training. The large geographic area needed to include communications throughout Fort Bliss, Holloman AFB, White Sands Missile Range, as well as NASA Shuttle landing and training missions. The new system would need to comply with all federal regulations and support interagency cooperation with state, county and municipal fire, police and EMS units near the military complex.

The selected vendor would be charged with providing infrastructure, Radio Frequency (RF) equipment and services in support of the project, including project management, systems engineering, equipment installation and optimization, security implementation, acceptance testing, training, technical assistance, warranty and maintenance support. The new system was to consist of ten remote sites, requiring site development and construction of towers, concrete foundations, setting shelters and build out to current standards. One site, known as 506 Mesa, was particularly inaccessible. To avoid the estimated \$1.1 million that would be required to bring power lines to the site, the RFP requested proposals for alternative energy sources at 506 Mesa.



Motorola's project management responsibilities included planning, designing and construction of the new 506 Mesa antenna site, which is powered by solar and wind energy. Traditional infrastructure at the isolated site would have been prohibitively expensive.

Motorola's Federal Division Proposal Team spent several weeks crafting a comprehensive response to the Fort Bliss RFP. Ultimately, after weighing all options and proposals from a variety of integrators and other communications companies, the Fort Bliss evaluation team chose Motorola to develop and build their new network.

Solution

The scope of the Fort Bliss project is significant. This required the Motorola solution to deliver a number of discrete, integrated services during the deployment of the new digital radio system.

Project Design and Management

Motorola's Federal System Integration Team designed a Project 25 network that would meet the needs of the Fort Bliss project participants, building on best-in-class, technology selections. Other critical concerns, such as security and information assurance, were also considered at this stage, so they could be managed well before implementation.

The solution is based on Motorola technology, but also incorporates coordination and management of several trusted partners, including specialists in solar and wind power. Advance staging and testing of the radio solution in Motorola's facilities ensured reliable system performance and a smooth, predictable deployment. Careful cutover planning avoided any costly disruptions in network operations or workflow and met all interoperability requirements.

Motorola's robust, reliable design for the wind and solar energy plant at 506 Mesa is delivering power significantly beyond the requirements specified by Ft. Bliss. Based on its success, the Army is currently considering adding alternative energy sites elsewhere within the network.



Site Development

One of the biggest challenges of the Fort Bliss project was site development. The specialized experience of Motorola's National Site Design and Integration Team (NSDIT) proved invaluable. Motorola's site development services typically encompass five success factors:

1. Site Acquisition: timely execution of cost effective lease rates and terms
2. Constructability Reviews: site selection decisions that help meet current and future needs and deliver best value
3. Environmental Screenings and Approvals: ensuring compliance to jurisdictional regulations
4. Zoning and Permitting: processing and vetting jurisdictional requirements and approvals
5. System Connectivity: leveraging an iterative site location process working with RF and Microwave engineers to optimize path reliability and system coverage

For the Fort Bliss project, sites were pre-selected on government land, so acquisition and permitting were not an issue. Constructability reviews, intricate planning and extensive coordination were required to upgrade nine existing radio sites for P25 capability. The Fort Bliss project was also designed to include ground-up construction of a new 7-channel repeater site at 506 Mesa – an isolated site over 5,000 feet in elevation. Further, the site is about two hours from the nearest blacktop with no infrastructure in place.

Motorola's NSDIT used their significant experience in providing off-grid energy as an alternative solution for 506 Mesa. An example of previous experience includes the successful installation of alternative energy solutions at several remote National Park Service sites. New Mexico's sunny climate provides the perfect setting for a solar energy solution, backed by wind turbines and a natural gas generator. NSDIT designed the solution, sourced the hardware and supervised its installation, with close attention to both the energy requirements of the station and the challenges of ongoing maintenance and upkeep in such a remote location.

Construction planning required unique coordination, because all equipment and materials had to be trucked off-road to the mesa, with military escorts accompanying each delivery. With Motorola project managers coordinating every step, construction of the site met and exceeded all requirements.

Mike Olson, Frequency and LMR Manager, of Fort Bliss is particularly proud of the 506 Mesa site. "Alternative energy wasn't merely a green option in this situation. It was the only practical solution; bringing the power grid out to such a remote site was simply out of the question. Now 506 Mesa is not only producing the energy we need, it's generating power well above specs. At an industrial rate cost of \$5/kilowatt-hour, that's saving the U.S. government nearly \$18,000 a month, just at that single site."

Network Monitoring

To ensure that the Fort Bliss network maintains the reliability and coverage its users demand, Motorola also established a direct link between the Fort Bliss network and Motorola's Federal Secure Support Center in Illinois. This is a restricted facility that is part of our Network Monitoring Operations (NMO) center. The center operates as a stand alone operation with dedicated monitoring and support resources for federal customers.

The Federal Secure Support Center is built to meet the National Industrial Security Program Operating Manual Chapter 5 (*Safeguarding Classified Information*) physical standards – secured with multiple physical access controls and video surveillance. Employees have access only to the information required to support the customer's networks. Monitoring and case management databases, along with the isolated network they reside on, are dedicated to federal customers and are only accessible from within the secure facility.

Motorola provides real-time fault monitoring and diagnostics capabilities for the network on a consistent, continuous basis, using multiple hardware and software tools for remote monitoring, event characterization, and restoration of the communications networks. When an event is detected, Motorola technologists can acknowledge and assess the situation, conduct remote diagnostic routines, and help initiate the most effective response. Then they respond with continued monitoring, remote restoration or dispatch of a local service technician to the site.

Network Security Hardening

For the users of the Fort Bliss network, security of mission-essential communications is a paramount concern. Motorola's design helps improve wireless network security and ensures that the network will meet all expectations for availability, security and privacy. Motorola also performed a number of services to prevent malicious or unintentional security lapses.

As a routine function of deployment, Motorola engineers harden the system to align with the DoD Information Assurance Certification and Accreditation Process (DIACAP) requirements and security best practices. Unneeded services and interfaces were disabled. Unused ports and protocols were shut down. Required software was upgraded with the latest patches, and procedures were introduced to ensure that it is regularly updated. These activities help protect the long term security of the Fort Bliss network, but also position the system for the DoD DIACAP process.

Results

Motorola project management kept the Fort Bliss project on track to meet the system deployment timeline, bringing all 10 sites on-line with P25-compliant interoperable communications across the coverage area. Motorola also completed the interface to, and optimization of, the OC-12 fiber communications system that links Fort Bliss with Holloman AFB, connecting the 10 repeater sites to the Fort Bliss Master Site. The system installation and optimization was completed in December 2009.

"We have coverage we never had before, the efficiency and advanced capabilities of state-of-the-art digital communications, the security and reliability we must have for first responder dispatch, and it's all working just as smoothly as we hoped," says **Mr. Olson**.





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