



Executive Summary

The State of Wyoming, working through a Steering Committee and Project Team consisting of State agencies, county and municipal organizations, Federal agencies, and consultants from Federal Engineering, Inc., has finalized a set of recommendations to develop a statewide public safety mobile communications system. These recommendations, developed over a 12-month period, define the technical and functional architecture as well as the budgetary requirements for a system that will provide improved coverage, improved interoperability across all State and local public safety agencies, and improved functionality especially in the critical areas of mobile data and encryption. The recommendations were chosen after careful consideration of all possible alternatives, including technical, operational, and financial factors.

The recommended system, known as WyoLink, will consist of a Project 25 (a national standard developed by the Association of Public-Safety Communications Officials (APCO)), digital, trunked VHF/150 MHz infrastructure utilizing 57 sites with interconnectivity via the WyDOT microwave backbone and planned extensions. The system will provide an estimated 94% statewide coverage for mobile radios. This system was selected over two other extensively analyzed alternatives:

- an 800 MHz system that would have required over 200 sites to achieve the same coverage, at a much higher cost.
- a “Do-Nothing” approach which would not provide a statewide system but rather each State agency and municipality would plan and manage their own upgrades.

The recommended system will require approximately \$51M to acquire. This represents a \$23M savings over the 800 MHz solution and a \$20M savings over what will be spent if there is no statewide plan. An implementation plan has been developed that begins with the design/pilot phase (\$5.1M), the core implementation phase (\$25.5M), and system expansion phase (\$20.4M).

WyoLink will provide the following critical benefits to the citizens and Public Safety providers in Wyoming:

- Full interoperability across all participating State, local, and Federal agencies, plus an interface to the existing Casper 800 MHz system, and “mutual aid” functionality for those who wait or decline to participate in the WyoLink shared system.
- Improved statewide mobile coverage from 83% to 94% (estimated)
- Full compatibility with the current and emerging APCO standards
- Digital technology, which is the technology of choice in the industry today and into the future
- Added features such as encryption, low-speed data, and AVL (automatic vehicle location)



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- Increased capacity through the addition of new channels
- The ability to use trunking to set up efficiently tailored talk groups of emergency personnel to talk with exactly those others they need to, without congestion
- Improved reliability and disaster recovery capabilities through replacement of obsolete radio infrastructure and the addition of multiple control points

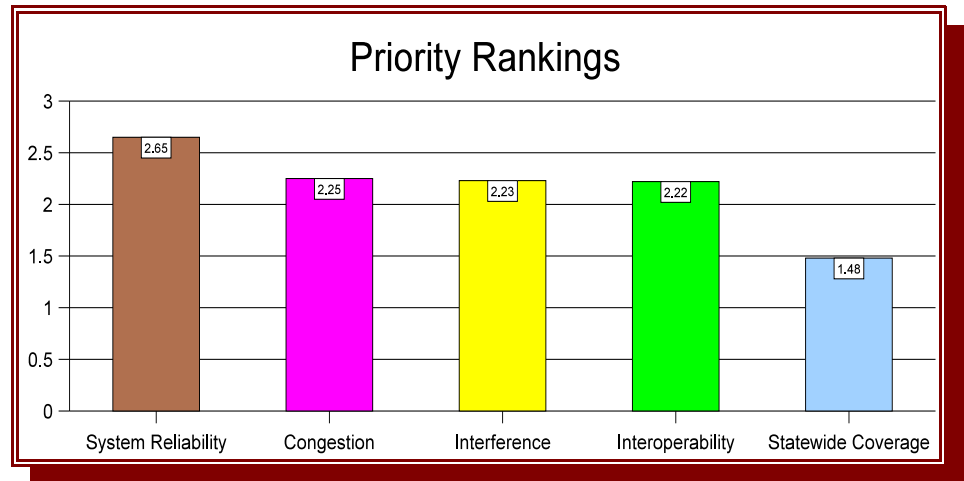
In October of 2002, the State of Wyoming, through a competitive bidding process, selected Federal Engineering, Inc. (**FE**) of Fairfax, Virginia to assist in the development of a Statewide Public Safety Mobile Communications (PSMC) plan to service the needs of Wyoming. **FE's** experience with similar programs in other states was instrumental in shaping a practical direction for Wyoming.

In recent years, less extensive studies were performed in Wyoming which consistently identified problems in the areas of infrastructure, coverage, and interoperability. In this effort, the State resolved to go well beyond the general recommendations of the past, and to produce an actionable plan to serve as the foundation for the formal procurement of a new PSMC system.

Phase I of this effort concentrated on understanding current PSMC infrastructures and equipment as they exist today within the State. Internet-based surveys using **FEClientNet** were completed by 72 different reporting entities including State, county, local and Federal agencies. These surveys were augmented by a month-long series of group meetings, interviews, and site visits across the State. The findings from these efforts, confirmed the results from previous studies regarding deficiencies in the infrastructure, coverage, and interoperability.

During the interviews, group meetings, and surveys, participants were asked to describe their immediate and long-term requirements for a PSMC system. The magnitude of these needs reinforced the findings that there is a strong “demand pull” and great support for improvements in the overall statewide PSMC environment.

The relative priority rankings of the primary needs are as shown here:



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Phase II of this program saw the development and release of a Request for Information (RFI) to the vendor community. Responses from six vendors were used to prepare a range of all conceptual alternatives, which were then narrowed down to two reasonably viable statewide alternatives for detailed analysis: the VHF-highband and 800 MHz frequency bands. Then the RFI information was used to create a cost breakdown for these two options, plus the cost implications of “Doing Nothing” for a shared statewide system. A followup survey of State and local agencies that might participate in a statewide system was also performed to assess their courses of action if a statewide infrastructure was not implemented in the near future. This formed the foundation for the “Do-Nothing” approach, which included the costs of incremental, localized improvements in technology without any appreciable improvement in coverage or interoperability.

Identified needs were refined into the following high level requirements (“system specifications and required features”) to drive the subsequent planning phase, and ultimately the WyoLink acquisition. These requirements were prioritized as follows:

Basic (essential/mandatory system requirements):

- Additional channel capacity and improved efficiency
- APCO Project 25-compatible, narrowband digital trunked radio system
- Compatibility with existing analog systems
- Low-speed data capabilities
- Encryption capability, for privacy
- AVL, casual use, and subscriber ID capabilities
- Improved mobile coverage to approximately 94% and improved portable coverage in selected areas
- Improved interoperability at the statewide, local interagency, intercounty/regional, and Federal agency levels
- Statewide roaming capability and exclusivity of use
- Multiple master control points
- Upgraded network local sites to basic standards

Optional (may not be implemented with the initial system but the design should accommodate an easy transition to them):

- Upgraded towers, grounding, and shelters where necessary
- Upgraded network sites for building alarms and expanding generator fuel capacity to ten days
- Panic/emergency buttons on subscriber units
- High-speed data capabilities in selected areas
- Upgraded microwave backbone system for redundancy

Expandable (future near-term items that may not be implemented with the initial system unless they can be done without significant additional costs):

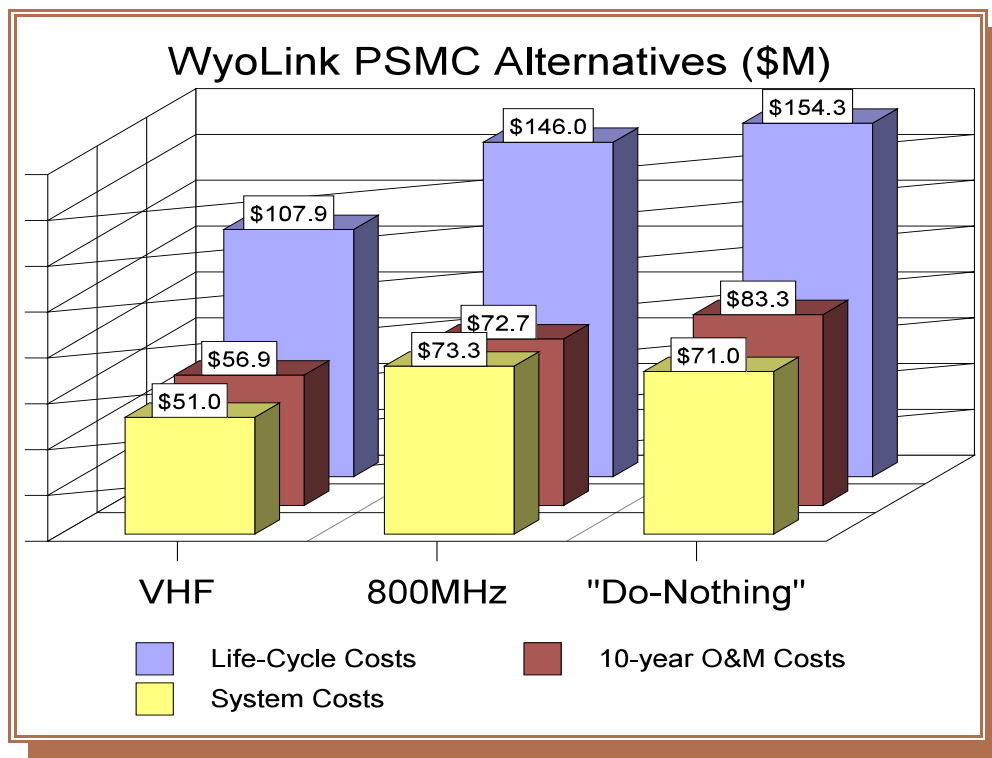
- Card swipe, mobile printing, voicemail, email, paging, and mobile video capabilities
- Improved site security at remote sites



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Through a detailed review of the proposed system architectures for VHF, 800 MHz, and “Do-Nothing,” the Steering Committee determined the features that would be provided in the initial WyoLink deployment. Optional and Expandable features will be deferred for reconsideration in the future as funding opportunities arise.

Coverage analyses were generated for the two alternative frequency bands (VHF and 800 MHz) chosen by the Steering Committee. **FE**'s approach for optimizing the mix of sites recognized that existing and planned WyDOT sites would have microwave connectivity and were generally found to be in better overall condition than most other sites investigated. These sites were heavily favored in the site selection process. In order to provide a degree of affordability as well as comparability, the Steering Committee agreed with **FE** to provide a WyoLink target coverage level of approximately 94%. It was felt that this level of coverage provided a significant improvement over the current coverage of approximately 83%. It also maximizes the use of WyDOT towers and microwave network infrastructure, thus avoiding significant additional costs. The resultant system costs for each alternative architecture are shown below:



WyoLink System Costs

By unanimous consensus vote, the Steering Committee approved the VHF solution as the optimal choice for the statewide PSMC plan.



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The completion of this project is a major milestone towards the goal of developing a statewide Public Safety Mobile Communications Plan that will meet the needs of all of the stakeholders. The “book of knowledge” that has been created provides the history, current status, immediate and long term needs, system specifications, testing requirements, standards, an assessment of alternative architectures, a financial analysis of the acquisition and lifecycle costs of each alternative, and a recommended solution. More importantly, it is the result of a highly collaborative effort - between numerous State, county, local, and Federal public safety agencies - that all can embrace and use to move forward. This program establishes a course of action that will facilitate an improved statewide PSMC network while significantly reducing long term costs - **WyoLink!**

