

VENTURA COUNTY FIRE PROTECTION DISTRICT

BOB ROPER
County Fire Chief



165 Durley Avenue
Camarillo, CA 93010-8586
(805) 389-9710
FAX (805) 388-4364

December 8, 2009

Board of Directors
Ventura County Fire Protection District
800 South Victoria Avenue
Ventura, CA 93009

SUBJECT:

Status Update of the Simulcast Radio Equipment Project for the Ventura County Fire Protection District (Fire District) and the Ventura County Sheriff's Department (Sheriff's Department) Radio Networks.

RELATED BOARD LETTER:

IT Services has submitted an item on today's agenda to request approval of cost adjustments for the Public Safety Microwave Project necessary to provide incremental space at nine mountain-top sites for the Fire District's and Sheriff's Department's radio equipment identified by the Simulcast Radio Equipment Project.

RECOMMENDATION:

None. Information only.

DISCUSSION:

As was presented to your Board on May 13, 2008, the Simulcast Radio Equipment Project is a joint effort of the Fire District, the Sheriff's Department, and IT Services. The Fire District leads the project and is representing the interests of all three agencies. Oversight is provided by a steering committee chaired by the County's Chief Information Officer, whose members include Sheriff Department and Fire District executives. Synergies of the collaborative project have resulted in cost-savings due to economies of scale and effort. Moreover, the joint project facilitated unprecedented cooperation

Committed to Excellence . . . Delivered with Pride

Providing protection and preservation of life, property and environment to: The Cities of Camarillo, Moorpark, Ojai, Port Hueneme, Simi Valley, Thousand Oaks, and the unincorporated areas of Ventura County.

between public safety agencies by providing greater operational capabilities and greater potential for interoperability than either agency could achieve acting alone.

The Sheriff's Department and Fire District each utilize a countywide network of VHF base station radios providing communications between field personnel (deputies, commanders, firefighters, chiefs, etc.) and their respective dispatch (command and control) centers via mobile or portable VHF subscriber radio equipment and base station radios located predominately on mountain-top sites. Geographic expansion in the county coupled with operational limitations of the current radio systems necessitated more sophisticated and expanded public safety radio systems. The current Sheriff's Department and Fire District radio networks were designed long ago when the county's population was smaller, calls for emergency services were significantly fewer, and mobile radios mounted in vehicles were the primary subscriber equipment. Since then, hand-held portable radios have been adopted as a standard communications tool and have become a communications lifeline for deputies and firefighters, even though the small size of portable radios constrains transmitting power. The Simulcast Radio Equipment Project addresses the challenges of communicating in a larger geographical area when using a lower power portable radio by expanding radio coverage, repeating radio signals, improving transmission quality, and by simultaneously transmitting from multiple base station radios via the Public Safety Microwave Network.

The General Services Agency/Procurement Services released purchase orders for the Simulcast Radio Equipment Project to Motorola on June 25, 2008. On July 22, 2008, a project kickoff meeting was held with the key project team members from the Fire District, the Sheriff's Department, and IT Services.

During Phase I of the Simulcast Radio Equipment Project, which was completed on October 30, 2009, Motorola re-engineered the Sheriff's Department's and Fire District's radio systems, designed new simulcast radio networks, identified the radio sites necessary to meet the coverage areas required for six simulcast public safety radio channels and identified infrastructure improvements necessary at the required radio sites. The new simulcast radio networks will utilize the County's new Public Safety Microwave Network to transport audio and to interface with the radio switches and radio dispatch consoles at the Sheriff's Department and Fire District dispatch centers.

The Phase I deliverables and final design included several key aspects:

1. Transmit Site Radio Coverage Engineering (talk-out radio): Motorola evaluated the 18 microwave sites and developed detailed maps of the transmit radio coverage that could be obtained from each potential transmit site. Thirteen of these sites were subsequently recommended in the final simulcast design.

2. Receive Site Radio Coverage Engineering (talk-in radio). Motorola evaluated an additional 34 current and available receive sites and developed detailed maps of the receive radio coverage that could be obtained from each potential receive site. Twenty-three of these sites were subsequently recommended in the final simulcast design.
3. Site Evaluations: Motorola evaluated the available transmit and receive sites for conformance to their R56 Standards and Guidelines for Communication Sites, with a primary focus on identifying life and safety issues (such as equipment grounds) at the sites and issues that would potentially cause radio interference and preclude the manufacturer's warranty. The deficiencies identified at the 13 transmit sites included in the simulcast design will be mitigated during Phase II of the project.
4. Mathematical Frequency Intermodulation Analysis: Simulcast frequencies must be properly mixed and matched to ensure that intermodulation and transmitter noise receiver desensitization (TNRD) do not result. Motorola performed an initial study based on the desired 12 simulcast channels. This high-level analysis showed that frequencies for only 8 of the 12 desired simulcast radio channels could be utilized by the County in a simulcast system.
5. Physical Frequency Intermodulation Analysis: Motorola visited and evaluated the 18 potential transmit sites. This analysis required a 24-hour survey at each mountain top with a frequency analyzer to identify and record potential intermodulation issues that could cause radio signal interference. The physical frequency intermodulation analysis confirmed the results of the mathematical frequency Intermodulation analysis and defined the frequency filtering requirements necessary for designing the antenna combiner systems.
6. Site Space Requirements: Motorola evaluated equipment space requirements at all recommended sites and determined that insufficient space existed at several sites. The final equipment configuration was adjusted as much as possible to minimize the amount of equipment at each site. Measures taken included eliminating superfluous radio channels at one site and maximizing the equipment shared by the Sheriff's Department and Fire District's radio systems at every site. The remaining sites with space issues are defined in the IT Services Board letter on today's agenda.
7. Incremental Project Options: Motorola reviewed the requirements for 13 incremental options; those selected by the County were included in the final system design.

8. Final System Design: Motorola recommended a transmit system design comprised of 13 transmit sites (not all 13 sites are used for every simulcast radio channel). Motorola recommended a receive system design comprised of the 13 transceiver sites and 23 additional receive-only sites (not all 36 sites are used for every simulcast radio channel).
9. Equipment Lists: Based on the final design, Motorola identified the required simulcast equipment, identified the equipment necessary to filter transmitter noise receiver desensitization (TNRD), preclude inter-modulation, and engineered antenna systems that would optimize signal strength for public safety users of the system.
10. Revised Pricing: Updated pricing to match the final system design's equipment lists and professional services required to complete the project were incorporated via contract change order.

SIMULCAST RADIO EQUIPMENT BUDGET UPDATE:

County of Ventura Contract #5662 Simulcast Radio Equipment Budget Summary			
Cost Item Description	IT Services/ Sheriff's Cost	Fire District Cost	Total Cost
Total Phase I Costs	\$424,684.40	\$524,600.60	\$949,285.00
Phase II Costs			
Total Simulcast System Equipment	\$1,879,291.66	\$604,347.63	\$2,483,639.29
Total Phase II Services (including discounts)	\$928,081.86	\$3,464,698.83	\$4,392,780.69
Total Phase II Costs	\$2,807,373.52	\$4,069,046.46	\$6,876,419.98
Total Simulcast Contract Cost [revised contract value]	\$3,232,057.92	\$4,593,647.06	\$7,825,704.98
Remaining BOS Approved Contingency Funds	\$115,091.21	\$0.00	\$115,091.21
Total BOS Approved Simulcast Budget (IT Services)	\$ 3,347,149.13	\$ 4,593,647.06	\$ 7,940,796.19

The Fire District also released a purchase order to Motorola in the amount of \$755,094.80 for budgeted radio equipment, which allowed the County to receive total discounts from Motorola in the amount of \$1,067,000 for the cumulative purchases. This incremental purchase for radios system equipment was deferred until recently to correspond with the Simulcast Radio Equipment purchase in order to negotiate better overall pricing from Motorola.

SCHEDULE UPDATE:

Phase I of the Simulcast Radio Equipment Project was signed off by the County on November 4, 2009.

Phase II of the Simulcast Radio Equipment Project (per Motorola's preliminary schedule) will take up to 18 months to complete. An updated Phase II schedule will be developed after lease and construction schedules are provided for the sites described in the companion IT Services request.

PENDING DECISION:

Should your Board approve IT Services' companion request for incremental funding to resolve the microwave site space issues, Phase II of the Simulcast Radio Equipment Project will commence. In Phase II Motorola will provide, install, configure, and optimize all required simulcast equipment; perform necessary site improvements at transmit sites; make all connections between the County's new Public Safety Microwave Network and the simulcast radio systems; and provide training for technical staff. The resulting new simulcast radio systems will meet stringent operational and technical requirements for coverage, availability, reliability, and maintainability.

This Board letter has been reviewed by the County Executive Office, the Auditor-Controller's Office, County Counsel, the General Services Agency/Procurement Services, and IT Services. If you have any questions, please contact me at 389-9700 or Deputy Fire Chief Kevin Nestor at 389-9704.

A handwritten signature in black ink, appearing to read 'BOB ROPER', with a long horizontal line extending to the right.

BOB ROPER
Fire Chief

BR/JN: ca/bb