



NBEMS OPERATIONS PROPOSAL

Prepared for: Communications and Fleet Management Bureau, Los Angeles County Sheriff's Department

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LACDCS TECHNICAL COMMITTEE

DCS Mission

The Los Angeles County Disaster Communications Service (LACDCS) is organized to provide auxiliary communications to Los Angeles County in times of emergency. The primary mission of DCS is to support county level disaster emergency management when normal means of communications fail. A secondary mission is to provide mutual aid and augment the emergency communications needs of the cities.

Goal

Supporting the County's emergency management mission means LACDCS passing high volumes of detailed information over the auxiliary communications circuits rapidly and accurately. After a major natural or man-made disaster typical disaster management information includes city situation reports, requests for resources, damage reports, operational status of hospitals, status of injuries and triage, shelter rosters, directions to locations, etc. Transmitting such traffic by voice is slow and prone to error and is better handled over a digital platform. The Narrow Band Emergency Messaging System (NBEMS) has been identified as the LACDCS digital messaging standard. It is in use by many other emergency communications radio amateur groups and the Military Auxiliary Radio System across the country. Individual DCS stations are relying on the DCS members' private equipment and ingenuity to implement NBEMS to varying degrees at the Sheriff Stations. In addition to rectifying the deficiencies in voice communications, the DCS Technical Team has identified the goal to equip each Sheriff Station with County owned equipment to uniformly implement NBEMS operations as an integral part of the DCS installation.

NBEMS Background

NBEMS is an open-source software suite provided free of charge to radio amateurs and is infrastructure independent (i.e., it works on any computer operating system). NBEMS allows for a considerable amount of non-voice information to be transmitted and received over HF/VHF/UHF radio frequencies rapidly and accurately. The software suite integrates software modems for standard digital modes seamlessly with a forms module that produces nationally recognized standard forms in use by various disaster support agencies. The software modem we typically use is MT-63 which incorporates robust error correction techniques to ensure that messages sent and received accurately even at low signal to noise ratios prevalent with poor HF conditions.

Forms such as standard FEMA ICS, hospital ICS, Red Cross Safety & Welfare, ARRL radiograms, comma separated value spreadsheets and MARS messages are built in and can be printed, or if connected to a network, e-mailed to decision makers. Messages are automatically decoded and formatted by the recipient's computer allowing for seamless operation during times of potential chaos. FEMA states that "the use of these standardized ICS Forms is encouraged to promote consistency in the management and documentation of incidents in the spirit of NIMS, and to facilitate effective use of mutual aid".

Since the software is free, all that is needed is a modest computer hardware suite. The software is capable of encoding and decoding the messages using the computer's built-in microphone and sound card which makes it ideally suited to fulfill the needs of various emergency communications scenarios. A laptop can be used with a handheld radio in the field should that be necessary. Messages are sent and received equally well in either simplex or repeated operating environments. NBEMS operations only require a computer and a radio to function, however a dedicated sound card with hardwired radio interfaces can make the operation easier for the Sheriff Station installation. NBEMS will enable DCS to operate in a flexible, accurate, and highly capable environment all while maintaining cost-efficiency. Installations and training should be carried out through a partnership between the LACDCS Technical Committee, the District Communications Officers, and the District Training Officers.

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Solution

The LACDCS Technical Team has proposed a computer hardware suite needed to fully implement the above goals at each Sheriff's Station when used in conjunction with the existing amateur radio equipment. The table below outlines the items, quantities, unit prices and total cost assuming 26 stations are equipped. Any hardware provided from Sheriff Station resources would decrease the cost proportionally.

Description	Quantity	Unit Price	Cost
Dell Latitude E6500 15.5" Laptop - Intel Core 2 Duo 2.26 GHZ, 4GB RAM, Windows 7	26	\$218	\$5,668
SingaLink USB Audio Interface (with corresponding radio interface cable)	26	\$99	\$2,574
HP Deskjet Wireless All-In-One Printer - A9U22A#B1 H	26	\$60	\$1,560
Total			\$9,802

Other equivalent computer and printer hardware would also be acceptable.

Project Summary

The proposed equipment, in addition to our existing LACDCS amateur radios at each station, will enable

- Effective and accurate communications involving large amounts of detailed information over a non-voiced and potentially long range platform (frequency flexible).
- Standardization across the County and furthering our organization's compliance with nationwide standards.
- Saving voiced communications for those who/when it is needed the most.

Conclusion

The LACDCS Technical Committee regards the aforementioned capabilities as *highly necessary* for the preparedness and the evolution of emergency communications for the Los Angeles County Sheriff's Department. Furthermore, we believe that an investment in the systems proposed would further ensure our excellence in communications in support of the Los Angeles County Sheriff's Department and the County of Los Angeles.
