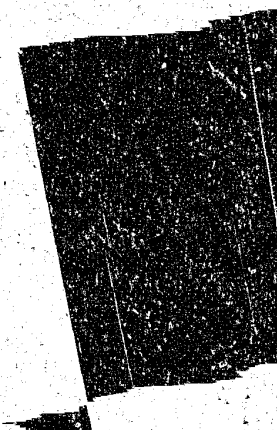


68589



NCJRS

NOV 27 1979

A REVIEW AND EVALUATION

of

ACQUISITIONS

POLICE COMMUNICATIONS

A Technical Assistance Report

Prepared for

X NEW CASTLE COUNTY

TASK NO. 7905701

Performed by

THE ASSOCIATED PUBLIC-SAFETY
COMMUNICATIONS OFFICERS, INC.

New Smyrna Beach, Florida

32069

under a grant from

THE LAW ENFORCEMENT ASSISTANCE ADMINISTRATION

ADVISOR: ALAN L. ARMITAGE

SIGNATURE: *Alan L. Armitage*

68589
Evaluation

INTRODUCTION:

Based upon a letter of request dated August 1, 1979 from the New Castle County (Delaware) Department of Public Safety and signed by Mr. Richard W. Kendall, Executive Assistant, this technical assistance project (Task No. 7905701) was assigned through the Associated Public-Safety Communications Officers, Inc. as administrator of the Law Enforcement Assistance Administration grant.

Review of the problem was accomplished through analysis of data provided with the initial request, further documents provided by the County to this advisor, an on-site visit to New Castle County, and subsequent pertinent data gathered during this on-site visit conducted on September 24 and 25, 1979.

Interviews were conducted during the on-site visit, principally with Mr. Richard W. Kendall, Executive Assistant; Major Robert Klosiewicz, Commander of the Administration Division; and Lieutenant George Freeberry, Operations Division. Additionally, meetings were held with Mr. Richard Dahl, Chief Engineer for the City of Wilmington, who serves as Assistant Frequency Coordinator for the State of Delaware, and Chief Bell of the New Castle Fire Dispatch Center.

PROBLEM STATEMENT:

The major problem, as stated in Mr. Kendall's letter of August 1, 1979, indicates the Department's recognition of a need to change their current radio system operating on the low

PROBLEM STATEMENT: (Continued)

band portion of the frequency spectrum to a higher range of the spectrum. Further, budget, frequency allocations and licensing, system concept and implementation planning are included in this letter. These areas are very well stated, and will be the principal areas addressed within this report. Other areas generally of concern within the scope of a Technical Assistance Project of this type will also be briefly addressed such as: Citizen Access, Command and Control, Interagency Communications, Information Systems, and Technical, as they apply.

PROBLEM ANALYSIS:

USE OF OTHER THAN LOW BAND FREQUENCIES:

Presently, the Department principally utilizes three (3) low band frequencies and one (1) high band frequency in the operation of their communications system. Use configuration is as follows:

39.86 MHz (F-1) -- utilized as the main dispatch frequency for all transmissions.

39.54 MHz (F-2) -- Serves for data requests and replies, specialized units, tactical enforcement unit, traffic service unit, and others.

39.70 MHz (F-3) -- Mobile-to-mobile only for field operations.

154.755 MHz -- Point-to-point network providing their participation in the State-wide system established for regional communications centers use as well as the Delaware State Communications Center in Dover, Delaware.

Initial selection for the principal use of low band frequencies was, at the time of their choosing, a most logical decision. Prior to 1967 the Department was essentially rural or semi-rural with

twenty-two (22) officers serving an area of approximately four hundred fifty (450) square miles. Obviously, low band had its advantages with minimal patrol vehicles available and extended geographical areas of coverage as a requirement. The rapid growth rate of the County, however, has resulted in a totally different set of circumstances which do now, in fact, exist in the County. Although the geography remains at approximately four hundred fifty (450) square miles, the Department has increased its manpower strength to a current of two hundred seven (207) plus a contingent of school crossing guards. Based on fiscal year 1979 figures, the vehicle allotment to the Department totalled one hundred four (104).

Further, the type of police patrol functions had also made dramatic changes as a result of growth of the area. Considerable apartment dwellings and/or high rise (10 story) complex development has ensued, several with up to one thousand (1,000) units each. These dwellings constitute the highest concentration of crime, and subsequent patrol response, demand upon the Department.

The present frequency utilization scheme as described earlier is not satisfactory. Attempting to do only initial dispatching on one (1) frequency, (F-1), has not relieved the heavy channel loading of that frequency. It often results in the stacking of calls based on priority due simply to the quantity of vehicles operating during peak periods.

A second condition, which could very well cause problems in this method of assignment utilization, is that the specialized units operating in a particular geographic area are isolated from knowing the conditions facing the regular patrol forces operating in the same

PROBLEM ANALYSIS: (Continued)

area as each type is on a different frequency. Equally so, the regular patrols have no knowledge of the in-progress activities of the specialized units. Conceivably, a regular or specialized patrol could be in a pursuit, officer in trouble, or other type of situation, and another unit in the near vicinity would have no knowledge of the situation.

Thirdly, frequently the main frequency (F-1) is overloaded and the second special unit frequency (F-2) is under-utilized from a channel loading or distribution standpoint.

These particular deficiencies could be relieved through zoning of the County patrol areas based upon work load, number of units, etc.; and requiring ALL UNITS operating within the same zone to communicate on the same frequency, except under very specific circumstances requiring special consideration.

Reallocation of units between the existing frequencies could provide relief for a part of the loading problem facing the Department. However, there are other considerations which must be included before making such a decision. The inherent characteristics of low band frequency propagation has a severe effect on the New Castle County radio system. Some of these causes or effects are:

Skip interference: This condition results from layers of the atmosphere reflecting signals from a distant transmitter back to earth. These signals can arrive from several thousands of miles away, and they can be very disruptive to a police operation. The Department utilizes a version of tone coded squelch which serves to

partially reduce these disruptive effects. The effects of skip appear on an eleven (11) year cycle, with 1980 being the high point of the current cycle. In other words, the Department can expect skip to diminish gradually over the next five (5) years and then increase again to a high in 1991.

Skip interference causes serious annoyance and fatigue factors to surface in dispatch personnel who must deal with it for a full day shift.

Hand held portable equipment: The extremely limited range of direct portable/portable, portable/mobile, and portable/base communication when using low band frequencies has yielded a minimal acceptance by the patrol forces. Consequently, portables are not used to any degree by the Department.

Early in their development stages, vehicular repeaters designed to repeat and increase portable range were evaluated on an experimental basis. Although greater coverage (portable/portable, portable/mobile, and portable/base) was realized, the reliability and maintainability of this equipment was less than satisfactory (reported by those officials interviewed). (Note: Due to the present size of the Department's system vs. their large area coverage requirement, this type of system would appear impractical when the acquisition and maintenance costs are compared with other available alternatives.)

Insufficient range of communication for patrol supervisors: The current mobile/mobile, portable/mobile (when utilized) range of communication is continually proving itself insufficient for adequate supervision by the shift supervisors of the regular patrol forces in

PROBLEM ANALYSIS: (Continued)

the performance of their assignments. Command and control by the "on street" supervisors is severely hampered due to insufficient communications range obtained from the radio equipment.

Repeater systems: (mobile relay) Several of the cited problems can be overcome through employing a repeater (mobile relay type) system. In this configuration, radio transmission from field units are repeated (or re-transmitted) automatically through the base station. As a result, any field unit signal that can reach the base can be heard by all units who hear the more powerful base station.

This could reduce the existing car-to-car communications problem and enhance the supervisor's capability to be aware of conditions in his area of concern.

The repeater system is not readily adaptable to low band frequencies. However, this technique is widely used on the VHF 150 MHz and UHF 450 MHz frequency bands. New frequencies obtained in these bands would remove most of the skip interference problems as well.

Voting receiver system: A voting receiver system using several receiver sites tied to a voter and installed in conjunction with the repeater system would significantly aid low power portable radios to reach the base station with its automatic re-transmission capability.

The use of portable radios in the Department could be increased with the voting system. In effect, the portables range is increased. Under this condition, the acceptance and utilization of the

PROBLEM ANALYSIS: (Continued)

portables by field units could be improved.

Citizen Access:

Regional Emergency Communications Center (RECOM).

Presently the Department is a participant in the RECOM Center, which is a joint effort with the State Police and serves the Department and State Police patrol jurisdictions within the County. Citizen access is achieved through a standardized seven (7) digit telephone number. Both State and County provide staff to handle calls of their specific jurisdiction.

Management of the current RECOM system is provided with sworn (supervisory) personnel on duty at all times, each representing their particular agency.

The system design of the dispatch center is of immediate past generation, utilizing manual records systems and conveyors for relaying messages from complaint takers to dispatch personnel.

Training from an outward viewpoint appears to be active in that it is known that dispatch personnel are frequently encouraged and allowed to attend seminars and other programs given within the fiscal capability of the Department. In-service training within the Department and user (patrol) training was not evaluated within the scope of this project.

Concerning citizen access, two (2) points were raised: System Design - The County is about to embark upon a 911 system for citizen access, which will include total computer aided dispatch in two (2) stage process, i.e., complaint takers and dispatchers. It was not

PROBLEM ANALYSIS: (Continued)

evident in the preliminary plans reviewed for implementation of an adequate back-up capability of the CAD system. Of principal concern, however, was the management structure, in that it is proposed to have two (2) separate "dispatch" organizations (fire and police), each with their own management structure, and thirdly, to employ a Communications Center Manager whose duties are depicted in an attachment to this report.

It is not intended to dispute the chosen organizational table of this new venture of the County; however, a clearly defined up/down management structure was not evident in that the communications center manager will have responsibilities for the physical facility and equipments as well as the "call takers". However, once the call leaves the call takers and is passed to the dispatcher (fire or police), it then is under the jurisdiction of the supervisor for the particular service. A re-review of this structure is suggested (only).

Command and Control:

Reference to questions pertaining to this subject are covered in the preceding paragraph.

Interagency Communications:

Frequencies: With the present utilization of low band frequencies, interagency communication is severely hampered. No communication is provided with State Police helicopters and little communication with neighboring jurisdictions, except on a cross-monitoring basis. Little or no coordination is provided on an interstate (New Castle

PROBLEM ANALYSIS: (Continued)

County to New Jersey, Pennsylvania or Maryland) basis, also due to New Castle's utilizing low band frequencies.

Presently, New Jersey and Pennsylvania are actively involved in the implementation of systems which will employ the Nationwide Police Emergency Frequency, 155.475 MHz. Further, some plans include a Statewide Emergency Police Frequency. Delaware is also in the process of developing this Statewide system. Installed in thirty-eight (38) of the one hundred four (104) Department patrol vehicles are "high band" mobile radios which have a four (4) frequency capability. Two (2) of these frequencies are currently utilized. They are:

154.860 MHz - Intended as a dispatch frequency (State-wide system)

154.770 MHz - Designated for mobile/mobile use (Statewide system)

With approximately one-third (1/3) of the Department's fleet equipped already with high band radios, and each with a remaining two (2) channel availability capability, further pursual of high band utilization to eliminate problems previously enumerated in this report must be considered.

Frequency availability: During the Atlantic Chapter APCO meeting held October 16-18, 1979, brief individual meetings were held by this advisor with Mr. Russell Lee, Frequency Coordinator for the State of Delaware, and Messrs. James Barsuglia and Norman Coltri, Frequency Coordinators for the State of New Jersey, concerning availability of frequencies for New Castle County. All were in agreement with the recommendations which will be stated further in this report,

PROBLEM ANALYSIS: (Continued)

and were of the opinion that through cooperative effort of the frequency coordinators, suggested high band frequencies could be available, particularly on a co-channel shared basis with systems of neighboring States.

Several frequencies were discussed as possibilities; however, final formal clearance is pending due process.

Information Systems:

The Department, when moving to the new combined dispatch facility in the police building, will also be adding a computer aided dispatch system. This system was not evaluated within the scope of this project and therefore cannot be further commented upon.

Technical:

Most of the mobile equipment utilized by the Department is currently less than ten (10) years old. Life expectancy for current generation equipment is heavily dependent upon the quality of maintenance which is provided and this was not evaluated within this project subject to the recommendations which will follow.

CONCLUSIONS:

▶ Continued use of low band frequencies is a definite detriment to the efficiencies of the Department. Frequent two (2) car response is required in situations where they may very well be handled by one (1) man patrol unit. This is due to the lack of portable

CONCLUSIONS: (Continued)

communications, which serve to insure the safety of one man units out of their vehicle. The costs of a two (2) unit response for backup should be considered against the costs of portable units, where the situations are comparable.

► The safety of the street force is jeopardized. A man away from his vehicle is out of communication due to the lack of hand held portable radio equipment. He is exposed to greater threat of personal injury.

► Current skip interference is "harmful". It disrupts the radio operation and causes excessive fatigue. It poses a continued threat to the safety of all personnel by blocking local Department transmission.

► Hand held portable equipment should be implemented within the system. In addition to the advantage expressed above, the Department is better able to deploy its personnel (on foot patrol when necessary).

► Communication range will be greatly improved in ALL ASPECTS with the implementation of the repeater concept of communication. A voting receiver system will be necessary for supporting portable radios.

► Interagency, particularly interstate, communication can be greatly improved through the utilization of high band frequencies, as the neighboring States are planning and implementing their Statewide law enforcement common channels.

CONCLUSIONS: (Continued)

► Zoning of the channels utilized within the Department is a must for more efficient radio traffic loading.

► High band would be the most practical and logical choice of a frequency band. Interagency/interstate coordination can be enhanced. The use of existing high band equipment when additional frequency capability is available will reduce the overall cost. Based on current channel loading and that which can be expected through addition of portable hand held units, a minimum of two (2) repeater pairs of frequencies are clearly justified.

► Close spaced frequencies for repeater operation will be required to insure compatibility with existing State of Delaware plans and those of the adjoining States.

RECOMMENDATIONS:

1. Implement a minimum of two (2) VHF high band repeater systems. Used in conjunction with the two (State) frequencies, this should provide for significantly improved near term operations. Consideration should be given to obtaining a third repeater pair to provide for long term system expansion. Department growth projections keyed to the FCC fifty (50) units per channel standard would yield an appropriate time for expansion.
2. Proceed at once to contact appropriate frequency coordinators to determine availability of frequencies compatible with conclusions drawn above.
3. Zone the County so that all units operating within a particular zone are communicating on the same repeater frequency.
4. Implement an expanded use of hand held portable equipment and associated voting receivers.

COMMUNICATIONS CENTER MANAGER

General Statement of Duties: This is supervisory work in maintaining a County-wide "911" emergency answering service and requires coordination with the dispatch operations of New Castle County fire, ambulance, and police; Wilmington fire and police, Newark Police, and Delaware State Police.

Distinguishing Features of the Class: The work in the class involves supervision of and responsibility for telephone answering service (call-taking). The employee supervises the work performed by the call-takers and participates in the operation of the answering service when necessary. He/she must exercise independent judgment in daily operations of the answering service and related duties and is responsible to an Executive Board (consisting of representatives from each participating government) and the Director of Public Safety.

Examples of Work:

Assigns call-takers to work stations.

Schedules call-takers.

Receives complaints concerning telephone service from participating agencies and the public.

Contacts the telephone, computer, radio and other service companies to request correction of technical difficulties.

Relieves on call-taking board when necessary.

Maintains an accurate record on all call-takers.

Prepares reports on the calls received.

Assists participating agencies in developing operating procedures.

Is available for all emergency needs.

Prepares annual budget.

Maintains an accurate accounting of the financial operations of the Center.

Prepares all necessary reports requested by the Director of Public Safety and the Executive Board.

COMMUNICATIONS CENTER MANAGER

Required Knowledges, Skills and Abilities: Good knowledge of the operation of an answering service; thorough knowledge of the geography, streets, roads and highway system of the County; ability to operate a complicated answering service under stress; ability to assign and supervise the staff of call-takers; ability to determine inadequacy of manpower and equipment, and to take corrective measures; courtesy and tact in dealing with others; good physical condition.

END