PORTLAND POLICE COMMUNICATIONS SUBPROJECT

Final Evaluation Report
Subproject Description and Outcome Assessment

Prepared by the
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Robert D. Houser
Administrator

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This report was prepared by:

Norman Inskeep Researcher
Impact Evaluation Unit

Clinton Goff, Ph.D.
Impact Evaluation Unit Coordinator

L.W. "Bud" Mallett
Deputy Administrator

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PORTLAND POLICE COMMUNICATIONS SUBPROJECT

Errata

Summary, point 2:

Contents of the second parentheses should read:

"from 235 to 240 seconds equals 2.1 percent"

Page 2, bottom paragraph:

The FADS system does not print out hourly summaries. Rather, running counts are recorded by hand hourly.

Page 5, middle paragraph, lines 8 through 10:

Contents of the parentheses should read:

(Sixty percent of the calls into Emergency Communications do not result in dispatch. A portion of these are inappropriate calls or duplicate calls arising from the same emergency situation. A large proportion are situations for which a car might have been dispatched but instead were handled over the phone avoiding the necessity of dispatch.)

Page 5, bottom paragraph:

"Dial-to-dispatch time" for MCDPS has increased by only about 5 seconds from 235 to 240. Previous "connection time" was closerto 15 seconds on the average than 5 seconds which was the minimum.

Page 6:

Table and graph values for MCDPS "connection time" should be adjusted correspondingly.

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Summary

The purposes of this report are: (1) to describe Phase I of comprehensive changes in the communications operations of the Portland Police Bureau (PPB) and the Multnomah County Department of Public Safety (MCDPS), (2) to assess major changes in ongoing costs and quality of service associated with Phase I changes, and (3) to project other impacts which could not be quantified for various reasons.

In general, the report concludes:

1. Combined yearly ongoing costs for PPB and MCDPS communications services (excluding maintenance) are projected to increase 10 percent when inflation is taken into consideration.

2. The elapsed time from initiation by telephone of emergency priority request for service until a response unit is on its way has been reduced slightly (from 185 to 175 seconds equals 5.4 percent) for points of origin within the PPB jurisdiction and has increased slightly (from 225 to 240 seconds equals 6.7 percent) for points of origin within the MCDPS jurisdiction.

3. The entire Phase I development cost may be justifiable solely by the improved service provided to the PPB by a new radio system which features more channels and a full complement of personal portable (handset) radios.

4. The major problem currently effecting system performance is the loss of prescreening by switchboard operators which has resulted in the necessity of handling inappropriate calls by emergency communications operators. This problem may be alleviated through public information and additional personnel.

PORTLAND POLICE COMMUNICATIONS SUBPROJECT

DESCRIPTION

Overview

The three-year, five million dollar Portland Police High Impact Project (73-DF-10-0105) was divided at the outset into the Police Strike Force Subproject and the Police Communications Subproject for administrative purposes. The Police Strike Force Subproject will continue to be the subject of separate reports.

The 1.8 million dollar direct cost Communications Subproject is the major component of Phase I of three phases of comprehensive change in the communication operations of both the Portland Police Bureau (PPB) and the Multnomah County Department of Public Safety (MCDPS). The subproject has provided: (1) site preparation for co-location of the personnel of the two communication operations, (2) a single telephone interface between the public and the two radio communication operations, (3) a replacement radio system for the PPB which features more channels, improved propagation, and a full complement of personal portables, (4) phone and radio monitoring equipment useful to both the PPB and MCDPS, and (5) complete functional specifications for Phase II communications changes--fully consolidated, computer-assisted dispatch. The subproject is coincident with the gradual replacement of sworn personnel by civilians.

Co-location in an Interim Facility

Prior to late November, 1974, PPB service request telephone call reception and dispatching were conducted in a room within the main headquaters building in downtown Portland, while MCDPS request reception and dispatching were conducted in a room on the top floor of the Multnomah County Courthouse, also in downtown Portland. In November, 1974, both operations moved into subproject-funded, remodeled interim facilities (previously a bomb shelter) near the summit of Kelley Butte, just east of Portland city limits. Later, when Phase II of communication changes is completed, phone reception and dispatching will be conducted in a larger room within the Kelley Butte site.

Consolidated Telephone Interface

In December, 1974, the new consolidated telephone interface system between the public and dispatchers began operation for both PPB and MCDPS. Previously, requests for PPB officer service were routed electronically to the Bureau's central switchboard where operators would forward appropriate calls to the dispatch room communications operators via one of four or five lines. At each communications operator's position was a phone which could receive any of the four or five lines. One line was reserved for "hot" or real emergency situations such as a robbery in progress. The MCDPS dispatch room could be called directly using a listed emergency number.

In the new consolidated telephone interface system the joint dispatch facility can be called directly using a common emergency number for both city and county points of origin. Calls are directed automatically on a rotating basis to one of eight receipt positions by an automatic call distributer (ACD). If no communications operator answers within 20 seconds a recorded message is automatically played informing the caller that all operators are temporarily busy and asking the caller to hold until an operator becomes available.

Once determination is made by a communications operator that a response unit should be dispatched, and adequate information has been obtained from the caller, this information must be forwarded to the dispatcher. In the old PPB operation information was written on a card (dispatch ticket) which was then placed on the conveyor belt which carried the card to the dispatcher. In the previous MCDPS operation the communications officer would fill out a dispatch card, but in many cases would perform the dispatching or could hand the card directly to the dispatcher with or without expeditious verbal communication. In the present consolidated system the process for getting the necessary information to the appropriate dispatcher is similar to the old PPB operation, except that the card must be placed in the correct groove on the conveyor, either the one routed to the PPB dispatchers or the one routed to the MCDPS dispatchers.

Monitoring Equipment

Previously, both the PPB and the MCDPS made tape recordings of their radio channels for use in preparation of cases, training, and investigation of complaints about services of the communications operation made by citizens or field units. MCDPS also taped phone lines coming into the dispatcher positions. The tapes were of poor sound quality and clock time was not indicated on the tapes. In the current interim set-up all eight lines to the communications operator positions, all radio channels (4 for PPB, 2 for MCDPS), and a time marker (date, hour, minute, and second) are simultaneously recorded. Sound quality is good and any three recording tracks can be played back at one time beginning at any selected second.

Live radio channel monitors were available in the old set-ups just as in the new, but the new set-up also has live monitoring capability for all phone lines that pass through the ACD. A "gray box" is also tied into the ACD which continuously tallies such things as number of calls directed to each of the eight lines, the number of times the recorded "please hold" message is automatically played, the number of callers who don't hold and other tallies. Also in April, 1975, a FADS system was installed which at regular 100-second intervals automatically checks the status of the eight ACD phone lines and each hour prints out summary data from which useful performance statistics can be derived. The statistics include average elapsed time until calls are answered, average elapsed time of conversation between caller and communications operator, and average time from caller hang-up until the operator is again available for a call.

New PPB Radio System

In November, 1974, the PPB began utilizing four channels of transmission and receiving equipment including new base stations, voting receivers, 220 vehicle radios, and 233 personal portables. Use can eventually be expanded to eight channels on this equipment. Currently two channels carry the status and dispatch functions like the old two-channel system did, while one new channel is utilized for record inquiries and the other is utilized for administrative and training purposes as well as occasional special operations. Previously only a few personal portables with weak propagation and receipt characteristics were available for sporadic use by PPB personnel. The new full complement of personal portables provides better than satisfactory service throughout the city and in most inside locations.

IMPACTS

Ongoing Dollar Costs

Before impacts on the quality of service provided to PPB and MCDPS by the altered communications operations are assessed some of the identifiable changes in combined ongoing costs for PPB and MCDPS communications service before and after Phase I are presented. Fiscal year 74-75 straddled much of the transitional period and was atypical, including such costs as $130,000 of overtime compared to about $40,000 in FY 73-74 and FY 75-76. Thus comparison of estimated costs for FY 73-74 and FY 75-76 is more appropriate. Estimated ongoing costs included are:

	1973-74	1975-76
Personnel	$1,032,000	$1,422,000
Operating	121,000	139,000
Maintenance	unknown	93,000

Personnel expenditure estimates include full-time and part-time employees, overtime, fringe, and premium (night shift differential). Personnel expenditures are expected to increase in two years by 38 percent. When inflation is taken into account (about 23 percent in two years) the real increase in personnel costs is estimated at 12 percent.

Operating costs, largely phone line and equipment rental or lease costs are estimated to increase by 14 percent, in reality a 7 percent decrease when inflation is taken into account.

Unfortunately, identification of 1973-74 maintenance costs would be a monumental task due to previous accounting procedures for Portland and Multnomah County. This is especially disappointing because excessive maintenance cost was listed as an important consideration as justification for communications system overhaul. The 1975-76 figure is presented mainly for purposes of perspective.

Especially with regard to personnel costs, Phase I changes through 75-76 are not expected to alleviate increasing personnel cost. However, civilianization (the replacement of relatively expensive sworn personnel, by relatively less expensive civilians) and simplification of the supervisory organization in late calendar 1976 is planned to at least slow down the increase in personnel costs while maintaining or increasing the level of service.

Consolidated Telephone Interface

A crucial performance indicator for any emergency communications system is the "dial-to-dispatch time" - the elapsed time from initiation by telephone of an emergency request for service until a response unit is on its way. "Dial-to-dispatch time" characteristically has three primary consecutive components: (1) "connection time" - the elapsed time from dialing until the person who can help (communications operator) is contacted; (2) "dispatch information preparation time" - the elapsed

time for the communications operator to elicit necessary information from the caller, retrieve other necessary information such as response district number from reference materials, transcribe the information into or onto the appropriate medium, and route the information to the dispatcher; and (3) "dispatch time" - the elapsed time for the dispatcher to comprehend the dispatch information, select an appropriate, available, and accessible response unit, wait for airspace, contact the unit, and transmit the dispatch message.

The following findings with regard to components of dial-to-dispatch time are based on analysis of 100 test calls performed during the last month of the old operations (November, 1974) and a "stopwatch" survey made during 14 days in June, 1975. Some of the increases or decreases were arrived at logically based on typical delays encountered and the relative frequency of such delays. Table 1 and Figure 1 illustrate the findings.

"Dial-to-dispatch time" for emergency priority calls for PPB service (e.g. robbery in progress, etc.) has been reduced by Phase I changes by about 10 seconds, from an estimated 185 seconds to an estimated 175 seconds. Average "connection time" has been reduced from 25 seconds to 15 seconds, "dispatch information preparation time" has increased by about 5 seconds, and average "dispatch time" has decreased by about 5 seconds.

The drop in "connection time" has been due to the following combined effects: (1) direct dialing to the communications operators without handling by switchboard operators saves an average of 15 seconds; (2) telephone interface consolidation has eliminated the occasional need to transfer requests for service by city residents near jurisdictional boundaries who incorrectly called the MCDPS, saving a few seconds of the average for all calls; and (3) loss of prescreening by switchboard operators has resulted in a greater volume of calls into Emergency Communications (60 percent of the calls into Emergency Communications are inappropriate calls or duplicate calls arising from the same emergency situation) causing a back-up of incoming calls during periods when all manned receipt positions are busy. The latter problem has increased the average time until a call is answered by about 10 seconds. Average "dispatch information preparation time" has increased a few seconds to about 90 seconds due mainly to increased time to retrieve the appropriate response district number caused by an increased size of the service area of the consolidated emergency communications. Average "dispatch time" has declined a few seconds to 70 seconds due mainly to slightly improved access to response units resulting from improved propagation and personal portable handsets.

"Dial-to-dispatch time" for emergency priority calls for MCDPS service has increased by about 15 seconds from an estimated 225 seconds to an estimated 240 seconds. Under the previous MCDPS communications system "connection time" averaged about 5 seconds (direct dial), "dispatch information preparation time" averaged an estimated 85 seconds (most for eliciting necessary information from the caller) and "dispatch time" averaged about 135 seconds. Consolidation has forced the MCDPS to a performance level equivalent to the PPB for "connection time" (15 seconds) and "dispatch information preparation time" (90 seconds). Thus completion of these two consecutive components of dial-to-dispatch time" has increased by an estimated 15 seconds, up from 90 seconds to 105 seconds. Average "dispatch time" has been unaffected by the consolidation. However, subsequent to

TABLE 1

DIAL-TO-DISPATCH TIME FOR EMERGENCY PRIORITY
REQUESTS FOR LAW ENFORCEMENT SERVICES BY JURISDICTION
OF POINT OF ORIGIN OF REQUEST

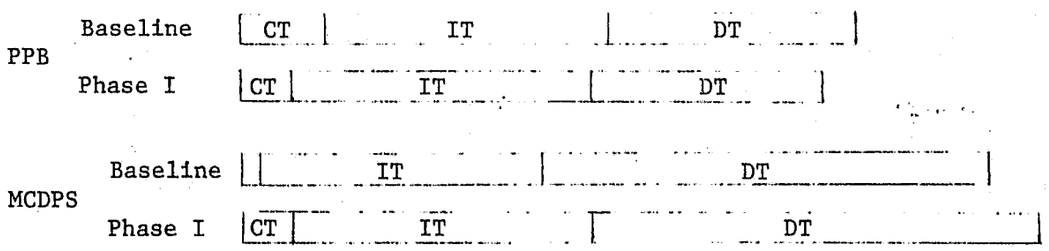
(In Seconds)

Jurisdiction	Period	Connection Time	Dispatch Info Prep Time	Dispatch Time	Total: Dial-to-Dispatch
PPB	Baseline	25	85	75	185
	Phase I	15	90	70	175
MCDPS	Baseline	5	85	135	225
	Phase I	15	90	135	240

FIGURE 1

GRAPHIC ILLUSTRATION OF TABLE 1

Key: Connection Time = CT Info Prep Time = IT Dispatch Time = DT



Phase I consolidation MCDPS service request handling procedures have been drastically altered by a switch to team policing. The relevant effect here is on dispatch time, in that the decisions on response "who" and "what" have been passed from the communications center to field commanders. Thus "dispatch time" at the center has dropped considerably, to an estimated 30 to 40 seconds.

Monitoring Equipment

New and enhanced monitoring, recording, and playback equipment are providing moderately important new capabilities for both PPB and MCDPS. Potential effects of course depend on the use of the capabilities. Training and evaluation of communications operators (including dispatchers) can be largely improved through use of the recording/playback capability and live radio and telephone line monitors. Such training and evaluation plays a crucial role in maintaining or improving minimum "dispatch information preparation time" and "dispatch time" while maintaining minimum errors. Also, minimizing "dispatch information preparation time" helps minimize "connection time" by freeing up communications operators for handling additional calls sooner.

The recording/playback capabilities provide for improved support of the overall law enforcement function by reducing the amount of time and effort to retrieve elements for case preparation, thus providing a significant amount of patrolman or detective manhours for other functions. The recording/playback capability also provides for quick, definitive investigation of complaints about communications services originated by field units or complaints about law enforcement response to service demands originated by citizens.

The "grey box" and "FADS" equipment provides emergency communications service management information useful to identification of system weaknesses and development of optimal operating procedures. For example, the proportion of incoming calls answered by the recorded message has been increasing every month since switchover to the new system. This information is prompting efforts to curb the number of inappropriate calls through public information, and has precipitated standard procedures for handling such calls in the most expeditious manner possible.

New PPB Radio System

Certainly the most important change brought by the Phase I Police Communications Subproject for PPB has been the new radio system featuring greatly improved propagation reliability, an increase in channels from two to four, and a full complement of personal portable radios (handsets).

Dedication of one channel for checks into computerized warrants, stolen property, operators license and vehicle registration records via terminals at the Emergency Communications Center and dedication of a second channel for administrative use has made available much airspace on the two status/dispatch channels for coordination and supervision of field activities.

Field officers greatly appreciate not needing to "wait-in-line" to request help or update their status. Also record checks themselves have shot up by 33 percent since system switchover. Warrant checks increased from 150 per day to 200 per day according to the Oregon Law Enforcement Data System monthly printouts.

Equally large and important have been the effects provided by the full complement of handsets. Field officers feel safer for having them, and appreciate not being "tied" to their cars. The commanders of Strike Force Operations have indicated that the handsets have provided greater tactical flexibility especially with regard to covert surveillance operations. The Planning and Research Division informed the author that a new radio code for officer status indicating "walk and talk" was created, reflecting increasing actualization of the potential for greater face-to-face contact with the public. As mentioned earlier "dispatch time" has probably been partially held down due to greater access to field units afforded by deployment of handsets. Although not documented by empirical data, it is logical to expect that crime hazard checks such as for building security will increase in quantity and quality due to increased safety and mobility provided by handsets.

END

7 additional