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LAW ENFORCEMENT ASSISTANCE ADMINISTRATION  
POLICE TECHNICAL ASSISTANCE REPORT

SUBJECT: Montgomery, Alabama; Equipment Performance  
Specification Development

REPORT NUMBER: 76-18

FOR: Alabama Law Enforcement Planning Agency

NCJRS

JUN 12 1980

ACQUISITION

CONTRACTOR: Westinghouse Justice Institute

CONSULTANTS: Richard C. Banta  
Edward J. Mueller

CONTRACT NUMBER: J-LEAA-003-76

DATE: April 12, 1974

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## FOREWORD

The Alabama Law Enforcement Planning Agency (ALEPA) requested technical assistance in following up on the earlier evaluation of inadequacies in the present Montgomery, Alabama, Police Communications system. Additionally, ALEPA requested technical assistance in the preparation of procurement specifications to be used by law enforcement agencies throughout the State in purchasing communications equipment.

State Planning Agency: Alabama Law Enforcement Planning Agency;  
Mr. Robert G. Davis, Director;  
Mr. William Yates, Communications Specialist

Approving Agency: LEAA, Region IV (Atlanta);  
Mr. Donald A. Manson, System Specialist

## 1. INTRODUCTION

The Alabama Law Enforcement Planning Agency (ALEPA) desires to ensure that adequate and cost-effective law enforcement communications are being achieved by all law enforcement agencies and requested that the "in state" communications expertise be complemented by engineering assistance through the National Police Technical Assistance Program. To accomplish this, technical assistance was previously requested to investigate the "dead spots" and interstate interference that is being experienced by the Montgomery Police Department, to evaluate the existing communications system, and to provide recommendations for improvement. This assistance was rendered in December 1975 and resulted in a Final Report<sup>1</sup> which suggested ten potential changes/actions that could provide the necessary system improvements. The report was distributed on February 6, 1976, after technical review by Mr. Manson, Systems Specialist, LEAA Region IV; ALEPA; and the Westinghouse Police Technical Assistance Program Manager. On March 3, 1976, the Consultant on that assignment was given a letter prepared by Mr. Robert Champion, City of Montgomery Communications Engineer, commenting on the report.

Because of questions brought up by Mr. Champion and perhaps others concerning the trade-offs between improving the old VHF (very-high-frequency) system or replacing it with an up-to-date UHF (ultra-high-frequency) system, additional technical assistance was requested to discuss the recommendations in the report in more depth. Also, one of the recommendations made in the report dealt with the need to review all future communications equipment purchase specifications to ensure that the desired performance requirements are being presented to the candidate equipment suppliers. Additional assistance was requested to help develop performance specifications. This report contains the result of the additional technical assistance effort.

During the course of performing the technical assistance assignment reported herein, the consultants met with the following individuals:

- Mr. Robert G. Davis, Director ALEPA.
- Mr. William Yates, ALEPA Communications Specialist.
- Mr. Robert Champion, City of Montgomery, Communications Supervisor.

In addition, one of the consultant (Mr. Banta) discussed the problems with Lt. C. E. Pyle, Communications Technical Advisory Committee (CTAC).

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<sup>1</sup>"Communication System Problem Investigation, Montgomery, Alabama" Final Report prepared by Westinghouse Justice Institute under Contract J-LEAA-003-76, January 1976.

## 2. UNDERSTANDING OF THE PROBLEM

The Alabama Law Enforcement Planning Agency (ALEPA) requested the additional technical assistance to cover the two task areas stated below:

- To meet with representatives of the City of Montgomery to discuss in more depth the recommendation contained in the Final Report on the previous technical assistance assignment.
- To assist in developing performance specifications to be used as guidelines by purchasing entities within the State.

The first task derives from the desire to determine the most cost-effective course of action regarding trade-offs between making improvements in the existing VHF system, which contains a significant amount of obsolete equipment, and replacing the system with an up-to-date UHF system operating in a repeater mode.

In the second task, the Consultants were asked to review a set of guideline specifications prepared by CTAC for ALEPA and a number of letters containing specifications already used by local purchasing entities within the State. It became evident from this review that much difficulty was being experienced with requested frequency assignments that were incorrect or unusable. As a result, two additional subtasks were undertaken by the consultants.

- Prepare a draft specification for a Frequency Allocation Plan for the State of Alabama.
- Recommend a structure for approval of frequencies within the framework of existing organizations within the State.

### 5. ANALYSIS OF THE PROBLEM

#### 3.1. City of Montgomery Police Communications

It has been established by both in-State expertise and during an earlier technical assistance effort (December 1975) that the Montgomery Police Department presently has a communications system design that does not permit reliable car-to-car coverage within the police jurisdiction. Moreover, the system displays several types of interference problems. The final report for the December 1975 technical assistance assignment contained several suggestions that offered potential improvement for the conditions that exist. These suggestions were supported by a technical rationale and analysis of the system details. The report suggestions covered the entire range of system improvements and were made knowing that perhaps some of the suggestions had already been explored by the in-State expertise.

On March 3, 1976, a meeting was held at ALEPA to discuss the suggested actions/changes with the City of Montgomery Communications Supervisor. At the meeting on January 26, 1976, letter comments on previous technical assistance efforts made by the City of Montgomery Communications Supervisor was presented to the Consultant on that assignment. Appendix A contains a copy of this letter. Each suggestion made was then discussed, expanding upon the expected results and in view of experiments that had already been tried. Since detailed accounts of previous efforts to correct the Montgomery problems were not presented at this meeting, the Consultant suggested that the technical/cost trade-offs be documented to establish the most feasible course of action. This would serve as a justification for making a change perhaps to a new UHF system.

At this time, the scope of the previous technical assistance was stated again showing that the objective of the short-term assistance was for the Consultant to participate as a team member in reviewing the interference problems that Montgomery was experiencing. It was the Consultant's understanding that a detailed equipment inventory (showing age, equipment condition, etc.) was not to be performed by the Consultant as it was felt this information was already available by those professionals who were closer to the system. The Consultant again pointed out the necessity to establish a cost trade-off analysis to support the course of action to be followed. Budget type estimates and the cost elements comprising these estimates were briefly discussed.

#### 3.2 Procurement Specifications

The Consultants on the present assignment were asked to review and comment on a number of documents containing procurement specifications. These documents fell into two general categories: (a) Letters from vendors containing copies of specifications already used in procurement proceedings by various local purchasing entities, and (b) a series of basic specifications prepared by CTAC for ALEPA to be used as guides (only) in determining the basic equipment needs by purchasing entities. The following comments pertain to these specifications.

(1) All of the specifications required the purchasing entity to identify vendor model numbers and to specify transmitter powers. In some situations where a thorough and complete system design has been carried out, this type of detail ensures that the buyer will get the products desired. However, in general this practice can have undesirable effects. First, it can tend to reduce competition and reduce the likelihood that reliable equipment will be obtained at low cost. Second, it places upon each purchasing entity the burden of keeping up to date with all of the vendors' model numbers and variations. And, third, it removes system responsibility from the suppliers. It is better practice to define the essential system performance requirements (such as points of communications, coverage areas, antenna heights, signal quality and reliability, etc.) and allow the suppliers to decide for themselves the power requirements and models that can best do the job. In other words, the specifications should be written so as to place the system performance responsibility on the supplier. This will require the specification to also include the criteria by which the performance will be evaluated and accepted by the procuring agency.

(2) The specifications appear to require all mobile units to employ 110-watt or larger transmitters. This may not be a requirement for all procuring agencies, especially those in small towns with small coverage areas. In fact, this could be in violation of Federal Communications Commission (FCC) Rules and Regulations, Part 89 (Paragraph 89.111) which requires that:

"The power which may be used by a station in these services shall be no more than the minimum required for satisfactory technical operation commensurate with the size of the area to be served and local conditions which affect radio transmission and reception."

Purchasing equipments with powers higher than technically necessary will also adversely affect budgetary constraints.

As stated in (1) above, it would be more desirable to define the requirements in such a manner that the system responsibility for satisfactory performance is placed upon the vendor and to let him choose the power, subject of course to approval by the communications engineering expertise available to the procuring agency.



- (3) All specifications in the basic (guideline) document required the vendor to bid his "top-of-the-line" equipment. Many nontop-of-the-line equipments have excellent performance and reliability records and are available at lower cost. This requirement appears to be too restrictive and reduces flexibility in system design. If the approach to the specifications were changed to place the system performance responsibility on the vendor, as discussed in (1) and (2) above, it would not be necessary to invoke such a clause in an attempt to obtain high-quality products.
- (4) The requirement for the mobile receivers to have 10 watts or more audio power output is in the same category as the requirement for transmitter RF (radio frequency) power output. It would be more desirable to specify the system performance requirements for distance, coverage, and environmental noise relative to the activity of the police officer and again let the supplier choose the most effective power and loudspeaker combination.
- (5) The specifications should include a statement covering the performance criteria by which the system will be evaluated and accepted by the procuring entity.
- (6) The specifications should include the life-cycle and reliability requirements for the equipment.
- (7) In some cases, it would be desirable to identify standardization requirements (i.e., which component parts are to be standardized and which are to be interchangeable). This is especially important when future expansion of the system is anticipated.
- (8) The environmental conditions and the corresponding electrical characteristics should be specified.
- (9) Guarantee and warranty requirements should be delineated.
- (10) The delivery dates required and any necessary penalty clauses should be included in either the specification or the letter of transmittal.

### 3.3 Frequency Allocations Plan

Several letters from vendors regarding equipment procurements for various county and city police departments within the State were reviewed. In each of the letters, incorrect or unusable frequencies were ordered and, in some cases, the errors were not detected until such a time that additional costs were incurred to correct the errors. In the Lamar County case,

the system was installed only to find "... an awful lot of interference" which required filing for a new FCC license. This newly requested frequency was denied by the FCC, because of a further potential interference situation.

These incidents, combined with the increase in interference problems like those experienced by the City of Montgomery, have made it apparent that a statewide Frequency Allocation Plan is now required. This need was recognized in the Alabama Law Enforcement Communications System Master Plan, and the need to coordinate all frequency allocations within the State Government was recognized in Executive Order 48, signed by Governor Wallace early in 1974.

As a subtask related to the review of the specifications, the Consultants agreed to supply a draft of an RFP for the development of a Frequency Allocation Plan for the Police Radio Service. This draft is contained in Appendix B to this report.

### 3.4 Structure for Approval of Frequencies

Based on the discussions that took place at ALEPA, the Consultants were requested to outline a procedure that would improve frequency coordination. There are several methods by which this can be accomplished and one is suggested herein. Since others are also feasible, this procedure should be used for guidance in developing a workable approach that will achieve the support of the several individuals/agencies involved.

Figure 3-1 suggests an eight-step sequence of events that could offer improved frequency coordination within the State of Alabama. The sequence begins (Step 1) with a suggested change to an existing communications system or a suggestion to provide a new communications system. These suggestions may come from many sources, including the several vendors and their representatives who meet and work with the various users.

As the vendor and the user agency establish the detailed requirements for the change (Step 2), some informal guidance may also be sought by the users from several State individuals who are knowledgeable in communications. It is at this point that a request for frequency coordination should be made to the State frequency coordinator (Step 3). A candidate frequency selection and the supporting rationale for the recommendation is then established by the frequency coordinator (Step 4). Perhaps simultaneously with this effort, the cognizant individuals could be writing up a Preliminary Request for Police Communications Equipment (Step 5). This request would be similar to the one that is currently being used. A formal request for use of a frequency is then made to CTAC (Step 6). This group reviews all of the detailed information surrounding the request and may have participation from the equipment suppliers and all agencies who are involved with the recommendation. At this meeting, a decision is made to approve or reject the recommended frequencies. This is based on a detailed review of the recommendation considering both the FCC Rules and Regulations and the overall impact and compliance with the State plan. Technical and jurisdictional inputs are fundamental to this decision. If

the recommendation is rejected (Step 7), the request then goes back to the originator who redefines the requirements. If the recommendation is approved (Step 8), a license application is made to the FCC and the Procurement Specifications are prepared for the equipment.

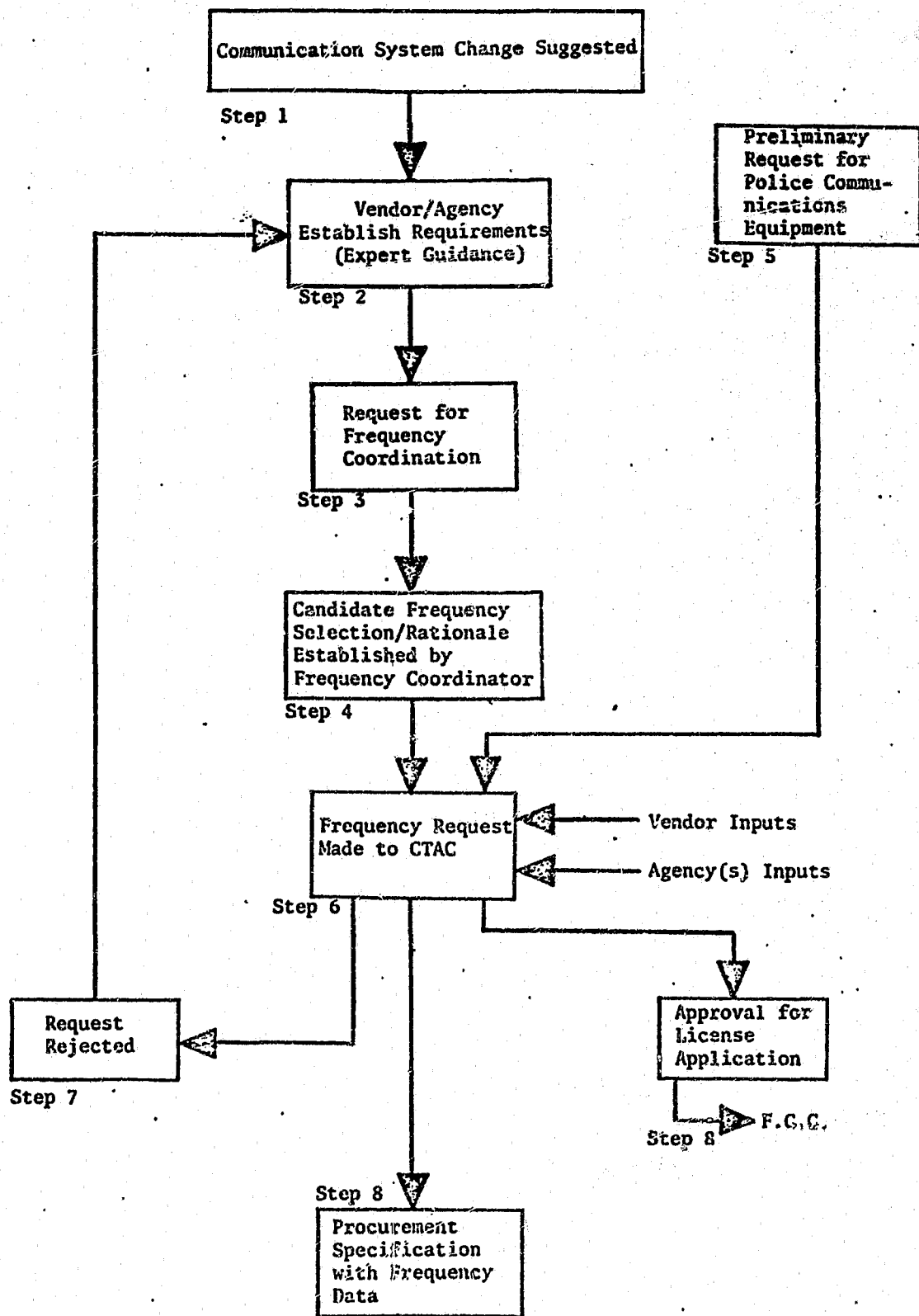


Figure 3-1. Procedure for Frequency Coordination/Approval

#### 4. FINDINGS AND CONCLUSIONS

(a) The findings, conclusions, and recommendations regarding the problems confronting the City of Montgomery Police communications system that were documented in the previous technical assistance report remain unaltered as a result of the in-depth discussions with representatives of the City of Montgomery. However, quantitative data on the high percentage of obsolete equipment, introduced in this new technical assistance assignment, more strongly supports one of the Consultant's alternative suggestions (i.e., "Replace the existing system with an up-to-date UHF system operating in a mobile repeater mode").

- The previous technical assistance assignment was tasked to investigate the problems of car-to-car coverage and interference. Although the advanced age of the existing equipment was noted in the Consultant's report [Findings and Conclusions (b) on page 4-1], the degree of obsolescence was not assessed in detail. Quantitative data were furnished by the Supervisor of Communications of the City of Montgomery during this assignment that suggested that a large percentage of equipment would be phased out in the near future. If the cost of replacing this equipment were instead directed toward a new UHF system, this alternative long-range solution would become more cost-effective.

(b) A complete detailed assessment of all of the possible alternatives should be made to ensure that the most cost-effective course of action can be established for resolution of the problems confronting the City of Montgomery Police Communications system.

- There are a number of possible changes or actions that could be implemented to improve the situation that exists. Several suggested changes are described in the Final Report on the previous assignment. Among these is the replacement of the existing system with an up-to-date UHF repeater-mode configuration. However, this action represents a large financial investment and does not fully guarantee that problems similar to those currently being experienced will not re-occur. Therefore, it will be necessary to justify the new system on the basis that none of the other alternatives are so cost-effective. This can best be accomplished by a thorough and detailed assessment of the cost/time relationships of all of the alternatives.

(c) The procurement specifications reviewed by the Consultants were found to be in need of some revision and expansion to maximize competition in bidding and increase the likelihood that high-quality, highly reliable equipment will be obtained at least cost.

- The specifications reviewed were directed toward procuring specific models of equipment; this practice places the burden of systems design and keeping up with all vendor equipment characteristics upon the purchasing agency. It would be more desirable to re-orient the approach to the specifications to define the system performance requirements and allow the suppliers to decide the equipment parameters and models that can meet those requirements. It was also noted that the specifications should be expanded to include such items as environmental conditions, reliability, standardization, interchangeability, equipment life-cycle, guarantee and warranty, and evaluation and acceptance criteria.

(d) At the present time, the State of Alabama does not have a coordinated Frequency Allocation Plan and, as a result, problems are arising in obtaining usable, interference-free frequencies for the various county and city police departments.

- Interference problems like those being experienced by the City of Montgomery and difficulties experienced by local purchasing entities in obtaining suitable frequency assignments have indicated an urgent need to establish a Frequency Allocation Plan and implement a coordinated structure within existing agencies for obtaining approval of frequency assignments prior to placement of purchase orders for equipment and making application to the FCC for licenses.

## 5. RECOMMENDATIONS

- (a) Prepare an item-by-item assessment of all of the changes/actions suggested in the Final Report on the problem investigation.
- The ten suggested system improvements contained in the Final Report developed during the initial technical assistance assignment suggest a spectrum of potential solutions to the Montgomery Police Communications system difficulties. These potential solutions range from inexpensive near-term changes to longer range major system configuration changes. The problems remaining are to choose among these alternatives or others and establish the most cost-effective course of action.
  - The Supervisor of Communications for the City of Montgomery has carefully analyzed the problems being experienced and has made several changes to improve performance. He has also prepared a plan and preliminary cost estimate for replacing the system with an up-to-date UHF system. A detailed summary of the changes that have been made and the degree of improvement should also be prepared. In addition, a cost-time estimate and schedule should be prepared for those changes that have not been tried. A currently up-dated budgetary estimate for a new UHF system is absolutely needed. Along with these estimates, a detailed inventory specifying the phase-out schedule and cost of replacement for the obsolete VHF equipment must be factored into the assessment. When a full and detailed knowledge of the cost/time relationships of all of the alternative solutions is known, an informed and competent justification can be achieved for a major system configuration change.
- (b) Establish a meeting among the various cognizant agencies and organizations to review the above assessments and to establish a plan of action as described in Recommendation (a) of the earlier Final Report.
- (c) Update and expand if necessary the specification for a new UHF mobile repeater system previously prepared by the Supervisor of Communications for the City of Montgomery.
- It is likely that the steps taken in Recommendations (a) and (b) above will indicate that the most cost-effective

approach will be achieved by going to a UHF mobile repeater configuration. However, it should be cautioned that such a change could also create a set of problems similar to those presently being experienced. Some of the potential pitfalls were outlined in Findings and Conclusions (e) of Section 4 in the previous report; at least one of these is borne out by the reported inter-modulation interference in the Birmingham UHF system recently put into operation. To minimize the potential of such difficulties, a detailed system specification -- taking into account proper combinations of power, antenna heights and locations, receiver sensitivities and a careful analysis of co-channels, adjacent channel and inter-modulation interference -- is needed. New frequency allocations in the UHF band should be coordinated with a long-range frequency plan for the State as discussed in Section 3.3 of this report.

- (d) Prepare a detailed cost estimate and transition schedule for changing the Montgomery VHF system to a new UHF mobile repeater configuration.
  - If the proper UHF system design and frequency allocation are made, accurate cost estimates can be easily obtained by using the specifications suggested in (c) above. The costs for this major change should be reviewed in detail to determine the resources required to implement the change. Further, a phasing-in schedule should be prepared to minimize the impact of the transition from one system to the other in terms of down-time for mobile conversions and complications arising from a period of dual system operation, if this cannot be avoided.
- (e) Expand and revise the CTAC guideline specifications in accordance with the comments contained in Section 3.2 of this report.
  - A review of the basic guideline specifications disclosed the need to revise and expand them to maximize competition in bidding and increase the likelihood that high-quality, highly reliable equipment will be obtained at least cost.



(f) Prepare a frequency allocation plan for the State of Alabama to permit the efficient and orderly use of the frequency spectrum.

- Recent events associated with the procurement cycle and the increasing incidence of intra- and intersystem interference have highlighted the urgent need for a Frequency Allocation Plan for the State of Alabama. When such a plan is available, it will further be necessary to establish a coordinated structure among existing organizations and agencies within the State to approve all frequency assignments in accordance with the plan. It should be recognized that such a plan will necessarily be dynamic and require modification from time to time. It would be desirable to build into the structure a means of ensuring the long-range value of the plan.

APPENDIX A

Letter Comments from the Montgomery Communications  
Supervisor on Previous Technical Assistance Efforts.

*City of* MONTGOMERY *Alabama*

P. O. Box 1111, Montgomery, Alabama 36102



JIM ROBINSON  
Mayor

MONTGOMERY CITY COUNCIL

EMORY FOLMAR - Pres.  
HERMAN L. KARKIS - Pres. Pro Tem  
MRS. CATHERINE W. CASSELL  
LARRY BUGH  
LEWIS COLSON  
LUTHER L. OLIVER  
WILLIE B. PEAK  
JOE REED  
MRS. PAT WILLIAMSON

January 26, 1976

Mr. James W. Yates  
Alabama Law Enforcement Planning Agency  
Executive Park  
Montgomery, Alabama

Dear Mr. Yates:

This letter is in regards to your request for my comments on the evaluation report for communications problems of the Montgomery Police Department.

This report is lengthy and impressive and no doubt took considerable time and effort to compile. Much of the material is technical in nature and therefore would have meaning only to the technical minded person. In this reply I will not go into any great detail of page by page analysis, but will present to you my thoughts on the report in plain, everyday English so that it may be understood by all people concerned.

First, and probably most important of all, the report does not mention one of our most outstanding problems, the operation of a large percentage of obsolete equipment. It is estimated that regardless of what steps we might take to ease our present ills, there is still the pressing need to replace at least 40% of our present mobile units, 23% of our hand-held units, 50% of our base station units and 100% of our control center equipment.

Obsolete equipment in this case means old tube type equipment and/or equipment which is in excess of eight years old. Much of our present equipment is in excess of 15 years old. This fact was plainly spelled out in the preliminary report to ALEPA.

The entire text of the report deals with two problems: (1) Car to car coverage and (2) Interference, which other than the obsolete equipment mentioned above, are our main problems.

Mr. James W. Yates  
January 26, 1976

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Reference is made to pages 3-10 through 3-12 of the report under the heading "System Improvements." Items 1,2,3 and 8 have, in effect, been carried out with limited results.

Items 4,5,6,7 and 9 have not been carried out and could not possibly be carried out without a tremendous expense for "experimenting" just to see if some improvements could be made. Even if some slight improvement could be gained in one of the problem areas, it would amount to only a temporary "fix" on an obsolete inadequate system. Also an improvement in one problem area could possibly lead to a degradation in another area.

Perhaps, I have over simplified my above analysis of the suggested system improvements. However, upon request, I could show in detail what we have already done, and could also show my thinking on why other suggestions would not be feasible. This type of information would be too technical and beyond the scope of this letter.

Item 10 is in keeping with my recommendations for a good, workable, and dependable communications system such as the Montgomery Police Department needs and deserves.

Since 1971 a great deal of effort has been expended toward the goal of obtaining a modern UHF Communications System. I have personally made several trips out of town and talked with many technical people as well as users of radio equipment and all seem to agree that this is the ultimate solution to the problems that seem to be so common with everyone on the old VHF frequencies. Most major cities in this area have already converted to UHF radio for their Police Departments. Some cities such as Atlanta has spent millions on this conversion. I believe that any person, technical or otherwise, would agree that there must be some good, sound reasoning behind a communications conversion that cost millions of dollars. I believe also that this sound reasoning applies to the City of Montgomery.

One other point I would like to stress is that it appears that the City of Montgomery has been singled out to cope with recommendations such as are presented in this report. There seems to be no evidence of any other area having to follow similar procedures. This seems to indicate a lack of confidence in technical abilities at both the local and state levels.

In summary, it seems that we have one of two choices: (1) Continue striving for a new UHF Communications System, or (2) Spend untold thousands of dollars in experimentation to upgrade an obsolete system. Who is to make this decision?

Mr. James W. Yates  
January 26, 1976

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Let me state that my only interest is the ultimate goal of providing our Police Department with a modern crime fighting tool in the form of a dependable communications system.

Yours truly,



Robert Champion  
Communications Supervisor

RC/ejc

cc: Chief E. L. Wright, Jr.  
First Ass't Chief C. E. Swindall

APPENDIX B

Draft Specification for a Frequency Allocation Plan

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## SECTION I

### PROPOSAL FORMAT

#### 1.0 FORMAT

Proposals must be submitted in the following format.

##### 1.1 Business Organization

State the full name and address of your organization, the branch office or other subordinate element that will perform or assist in performing the work hereunder. Indicate whether you operate as an individual, partnership or corporation. Include the state in which you are incorporated or licensed to operate.

##### 1.2 Statement of the Problem

State in detail your understanding of the problem presented by this RFP and of your role in its solution.

##### 1.3 Project Management Structure

Provide an overview explanation and chart showing named project leadership and reporting responsibilities. If subcontractors are to be utilized, a management structure shall be provided for these firms.

##### 1.4 Work Plan

Describe your technical plan for accomplishing the work. Indicate the number of man days you have allocated to each task. Include a display, time related graphs and charts showing each milestone, task and sub-task related to the Statement of Work, and decision point in your plan. Clearly indicate: (1) The steps and sub-tasks you will take in performing the tasks, (2) the specific technical factors you will consider in accomplishing tasks, and (3) the definitiveness of your resultant frequency management plan.

##### 1.5 Prior Experience

As part of your proposal, include both relevant corporate experience and a brief statement concerning the actual experience of the actual persons from your firm who will be actively engaged in the proposed effort. Describe only experience directly applicable to this RFP.

##### 1.6 Manpower

The names and qualifications of all non-clerical personnel actually to be assigned to the project shall be presented. State the primary work location of these personnel during the time they will be engaged in the

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study and the amount of weeks they will spend in field efforts. Estimate the percent of his or her time each individual will devote to the work. Identify key individuals by both name and title. Provide all resumes.

**1.7 Authorized Negotiators**

Include the name and telephone numbers of personnel of your organization authorized to negotiate the proposed contract.

**1.8 Additional Information and Comments**

Include any other information that is believed to be pertinent but not specifically required elsewhere.

**1.9 Cost and Price Analysis**

The information requested in this section is required. Your established method of costing may be used and should be described. A fixed price contract is contemplated with progress payments. Twenty-five percent (25%) of the total will be retained until the Final Report is accepted.

**1.9.1 Manpower**

Itemize so as to show the following for each category of personnel with a different rate per hour.

(a) Category, e.g., project manager, senior analyst, communications engineer, subcontractor labor category, etc.

(b) Estimated hours.

**1.9.2 Cost of Supplies and Materials**

Itemize.

**1.9.3 Other Direct Costs**

Itemize.

**1.9.4 General and Administrative Burden of Overhead**

Indicate base used and basis therefore, percentage and total.

**1.9.5 Transportation Costs**

Show travel costs and per diem separately.



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**1.9.6 Printing Price**

State separately the price for furnishing an original and five (1+5) bound copies of the final products as called for in the Work Statement.

**1.9.7 Project Cost Schedule**

To assist in determining the validity of partial payments, provide the effort and cost expended for each task and major milestone listed in the Work Plan.

**1.10 Monthly Progress Reports**

The contractor will submit a monthly progress report showing percentage of completion related to the Project Cost Schedule.

**1.11 Delivery**

The contractor shall complete all work in six (6) months and shall structure the Work Plan accordingly.

DRAFT

## SECTION II

### WORK STATEMENT

#### 2.0 SCOPE

This request for proposal covers all of the tasks required to prepare a complete frequency allocation plan for the State of Alabama Law Enforcement Communication System.

#### 2.1 Primary Objective

The frequency allocation plan which is to be developed shall permit the State of Alabama to use the frequency spectrum in an orderly and conservative manner to support communication system concept which is described in the Master Plan. This frequency allocation plan shall provide the detailed frequency usage specifications necessary to produce an effective statewide system.

#### 2.2 Status of Existing Communications Systems

THIS SECTION SHOULD CONTAIN GENERAL INFORMATION FROM THE MASTER PLAN AND EXISTING RECORDS TO SHOW THE STATUS OF THE EXISTING COMMUNICATIONS SYSTEMS.

- i.e. The State of Alabama has a Master Plan for Communications which shows . . . . Present frequency usage in the state has X UHF channels, Y VHF channels, and Z 10-Band channels . . . . .

#### 2.3 Statement of Work

##### 2.3.1 Task 1 -- Data Collection and Requirements Analysis

The contractor shall review the Master Plan for Communications and existing records to define in detail the State's telecommunications requirements, and extract the data relevant to Law Enforcement. A detailed analysis of the frequencies required to support the agencies shall be performed. This analysis shall compliment the existing documentation and result in a comprehensive documentation of the frequencies presently employed by all police agencies within the State and those licensed to all base stations within a 75 mile radius of the State of Alabama. The contractor will assemble this information in a form usable for developing a detailed frequency allocation plan. The contractor will verify the frequency data with the Alabama Law Enforcement Agencies, with the Associated Public-Safety Communications Officers (APCO) frequency coordinator(s), and with the FCC. It is the contractor's responsibility to collect and assemble all frequency data including that outside of Alabama.

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#### 2.3.2 Task 2 -- Frequency Plan Development

The contractor shall develop a frequency management plan for the State of Alabama. This plan shall be based upon the existing FCC Rules and Regulations, those that may be promulgated by the FCC during the course of the program, and any FCC dockets for which there is a reasonable expectation that an FCC report and order may be issued during the period covered by the plan. The frequency management plan shall develop a definitive frequency allocation and/or reallocation for every police agency in the State. The frequency management plan shall contain a time phased plan for the allocation and/or reallocation of frequencies. The frequency management plan shall adhere to all FCC regulations and will be coordinated with APCO frequency management personnel.

#### 2.3.3 Task 3 -- Engineering Analysis

The contractor shall perform all engineering analyses required to show that the frequency allocations defined by the plan meets FCC requirements. All propagation analysis performed will describe the antenna heights and effective radiated power as a function of the coverage. These analyses will provide guidelines for system design which will enable the implementation of engineers to develop systems which allow the maximum utilization of available channels. To conserve the frequency spectrum radiated power and antenna heights will be limited to the extent required to provide coverage of an agency's normal area of operations. The engineering analyses performed will show that the frequency allocations are appropriate for the topography and requirements of the individual agencies. Other on-channel and adjacent-channel users in neighboring states where interference potential exists will be considered in this analysis.

#### 2.3.4 Task 4 -- Documentation of Frequency Plan and Analysis

The consultant shall organize and document the detailed findings in a final report. The report shall contain sufficient analysis and data to justify the selection of frequencies and to meet the requirements of the FCC. This report will provide the detailed guidance necessary to implement the frequency changes which result. A summary chart which shows each department's frequency allocation shall be contained in the report. All frequency allocation contingencies associated with the developed plan shall be defined.

**END**