STATE OF CALIFORNIA

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A REVIEW OF THE ORGANIZATION AND MANAGEMENT OF STATE TELECOMMUNICATIONS

APRIL 1985

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A Report of the
COMMISSION ON CALIFORNIA STATE GOVERNMENT ORGANIZATION AND ECONOMY

April 1985

Prepared for the Commission by:

Joel Kugelmass, Consultant

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President pro Tempore of the Senate
and Members of the Senate

Honorable Patrick Nolan
Assembly Minority Floor Leader

Honorable Willie L. Brown, Jr. Speaker of the Assembly
and Members of the Assembly

Dear Governor and Members of the Legislature:

In July 1984, our Commission initiated a major study of the organization and management of State telecommunications. The study was undertaken for three reasons. First, State telecommunications resources and expenditures are substantial. In fiscal year 1985-86, the State will spend at least $130 million on telecommunications; in actuality, the figure probably approaches $250 million when more appropriate accounting definitions are used. Second, deregulation of the telephone industry and divestiture of AT&T changed virtually all the rules regarding the management of this major asset. Finally, technological advancements in recent years have greatly increased the range of alternatives for information management available to organizations like the State of California.

These factors and others have significantly changed the telecommunication environment and, therefore, how every organization including the State manages its telecommunications resources. Recognizing this, the Little Hoover Commission conducted this study with the goal of answering two fundamental questions: 1) Is the State contemporary with other large users in implementing cost-effective and cost-avoiding improvements in telecommunications? and 2) Is State management properly organized, staffed and prepared to efficiently implement a telecommunications strategy?

Our Commission has concluded that the State of California is <u>not</u> contemporary with major corporations and other states in its management of its own telecommunications system. It is not that the State has mismanaged its telecommunications resources. Rather, the State has not yet developed the organization and management system necessary to actively manage this quarter of a billion dollar asset. As a result, the State is missing the opportunity to offset rising telecommunications expenditures and costs by at least $50 million annually.

(This letterhead not printed at taxpayer's expense)

Corporations such as Bank of America, Hewlett-Packard, and Boeing Aircraft as well as the States of Pennsylvania, New York, Washington, and many others have responded to the post-divestiture environment by developing strategic plans, reorganizing resources, and beginning to implement tactical plans based upon thorough assessments of their telecommunications "needs."

California, on the other hand, has done very little to date to develop the organization, management resources, and plans necessary to respond to the post-divestiture environment. Since adoption of an April 1984 report entitled "A Telecommunications Strategy for State Government," the State has made virtually no progress towards refining its strategic plan; assessing its telecommunications needs; developing a tactical plan; or establishing basic management systems in such areas as the inventory of equipment, the classification and training of telecommunications personnel, and the development of methods for taking complete advantage of the competitive market place. As a consequence, the State is missing productivity gains that have become literally commonplace in the private sector.

The State has also not committed the resources necessary to capitalize on potential cost savings. Although our Commission is very cautious in presenting recommendations to add staff to the State workforce, we believe it is totally justified in this case. By spending a relatively small amount of money on additional staff, the State will earn a very high return on its investment. Even small percentage savings in telecommunications expenditures will generate tens of millions of dollars in quantifiable savings. Corporations which have implemented many of the reforms we recommend in this report have experienced 20 percent savings in their telecommunications expenditures. Our view that $50 million could be saved is conservative. Experts have estimated the savings for the State could approach $100 million annually. However, the State will neither obtain these substantial savings nor the improved productivity resulting from the new technologies unless it commits to that initial investment. Put simply, the State must spend a little to save a lot.

The Commission's specific findings fall into four areas: planning, operations, evaluation, and organization.

Planning

- The State's ability to undertake and accomplish critical telecommunications planning has not been commensurate with the demands of the post-divestiture environment.

- Although the State has developed a strategic direction for its telecommunications system, certain critical policy questions have not yet been addressed.

- The State has made no progress to date in developing a tactical plan to implement its strategic policy.

- The State has not conducted a thorough assessment of its telecommunications "needs." Without such an assessment, it is not possible to analyze how improved telecommunications can enhance productivity.

- The State needs to clarify user agency and central agency planning responsibilities.

- The State needs to develop its own planning capability. The absence of this capability has created a vacuum which has been filled in some instances by vendors with an economic interest in the outcome.

- The State needs to undertake a rigorous analysis of available telecommunications technologies and associated public policies in order to plan successfully in the deregulated environment.

- The State's lack of planning for the post-divestiture period has undermined preparedness in emergency communications.

Operations

- The State's acquisition of telecommunications goods and services should take greater advantage of the deregulated, competitive marketplace.

- The State needs policies and resources to address the management of contemporary telecommunications operations.

- The State needs to develop its systems for the control of telecommunications assets.

Evaluation

- The State needs to evaluate telecommunications systems and their use as a routine management function. There are no criteria by which the adequacy, efficiency, and effectiveness of systems can be judged.

- In order to conduct sufficient evaluation of telecommunications, the State needs to collect and organize various types of performance data into a management information system.

Organization

- Other large users whose telecommunications expenditures compare to those of the State have undertaken reorganization in order to meet the functional requirements of the new telecommunications environment.

- In order to function efficiently and effectively in the new telecommunications environment, the State needs to reorganize its telecommunications management at central and user levels even as it allocates additional resources.

To improve the organization, management, and efficiency of State telecommunications and reduce or contain its cost, the Commission has developed over 30 recommendations including the following:

1. The State should reorganize existing and central telecommunications and data processing activities and supervision into a new Department of Telecommunications and Information Technology. The new department should be the center of policy development and representation before regulatory bodies. The staff budget of the new department should reflect the mix of personnel and consulting contracts proposed by the Strategic Report; that is, it should primarily consist of State employees.

2. The Commission recommends that if a new Department of Telecommunications and Information Technology is not organized, then at a minimum the functions of the Office of Telecommunications and the Office of Information Technology should be consolidated within an existing department and accountable to the same departmental director.

Recommendations Requiring Immediate Action While Reorganization is Considered

3. The budget of the Office of Telecommunications (Voice and Data Section and Administration) which is now financed by 100% reimbursement should be redirected to an appropriation with a corresponding reduction in the budgets of reimbursing agencies and departments.

4. A thorough strategic plan for each user agency and department should be developed in conjunction with the Office of Telecommunications. This plan should identify the role of information management in the user's programs and assess needs for telecommunications and information technology to utilize information management in a productive, efficient manner.

5. The State should develop a tactical plan to implement the network strategy presented in a "A Telecommunications Strategy for State Government." The tactical plan for a network should be developed by a special project planning task group outside of the Department of General Services as proposed by the major telecommunications users of the State.

6. A thorough needs assessment of each user agency and department should be conducted by the Office of Telecommunications in tandem with network planning recommended above.

7. Through cost/benefit analysis, the Office of Telecommunications should develop flexible policies for the acquisition of deregulated, customer-premise equipment, including switching services.

8. The Office of Telecommunications should undertake a thorough assessment of the State's staff capabilities in telecommunications management, and define appropriate classifications, user management structures, salary ranges and the viability of exempt positions for acquiring resident telecommunications expertise.

9. The Office of Telecommunications should develop, in conjunction with the Governor's Office of Emergency Services, a comprehensive plan for the use of voice, data and radio communications in the event of an emergency.

Our Commission believes that the State must act immediately to implement all the recommendations outlined in this report. Not only will their implementation generate millions of dollars annually in cost savings, but they will also significantly improve worker productivity and the services upon which every taxpayer of this State relies each day. Our system of communication with one another is perhaps the most fundamental and vital link we have to the citizens we serve.

Respectfully submitted,

Members, Telecommunications Study Subcommittee
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Haig G. Mardikian
Subcommittee Vice Chairman
James M. Bouskos, Vice Chairman
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Mary Anne Chalker**
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**Commissioner Mary Anne Chalker was appointed effective April 1, 1985, and did not participate in this study.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

CHAPTER I. INTRODUCTION 1

The Changing Telecommunications Environment and Its Economic Implications 2

The Divestiture of AT&T 4

Advancing Technologies 6

Changing Prices and Costs 7

Potential for Cost-Saving and Cost-Avoiding 8

The Factor of Risk in a Changing Environment 10

CHAPTER II. THE STATE'S SYSTEM FOR TELECOMMUNICATIONS PLANNING 12

The Benefits of Planning 13

FINDING #1. THE STATE'S ABILITY TO UNDERTAKE AND ACCOMPLISH CRITICAL TELECOMMUNICATIONS PLANNING HAS NOT BEEN COMMENSURATE WITH THE DEMANDS OF THE POST-DIVESTITURE PERIOD 17

The State Needs to Develop a Strategic Approach 18

The State Needs to Develop An Adequate Tactical Plan 21

The State's Tactical Plan 25

The State has not Assessed its Telecommunications Needs 32

FINDING #2. THE STATE NEEDS TO CLARIFY USER AND CENTRAL PLANNING RESPONSIBILITIES 36

FINDING #3. THE STATE NEEDS TO DEVELOP ITS OWN PLANNING CAPABILITY 46

Some Telecommunications System Plans Have Been Compromised 48

CHAPTER II, continued

Vendors are Exerting Influence on State Telecommunications by Planning for the State's Needs 54

FINDING #4. THE STATE NEEDS TO UNDERTAKE A RIGOROUS ANALYSIS OF AVAILABLE TELECOMMUNICATIONS TECHNOLOGIES AND ASSOCIATED PUBLIC POLICIES IN ORDER TO PLAN SUCCESSFULLY IN THE DEREGULATED ENVIRONMENT 64

The definition and acquisition of deregulated customer-premise equipment 68

The State Needs to Undertake a Rigorous Analysis of the Social Impact of Its Telecommunications Strategies 79

FINDING #5. THE STATE'S LACK OF PLANNING FOR THE POST-DIVESTITURE PERIOD HAS NEGATIVELY AFFECTED PREPAREDNESS IN EMERGENCY COMMUNICATIONS 83

CHAPTER III. THE MANAGEMENT OF TELECOMMUNICATIONS OPERATIONS 89

The Telecommunications Asset 89

FINDING #1. THE STATE'S ACQUISITION OF TELECOMMUNICATIONS GOODS AND SERVICES SHOULD TAKE GREATER ADVANTAGE OF THE DEREGULATED, COMPETITIVE MARKETPLACE 92

The State Utilizes Unanalyzed Sole Source Agreements 95

FINDING #2. THE STATE NEEDS POLICIES AND RESOURCES TO ADDRESS THE MANAGEMENT OF CONTEMPORARY TELECOMMUNICATIONS OPERATIONS 111

The State Needs Comprehensive Training Programs for Telecommunications Managers, Executive Management, and Users 113

The State Needs to Analyze and Meet its Requirements for Telecommunications Management 118

The Appropriate Use of Consulting Expertise Needs to be Defined 129

Insufficient Management Resources Are Creating Priorities Based on Work Rather Than on Need 136

CHAPTER III, continued

FINDING #3. THE STATE NEEDS TO DEVELOP ITS SYSTEMS FOR THE CONTROL OF TELECOMMUNICATIONS ASSETS 138

Inconsistent Accounting Definitions Leave Total Expenditures Understated 140

No Standard Inventory System Accounts for Telecommunications Assets and Rentals 142

Management and other Personnel Costs of Telecommunications are not being Tracked 144

The 9-1-1 Emergency Calling Fund is an Unaccounted and Unsupported Management Activity 145

CHAPTER IV. EVALUATION IN STATE TELECOMMUNICATIONS 150

FINDING #1. THE STATE OF CALIFORNIA NEEDS TO INCLUDE EVALUATION OF TELECOMMUNICATIONS SYSTEMS AND THEIR USE AS A ROUTINE MANAGEMENT FUNCTION 151

The State Needs to Develop a Management Information System 152

The State is Not Realizing the Benefits of Evaluation 154

CHAPTER V. THE ORGANZIATION OF TELECOMMUNICATIONS MANAGEMENT 158

FINDING #1. OTHER LARGE USERS, WHOSE TELECOMMUNICATIONS EXPENDITURES COMPARE TO THOSE OF THE STATE OF CALIFORNIA, HAVE UNDERTAKEN REORGANIZATION IN ORDER TO FUNCTION SUCCESSFULLY IN THE NEW TELECOMMUNICATIONS ENVIRONMENT 161

FINDING #2. THE STATE OF CALIFORNIA HAS BEEN CONSTRAINED FROM MEETING REQUIREMENTS OF THE POST-DIVESTITURE PERIOD WITH ITS CURRENT ORGANIZATION OF TELECOMMUNICATIONS MANAGEMENT 165

FINDING #3. IN ORDER TO FUNCTION EFFICIENTLY AND EFFECTIVELY IN THE NEW TELECOMMUNICATIONS ENVIRONMENT, THE STATE NEEDS TO REORGANIZE ITS TELECOMMUNICATIONS MANAGEMENT AT CENTRAL AND USER LEVELS EVEN AS IT ALLOCATES ADDITIONAL RESOURCES 169

CHAPTER V, continued

Technology Leadership is Organizationally Fragmented 172

The Division of Telecommunications and Data Processing Leadership Is Inconsistent with the Convergence of these Technologies 176

User Agencies Are Not Receiving Adequate Support 178

The Administration's Strategic Policy Needs an Implementing Organization 179

CHAPTER VI. RECOMMENDATIONS 184

Introduction 184

THE DEPARTMENT OF TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY MANAGEMENT 185

Authority and Responsibility 188

Structure and Resources 192

Objectives 197

TASKS REQUIRING IMMEDIATE ATTENTION 198

Planning 199

Operations 208

Evaluation 213

NOTES TO CHAPTERS 216

APPENDIX A. OVERVIEW OF STATE TELECOMMUNICATIONS MANAGEMENT A-1

The Organization of State Telecommunications Responsibilities A-2

State Telecommunications Resources and Budget A-7

APPENDIX B. SCOPE AND METHODOLOGY B-1

APPENDIX C. ACKNOWLEDGMENTS C-1

A REVIEW OF THE ORGANIZATION AND MANAGEMENT OF STATE TELECOMMUNICATIONS

SUMMARY

The Commission on California State Government Organization and Economy, also known as the Little Hoover Commission, initiated a comprehensive review of the State's management of its own telecommunications system in the post divestiture environment. There were three primary reasons for conducting this study. First, State telecommunications resources and expenditures are extensive. The State owns or rents approximately 200,000 telephones connected to 150,000 telephone lines. Additionally, the State manages in excess of 15,000 computer terminals which share the use of telephone lines for computer communications. The State also owns a microwave system and deploys six satellite communication devices for emergency access to the network. The cost of these and other State telecommunications resources is substantial. In fiscal year 1985-86, the State will spend at least $130 million on telecommunications. However, this figure is based on narrow accounting definitions. Our Commission believes the actual total approaches $250 million.

The second reason for conducting this study is the complete renaissance the telecommunications environment has experienced in the past few years. Deregulation of the telecommunications industry and divestiture of the American Telephone and Telegraph Corporation changed virtually all the rules regarding the management of this major asset. In the past, organizations like the State of California relied upon AT&T and its subsidiaries to "manage" the telephone system. Today, however, State telecommunications managers are being forced to "manage" major parts of the system and assume responsibilities for functions unfamiliar to them. These managers must undertake major evaluations of their telecommunications equipment and system while being faced with the choices a competitive market offers. Not only must these managers become experts regarding system "architecture" and "protocols of voice and data communications," but they must also make critical decisions about each.

Finally, technological advancements have greatly increased the range of alternatives available to organizations like the State for information management. The evolution of computers is continuing to significantly affect telecommunications since data communications using computers is the fastest growing component of telecommunications usage.

These factors have fundamentally changed the telecommunications environment and, therefore, how every organization, including the State, manages its telecommunications resources. Recognizing this, the Little Hoover Commission began its review with the goal of answering two fundamental questions:

1. Is the State of California contemporary with other large users in implementing cost-effective and cost-avoiding improvements in telecommunications? and

2. Is State management properly organized, staffed and prepared to implement efficiently a telecommunications strategy?

The answers to these questions are critical to the State of California. The State must take advantage of every opportunity for cost-savings and cost-avoidance that the new telecommunications environment offers. Where the private sector has optimized such opportunities, it has resulted in savings of approximately 20 percent of total telecommunications costs. Similar savings for California, therefore, could approach $50 million annually.

Chapter I and Appendix A of this report provide a detailed overview of State government's telecommunication system through discussions of the legislative history and organization of responsibilities. As the Chapter indicates, the organization of telecommunications responsibilities is complex and, as this report will establish, inefficient and counterproductive.

Specifically, there are four levels to the organizational table: (1) the Department of General Services, Office of Telecommunications [OT/DGS]; (2) the Department of Finance, Office of Information Technology [OIT/DOF]; (3) Teale Data Center and the Health and Welfare Data Center; (4) State departments, agencies, boards, commissions and the postsecondary education systems, the University of California and the California State University System. Certain specialized areas of telecommunications have been assigned to other branches of government. For example, the Governor's Office of Emergency Services is responsible for emergency communications; it draws upon the resources of Office of Telecommunications on a project by project basis.

Chapter II through V present the Commission's findings regarding the State's planning, operational management, evaluation, and organization of State telecommunications. Chapter VI presents the Commission's set of detailed recommendations. Following is a summary of the findings and recommendations, by chapter.

SUMMARY BY CHAPTER OF FINDINGS AND RECOMMENDATIONS

CHAPTER II: THE STATE'S SYSTEM FOR TELECOMMUNICATION PLANNING

Planning has become a crucial component of telecommunications management as it addresses and supports decision-making in the face of a changing institutional, technological, and regulatory environment. Without effective

planning, the organization is at the mercy of past practice and the confusion of the present. There are several different levels of planning. Strategic planning, the first stage, sets forth broad goals and principles of an organization and the relation of information management and telecommunications and information technology to them. The second stage of the planning process is the development of a tactical plan which outlines the methods by which the strategic plan will be implemented and accomplished. Finally, to develop meaningful plans, it is necessary to conduct a thorough assessment of the telecommunications needs of the organization. Effective planning is imperative to ensure that an organization optimizes all opportunities for cost-savings through coordinated and shared activities, economies-of-scale, and avoidance of duplication.

Finding #1. **The State's Ability to Undertake and Accomplish Critical Telecommunications Planning Has Not Been Commensurate With the Demands of the Post-Divestiture Environment.** Large corporations with extensive telecommunications needs such as the Bank of America, Boeing Aircraft, and Hewlett Packard have responded to this environment by developing a broad strategic plan, reorganizing their telecommunications resources, and acting immediately to complete a comprehensive tactical plan based upon a thorough assessment of their telecommunications "needs."

To date, the State's only tangible accomplishment in telecommunications planning has been the completion and adoption of an April 1984 report entitled A Telecommunications Strategy for State Government. Although this report provides the State with a general operational direction for telecommunications, it does not address certain critical policy questions such as what the appropriate linkage between information technologies and the basic goals of departments and the State overall should be.

At the same time, the State has made no progress in developing a tactical plan to carry out the goals and objectives outlined in the Strategic Report. Although the Department of Finance on behalf of the Department of General Services introduced a budget change proposal (BCP) in May 1984 which they have referred to as the State's tactical plan, it in fact is not one. This BCP, which was not enacted, would not have fully implemented the State's strategic telecommunications policy and was at variance with a significant portion of the Strategic Report. Since this BCP was considered by the Legislature, the Department of General Services has been unable to do any work towards developing a true tactical plan due to significant resource limitations.

In addition to lacking an overall tactical plan to implement strategic policy, the State has not conducted a thorough assessment of the needs of its users of

telecommunications. Without a needs assessment, neither the user agencies nor the Department of General Services can go to the next step of analyzing which areas of the State's programs can be made more productive and efficient by improved telecommunications and information processing. Similarly, without a completed needs assessment, it is really not possible to analyze alternative systems and make prudent, cost-effective telecommunications decisions.

Given the absence of any meaningful planning effort by the Departments of General Services and Finance, our Commission undertook a survey of all State user organizations to determine what, if any, planning they had conducted on their own. Of 110 State units surveyed, only 31 reported telecommunications planning of any kind whatsoever in the past three years. Additionally, several major agencies report no planning of any kind. Only two departments among the 110 surveyed reported undertaking all categories of planning.

Clearly, the State of California is not moving forward in a manner that will offer it the opportunity to maximize the significant potential cost-savings large private sector organizations are experiencing.

Finding #2. The State Needs To Clarify User And Central Planning Responsibilities. Telecommunications planning must extend beyond strategies and tactics for the whole of government. Planning must also include development of system plans for a particular user. Such planning, it is widely believed, must be initiated by that user. However, there is unclear authority of user agencies in planning telecommunications, and an unclear assignment of responsibility between users and reviewing agencies. The Office of Information Technology and the Office of Telecommunications have emphasized the responsibility of State users to plan their own telecommunications. At the same time, requirements are being drawn by users only to be replaced or rejected in the review and approval process conducted by the control agencies. This is the effect of two conflicting leadership policies in telecommunications. One is articulated by the Strategy Report, which assigns considerable authority to users in planning their local telecommunications requirements. The other exercises central authority through case-by-case reviews of departmental proposals.

Control agency planning and approval procedures are also unclear, inconsistent, and confusing. The State has sought to guarantee effective applications of telecommunications and information technology by a two step process: Users analyze their departmental needs and the requirements to meet them in a proposal which is then reviewed and possibly changed by the Office of Telecommunications and/or the Office of Information Technology. A user must participate in this process of proposal

writing and review, since without approval from the appropriate agency, requests for bids cannot be released, funds are not expended, and budget change proposals are not considered.

However, an analysis of actual applications of State planning procedures shows inconsistent procedures, changeable review processes, and elusive definitions of planning itself. As a consequence, departments are unable to determine whether they are planning properly. Unclear procedures may also have the effect of slowing innovation among newer users of telecommunications technology needing budget augmentations for this purpose.

In an October 1984 management memorandum, the Office of Information Technology sought to clarify for user agencies the division of review functions between itself and the Office of Telecommunications by designating the Office of Telecommunications as the "lead" agency for planning purposes. However, the memo outlines a series of conditions for exception; consequently, the procedures between the two organizations remain unclear. Additionally, the provisions of the memo are not consistent with provisions of the State Administrative Manual.

Finding #3. The State Needs to Develop Its Own Planning Capability. In order to develop an effective telecommunications plan and to thoroughly prepare for the acquisition of telecommunications products and services, the State may either dedicate employee time or retain consultants. If neither planning resource is made available, the State must rely on plans developed for marketing purposes by vendors, or forego planning altogether. In examining the use of these options, the Commission found little reliance on developing the State's own planning capabilities although there are significant economic incentives for the State to employ resident expertise.

Because it continues to lack the necessary planning resources, the State has uncritically accepted a vendor's plans or has proceeded to procure without planning at all in order to fulfill its telecommunications needs. Sometimes the State has been able to proceed only with compromised requirements or else by procuring a more expensive system because it was readily available. As a result, goods, services, and systems are acquired without comprehensive, objective analysis of alternative technologies and their cost-benefits. The absence of an in-house planning capability has also enabled vendors to exert inappropriate influence on State telecommunications by planning the State's needs. The Commission found instances where a lack of State planning staff created a vacuum that was filled by plans from vendors with an economic interest in the outcome.

The State can take advantage of private sector planning expertise without surrendering its control by defining requirements and issuing requests-for-proposals to solicit vendors strategies. A large user, like the State of California, can take advantage of expertise in the marketplace without accepting a sole source of that expertise -- provided the user applies planning to learn the needs and requirements of its organization.

Finding #4. **The State Needs to Undertake a Rigorous Analysis of Available Telecommunications Technologies and Associated Public Policies in Order to Plan Successfully in the Deregulated Environment.** For example, although the Office of Telecommunications identified telephone rental costs as the most expensive consequence of divestiture to the State, the Commission found that a plan to analyze the replacement of telephone receivers in State use has never been developed. Additionally, the State has not conducted a thorough analysis comparing Centrex to PBX switches although central control agencies routinely deny requests for PBX installation.

The State also needs to undertake a rigorous analysis of the social impact of its telecommunications strategies. Our Commission has been unable to identify any consistent, explicit process for developing policy for State telecommunications. In the absence of comprehensive planning, it appears many issues are not even being defined. The State of California needs to clarify how it will reach validated conclusions about appropriate policy and how those conclusions will be reflected in the development of its telecommunications.

Finding #5. **The State's Lack of Planning for the Post Divestiture Period has Undermined Preparedness in Emergency Communications.** The State of California, given its large land mass, distinct centers of population and well known geological dangers, faces the emergency communications requirements complicated by divestiture. The Commission has found significant gaps in planning emergency telecommunications, including the coordination of State agencies, establishing protocols for emergency telephone service, evaluation of the cost/benefits of new technologies; and the provision of emergency communications for a major earthquake in Northern California. In addition, there appears to be statutory confusion over what units of government lead emergency communications planning.

CHAPTER III: THE MANAGEMENT OF STATE TELECOMMUNICATIONS OPERATIONS

During the fifty years of AT&T monopoly service, the famous label on the bottom of every telephone said it all: "Property of the Bell System." Today, however, the State has the legal rights to design, purchase, and implement telecommunications systems of its own choosing. Consequently, telecommunications is no longer a simple, consolidated cost center with a single, responsible vendor. Rather, telecommunications has become a major asset much like buildings, automobiles, computers, and other equipment which must be purchased or leased, inventoried, depreciated, and secured from illegitimate use and theft. In other words, the telecommunications asset requires active management. The State's ability to assume these new responsibilities inevitably is dependent upon the sufficiency and qualifications of its management resources.

Finding #1. The State's Acquisition of Telecommunications Goods and Services should Take Greater Advantage of the Deregulated, Competitive Marketplace. Procurement administration and regulation protects the user from unsatisfactory goods and services, the taxpayer from uneconomic acquisitions, and the vendors from vague user expectations. Prior to 1984, there was little incentive for the State to examine alternatives to the so-called traditional carriers of telecommunications services with which it had contracted without competition since there were virtually no competitors. However, the divestiture of AT&T and the complete deregulation of customer premise equipment foreclosed the sole-source contract environment for long distance communications and telecommunications equipment.

Nevertheless, the State of California has generally continued to maintain its pre-divestiture reliance on the traditional vendors. This has occurred, in part, because neither the Office of Telecommunications nor most State agencies have any meaningful experience in procuring telecommunications services and equipment. Consequently, attempts at competitive procurements have not been planned or implemented well. The State has not developed a procurement strategy nor developed estimates of the volume of equipment it will want to purchase over a set period of time. Consequently, the State has not fully engaged the competitive process.

For example, in 1984 the State issued invitations for bids to provide the State with approximately 6000 telephone receivers meeting certain specifications. Concurrent to this competitive process, the State responded to an offer by PacTel Communications Systems and awarded a sole source opportunity purchase to them for 15,000 receivers which did not meet the State's specifications used for the competitive bid. Although the State received a good price, there are no guarantees that it

was a better deal than the competitive process would have produced. The State has an obligation to the taxpayers to use the competitive process in all cases where it is appropriate.

Finding #2. **The State Needs Policies and Resources to Address the Management of Contemporary Telecommunications Operations.** Telecommunications organizations and management in State Government historically were developed to enable departmental users to coordinate with telephone companies. Suddenly with divestiture, organizations accustomed to a coordinating role have found themselves expected to implement networks, integrate traffic, execute plans, and choose among a myriad of rate and price alternatives. At this point in time, the State is poorly prepared to respond to the demands it faces due to three areas of critical deficiency.

First, the State needs comprehensive training programs for telecommunications managers, executive management,and users. The State currently has few training courses of any kind in telecommunications although virtually everyone agrees on their importance. Perhaps the greatest need for training lies with middle and executive management who are regarded as poorly informed in the telecommunications area and, as a result, only concerned when situations reach a point of crisis. There is also a need for contemporary written materials of all kinds. The last telecommunications manual was published in 1977.

Second, the State needs to analyze and meet its requirements for telecommunications management. The hidden benefit of telecommunications resource management is the increased economies the system will derive from it. Private sector organizations analyze management expenditures in relation to operating expenditures; that is, six figure salaries ($100,000 plus) would be justified if they produce seven figure reductions in cost ($1,000,000 plus) in total telecommunications expenditures. In a public sector organization adverse to increased personnel expenditures, the economic benefits of telecommunications management may be overlooked. The State needs to not only analyze its staffing requirements, but also determine whether special exceptions are warranted to provide competitive salaries for telecommunications analysts and managers.

Finally, the State needs to define the appropriate level and use of consulting expertise. Invariably, the unit cost of consulting time will be greater than corresponding civil service positions, perhaps twice as great. Consultants should bring to the State specialized expertise which would otherwise be unavailable. In some instances, the State has not defined exactly what consultants would do or how they would be supervised.

Partnerships with consultants rather than uncritical reliance on them would strengthen State telecommunications management. The State needs to anticipate ongoing responsibilities that cannot be met by consulting contracts. Major telecommunications consulting firms recommend that clients work out in advance a plan for a transition of responsibility from consulting contracts to permanent staff. However, for the consultant budgets of major telecommunications efforts reviewed in this Report, the State has not established a partnership with consultants. Rather, consultant time has been budgeted without planned transitions to permanent operating staff and without reference to ongoing staff requirements.

Finding #3. **The State Needs to Develop its Systems for the Control of Telecommunications Assets.** Precise accounting of assets and expenditures is an important aspect of telecommunications management. The telecommunications marketplace is increasingly segmented with different vendors supplying various pieces of systems for purchase, lease, or rental. Without both a breakout and consolidation of costs across these segments, the user cannot analyze what the total cost of the system is, or which segments are becoming more expensive. When telephone costs were lower and choices among vendors and technologies were limited, there was little incentive to collect detailed information about the use and cost of telecommunications. Management could not implement alternatives. Today, higher prices and technological and vendor options for their reduction can enable more exacting telecommunications administration to pay its own way. However, underdeveloped administrative practice in telecommunications management has lessened the control the State exercises in this area. Specifically:

- Inconsistent accounting definitions leave total expenditures understated perhaps by as much as $100 million.

- No standard inventory system accounts for telecommunications assets and rentals.

- Management and other personnel costs of telecommunications are not being tracked.

- The 9-1-1 emergency calling fund is an unexamined activity which is being denied the resources needed to enable management to control costs.

- Guidelines for efficient asset management are needed. The absence of a systematic and independent asset management system for telecommunications, including an appropriate accounting schema, by definition makes informed decision-making extremely difficult.

CHAPTER IV: EVALUATION IN STATE TELECOMMUNICATIONS

Evaluation is an empirical process comparing the actual result of a decision to its predicted result. It is important in telecommunications management since even the best efforts at planning and the most demanding operating standards cannot assure that a communications system will meet its goals. Without evaluation the assumptions behind management decisions become fugitives from confirmation. Evaluation is the basis of corrective action in telecommunications management.

Finding #1. The State of California Needs to Evaluate Telecommunication Systems and Their Use as a Routine Management Function. Presently, the State of California does not conduct routine evaluations of telecommunications systems and their uses. State administrative practice neither requires evaluation of new technologies by those acquiring them, nor assigns responsibility to user or to central agencies to perform evaluation as part of the ongoing management of telecommunications systems. As a result, the State has no mechanism in place that:

- Establishes a criterion by which systems can be judged.
- Identifies inefficient or ineffective telecommunications systems that are in use.
- Establishes explicit goals for the performance of central and departmental management in planning and operating telecommunications systems.
- Applies the actual experience of users with a system in one part of government to plans of users in another part of government.
- Judges whether or not newer technologies would return a greater cost/benefit to the State than those in currency.

In order to conduct sufficient evaluation of telecommunications, the State needs to collect and organize various types of performance data into a management information system. Additionally, the State needs to begin to actively monitor its major telecommunication systems to determine how efficient they are, and to trigger, if needed, planning activities for their modification.

CHAPTER V: THE ORGANIZATION OF TELECOMMUNICATIONS MANAGEMENT

As we have discussed, new management functions have emerged to respond to the significantly different telecommunications environment. These functions and the resources allocated to them constitute the organization of telecommunications management. Management organization is a major issue. Institutions confronted by new functions may simply assign them to the existing structure without recognizing its inability to efficiently fulfill those responsibilities. However, inadequate attention to the management of telecommunications today will produce functional inadequacies which may cost the user tens, even hundreds of millions of dollars in the future.

Finding #1. Other Large Users, Whose Telecommunications Expenditures Compare to Those of the State Have Undertaken Reorganization in Order to Meet the Functional Requirements of the New Telecommunications Environment. Most governments and nearly all large corporations share with the State of California a history of telecommunications management fragmented between voice and data communications each of which has developed individually. Since deregulation and divestiture, large institutions have begun examining their own capabilities looking towards developing greater expertise, a more sophisticated approach, and clearer plans for the future. Numerous state governments such as New York, South Carolina, Florida, Washington, and Pennsylvania are revising their approaches and organizational structure to improve how much "bang for the buck" they achieve. Corporations across the Nation have reorganized their telecommunications management along with data processing to unify and advance all information technology activities.

A survey of twelve corporations with telecommunications expenditures in excess of $50 million revealed the following patterns:

- All have a centralized decision-making process for both voice and data.
- The centralized telecommunications group is responsible for both planning and operations.
- The central body has final authority over decisions involving capital equipment acquisitions and networks.
- The central telecommunications division does not "stand alone," but is part of a larger organization in which data processing, management information services, and data collection all report to the same executive.

Specifically, our Commission believes that the State's failure to apply management organization typical of other large users will become a growing barrier to efficient and effective telecommunications. For example, user agencies are not receiving adequate support. The Administration's strategic policy needs an implementing organization. The Commission believes that the continued omission of organizational issues from critical appraisal is counter productive and inefficient.

The State's technology leadership should not continue to be organizationally fragmented. The State has divided its central management of telecommunications, spawning confusion, inconsistency and unsystematic supervision of State telecommunications activities. The division of telecommunications and data processing leadership is inconsistent with the convergence of these technologies.

As previously stated, the benefits of reorganization have been proven. Large user institutions with networks quite parallel to the State's have made changes in their telecommunications organization and the systems they manage with spectacular economic benefits.

CHAPTER VI: RECOMMENDATIONS

The Office of Telecommunications and the Office of Information Technology have worked to address the management obligations of the new telecommunications environment in spite of a lack of resources and an organizational structure commensurate to its demands. However, the State is trading significantly higher telecommunications costs and lesser capabilities of its system for limiting the number of telecommunications management resources and retaining an historical and outdated management organization. Quite simply, the return to the State will far exceed the additional investment in resources in this case. Therefore, the Commission recommends major reorganization of telecommunications management and a commitment of resources adequate to generate the substantial cost savings available. At the same time, there are many actions the State should take independent of reorganization to significantly improve overall operations. Following is a summary of our major recommendations (we encourage the reader to review Chapter VI in detail for a complete listing and understanding of the recommendations):

1. The State should reorganize existing central telecommunications and data processing activities and supervision into a new Department of Telecommunications and Information Technology. The new department would be responsible for the promotion, strategic and tactical planning, day-to-day operations, and on-going evaluation of

State government's telecommunications and information technology. The new department should report either to the Secretary of the State and Consumer Services Agency or the Secretary of the Business and Transportation Agency.

2. The new department should be authorized to delegate to user agencies and departments authority to define and meet their local requirements for information technology, subject to architectural standards and shared use of facilities, and accountable to the new department for proved efficient and effective applications of information technology.

3. The new department should assume significant responsibility in the relations of the State to the technology marketplace including the management of information technology acquisitions and competitive bid processes.

4. The new department should be the center of policy development and representation before regulatory and parliamentary bodies, both State and Federal.

5. The new department should have separate and distinct sections for telecommunications and data processing, with further divisions of planning, operating and evaluation functions for both. These functions should be coordinated and unified through an executive office.

6. The California Forum on Information Technology should be advisory to the new department and the principal vehicle through which user agencies and departments express their views to it.

7. The Administration and the Legislature should consider formation of a special advisory body of the State's political subdivisions to the new department.

8. The Agency placements of the State's data centers should be reviewed for their appropriateness in light of the organizational placement of the new department.

9. The budget of the Office of Telecommunications (Voice and Data Section and Administration) which is now financed by 100% reimbursement should be redirected to an appropriation, with a corresponding reduction in the budgets of reimbursing agencies and departments.

10. The staff budget of the new department should reflect the mix of personnel and consulting contracts proposed by the Strategic Report, e.g., it should primarily consist of State employees.

11. The department should assess and make recommendations regarding the capabilities of programs and the State workforce, and the adequacy of specialist classifications

to the deployment of information technologies to improve productivity and to better serve the public.

12. The department should first, in discharging its responsibilities, plan and acquire through lease or purchase one or more statewide networks providing efficient, long-term capacity for the transmission of voice and data.

13. The Commission recommends that if a new Department of Telecommunications and Information Technology is not organized, then at a minimum the functions of the Office of Telecommunications and the Office of Information Technology should be consolidated within an existing department and accountable to the same departmental director.

Recommendations Requiring Immediate Action

14. A thorough strategic plan for each user agency and department should be developed in conjunction with the Office of Telecommunications. This plan should identify the role of information management in the user's programs and assess needs for telecommunications and information technology to utilize information management in a productive, efficient manner.

15. The State should develop a tactical plan to implement the network strategy presented in A Telecommunications Strategy for State Government.

16. The tactical plan for a network should be developed by a special project planning task group outside of the Department of General Services as was proposed by the major telecommunications users of the State.

17. A thorough needs assessment of each user agency and department should be conducted by the Office of Telecommunications in tandem with network planning recommended above.

18. The Office of Telecommunications and the Office of Information Technology should clearly delineate their respective functions and prerogatives and those of user agencies and departments, with the following objectives:

    - that the Office of Telecommunications take the lead in all telecommunications projects and proposals, and not have its lead subject to review or exception by the Department of Finance;

    - that user agencies and departments be given the authority to plan and implement systems to meet their local requirements, consistent with the overall network strategy of the State.

19. Through cost/benefit analysis, the Office of Telecommunications should develop flexible policies for the acquisition of deregulated, customer-premise equipment, including switching services.

20. The Office of Telecommunications should develop, in conjunction with the Governor's Office of Emergency Services, a comprehensive plan for the use of voice, data and radio communications in the event of an emergency.

21. Funding for emergency communications planning should be provided by a more efficient administration of the 9-1-1 emergency calling fund. Staff should be provided to realize the estimated cost-savings of more efficient administration.

22. The Legislature should review the statutory basis of emergency preparedness, and in particular, emergency communications planning, to see whether adequate delineation of authority and responsibility has been accomplished.

23. The Office of Telecommunications should undertake a rigorous analysis of the social impact of State telecommunications strategies and recommend appropriate policies to the Administration and to the Legislature for issue areas such as bypass of the existing system.

24. The Office of Telecommunications should develop a budget change proposal for telecommunications planning resources in addition to those needed for implementation of the network strategy.

25. The Office of Telecommunications should undertake a thorough assessment of the State's staff capabilities in telecommunications management, and define appropriate classifications, user management structures, salary ranges and the viability of exempt positions for acquiring resident telecommunications expertise.

26. The Office of Telecommunications should develop workload standards for the retention of consulting expertise, guidelines for their effective management, and a clear statement of consulting and support services it is able to provide user agencies and departments.

27. The Office of Telecommunications should be responsible for the design and implementation of training programs targeted to and differentiating among (a) telecommunications and data processing specialists in State service; (b) executive management of departments and agencies; (c) users of information technology; (d) individuals responsible for the acquisition, accounting and custody of information technology assets and related expenditures.

28. The Department of Finance should revise uniform accounting principles to enable users to properly reflect their telecommunications and information technology expenditures, and to provide the Legislature and the Administration accurate information about the level of information technology expenditures.

29. The Office of Telecommunications should establish a comprehensive management information system suitable to its responsibilities and to the needs of the Administration and the Legislature for proper oversight of State programs and operations.

CHAPTER I

INTRODUCTION

The Commission on California State Government, Organization and Economy, also known as the Little Hoover Commission, was established in 1962 to review the management of State activities and recommend ways to operate more efficiently and effectively. Throughout its history, the Commission has conducted numerous studies of the State's management of various capital assets including surplus land, equipment, and financial investments.

In July 1984, the Commission initiated a comprehensive review of the State's organization and management of its own telecommunications system. A number of factors prompted the study. First, State expenditures on telecommunications each year are substantial, totalling from $130 to $250 million depending on how it is calculated. Second, deregulation of the telecommunications industry and divestiture of the American Telephone and Telegraph Corporation changed virtually all the rules regarding the management of this major asset. Finally, competition has drastically accelerated the technological advancements and alternatives available to organizations including the State of California.

These factors, as well as others, have substantially changed the telecommunications environment and, therefore, how every organization, whether large or small, manages its

telecommunications resources. Recognizing this, the Little Hoover Commission began its review with the goal of answering two fundamental questions:

> 1. Is the State of California contemporary with other large users in implementing cost-effective and cost-avoiding improvements in telecommunications? and
>
> 2. Is State management properly organized, staffed and prepared to efficiently implement a telecommunications strategy?

THE CHANGING TELECOMMUNICATIONS ENVIRONMENT AND ITS ECONOMIC IMPLICATIONS

The three horsemen of change in telecommunications -- deregulation, the divestiture of AT&T, and new technologies -- together lead the transition from a national policy enunciated in the Federal Communications Act of 1934. The transition has been called everything from A.D. (After Divestiture) to the "second industrial revolution." The movement away from a fifty year old approach to telecommunications has involved the development of complex statutes and court judgments; realignment of industrial capital and assets; evolving theories that describe the how of information; and the invention of new electronic components along with new techniques for manufacturing them.

Deregulation of the telecommunications industry has unleashed the economic forces of our capitalistic system. Until 1984, AT&T maintained its monopoly-like grip on telephone service through it's special status of "end to end

provider." Consequently, the various divisions of the AT&T Company manufactured nearly all telephone equipment, made the largest investments in research and development, and devised and operated the necessary billing systems. Subsidiaries of AT&T, known as Bell operating companies, sold local communications services and leased equipment. AT&T also sold the "long line" communications between the various operating companies. Competition with these was illegal.

In 1967, MCI Corporation successfully challenged the transmission monopoly of AT&T. Since the time MCI broke ground by altering its transmission system in competition with AT&T, the Federal Government has steadily increased in numbers and types the competitors permitted to offer transmission services and related equipment. Although there may be various ways of categorizing these goods and services, we have generally classified them for the purposes of study as follows:

> Customer Premise Equipment (CPE): includes telephone receivers and other equipment such as computer communications devices, switching mechanisms (PBX's), satellite dishes and other devices placed outside regulation and inside the property of the user. Although CPE may be leased, title is typically acquired.
>
> Local Loops: the regulated transmission system connected to the telephone company office; sometimes a user "builds his own" if the economies of doing so are judged favorable. This is called a "bypass" of the telephone company, as it duplicates service features of the regulated offering.

Long distance communication: Where once only private systems were an alternative to monopoly service, the customer now may also select among quasi-regulated, non-monopoly competitors. For example, the State of California operates a privately owned microwave transmission facility whose capital, maintenance and upgrade expenditures are competitive with a variety of long-distance offerings.

A universe of minimum choice in the acquisition of telecommunications goods and services has given way to a universe of extensive choice. Further, all identified trends show an even greater range of choices in the future. [1] Today, there are over 400 long distance carriers, some of which specialize in areas such as data communications, while others serve a broader set of needs.

The Divestiture of AT&T

In 1984, Judge Green's order that AT&T divest took effect. This historic event received massive publicity in part because it symbolized and extended the process of deregulation. Without divestiture, the users of telecommunications may have been able to hold onto past practice for a longer period of time even though deregulated offerings were becoming commonplace.

The divestiture of AT&T split the provisioning of monopoly telephone service into seven holding companies, each of which was allowed to undertake both regulated and unregulated business activities. In California, for example, Pacific Telephone and Telegraph became Pacific Telesis. Its

subsidiary, Pacific Bell, offers regulated local telephone services. Other subsidiaries such as PacTel Communications Systems sell unregulated customer premise equipment and cellular radio services. Pacific Telesis is known as a "regional" holding company because it sells regulated services in a defined geographical region of the United States. Some regional holding companies, including Pacific Telesis, are marketing on a worldwide basis.

AT&T, Inc., the parent holding company, was divided into three principle units: AT&T Communications (AT&TC) which sells regulated transmission facilities; AT&T Information Services (AT&TIS) which sells unregulated customer premise equipment -- and Bell Laboratories, which services both. AT&TC and AT&TIS are now jointly marketing.

The assets were distributed according to complicated algorithms, some of which are still being contested. In addition, telephone service was structured according to a "map" of the United States specifically developed to handle divestiture. This map compartmentalizes telephone transmissions into local services areas known as "local access and transport areas" (LATA's). Intra-LATA transmissions (those within a LATA) are regulated offerings of a Bell operating company such as Pacific Bell. At present, each Bell operating company has a monopoly franchise. Transmissions which originate in one LATA but terminate in another are termed inter-LATA communication and are regarded as long distance calls [termed "long-distance" in this report; toll

calls can still travel within a LATA but cover "long" distances].

Since LATA's define who sells what, they have become road maps for the user as well as for the provider. Telecommunications management must develops acquisition strategies with this structure in mind since it establishes the parameters of choice. The implications are major for a user with offices in many LATA's such as the State of California.

Advancing Technologies

In recent years, several basic changes have occurred in the technology of telecommunications. For example, there are now two ways rather than one to engineer a communications signal: analog and digital. Most telecommunications is "analog." In recent years, "digital" transmission has evolved. It offers a more efficient method of transmission and superior computer communications.

The continuing evolution of computers has greatly affected telecommunications. Computer components may be successfully used to originate, receive, amplify, control, route, account, combine and separate communication signals. Since these components have been subject to remarkable innovations in design, their capabilities have increased while their size and energy requirements have decreased. Moreover, the cost of manufacturing these components has continued to decline.

As a result of these and other new technologies combined with increasingly competitive prices, the telecommunications manager is faced with a changing environment demanding many new decisions and offering many alternatives from which to choose.

Changing Prices and Costs

As a monopoly service, telephone charges in the United States were commonly viewed as uncontrollable. [2] Except for reviews of personal use and telephone company charges, the amount expended for the telephone was considered a "given" among operating budgets. Historically, there have been few incentives to examine the telephone company's pricing policies or to understand the composition of telecommunications expenditures.

However, with deregulation and the reductions of cross-subsidization (the AT&T monopoly deflated local calling prices with revenues from long-distance tolls which exceeded costs) between long distance services and local services, two significant areas of telecommunications expenses have been identified. First, local calling which accounts for the greater proportion of use and is growing more expensive. At the same time, the cost of long distance telecommunications is declining. Neither change has reached equilibrium, and both are subject to further manipulation by both providers and regulators.

Overall, the price of telephone service is increasing. In the absence of subsidies, Bell operating companies such as Pacific Bell have been obliged to adjust prices as close to cost as the regulatory bodies will allow. Without the benefits of cross subsidies, local services such as private lines (which are of particular interest to institutional users) are also showing major cost increases.

The uncertainties of pricing lead to a diversity of budget approaches among large users. For example, the State of California did not budget price changes for telephone service for FY83-84 as it found the pricing situation too volatile for analysis. Some large users have simply "thrown 10% into the pot" in lieu of forecasting while others have attempted predictions. In general, large users are budgeting about a 20% annual increase in their cost, assuming no change in how telecommunications goods and services are acquired. [3] This rate of increase is consistent with estimated increases in State telecommunications expenditures over the past three years.

Potential for Cost-Saving and Cost-Avoiding

The changes in the telecommunications environment described above are all accompanied by new opportunities for decision-making by the user. In the past, all of these decisions were made by AT&T; if there were choices, the choices were defined by AT&T.

Competition within the marketplace and a vast selection of technologies create management instruments for the control of telecommunications expenditures. These instruments include competitive bidding, a host of management tools to channel, restrict or guide the consumption of telecommunications services, and the design of technology systems that operate more efficiently. Efficiency in telecommunications can be achieved through two forms of technological innovation. Local systems can be tailored to meet quite specific, individual user needs. Requirements of many users can often be aggregated, and met by shared systems achieving impressive economies-of-scale. For large users such as the State of California the economies are further boosted by large scale purchasing which is subject to quantity discounting.

Since both the demand for telecommunications and its costs will continue to increase, the net telecommunications bill will also increase. However, this increase for the first time is subject to cost-avoidance; that is, the rate of increase should decline in relation to demand. A 20% increase in use might only result in a 10% increase in expenditure. Through prudent management, the State of California like other large users can improve how much "bang they get for the buck."

The Factor of Risk in a Changing Environment

Today, the State of California faces the same uncertainty and choices that all large organizations which use telecommunications must face. But the initial questions to be asked are not related to analog vs. digital, or MCI vs. ATSS long distance service. Rather, the question is: how well prepared is the State of California to respond to this ever changing telecommunications environment? How prepared is the State for the risks of today's technologies and marketplace?

The issues of telecommunications management are only exceeded by the stress involved in addressing them. No matter what the decision, it is likely that there was another, perhaps better, way to go. An intense pace of changing technologies and a corresponding change in their pricing, the rush of creative applications never before possible, the ready availability of conflicting engineering viewpoints all contribute to an uncertain environment. Professional publications in telecommunications are filled with discussions of "risk management" -- the selection of a course of action when the results cannot be certain.

Government is notoriously challenged by risk. In a risky decision, the penalties for miscalculation can be severe while the rewards for success are often non-existent. Telecommunications management in government may be one of its more difficult and risk prone assignments.

At what point in the changing telecommunications

environment is it appropriate to select a course of action; what period of time should a choice govern? Should capital commitments be made that are only cost-justified if over a 15 year amortization period? How would such commitments compare to a more expensive lease lasting only five years? These are the types of decisions that face the telecommunications manager today. And experience may not help since the decisions are of a new type; in the past, AT&T was the one to take the chances.

It is the purpose of this report to evaluate how the State is answering this broad question and set forth recommendations to assist the Legislature and Administration as they, like most other large telecommunications users, undertake for the first time to manage this multi-million dollar capital investment and operating expense.

Appendices A and B, respectively, provide an overview of State telecommunications management and a discussion of the scope and methodology of this report.

CHAPTER II

THE STATE'S SYSTEM FOR TELECOMMUNICATIONS PLANNING

Planning for telecommunications serves the same critically important role it serves in other areas. As a process, it forces management to identify an organization's needs, goals, and objectives, and to analyze the alternatives technologies to meeting them. Once alternatives are analyzed, it becomes possible for management to decide among them based on criteria of cost, benefit, estimates of their feasibility, preparation of the organization, and margins of risk.

Planning has become a crucial component of telecommunications management as it addresses and supports decision-making in the face of a changing technological and regulatory environment. Indeed, without planning, the organization is at the mercy of past practice and the confusions of the present. Planning is different from operations. Planning analyzes alternatives for the delivery of telecommunications services (i.e., comparing systems of hardware or the quality of service). There are several different levels of planning. Strategic planning, the first stage of the planning process, sets forth the broad goals and principles that are desirable. This stage of planning involves asking the right questions and getting the correct answers. A series of "interrogatories" are conducted in order to find out, "why is it being done like that? what are the

strengths and weaknesses of the current system? what are the implications of carrying out the operations as they currently are?" [1] These questions are posed in relationship to the organization's mission. In that way, the base of an organization's technology is developed to carry out and extend programs and purposes. Otherwise, an organization only succeeds in affecting its mechanics of day-to-day operations.

The second stage of the planning process is the development of a tactical plan which outlines the methods by which the strategic plan will be implemented and accomplished. A tactical plan is generally reduced to a series of action plans that outline short-term objectives which, over time, will collectively fulfill the tactical plan.

The Benefits of Planning

The planning process, or the absence of one, has significant economic ramifications. Planning, from an organizational point of view, is the admission ticket of program managers and executive officers to key expenditure decisions in telecommunications. Telecommunications planning establishes the connection between an organization's mission and programs on the one hand, and its communications system on the other. Without sufficiently comprehensive planning, the director of a State department or control agency has no basis for analyzing the value of a proposed course of action.

Effective planning can ensure that an organization optimizes all opportunities for cost-savings through coordinated and shared activities, economies of scale, and avoidance of duplication.

Modern organizations confronting the inadequacies and inefficiencies of their technology are led to plan not only superior machinery, but their approach to "information management," the way in which information is to be used to support basic goals. In the private sector, this is represented by the "competitive edge," and the margin of profit that the accumulation, exchange and application of information provides. Point of sale access to and update of inventory information is a typical example. In government, where profit motive is replaced by program goals, the information manager designs a strategic plan to gather, share and utilize information in support of public service. For example, rural areas need to be able to order disbursements for social services without being penalized for their distances from an agency's headquarters. This requires, in turn, effective communications between the field and headquarters, suggesting the need for electronically-simulated proximity. Modern data communications can provide that.

But then it turns out that a diverse organization with many different users -- any large corporation or state government -- can save money by sharing transmission facilities for data communications. Although it is

universally accepted that such approaches produce significant savings over disaggregated data communications, combining diverse networks requires extensive planning and a detailed approach and schedule for implementation. The strategic plan tells the organization that it will need in fact to meet data communications requirements throughout the State to unite its satellite offices with its central bureaucracy. The absence of planned aggregation is then seen to be significantly more costly than planned information management using telecommunications technology.

The benefits of planning or the costs of not planning manifest themselves in many other ways. For instance, the procurement process for telecommunications can have significant lead times for delivery of a product from a vendor. Although there are competitive incentives to shorten lead times, the evolution of new technologies can be on the order of three years from conception to its offering on the marketplace and hence to the point of actual installation. Consequently, it is necessary for every large user, including the State of California, to reach critical decisions through a thorough planning process that anticipates such timeliness.

The penalties for a lack of planning may reflect themselves in cost centers other than telecommunications. Poor planning can result in operational deficiencies which may incur additional cost or simply may appear in the form of poor departmental image or public relations. In 1980, the

Employment Development Department suffered such an experience when telephone switches failed and client calls could not be answered. A major planning effort was subsequently undertaken to upgrade numerous offices.

The value and importance of comprehensive planning is universally accepted. Not only does it ensure that the State minimizes inefficiency and avoids unnecessary duplication, it provides a necessary course of action that remains flexible in an environment that continues to evolve at a rapid pace. Therefore, the first step in evaluating how prepared the State is to respond to a post-divestiture, deregulated telecommunications environment is to review its system for planning.

FINDING #1. THE STATE'S ABILITY TO UNDERTAKE AND ACCOMPLISH CRITICAL TELECOMMUNICATIONS PLANNING HAS NOT BEEN COMMENSURATE WITH THE DEMANDS OF THE POST-DIVESTITURE PERIOD.

One area in which all parties in telecommunications agree is the critical importance of planning in a post-divestiture, deregulated telecommunications environment. The State Office of Telecommunications and the Office of Information Technology, private corporations, telecommunications consultants, and the major vendors of telecommunications goods and services each have stated that comprehensive planning is the key to cost-effective decision-making in this expenditure-intensive area.

Large corporations with extensive telecommunications needs such as the Bank of America, Boeing Aircraft and Hewlett Packard, responded to this environment by developing a broad strategic plan as a major first step in dealing with change. They began by ascertaining how they use information and the role its plays in each component of activity. In the case of Hewlett Packard this process began by reexamining telecommunications and data processing. It gave way recently to one of the most thorough reorganizations of corporate structure and objective in contemporary business history. The State of California has applied itself to the far more limited, utilitarian aspects of improving operating systems.

Unlike the State of California, these corporations have moved quickly to establish a well-coordinated process for continued planning after concluding that information management will be fundamental to their future. They have then acted immediately to develop a comprehensive tactical plan to implement technological policies which implement the objectives outlined in their strategic plans. The private sector has taken these steps because they, like the State, recognize that significant opportunities exist to minimize telecommunications costs and enhance productivity. But they also realize that as language bonds people together, information is the glue of organization.

The State Needs to Develop a Strategic Approach

Throughout this Report the Commission refers to A Telecommunications Strategy for State Government (April 1984, issued by the Department of Finance and the Department of General Services) as a valuable statement of an operating direction for the State's deployment of telecommunication technology. The so-called Strategic Report allows current practice to be compared to alternative directions which would offer significant improved economics and productivity.

Although the Strategic Report provides the State with general direction for telecommunications, it does not address how information technologies link to the basic goals of departments or of the State overall. This omission is significant. Other large users have found themselves obliged to reconsider their basic mission as they move to modernize telecommunications and information technologies. They have discovered that information processes within their organizations are so powerful as to allow, if not engender, major changes in how services (or products) are defined, created, distributed, and managed. For example, the "branch" organization of banking is being replaced by the automatic teller machine and thus changing the nature of banking service itself. The multi-national corporation is successfully managing -- through telecommunications -- worldwide operations from a single, consolidated headquarters rather than from a network of regional, supervising outposts. Companies with a well-developed base of telecommunications and information technology are able to locate factories farther from congested areas to where housing is more plentiful for their workers. Within large organizations, distributed data processing and terminal-based access to information is decentralizing the work process itself, and allowing a wider swath of employees to make decisions as the facts appear in front of them on a computer terminal's screen.

The State of California through each of its departments and programs needs to reflect carefully on the ramifications of information flow for its many missions. Departments that today must administer a vast complex of field offices might tomorrow be managing a communications-based complex of electronic booths. In one instance such a change might equalize and expand services among the public; in another, the public might be denied essential personal contact with professionals for support and help. A strategic approach should define the use of information technology on a clear enunciation of program objectives: who is being served? with what? how? what data is needed? by whom? how quickly? with what protections of privacy?

Thus, large users who began with intentions to economize their communications costs frequently ended up reconsidering their most basic goals. This evolution having occurred, large users realized the close link between their information technologies and their highest levels of leadership. This is a critical element of strategic planning. As a result, they have accorded increasing status to the "information infrastructure." The management responsible for defining the information infrastructure through technology has steadily moved closer to the executive office. The failure of the State thus far to give organizational clarity to its technological direction is non-strategic. In this Report we can only urge the Administration and the Legislature to

consider the profound effects of telecommunications and information technology on the very nature of government to avoid having the "tail wag the dog."

The State Needs to Develop
An Adequate Tactical Plan

The tactical plan implements strategic policy by resolving three issues: (1) how implementation of the strategy is managed; (2) the groundrules for access to the telecommunications goods and services identified by the strategy; and (3) how resources required to implement the strategy are allocated. In other words, who will do it? how will it work? and how much will it cost? A thorough tactical plan should answer each of these questions.

In this section, we examine tactical planning in light of the experiences of large users comparable to the State of California in their telecommunications expenditures and breath of organization; we then consider the State's effort to implement its own telecommunications strategy. In contrast to the private sector, the State has been slow to develop and implement a thorough tactical plan. It has not sought to lay a foundation for tactics in a strategic plan and a strategic outlook about the role of information. Instead, it has endeavored to adjust its current operations as issues arise.

Yet the State is more information intensive than any corporation. But the State has yet to question its current technological and telecommunications practices. It is not asking how well they meet government's goals. As we discuss, however, the realities of deregulation and new technological alternatives are forcing the issue.

Managing the Strategy

To take action in the volatile, technologically rich environment of contemporary telecommunications is to balance ongoing, routine operations against innovation. Planning anticipates, analyzes, and selects options for improving telecommunications in the context of regulatory, spending, and technological constraints while operations managers put selected options into effect.

Unless the State understands the distinction between strategic and tactical planning, it will confuse operations and its needs with innovation. A model may be taken from contemporary business theory. Changes in operating directions are based on strategic planning, while changes in organizational procedure and routine practice are a matter for tactical planning. Thus, enhancing a network to do better what it did before is an important, but non-strategic step. However, enlarging access to high-speed, Statewide digital communications for agencies who have always been limited to

the telephone would be a strategic change. Unfortunately, without strategic planning, terminals may multiply but they could end up functioning as glorified telephone sets. For example, terminals have replaced typewriters at many newspapers but they have not necessarily improved the news story.

The telecommunications planning required today is fundamentally different than it was in an earlier, pre-divestiture environment. A new set of choices have emerged, none of which have, per se, a "right answer." Choices will be made according to the "values" of the organization. For example, should a multi-vendor, prime vendor, or a sole vendor source be solicited? The selection among these will decide how extensively the competitive marketplace will be engaged. [2] Peter Keen, a pioneer in the functional analysis of telecommunications planning, enumerates dozens of telecommunications decisions whose outcomes will be affected by telecommunications strategy, pure short term economics, or broad policies not even specific to telecommunications. [3]

In order to address this greatly expanded planning function, large users have established planning and operations as <u>independent</u>, well-staffed branches of a common information technology organization. In this way, planning is freed from predisposition to and the diversions of existing operations in its analysis of alternatives. [4] (The issue of overall organization is discussed in detail in Chapter V.)

Accessible Telecommunications Goods and Services

A telecommunications strategy introduces a system which, by its nature, concerns the overall needs of the organization. Larger telecommunications users, such as State government, have highly diversified telecommunications interests. Consequently, a set of rules are needed to bring together and keep together a system accommodating a vast range of requirements. These rules are called the system's architecture, and should be articulated in the tactical plan. The obvious and absolutely necessary payoff to the user of a common architecture is access to the system. The Bell System, for example, imposed architectural standards on the nation's telephone network so that only one type of telephone protocol could access any other telephone.

Data communications, unlike voice communications, did not evolve as a universal service with a common architecture. [5] Different vendors developed different protocols for computer communications. As a result, customers, although from the same organization, acquired incompatible systems. The concept of computer protocols is explained by an analogy: One can call Japan on the network; one may not be able to communicate. The sounds are audible and clear but the languages are different -- that's the protocol issue in data or its the language barrier in people communications. [6]

Large users establish their own, internal "regulation" of their telecommunications network by means of an architecture. There are major incentives to do so once data communications includes and is between a variety of systems that wish to "talk" to one another. Incompatibility will result in the need for a new computer terminal on the desk, another computer in the closet. [7] Data generated by one system, without a common architecture, may become a prisoner of its protocols.

As described in Chapter I, data and voice communications can and should be "integrated;" they can share the same transmission facilities, with the benefit of a much more efficient telecommunications system. To integrate or not is a matter of architectural policy. For example, the U.S. Department of Defense is constructing an integrated network called Autovon, whose architecture requires connection to integrated equipment. Deciding whether or not to integrate and determining which services will be provided are critical milestones in developing an architecture.

The State's Tactical Plan

In May 1984, the Department of Finance introduced a revision of the Governor's budget to fund telecommunications activity. This was accomplished through a budget change proposal (which we identify in this Report as the "Strategy

BCP") requesting $18.2 million, of which $10.5 million was to establish a planning and policy capability at the Office of Telecommunications and to design and construct the core components of digital networks for voice and data communications. Of this total, $7.5 million was for a telecommunications equipment fund, primarily to purchase telephone receivers. During the 1984 Legislative session, the Legislature excluded the Strategy BCP from the final budget appropriation.

The Deputy Director for the Office of Telecommunications in the Department of General Services has testified that the Strategy BCP represented the State's tactical plan for implementing [the] Telecommunications Strategy for State Government. [8] However, the Strategy BCP would not have fully implemented the State's strategic telecommunications policy. It was not and is not a tactical plan, but an augmentation of staff, consultants and equipment to the Office of Telecommunications. Moreover, this augmentation, as presented, could not have lead to a tactical plan because its assumptions were at variance with a significant portion of the Strategic Report and the general purposes of telecommunications planning in the post-divestiture period. Because the Strategy BCP was not guided by strategic policy, it could not help but create its own assumptions as it went.

For the State of California to implement the operating direction enunciated in the Strategic Report, it must address the elements of tactical planning and solve problems that retard the planning process. First, we consider how the Strategy BCP conceived tactical planning and whether its conception would have been commensurate with policy and the post-divestiture telecommunications environment.

Management Assumptions are Inappropriate

A tactical plan should define a management organization to implement strategic policy; the organization is warranted by specific tasks in support of that policy. However, four core assumptions stated by the Strategy BCP, quoted and analyzed below, had the effect of transforming the strategic policy into an extension of current practices at the Office of Telecommunications -- rather than a retooling of State telecommunications management for current tasks of the new environment.

Assumption #1. "...management capability must be strengthened [at the Office of Telecommunications]." [emphasis added, 9] The strategic policy as enunciated in the Report does not direct its remarks to the Office of Telecommunications. Rather, it specifically calls for a project task force to implement well-defined objectives, none of which consider the Office of Telecommunications one way or another. [10]

A user Subcommittee on Management Issues formed by the Strategic Task Force that developed the Strategic Policy specifically rejected augmenting the Office of Telecommunications to accomplish implementation. [11] This recommendation was included in the draft report prepared by the consulting firm. The conflict between users and the Office of Telecommunications over organizational issues was deleted from the published Report. [12]

Assumption #2. "Individual agencies must prepare for new deregulated equipment responsibilities." [13] The telecommunications Strategic Report identifies equipment the user will connect to the network, and agency distribution systems and their management as responsibilities falling on individual agencies, a much more advanced level of activity than this assumption and the BCP as a whole projects. By narrowing individual agency responsibilities, the BCP foreclosed the expansion of telecommunications options in customer-premise, deregulated equipment, one of the two key areas of activity in the Strategic Report [see below, user access to telecommunications goods and services].

Assumption #3. "The effects of divestiture can be met [by] alterations to the existing operation and not a whole restructuring..." [14] This may be the case; however, the Strategic Report calls for a project team of 40 people whose functions and organization are unlike any existing State organization. It envisions a central telecommunications

organization whose program has virtually nothing in common with today's voice and data organization of the State of California.

Part of this project's mission, according to strategic policy, is evaluation of the future of the State's microwave system, a system presently commanding 86% of the Office of Telecommunications' personnel budget. The Report proposes that continued operation of the State microwave system must be questioned, raising the possibilities of a third-party operating contract to run it or of its abandonment altogether. Either eventuality would certainly constitute a "whole restructuring" of the Office of Telecommunications. However, the Strategy BCP deleted any evaluation of the future of the microwave system from the planning tasks it enumerated, and thus discarded one of the basic "interrogatories" of the planning effort. The Report calls for a component of the Project Task Force to be assigned to "existing services" precisely for evaluative purposes. However, the Strategy BCP eliminated an evaluation of current practice, redefining this component as a "user's equipment and services project."

Although the Strategy BCP did not contemplate restructuring the Office of Telecommunications, it did anticipate other restructuring not identified in strategic policy. For example, the BCP assumed functions of but otherwise ignored units of State government named by the Strategic Report as having "key" roles, such as the Governor's Office of Emergency Services.

Assumption #4. "Permanent Policy and Planning Section within the Office of Telecommunications." While the functions of this new section are left to the Project Task Force to define, it is an objective outside of strategic policy. Rather, it is a goal of the Office of Telecommunications. In fact, the future organizational placement of planning functions was omitted from the Strategic Report and was in contest between the Office of Telecommunications and the major users of the State who objected to assigning strategic functions (such as planning) to the Department of General Services. [15]

Elimination of User Access to Goods and Services

The Report provides substantive enumeration of telecommunications goods and services of interest to departmental users and network management. Therefore, a thorough tactical plan should implement this aspect of State strategic policy by defining an appropriate process for analyzing and acquiring, when justified, these goods and services.

However, the Strategy BCP made no mention of the vast majority of goods and services itemized in the Report, including local area networks and other user-defined distribution systems. In delineating "major tasks" that regard user equipment, customer premise equipment was inappropriately limited to telephone receivers.

The Report also establishes the network objectives of a "new high capacity, digital, long-distance telecommunications capability that will handle the requirements of voice, data and video..." and in that way "overcome the limitations of existing long-distance systems..." However, this objective is recast in the Strategy BCP to a "...long-distance telecommunications facility...that would include all long-distance lines used by the State and the equipment...necessary to switch the State's telecommunications traffic among the available lines..." The BCP avoided stating any new direction to the network, referring merely to the existing long-distance service. Thus, it in effect proposed an enhancement of the existing system -- a fundamental difference. Furthermore, the BCP nowhere affirmed the Report's architectural policy of integrating voice and data transmission, an approach so different from what exists today for State use that its absence from the Strategy BCP cannot be taken as having been an oversight. Later in this Chapter we consider how the viewpoint of the BCP is represented by the technological directions now being implemented, which would continue the disaggregation of voice and data communications.

It is the view of the Commission that the State of California does not at this point in time have a tactical plan to carry out the operating direction adopted by the Administration in the Telecommunications Strategy for State Government. In spite of various improvements in the State's

communications system reported to and acknowledged by the Commission, the lack of a tactical plan leaves the State a captive of business-as-usual. Substantive gaps in contents between the Strategy BCP and Strategic Report leave both the Legislature and the Administration with two divergent responses to the contemporary telecommunications environment. The State's operating direction is patterned after those other large users have found necessary in their approach to telecommunications planning: strategic thinking applied to operations during a period of sharp technological and marketplace change. However, the proposal of the Department of General Services, to the contrary, moves the State towards primarily enhancing what has been existing practice.

We turn now to an examination of systemic barriers to the planning process in the State of California.

The State has not Assessed its Telecommunications Needs

In addition to lacking an overall tactical plan to implement strategic policy, the State has not completed a thorough assessment of the needs of its users of telecommunications. For the purposes of our discussion, "users" indicate all State agencies, departments, boards, and commissions. A "needs assessment" starts with a statement of a user's purposes and the many ways in which information creation, access, and distribution, and its interaction with

decision-making are involved in meeting those purposes. The more thorough the examination of purposeful information (and the usual build-up of purposeless information), the more able the user will be to go to the next step: analysis as to which areas of the organization's programs, productivity, or efficiency would be improved by telecommunications and information processing. These are the very first steps of the planning process; that is, the connection between a department's mission and technological resources.

The needs assessment having been accomplished, telecommunications planning analyzes alternative systems (including the status quo) in relation to needs. It determines which alternative is technologically and organizationally feasible and offers maximum benefit in comparison to cost. The plan produces a set of requirements. At that point, the planning process has accomplished its purpose. Requirements state, in telecommunications terms, how an organization's needs are going to be met. When rendered in the more technical language of operating specifications, requirements become the basis of a detailed design and the selection of vendors for actual acquisition of telecommunications goods and services.

In the post-divestiture era, when alternatives are many and where feasibility and cost/benefit ratios are far from obvious, planning permits managers to make informed choice and assures the highest probability of satisfactory procurement. However, in California State government, few departments,

agencies, boards, or commissions have conducted any level of telecommunications planning. Our survey of State organizations indicated the following:

- of 110 State units (exclusive of colleges and universities) surveyed for their planning activities, only 31 report telecommunications planning of any kind whatsoever in the past three years; some major agencies do not report any planning; *

- of the 31 units that did report planning activities, nine included activities which could only be considered planning in the most general sense (e.g., submission of five year communications plans to the Office of Telecommunications, which are not actually planning documents [see this Chapter, pages 36-43 on documents]);

- only two departments among the 110 surveyed, reported undertaking all categories of planning: needs assessment, feasibility studies, strategic planning, cost/benefit analysis, and statements of requirements.

The Deputy Director for the Office of Telecommunications believes that the extremely limited effort in telecommunications planning among many State organizations is evidence that most users are adequately served by centrally provided technologies such as the telephone. [16] In this view, user planning is unnecessary except by the technologically sophisticated. On the contrary, millions of residential and small business customers are learning amidst great confusion that the telephone may be commonplace, but it is no longer simple.

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* Respondents were counted who listed any activity they identified as "planning," not only generic notions such as "needs assessment."

There are assessments of needs, for example, that State telephone users in any sized unit should do or have done for them. A case in point is the feature offering of Centrexes, the telephone company switches that serve the vast majority of State telephones. According to the Office of Telecommunications, Centrex supports at least 157 features. However, the Centrex system which the State leases only provides about nine features to users. [17] At least one of these features -- six port audio teleconferencing -- is not made available to all users. The difference of potential versus actual features is explained by the Office of Telecommunications as elimination of those that would be requested by users, if made available, but are not needed by them. However, no study of the Centrex features State organizations need has been undertaken within the past three years. [18]

The needs of the modern office have gone far beyond regular telephone service. With the addition of communicating microcomputers well within reach for $2,500, the desktop contains telecommunications and data processing technology that once required its own special room and three technicians to operate. The State has reacted to the growing use of telecommunications technology by establishing approval

processes rather than planning processes. Control agency approval by either the Department of Finance and/or the Department of General Services or both must be obtained by a user wishing to introduce new technologies. However, anticipatory analysis of alternatives -- planning -- has yet to be required. Instead, users must wind their way through a complex, ill-defined review process.

FINDING #2. THE STATE NEEDS TO CLARIFY USER AND CENTRAL PLANNING RESPONSIBILITIES

Telecommunications planning as conducted by the State of California should extend beyond strategies and tactics for the whole of government. The overall system of planning must include developing a telecommunications system for a particular user. Such planning, it is widely believed, must be initiated by that user. The State must also plan for specialized applications such as emergency communications or use of the State microwave system, where the application is utilized by more than a single department, but not the entirety of government. Planning for these types of applications fall to a lead agency or department in coordination with other State units, cities, or the Federal government.

It is in each of these areas that the State needs to clarify the planning responsibility of individual user agencies and of central and lead agencies. Similarly, the State also needs to define their respective procedures.

Unclear Authority of User Agencies in Planning Telecommunications

The Strategic Report establishes the policy of "distributed management responsibility" among user agencies and providers of telecommunications within State government. Under a "hierarchy" of authority, the user is granted the prerogative of designing the "local distribution system" including local area networks, customer premise equipment such as PBX switches, and terminal devices. Access to the network is a shared responsibility to assure compatibility; the network itself must be centrally designed.

At present, however, there is an unclear assignment of responsibility between users and reviewing agencies. Voice requirements are being drawn by users only to be replaced or rejected in the review and approval process as illustrated by the following examples regarding PBX switching decisions:

- The Department of Motor Vehicles sought to acquire a customer premise switch, a PBX, for its Sacramento headquarters and submitted a plan to that effect to the Office of Telecommunications. It was denied as contrary to the consolidated exchange policy which requires use of Centrex.

- The Department of Corrections submitted a plan for an integrated, voice/data PBX for new prisons which was disapproved by both the Office of Telecommunications and the Office of Information Technology in favor of a voice-only PBX.

- The Employment Development Department attempted to substitute a premise-based call management (billing) system for one operated jointly by the Office of Telecommunications and Pacific Bell. After four months of discussion, the department has not obtained formal approval to do so. [See this Chapter, pages 75ff. for a more detailed discussion of billing systems.]

- The Franchise Tax Board proceeded at the time of divestiture to plan a PBX installation which has since gone to bid. The Office of Telecommunications has indicated that the Franchise Tax Board was allowed to acquire the PBX because of uncertainties in telephone company offerings at the time, but that the PBX would be disapproved if the proposal was submitted today.

- The Department of Water Resources has unsuccessfully sought approval from the Office of Telecommunications for its plan to build an integrated, PBX based voice and data system for its downtown Sacramento facilities.

It is not our intentions to suggest that these PBX proposals should have necessarily been approved. Our concern, rather is with the process. In each of these illustrations, the user department has planned in one direction, but found the central telecommunications agencies implementing in another direction. One department cited the Strategic Report (which advocates integrated PBX systems) to justify its conclusions, but to no avail.

These departments did not undertake planning frivolously, nor did central agencies review their plans frivolously. There are, rather, two policies in circulation which differ on the user's role in planning telecommunications: one articulated by the Strategy Report, the other deriving from case-by-case reviews of departmental proposals.

The Office of Information Technology and the Office of Telecommunications have emphasized (in management memoranda and bulletins which have the force of administrative law) the responsibility of State users to plan their own telecommunications. Departmental plans are not intended to be academic exercises by the control agencies or by the users; they are meant to generate the specifications that are put out to competitive bid or are met by a sole source. Thereby, they direct the expenditure of public funds. If a department develops plans for integrated voice and data switching through a PBX, it may not be proposing the best technical solution. Nevertheless, the user agencies's assessed need to switch voice and data must be taken seriously regardless of the method proposed to accomplish it. The plan should be revised through a more informed analysis of alternative technologies than has been assembled by the user department. However, control agencies eliminate the value of the fundamental planning step -- the needs assessment -- when simply denying approval without working with the user to determine the best way forward. Moreover, the incentive to plan is lost without confidence by the user that the approval process will lead to a solution to the communications problem being identified. The planning effort needs to be seen as a mutual effort between the control agency and the user.

Control Agency Planning and Approval Procedures are Unclear

The State has sought to guarantee effective applications of telecommunications and information technology by the two-stage process we have been discussing. Departmental needs and the requirements to meet them are developed by users, the product of which is then reviewed and changed by the Office of Telecommunications and/or the Office of Information Technology. Without approval from the appropriate agency, requests for bids cannot be released, funds are not expended, and budget change proposals are not processed.

However, an analysis of actual applications of State planning procedures shows inconsistent procedures, changeable review processes, and elusive definitions of planning itself. As a consequence, departments are unable to determine whether they are planning properly. Unclear procedures may also have the effect of slowing innovation among newer users of telecommunications technology needing budget augmentations for this purpose.

The Commission reviewed in detail the procedures followed by two user agencies: the Employment Development Department and the Department of Corrections. When the Employment Development Department sought approval for its telephone upgrade project, it submitted the required Form 20's to the Office of Telecommunications. However, the Department of Corrections in the same quarter (Spring 1984) was denied

the permission it requested from the Office of Information Technology to follow exactly the same procedure for similar types of installations (new telephone and data communication systems for prisons) because it had not submitted the previous annual plan to the Department of Finance. When the Department of Corrections then submitted the Feasibility Study Report required by the Office of Information Technology, it did what Corrections was not allowed to do -- the Office of Information Technology sent the feasibility report to the Office of Telecommunications. Instead of responding with advice back to the Office of Information Technology, the Office of Telecommunications issued a disapproval of the Department's plan directly to the Department, and approved instead its own system plan. An integrated PBX was disallowed in favor of a "voice only" PBX. The Office of Telecommunications was strongly critical of the Department's proposal. When asked why any approval was granted, given serious criticism, the Office of Telecommunications operations engineer explained, "We knew they needed communications." [19]

The feasibility study was returned to the Office of Information Technology by the Office of Telecommunications, which six months after receiving the Feasibility Study Report, also rejected the proposed integrated PBX approach, only this time from a "data communications" standpoint. Neither the Office of Telecommunications nor the Office of Information Technology ever suggested to the Department of Corrections any alternative way to handle data communications. The Department

now faces the problem of how to connect computers and terminals within a prison facility for communications independently of voice communications.

From these cases, it is evident that the division of authority between the Office of Telecommunications and the Office of Information Technology is not managed according to consistent principles. The Commission's conclusions regarding this point were confirmed by the Supervising Engineer for Voice and Data in the Office of Telecommunications who described coordination between the two units as "accidental." [20]

Perhaps the best indication of the lack of a planning orientation among control agencies is made clear by considering the documentation that the Office of Telecommunications and the Office of Information Technology require from users. The Office of Telecommunications principally requires users to complete two principal documents: the Five Year Communications Plan, updated annually, and the Form 20, used for every purpose, from ordering new telephones to procuring PBX installations. An analysis of these documents shows, however, that the Office of Telecommunications does not actually solicit telecommunications plans -- the analysis of alternative approaches to meeting telecommunications needs. The Communications Plan has the objective, according to a bulletin from the Office of Telecommunications, of providing a data base of user activity to that office. Its intent is not

departmental planning. The Form 20 was created over a decade ago to accomplish "uniformity in ordering" telecommunications goods and services from the telephone company in a period of monopoly service. However, the Form 20 over the past year has been used as the exclusive conveyance of proposals submitted to the Office of Telecommunications.

The Information System Plan was developed by the Department of Finance to review expenditures in data processing. Its purpose was expanded when Chapter 1327, Statutes of 1983, mandated the Office of Information Technology to exercise oversight in telecommunications. The Feasibility Study Report is an adjunct to the Information System Plan. Under current policy, however, the Information system plan is only required for projects exceeding $75,000 or needing budget augmentations, which excludes most telecommunications activity. Except for a very general paragraph on planning in the State Administrative Manual, no formal guidelines for planning have been promulgated. As we see below, there is no clear direction to user agencies specifying when one document or another should be submitted or even to which control agency the department should go for approval.

The Department of Finance has not clarified procedures in spite of statutory direction to do so

In an October 1984 management memorandum, the Office of Information Technology sought to clarify for user agencies the division of review functions between itself and the Office of Telecommunications. A decision-tree was established with branches to the Office of Telecommunications and to the Office of Information Technology under the following conditions specified in the memorandum as follows:

1 If a department already has funds in its budget for telecommunications, it could spend them by submitting a Form 20 to the Office of Telecommunications, <u>except that</u>

2 the Office of Information Technology would "review and process for budget consistency requests for telecommunications which exceed $75,000 that have been approved by the Office of Telecommunications," <u>except that</u>

3 If a budget augmentation is needed to finance a project, regardless of amount, then the department would have to develop the Information System Plan and associated Feasibility Study Reports for submission to the Office of Information Technology.

Under Condition #3, the Office of Telecommunications would not have a role. The management memorandum "clarifying" the roles of these control units designated the Office of Telecommunications the "<u>lead</u>" agency in telecommunications. However, that Office would only have the lead for the numerous small projects financed from existing budgets. Major telecommunications systems would remain decision points of the

Department of Finance. Ironically, the State Administrative Manual provides the Office of Telecommunications with review of communications budgets, these "clarifications" notwithstanding.

The Office of Information Technology was required by Chapter 1327, Statutes of 1983, to detail its procedure in a 1984 report to the Legislature. This law is the source of that Office's mandate in telecommunications. However, the only reference to telecommunications in that report, the Strategic Implementation Plan (November 1984), is to the management memo described above. According to the author's staff, no effort was made to determine whether the "clarification" of October 1984, was faithful to the Legislative intent of Chapter 1327, Statutes of 1983.

The problem of complex, unclear procedures is greatest for those user agencies least able to handle them. Agencies which are seeking "new" money for a telecommunications project are obliged to get the approval of the Department of Finance. These are typically user agencies without the well-established information technology budgets which larger, experienced technology users have. Larger users within the State can avoid the review of the Department of Finance if they can keep their projects under $75,000. Units new to telecommunications who would innovate their use of technology have to write an Information System Plan and a budget change proposal; their plans will be reviewed by the Office of Information Technology, possibly by the Office of Telecommunications, and

yet again by the Program Budget Office within the Department of Finance. Departments new to technology will not be as familiar with these documents and processes as are more experienced users although the demands on them are greater.

The effect is that there are very few budget requests for telecommunications. Nearly all of the project activity is concentrated among the "haves" of information technology who use ongoing appropriations, rather than the "have nots." This is undermining the Governor's commitment to the "fullest" application of productivity-improving technologies throughout State government.

FINDING #3. THE STATE NEEDS TO DEVELOP ITS OWN PLANNING CAPABILITY

Throughout the State's history, new developments in science and public policy have created jobs which did not previously exist. Telecommunications management is a case in point. There also are special economic incentives for resident expertise in this field. "The economies of expertise" are every bit as important as the "economies of scale" in controlling telecommunications expenditures. [21] Through expert planning, the State maximizes benefits while minimizing costs.

In order to plan thoroughly the acquisition of telecommunications products and services, the State may either

dedicate employee time or retain consultants. If neither planning resource is made available, the State must rely on plans developed for marketing purposes by vendors, or else forego planning altogether and adapt specifications which were used in previous procurement efforts.

In examining the utilization of these options, the Commission found in major projects of departmental and central agency little reliance on developing the State's own planning capabilities. To fulfill telecommunications needs, the State has uncritically accepted a vendor's plans, or has proceeded to procure without planning. Sometimes the State has been able to proceed only with compromised requirements or else by procuring a more expensive system because it was readily available. As a result, goods, services, and systems are acquired without comprehensive, objective analysis of alternative technologies and their cost/benefits, an analysis which would be provided if the State had its own telecommunications plan. Thus, in the absence of planning the State surrenders control of its telecommunications systems, their design and their costs.

Although the State has anticipated a need to upgrade its telecommunications planning capability, there has been little progress in framing staff resource policies for telecommunications management, leaving the planning cupboard bare. (In Chapter III we analyze the issue of staffing policies in detail.) The State, unable to accomplish its own planning in many circumstances, is being buffeted by strategic

interests that may not coincide with its own.

Some Telecommunications System Plans Have Been Compromised

In the absence of staff or consulting resources for telecommunications planning, a department may be obligated to accept inefficient or ineffective systems as the alternative to prevent jeopardizing a program and the public's welfare. According to the Office of Telecommunications, the highest priority in departmental telecommunications is the establishment of new services needed when a department moves or when the State constructs new facilities. [22]

Certainly the most visible and publicly sensitive of all current construction projects are the ten new prisons being built by the Department of Corrections. All of them require customer-premise, PBX-based, telephone and data communications systems. They also require as many as one hundred other systems besides telecommunications, ranging from the special technology of prison doors to internal fire and medical facilities. They all must cohere precisely to produce secure, humane and cost-effective custody. The demands on executive management [management from the departmental director up to the agency] are intense; telecommunications is, from an overall standpoint, only one of many items "on the critical path" to be accomplished. A case study of planning for the new prisons demonstrates that the telecommunications management system at the user and central level has not been

organized to meet the tasks of the new telecommunications environment.

In order for telecommunications systems to be installed and working in the new prisons when they open, the following must happen:

- Planners must be assigned to define the system(s) that the new prison facilities require.
- Plans must be written and submitted for approval to central telecommunications agencies.
- Plans must be approved by the Department of Finance and by the Office of Telecommunications.
- Specifications must be written to implement the plans.
- The specifications must be put to bid or met by a sole source contract.
- Contracts must be signed and executed.

The Commission found that each of these steps, while logical organizational events, became potential crises in the absence of a clear management approach and well-defined management resources at both the user and the central telecommunications agencies.

To complete the necessary tasks, the Department of Corrections assigned the Chief of their Data Processing Unit overall responsibility for telecommunications system planning. However, as the Office of Telecommunications has emphasized in Commission interviews, expertise in data processing cannot be assumed to transfer to telecommunications. Although the technologies are converging,

and they share to some degree a common technical language, they are not equivalent. Technological alternatives in voice communications, especially, would be outside of the experiential base of a unit that had been solely responsible for computers and computer communications. The Business Services Office of the Department administers telephone service to the Department.

In order to provide additional expertise to the Data Processing Unit, the new facilities section "loaned" it with a short-term consultant (nine months) with a telephone company background. An analyst from the section was also available to work with the consultant on an intermittent basis. However, the consultant was never really free to plan telecommunications at the new prisons, because he was originally hired to resolve telephone system problems at operating prisons. At the same time, the Data Processing Unit was not relieved of <u>its assignments</u> to data processing issues. Although the Department of Corrections in form had accomplished the first step, the assignment of planners, the reality was otherwise. Requests from the Data Processing Unit for additional support for telecommunications planning were not understood by executive management. For example, when the Data Processing Unit submitted to the Executive Office a list of 24 projects in telecommunications and data processing, only an automated canteen transaction system was approved. Not until the Office of Telecommunications wrote to the Department's Director that it was concerned about the lack of

progress in system planning did the issue receive attention. In an interview with the Commission, a Deputy Secretary of the Adult and Youth Corrections Agency agreed that executive management was not aware of how much more work-intensive telecommunications planning has become since divestiture.

Planning telecommunications for the new prisons was further complicated by a stalemate with control agencies over basic technological strategy. In early 1984, the Data Processing Unit sought approval of a Feasibility Study Report calling for an integrated voice/data system for each prison. The Office of Telecommunications would not approve integrated technology. Instead, it approved a "voice only" PBX and did not comment on how the Department should meet its data communications requirements. Additionally, the Office of Information Technology did not respond to the Study Report for six months. From the standpoint of the Data Processing Unit, each new prison now needed two systems: one for voice, one for data. Since it is most efficient in new construction to lay cable for both voice and data simultaneously, the Data Processing Unit needed to develop plans for both systems before either proceeded. The Data Processing Unit was left without direction from the central control agencies regarding data communications. Furthermore, it was left in need of more support in planning voice communications than it had. As a result, months have passed without any planning being accomplished.

The Office of Telecommunications, in its analysis of the

situation, faults the Department of Corrections for developing a poor Feasibility Study Report and for not obtaining voice communications plans from the consultant. However, absent a management system to assure telecommunications planning, the State could not respond to these concerns with constructive action. At the time our study was being conducted:

- The Office of Telecommunications had not suggested to the Department how it could strengthen its Feasibility Study, or how it could better address voice and data communications requirements;
- No meetings had been held with the Department of Correction's consultant, and thus, the Office of Telecommunications never understood what assignments competed for his time;
- In the face of assignments to dozens of other departments, the Office of Telecommunications' analyst assigned to the Department of Corrections was unable to do more than urge the Data Processing Unit to develop its plans and specifications; the time that she did have for the Department of Corrections was consumed by operating problems at existing prisons; furthermore, she is not trained or expected to handle data communications;
- Because the PBX facilities were planned outside of the ATSS network, the Office of Telecommunications felt it had little leverage in directing the Department of Corrections.
- The Office of Information Technology had limited its role to requests for planning documents to review; when it received one, however, it sent the document to the Office of Telecommunications, and had not reviewed it for months thereafter.

Recently, the Office of Telecommunications has hired a telephone analyst from the Department of Corrections and will assign him to telecommunications planning for the new prison construction program. [23]

In order for the Department to have telecommunications systems in place and operating when the new prisons open, it now anticipates that communications requirements and procurement will have to be compromised. For example, the Department will not be able to provide the Office of Procurement adequate leadtime for the administration of clustered, competitive bid invitations for PBX equipment; instead, each prison's requirements will be bid independently, rather than as a group. The State will also lose the economic input that a multi-site bid process provides. The Department expects it may acquire less reliable equipment as a result of less exacting specifications. And whatever efficiencies might have resulted from planning voice and data communications together have been forfeited. The Deputy Director for the Office of Telecommunications believes that the Department may ultimately be forced to accept sole source installation of telephone systems in some prisons because of a lack of adequate leadtime for competitive bid processes.

Under current management practice, planning responsibility is diffused between departments and control agencies. The Office of Telecommunications insists that departments are responsible for managing their own planning of telecommunications and that it "cannot forcefeed" departments, even when it perceives that plans are not developing in a timely or adequate manner. [24] In fact, an Office [of Telecommunications] supervisor suggests that "a disaster" might be necessary to advance telecommunications planning for

the State's new prisons. This would be unfortunate, since communications is an important part of prison security. This case study illustrates a more general problem: when departments are unable to develop or obtain approval of their plans, no one seems accountable for the outcome or lack of it.

Vendors are Exerting Influence on State Telecommunications by Planning for the State's Needs

Planning is not a luxury in telecommunications. Rather, it is "taking control of one's own destiny." [25] If the customer cannot or will not commit to planning, vendors willingly fill the breech. Vendors have two incentives for doing so. First, by planning the State's future, vendors dramatically enhance their likelihood of successful sales as they guide the State to their own marketing priorities. Secondly, a vendor cannot prepare manufacturing and service offerings without data from the customer about what is needed and wanted. In addition to data about the present, the vendor wants a forecast of future requirements so as to be ready when the time comes. The data and forecast must come from a plan. As a marketing representative of AT&T Communications put it,

> "we want to enter the planning cycle and be able to look down the road...I have the feeling that the knowledge level of the people we're dealing with is as good as we make that knowledge...I would think [the State] need[s] to rely more on the utilities to assist them with their planning." [emphasis added, 26]

The Commission has found instances, minor and major, where a lack of planning staff created a vacuum that was then filled by vendors with an economic interest in the outcome. We believe that having economically interested parties perform technical planning skews the competitive process and may subject the State to poor quality control of the planning process.

Inappropriate Vendor Planning of State Requirements

In 1984, the Department of Corrections needed designs for a television system at a new prison planned in San Diego County. A telecommunications consultant arranged for a vendor of institutional television equipment to plan and estimate the cost of such a system. When asked why a prospective bidder was utilized for planning, the consultant said the service was "free" and "generic."* However, according to a Construction Operations Analyst, the vendor has provided this type of service "for many years" in the "hope of being awarded the contract" when the specifications it developed are put out to bid. [27]

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* Quoted by the Chief of the Data Processing Unit, California Department of Corrections, during a December, 1984 interview with the Commission

The design was certainly free; to determine whether it was generic would require a technical analysis by an impartial expert in the field. In telecommunications, generic designs are rare even in textbooks because they are tied to the selection of a particular technology base. For that reason, many customers of telecommunications prefer to issue so-called endpoint specifications, where the objectives of a system are stated, and the vending community is invited to compete at the design level.

A department's alternative to "free" designs from the marketing unit of a vendor is to hire a firm or individual specializing in designing systems of the type in question, but who is also clear of any economic interest in sales of such systems. Since television is a significant component of the educational and recreational programs for the incarcerated, institutional systems will be needed at every new prison. The technology is well understood, and impartial consulting expertise is readily available. For example, if unable or unwilling to afford outside consulting support, the Department might have sought advice from San Diego State University which runs one of the nation's most sophisticated institutional television systems.

The Planning of Economical Data Communications Systems

The State of California, according to estimates of data transmission experts at the Office of Telecommunications, could be saving approximately $10 - $12 million annually by the aggregation of data communications and the integration of data and voice communications. That is, data transmission would gain a virtually free ride on the excess capacity of the digitized voice carriers. [28] As we discuss below, the State is taking the first step in acquiring key transmission technologies for this type of sophisticated realization of economies-of-scale. However, the State is not relying on its own plans to do so, but is instead giving away its prerogatives to a vendor in return for that vendor's expertise. As it turns out, the State has had negative experience with the same issue that was handled in the same way.

A decade ago the Office of Telecommunications [then called the Communications Division] arranged with Pacific Bell [then organized as Pacific Telephone and Telegraph] the planning, design, and offering of a data communications utility known as ATSS/DS. This system became operational in 1976. It derives its economies from leasing private lines in bulk, in the same manner at the ATSS voice network. Almost from the beginning, ATSS/DS was unsuccessful. According to interviews with both Pacific Bell and the Office of Telecommunications, ATSS/DS never met adequate standards of

reliability, a crucial consideration in data communications. It also became technically obsolete quickly. The failure of ATSS/DS is an occasion for comments: "They never delivered," said one engineer of Pacific Telephone & Telegraph's work. [29]

ATSS/DS is a tariffed offering. That is, the State has no contract or agreement with Pacific Bell for the provision of ATSS/DS. Rather, the data communications network was developed as an "understanding" between the State and the vendor. As a consequence, the State cannot exercise corrective influence; that is, it has no right to demand that the system be upgraded or that it meet certain standards of performance. In this way, the State has received the "worst of two worlds." On the one hand, it does not control ATSS/DS by contract. At the same time, ATSS/DS is the State's "system" for economical, aggregated data transmission. The Communications Division has been in the position of "selling" [Pacific Bell's term] the tariffed offering. The revenue return from ATSS/DS to Pacific Bell is a function of its use. Over the years, users of ATSS/DS have dwindled, and its demise is apparently only a matter of time and timing.

Today the State is pursuing with AT&T exactly the same planning strategy. AT&T has been given the role of planning an efficient data transmission network for the State. In 1984 the Office of Telecommunications ordered high capacity, digital transmission links between network hubs in Los Angeles, Oakland and Sacramento. These links will save the

State from $100,000 to $150,000 per month in voice communication according to estimates of AT&T Communications (the vendor) and the State, respectively. Because "T-carrier facilities" are digital, they are well suited not only to the ATSS voice network, but also to economical aggregation of data communications. Thus, the State has an interest in planning how a data communication application can be developed for its users. The use of these "backbone" transmission links for voice and data is a cornerstone of the State's strategic telecommunications policy as outlined in the Strategic Report.

In the Strategy BCP discussed earlier, the Office of Telecommunications unsuccessfully sought funds for consultants to perform planning in this area. Given a lack of new money for planning, the Office faced two choices: find some other way to accomplish planning or defer planning until such as time as funding can be secured. The Governor's Budget for FY1985-86, now under Legislative deliberation, makes no requests for telecommunications funding for tactical planning; the Administration has elected, apparently, to find an alternative way to get the planning work accomplished.

According to the Deputy Director for the Office of Telecommunications, the planning task has been given to AT&T Communications, "who will solve the problem." [30] The Operating Engineer for Voice and Data indicates that Pacific Bell has also been asked to work on planning data communications using this advanced technology, although AT&T Communications is expected not only to plan, but also to

provide the resultant data communication service. [31]

Thus, the Office of Telecommunications is approaching the long-distance data communications issues of 1984 in basically the same way as the Communications Division approached the issues in 1977. A particular vendor has been invited to do the State's planning. It will not be the State's plan, but AT&T's. It will not be the State's system, but AT&T's. However, if the plan does not meet the requirements of user agencies, or if it is not reliable, then it will not be AT&T's loss, but the State's. However, if the system is a success, the benefits of developing it will be AT&T's.

The pride of authorship is not the issue. There are today the same disadvantages to giving network planning to a particular vendor -- any vendor -- as there was when Pacific Telephone and Telegraph developed ATSS/DS: The State is put in the corner of defending its own planning and management strategy by promoting whatever plans AT&T Communications and Pacific Bell develop. In contrast, the State is developing its own plans for the State microwave system and new applications the system may be able to provide.

Data communications in the State of California, unlike voice communications, are an area of significant user autonomy. Data centers and major data communicators have developed their own systems over the years in lieu of any accepted common facility. Under any circumstance, promoting a common data communications facility will be difficult and

would probably not be broadly used unless departments and data centers are visibly involved. According to design consultants familiar with the transition from disaggregated to aggregated data communications networks, the key to user acceptance is their conviction that the system will meet their needs. That is, they must see their subsystems reflected in the planning process.

For a vendor design to succeed, the vendor or the Office of Telecommunications will have to develop a strong participatory component in the planning process itself. The propriety, however, of a deregulated vendor such as AT&T Communications being granted access to State users as if it were central management is problematic. The unpalatable alternative is for the Office of Telecommunications to function as a representative of AT&T Communications. That, however, is exactly what Pacific Telephone and Telegraph expected of the Communications Division with regards ATSS/DS. AT&T Communications has no choice but to expect it as well. AT&T Communications knows that otherwise the plan cannot work.

However, planning efforts in this area are not being opened to users. For example, the University of California states that its efforts to find out the status of the digital backbone (T-carrier facilities described on page 59) have been unsuccessful: "We just can't get any hard facts about it," the Assistant Vice-President for Information Resources told the Commission. According to the Deputy Director for the Office of Telecommunications, discussions about using these

high capacity transmission systems for data have been undertaken "with large users such as Caltrans." Certainly, the University of California would have to qualify as a large user.

The University of California also analyzed the economic potential of the State's water aqueducts as rights-of-way for high capacity transmission systems, installation of which could be completely non-competitive with regulated, local telephone service as a matter of policy design. The University reports potential savings far in excess of <u>any</u> current plan to acquire and use backbone facilities from AT&T Communications on a leased basis. Thus, State government is not only "giving away" planning, but potentially overlooking the most cost-effective solutions to its network requirements based on planning expertise <u>inside</u> the State of California.

By having vendors on a large or small scale donate planning in return for vending, the State almost inevitably would allow its future to be shaped in ways it may not intend by:

- an uncontrolled planning process which is unlikely to admit the comprehensive participation and program knowledge of user agencies, possibly dooming the result to underutilization or even inappropriate design;
- a loss of control, since the planning products are not governed by contract, nor directed by any formal statement of requirements;
- an inequitable sharing (within the telecommunications marketplace) of detailed market information with selected vendors and a presumption of management role of those vendors;

- an awkward and possibly untenable "middle man" position of the central telecommunications agencies between the vendor and user agencies, with the necessity of promoting the vendor's offering to users; and
- a failure to take advantage of competitive processes with its benefits of multiple solutions for cost/benefit analysis of the best one.

The State may also be "splitting the network pie" in an inefficient manner. The State has invested substantially in forcing an ATSS voice network to become shared between of Pacific Bell and AT&T; Pacific Bell is leasing its key switching services directly to the State while AT&T is providing additional switching and, of course, long-distance (inter-LATA) transmission. According to an explanation provided by the Office of Telecommunications, AT&T is planning a separate data communications network which will only partially share transmission links with the ATSS voice network. The Strategic Report recommends and large users already are, combining voice and data communications to the maximum feasible extent. However, the State -- in return for the cooperation of these vendors -- may be obliging itself to accept less elegant, and potentially far less economical "disintegration."

The State can take advantage of private sector planning expertise without surrendering its control over its systems. By defining requirements and issuing a request-for-proposal to solicit vendors strategies for meeting them, the State could reduce its planning work while remaining the "captain of its fate." In the private sector, companies which are using

exactly the same technology for exactly the same purpose are issuing competitive bids complete with requirements and associated design issues they have identified. For example, the Office of Telecommunications stated that "clocking" -- the synchronization of data communications linkages -- is the major problem in data communications that must be solved to connect local Pacific Bell lines to AT&T T-carriers. The Office of Telecommunications anticipates AT&T Communications will provide the State with a "solution" by contracting data lines from Pacific Bell. But one large user described in the literature defined three types approaches to clocking its network, and is using the bid process to attract vendor solutions. A large user can take advantage of expertise in the marketplace without accepting a sole source of that expertise -- provided that the user applies planning to learn the needs and requirements of its organization.

FINDING #4. THE STATE NEEDS TO UNDERTAKE A RIGOROUS ANALYSIS OF AVAILABLE TELECOMMUNICATIONS TECHNOLOGIES AND ASSOCIATED PUBLIC POLICIES IN ORDER TO PLAN SUCCESSFULLY IN THE DEREGULATED ENVIRONMENT

In the absence of a comprehensive tactical plan, the State of California to date has generally structured individual telecommunications plans and implemented specific requirements within the existing structure of service. How

the State chooses its requirements and related policies is important to all telecommunications across the State. Since the State is the single largest user of telecommunications in California and the single largest customer of the local telephone companies, its decisions are politically visible. What the State does and does not buy could affect winners and losers in the marketplace. Therefore, as a government organization, the State is ultimately concerned with the economies and qualities of telecommunications, but also with the effect of its requirements on the public. Large users in the private sector are not obliged to consider such "social" factors in their analysis of alternative technologies.

For example, the State utilizes Pacific Bell's Centrex service whenever it is available to provide switching to departments. Policies are in place to support and enforce these requirements. The wide use of Centrex provides the State with complete design and maintenance services from the local telephone companies. By paying the telephone companies for this support, the State requires a smaller central telecommunications agency. In this way, the Governor's policy of limiting State personnel is implemented. This commitment to Centrex has also been viewed as consistent with a State policy not to "bypass." Bypass is where a user defects from the regulated services of the local telephone company, thereby undercutting its recovery of cost from ratepayers, and entailing higher charges to those who remain on the system, particularly residential and small business customers.

However, most users do not consider Centrex to be a bypass issue. It accounts for only three percent of Pacific Bell's total revenues. [32]

In this finding, we examine how the State has proceeded with intermittent planning and policy development in lieu of a comprehensive tactical plan and the resources to implement it; these intermittent efforts have focussed on:

- the definition and acquisition of deregulated customer premise equipment;
- the formulation of a policy on bypass; and
- the optimization of long-distance voice and data communication networks.*

In planning and identifying policies for these issues, however, the State has diverged from the Strategy Report. Moreover, we found that users and central agencies are divided in many instances over how telecommunications should be approached. In part, these divisions reflect quite different interpretations of what is and is not deregulated, and how the deregulated environment works.

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*In Chapter III, pages 92-110, we consider how these requirements and associated policies have affected the procurement of telecommunications goods and services.

In some instances, the State has not adequately planned for the acquisition of deregulated, customer-premise equipment or rigorously analyzed available alternatives.

Under the divestiture rulings, the Court is defining and redefining what is and what is not subject to competitive vending, what areas will continue to be regulated, and how the spin-off companies of divestiture -- AT&T (and its subsidiaries) and regional telephone companies -- will sell regulated and unregulated goods and services. While these proscriptions are evolving, the basic framework for customer-premise equipment has been clearly set. Any equipment that can be installed on the customer's premises may be competitively offered; where competition has been permitted, it has flourished.

At the same time, the transition from a pre-divestiture monopoly system to a post-divestiture competitive system incorporates a continuity of service and goods from divested companies. Thus, AT&T Information Systems continues to rent out telephone receivers just as AT&T's Bell System had before 1984. The customer, however, is free to stop renting from AT&T Information Systems and to buy telephone receivers. Wiring inside of buildings may be tended by Pacific Bell, as it always was, or may be acquired by the customer and maintained at the customer's expense. Switches that bundle and route telephone calls can be bought (PBX's) and installed on the customer premise or leased as an off-premise, tariffed service offering of Pacific Bell.

The definition and acquisition of deregulated customer-premise equipment

The Office of Telecommunications has promulgated an approach to deregulated, customer-premise equipment through both official bulletins and unofficial, tacit understandings. A high priority has been given in statements and proposals to the Legislature to the purchase of telephone receivers over their continued rental from AT&T Communications. It was a point of major discussion in the Telecommunications Strategy for State Government. An equally high priority has been given to continuing the leasing of switching services from Pacific Bell and General Telephone of California by means of Centrex. [33]

The purchase of telephone receivers

Although the Deputy Director for the Office of Telecommunications identified telephone rental costs as the most expensive consequence of divestiture to the State, the Commission found that a plan to analyze the replacement of telephone receivers in State use has not been developed by the Office of Telecommunications. [34] As a result, the State has not quantified critical factors, has left technological issues unresolved, and has adopted inconsistent approaches to

the exercise of central authority. Specifically, the State does not know:

- How many rotary telephone receivers user agencies would care to replace with more modern, touch tone receivers;
- To what extent user agencies would be in favor of buying rotary telephone receivers, given the cost/benefits of doing so;
- How many telephone systems are being upgraded and therefore could (or could not) make use of a separate procurement of receivers, since some system upgrades include telephone receivers and others do not;
- Whether the Department of Finance would authorize use of communication budgets for equipment purchase in this instance;
- What features on telephone receivers are valued by users.

In FY1983-84, the State attempted to negotiate a good purchase price for telephones being rented from AT&T Communications. According to a State official involved with negotiations, AT&T Communications "didn't followup" when the time came for it to make a final offer. [35] Nonetheless, the State could have purchased existing (rented) telephones at a price which would have amortized in six months when compared to ongoing rental costs. After six months, the State would then have owned its telephones; counting just the 150,000 rented by AT&T, the State would have saved approximately $3 million dollars in FY1983-84 and FY1984-85 with only a puchase of half of its telephones. Presumably the estimated 50,000 receivers rented from General Telephone also could have

been subject to purchase and similar economies.

There were technological concerns which made a decision in this matter less than obvious. Most of the State's telephones are "old fashion" rotary telephones, ill-suited to the digitalized features of modern network equipment that require touch tone telephones. If the State assumed ownership of rotary phones, there was there was the question of whether it would "throw them away" when introducing modern systems requiring touch tone receivers. The discard of working equipment is sometimes difficult to implement, no matter how well justified. The Office resolved the dilemma by arranging a choice for departments: they could buy their existing telephones or purchase new touch tone receivers. To implement this approach, the Office of Telecommunications requested $7.5 million from the Legislature for Fiscal Year 1984-85 and went to competitive bid for touch tone telephones.

Compared to the purchase price of rotary or touch tone telephones, departments have spent more in rental fees between January 1984 and September 1984 than the cost of ownership. However, as of February 1985, no plan or criteria for decision-making has been communicated to departments addressing <u>whether telephones should be purchased</u>, or <u>what kind of telephones</u> should be purchased. Even the announcement of a master purchase agreement for touch tone and rotary telephones contains no analysis of what, if anything, a department should do. The clock on this issue is ticking. The Office of Telecommunications expects a major increase in

AT&T telephone receiver rental fees in July 1985.

The acquisition of switching services

The soul of the telecommunications network is the switch. The switching of telephone and data communications from an originator to a receiver transforms, electronically speaking, a pair of tin cans and a piece of string into a network. One of the truly startling advances in telecommunications technology, made possible by the microchip, has been the manufacture of physically small, high capacity, cost-effective switches. The modern switch is a specialized computer able to route calls, monitor traffic, and trigger custom features in hundredths of a second. In the deregulated environment, the user can meet switching requirements by an off-premise switch know as Centrex or by an on-premise switch, the PBX. The Commission has found, however, that the State of California has not conducted a rigorous cost/benefit analysis of these two competing approaches.

In December 1984, the Office of Telecommunications issued a policy bulletin requiring departments to use Centrex rather than PBX whenever it is available as a standard telephone company offering. Centrex offerings are a high priority of Pacific Bell, the principal vendor of telephone service to the State, and it has located Centrex near enough to most State users to meet the criterion of a standard offering. Thus, the vast majority of departments use

Centrex. As a consequence of this policy, departments do not have to go to competitive bid to meet the switching requirement defined by the Office of Telecommunications since the State's contract with Pacific Bell is utilized as a master purchase agreement. (For discussion of procurement from Pacific Telesis, the parent company of Pacific Bell, see Chapter III, pages 95-110.)

However, the State has not conducted a thorough analysis comparing Centrex to PBX switches. The only planning analysis identified by the Office of Telecommunications to back up this policy consists of a July 1984 document entitled Centrex vs. PBX (although the policy has been in effect for many years). Centrex vs. PBX provided an economic analysis of these two switching approaches and concluded that Centrex was significantly more economical. Nevertheless, a review of this analysis combined with comparisons to the Strategic Report, a review of trade literature, and discussions of these options with various knowledgeable individuals, has indicated the following:

- With the sole exception of the Office of Telecommunications, all other experts on switching, including those of Pacific Bell and AT&T, believe that a generic policy is inappropriate to deciding the merits of PBX vs. Centrex. All those interviewed felt this planning decision should be conducted on a case by case basis, according to the particular needs of the user, period. The Supervising Engineer for Voice and Data, Office of Telecommunications, agrees that a case by case is preferable;

- The author of the Centrex vs. PBX analysis repudiated its conclusion only six months later (January 1985) by saying that it is always possible to find a PBX installation that is less expensive than Centrex -- a repudiation qualified only by the assertion that the

price differential will incur a diminution of feature offerings (see below);

- The Centrex vs. PBX analysis was prepared with specific help from Pacific Bell who wrote on request of the Office of Telecommunications a nine page comparative analysis two weeks before the Office of Telecommunications document was completed; no expert input was requested from any vendor other than Pacific Bell. General Telephone, which has expertise and experience in both Centrex services and PBX, stated that it would, as a matter of course, provide the State its views on the subject if solicited to do so. [36]

- The analysis does not mention that the "test case," a PBX installation for the State Department of the Military at Los Alamedos, but was required by the Federal Government for compatibility with the Defense Department's national, digital network, and therefore was not purchased on the basis of cost considerations;

- The analysis [Centrex] contains a spread sheet comparing costs which ignores the inflationary benefits of amortized installation costs and shows them instead as one time expenditures although the PBX contract appended specifically states otherwise;

- Staffing requirements for the PBX, characterized in the Centrex analysis as significant factors contributing to its "lack of economy" when compared to Centrex, are much greater than personnel budgets found in other Office of Telecommunications analyses, including the Strategy BCP;

- Centrex vs. PBX favorably highlights dozens of feature offerings of Centrex, none of which are utilized by the State at this time, and which would significantly increase Centrex costs were they utilized; however, many are standard features in PBX installations;

- No user input was solicited in preparing the analysis, nor has the analysis been distributed to users concerned with this issue.

None the less, this analysis was the basis of a policy affecting virtually the whole of State government and has been used to deny requests by users for PBX installations.

The Deputy Director for the Office of Telecommunications, it should be noted, had expressed dissatisfactions with the lack of an impartial analysis of Centrex in comparison to PBX, and sought, in the Strategy BCP and from master agreements with consulting firms, additional study of the issue. Nevertheless, the Office of Telecommunications has proceeded to establish a virtually "non-permissive" policy without any comprehensive studies having been conducted to date. [37]

The Operating Engineer for Voice and Data explained in an interview that PBX installations can be less expensive for the individual departmental user, but decrease "trunking economies" (the efficient bundling of telephone traffic into fewer lines) in access to ATSS. That is, a PBX would be cheaper for its user but more expensive for everyone else. However, the Centrex vs. PBX study argues that the same trunking economies can be developed by the PBX user when it analyzes the amount of staff needed for this purpose. Furthermore, the Office of Telecommunications has denied PBX requests even where ATSS service is unavailable and the presumed impact on other State users is therefore impossible.

The Administration of Fiscal Reimbursements to the Office of Telecommunications is Tied to Centrex Service

An institution must be able to allocate the costs of centralized telecommunications among its users. Thus, the Department of General Services needs to be able to chargeback to ATSS users their share of long-distance charges to the network. The Department of General Services also requires chargeback of the operating and personnel expenses of the Office of Telecommunications. The State of California has an extremely powerful system for accomplishing both of these chargebacks simultaneously through a billing system jointly managed by Pacific Bell and the State.

In brief, it works like this. Pacific Bell collects long-distance toll information as calls pass through Centrex switches on their way to their destination. It aggregates all of these into a master billing record. The State then further processes the master billing record and adds a percentage (about 1.5%) to each call to total a reimbursement to the Office of Telecommunications. An additional penalty charge is levied against local (intra-LATA) calls that are made over the ATSS network. The user is presented with a "telephone bill" for ATSS which covers both centralized telecommunications management expenses and telephone company charges.

This system, as we discuss below, has become dependent

upon Centrex. Any chargeback system is a headache to establish and normalize. The Office of Telecommunications spent considerable effort perfecting its "pricing" of telephone calls to achieve an accurate level of reimbursement after the Auditor-General found that agencies were being overcharged an average of $1 million annually in a five year period while the small number of State microwave users were being undercharged by almost as much.

It appears likely that part of the State's policy commitment to Centrex derives from a reticence to face the complexities of a new chargeback system that proliferating PBX's would necessitate. In part, conversion to PBX's would increase staff needs for charge analysis during implementation of a "no growth" policy by the Administration. The question is, where do the greatest cost/benefits lie? In the management of chargebacks or in switching? The answer would only be found by an analysis of the alternatives.

There is compelling evidence that contemporary PBX installations can no longer "feed data" to Pacific Bell's master billing record, as was possible in the past. In the past they were able to do so by use of the AIOD feature. (AIOD or Automatic Identification of Outward Dialing is a feature that collects traffic information about ATSS calls as they originate in PBX's and then transmits that information to other telephone company offices for master billing to the State.) The Employment Development Department was required by the Office of Telecommunications to bid in the Spring of 1984 for

PBX's that have AIOD capability. However, no vendors could be found who still make AIOD available; indeed, the one that has done so most recently, Northern Telecom, is having trouble making it work. In July, Northern Telecom announced it would no longer support AIOD. All responses to Employment Development Department bids were found "non-compliant" by the Office of Telecommunications because they did not include AIOD. After the Department presented substantial evidence that an AIOD feature requirement would make any PBX bid non-compliant, it still was (and has been) unable to obtain formal approval to bid the alternative to AIOD, a billing system that provides the user -- rather than Pacific Bell and the Office of Telecommunications -- detailed billing information.

Rather than a priori commitments to certain types of systems, most large users are seeking to tailor systems to specific needs. The University of California's San Francisco Bay Area systems are leasing Centrex because the University did not want, at this time, to undertake the planning complexities of PBX's at many scattered departments and off-campus facilities. In different circumstances, different technologies will be most advantageous. They are invoking the competitive process to oblige vendors to argue that their solutions at their prices are best. The State of California, on the contrary, is simply paying the bill.

The Strategic Report is manifest in its commitment to a

competitively acquired, integrated voice and data network. To this end, it recommends installation, when appropriate to user needs, of integrated PBX facilities.

Users are also seeking installation of integrated PBX's for the switching of voice and data. However, the Office of Telecommunications has concluded that integrated PBX's are not yet perfected and will degrade or even interrupt voice communications where any significant quantity of data traffic flows through the switch. As a result of this difference, some units of government outside of control agency jurisdiction are installing integrated PBX's while others, subject to Office of Telecommunications approval, are not. For example, the University of California has reported to the Commission that "to date, five campuses have signed contracts for the installation of PBX's capable of not only voice but data communications. One campus...has been operational for over a year [and] has been highly successful." [38] On the other hand, the Department of Corrections was told by the Department of Finance's Office of Information Technology that "we could find nothing in the literature" to support acquisition of integrated switches. However, because the State of California has no overall plan for data communications, the issue becomes a contest of authority rather than a consideration of alternatives or subject of roundtable analysis where responsible views that differ may strive for a consensus.

In the private sector, the management of risk associated

with newer technologies such as the integrated PBX discussed above takes the form of a blend of established and pilot practice. For example, the Department of Corrections is installing ten telephone systems in the new prisons. The Department could install one integrated system at a prison with stringent requirements for evaluation of its use, reliability, actual costs, and so forth. The experience of a carefully monitored pilot would be worth its weight in gold to all State users and planners. However, the State of California is accepting the risks of the status quo which appear, at least to the private sector, to be the most costly of all.

The State Needs to Undertake a Rigorous Analysis of the Social Impact of Its Telecommunications Strategies

Because the State of California is the largest single customer of the Pacific Bell system, our own telecommunications strategies can have a significant effect on all other ratepayers. Consequently, the State's consideration of certain alternatives, such as "bypassing" the existing system, could result in increases for other ratepayers, particularly residential users. On the other hand, exercising such alternatives provides the opportunity of reduced operating cost and more efficient use of tax revenues. In the words of the Office of Telecommunications, that is a "cost

shift" to the public rather than "true cost savings" to the State. [39] Obviously, the unique market position of the State creates difficult and complex policy questions for the State.

Our review of telecommunications as managed by the State of California has raised the question of where policy which governs State use of technology should originate. The Little Hoover Commission has been unable to identify any consistent, explicit process for developing policy for State telecommunications.

The absence of a clearly defined process generates the possibility that the State may intend one policy to oversee its telecommunications, yet be implementing another. For example, under the California Public Utilities Commission regulations the State is eligible for special discounts for telephone service which are not available to residential or small business customers. Three examples of this type of discount show how policy and practice can come into conflict:

- Recently, the State signed a contract with Pacific Bell for free touch tone telephone service which could ultimately deny the rate base as much as $3.6 million annually if all telephones connected to Pacific Bell facilities use touch tone.

- In February, 1985, the Federal Communications Commission characterized private line networks, of which the State's ATSS network is one, as a form of "bypass", yet A Telecommunications Strategy for State Government commits the State to a "no bypass" policy. [40]

- The State has operated since the mid-1960's the "green phone system" through the State microwave system, which provides a complete bypass to regulated, local operating companies.

Do discounts such as these represent "true cost savings" or a "cost shift" to the public? Only by undertaking a thorough analysis of the social impact of current and proposed telecommunications strategies is the State informed of the probable consequences of its actions, and of their fidelity to the policies which the State asserts.

At present, the State of California does not have the analysis or information it needs to assess the overall importance of the bypass issue. Without comprehensive planning by the State, it cannot gauge what impact its practices may have upon the local operating companies of California. Is economical telecommunications for the State a "zero-sum game," in which ratepayers lose if taxpayers gain through cost-savings in State telecommunications? Are bypass systems in fact more efficient from a telecommunications standpoint? Indeed, should the State seek an "all or nothing" bypass policy? Perhaps an extension of the current approach -- which combines bypass systems with extensive use of the regulated local service -- reflects a more realistic policy approach. The lack of information, beyond pronouncements of the telephone companies, makes these questions impossible to resolve.

Given that the State has a dichotomy of goals, to seek economical telecommunications on the one hand and avoid injury to the ratebase on the other, the source of State policy is an important issue in itself. The State's telecommunications

planning process should be a source of well-defined, well-documented issues. From there, the Administration should further process these issues into policy positions the Legislature can consider.

The State intends, through the Office of Telecommunications, to become more active in representing its views before regulatory bodies. Thus, the Department of General Services recently committed itself to redirecting an analyst's position to the Office of Telecommunications. This new position would monitor California Public Utilities Commission deliberations and prepare policy positions on issues affecting the State. At the same time, the Department of Finance is responsible for "strategic policy," according to statute. Do these dual instrumentalities of Administration policy adequately define a policy process? They appear to create the possibility that competing policies may emerge. How would ensuring differences be resolved? Certainly, the assignment of personnel to policy analysis is a critical first step. However, the fulfillment of a clear process requires that telecommunications be planned well enough to incorporate the guidance of State policy.

Bypass is a prominent issue, but it is not the only public policy question of importance to the State. Investigation has begun by the Department of Finance into access to State data bases, a use of telecommunications which could either enhance the public's right to know or abuse its right to privacy. The State has an interest,

like any other business or public service, in being able to reach its clients. Thus, it has a practical stake in the continuation of universal telephone service.

Each of these possibilities are fundamentally policy issues. If a policy is in place, the technology can follow, as teletype service for the hearing impaired shows. It will be up to the State to resolve a policy on emergency communications: how extensive will plans be? How will emergency communications resources be distributed? The policy process is an intrinsic component of telecommunications planning. The State of California needs to clarify how it will reach validated conclusions about appropriate policy and how those conclusions will be reflected in the development of its telecommunications.

FINDING #5. THE STATE'S LACK OF PLANNING FOR THE POST-DIVESTITURE PERIOD HAS NEGATIVELY AFFECTED PREPAREDNESS IN EMERGENCY COMMUNICATIONS

In examining how the State plans for emergency communications, two issues were considered: (1) what, if any, are the implications of deregulation and divestiture for emergency communications, and how have they been addressed? (2) who is responsible for emergency communications?

Prior to divestiture, an agreement could be struck with

Pacific Telephone and Telegraph for the provision of emergency telephone service during an emergency that would link a disaster site to off-site, distant locations (e.g., Los Angeles and Sacramento). Now, however, providers of local telephone service (such as Pacific Bell) cannot guarantee completion of an emergency system that includes services provided by a distinct company such as AT&T. The Federal Government, for example, has created a special agency expressly to deal with this problem. The State of California, given its large land mass, distinct centers of population and well-known geological dangers, faces new communications coordination issues as a result of divestiture.

New technologies, especially in radio, have created new capabilities in emergency communications. For example, digital radios can allow various public safety organizations that normally utilize different frequencies to share with a flip of a switch a common frequency for coordination purposes. As a result of this newer technology, the bane of cross communications -- the lack of frequencies -- no longer represents an obstacle. According to a Supervising Radio Engineer at the Office of Telecommunications, the problem is funding the purchase of digitally tuned radios, rather than the availability of frequencies. [41] The same point of view was expressed by the manager in charge of communications for the State Department of Forestry. No longer must the perfect frequency be found that is free from prior claim, and suitable for all locations.

In order to address the technological and vendor complexities of the new telecommunications environment as they affect emergency uses, a new set of planning tasks must be accomplished. However, the Commission has found significant gaps in planning emergency telecommunications. These include (1) the coordination of various State agencies, starting with those specifically assigned to telecommunications; (2) the analysis of disaster experiences to draw lessons for communications planning; (3) a response to the realities of divestiture in establishing protocols for emergency telephone service; (4) the evaluation of the cost/benefits of new technologies; and (5) the provision of emergency communications for a major earthquake in Northern California (a plan has been developed for Southern California).

In addition, there appears to be statutory confusion over what units of government are, in fact, designated to lead emergency communications planning in the contemporary telecommunications environment. We consider these in turn.

Coordination: The coordinating telecommunications body for State agencies concerned with public safety during a disaster is the Telecommunications Advisory Committee to the Governor's Office of Emergency Services. As of December 1984, it has not been convened by the Governor's Office of Emergency Services in over two years. The telecommunications manager of the California Highway Patrol had not heard from the Governor's Office of Emergency Services in his first six months of assignment. The Voice and Data Section of the

Office of Telecommunications reports no interaction with the Governor's Office of Emergency Services over a 12 month period. [42] This Section, however, has supervised the installation of satellite transmitters at network centers of ATSS, provided by AT&T Communications, without any involvement of the Governor's Office of Emergency Services.

Analysis of disaster experiences: Testimony to the Commission by California Highway Patrol officers on the frontline during the Coalinga earthquake reported severe communications problems resulting from a lack of coordination. The Office of Telecommunications reports that a dearth of trained personnel created a crisis in Coalinga when exhaustion took communications experts out of action. While these observations have been challenged by the Governor's Office of Emergency Services, no report by any agency could be located reviewing communications experiences in Coalinga and setting recommendations for the future -- except for a memorandum provided by Pacific Bell on findings about its own performance. (Testimony relative to public safety frequencies in the aftermath of Coalinga was provided the Legislature; see discussion below on new technologies.)

Divestiture: The five year communications plan of the Governor's Office of Emergency Services does not even mention telephone communications or indicate any issues relative to divestiture.

In a multi-vendor environment, written protocols are especially important since they allow those concerned to know

-- when disaster strikes -- who will do what with whom. In all emergency communications planning, written plans and agreements between parties are the core products. For example, the various radio networks developed through the Governor's Office of Emergency Services itemize over dozens of pages frequency assignments, key personnel, memoranda of participation, rules governing use and so forth.

However, the Governor's Office of Emergency Services reported that its agreements with Continental Telephone regarding preparation for possible volcanic disasters in the Lake Mono region (Plan Caldera) "you won't find written down anywhere" although it was stated that Continental has put reserve equipment in a secure location. [43] No other agreements were mentioned with telephone companies.

One analyst with the Office of Telecommunications doubts that the Governor's Office of Emergency Services is aware of the planning implications of divestiture. [44]

New technologies: According to the Office of Telecommunications engineers and Department of Forestry management expert in radio communications, new equipment makes cross communications (the capacity of various organizations to communicate with one another) entirely feasible. The conversion of existing radio equipment would be expensive, however. Yet the Legislature has been informed that the problem of cross communications is solely the result of the Federal Communication Commission's failure to provide more public safety radio frequencies. We were unable to identify

any cost/benefit analysis of converting radio equipment. The absence of such an analysis makes it impossible for the Legislature to analyze whether an expenditure would be justified.

Earthquake Planning for Northern California: No communications plan has been developed for an earthquake in this region, although experience with such a disaster is certainly part of the region's history. A communications plan was written for Southern California, evidently because of a Federal grant for earthquake planning. According to the Governor's Office of Emergency Services, planning in Northern California is awaiting the organization of a Federally funded planning project; unfortunately we cannot be assured that Mother Nature will wait!

Statutory confusion: The Governor's Office of Emergency Services understands that it is responsible for emergency communications and the Office of Telecommunications and the Office of Information Technology agree. None the less, both the Department of Finance and the Department of General Services have sought Legislative appropriations for emergency communications. These requests do not even mention the Governor's Office of Emergency Services, much less coordination with it. [45]

CHAPTER III

THE MANAGEMENT OF TELECOMMUNICATIONS OPERATIONS

The Telecommunications Asset

During the fifty years of AT&T monopoly service, the famous label on the bottom of every telephone said it all: "Property of the Bell System." Today, however, the State has the legal rights to design, purchase, and implement telecommunications systems of its own choosing. In the aftermath of deregulation and divestiture, telecommunications is appropriately viewed as an asset much like buildings, automobiles, typewriters and other equipment. The State may capitalize as leases or purchases many expenditures which once were rental payments to AT&T. Consequently, the telecommunications asset is subject to the State's generic principles of property acquisition and management. Equipment must be inventoried and valued. And expenditures for related goods and services must be appropriately accounted so that those who authorized them are accountable. Other factors such as staff time and salaries as well as depreciation need to be considered. Finally, the telecommunications assets must be secure from illegitimate use and theft. In other words, the telecommunications asset requires active management.

The sheer size of the telecommunications asset today and in the future makes it imperative that management employ effective controls. The State is contributing its share to a

worldwide demand that will probably double telecommunications applications in the course of the present decade. [1] Consider just one example. Nearly 68% of 143 respondents to the Commission survey use computer-to-computer communications. If the growth in State use is commensurate to the exploding world market, as experts predict, our expenditures could easily top $300 million annually within five years.

Telecommunications assets, however, are not like all other assets. They are unique in how they are acquired and how they are used. As a result, they require specialized management approaches. For example, in the new telecommunications marketplace, literally hundreds of vendors are seeking business opportunities with the State. They want and expect access to decision makers. On the other hand, telecommunications management's time is limited and it needs groundrules to make vendor salesmanship efficient. As the State acquires telecommunications goods and services, it must ensure that all relevant vendors understand what is needed. When a purchase is executed, the State cannot take for granted fidelity to user requirements no matter how competent the procurement process. New installations must be tested and accepted, and the vendor held accountable.

The management of telecommunications assets has also created certain new cost centers. Lease and purchased equipment places the cost of maintenance on the State, where before it was an implicit component of a rental fee. And now,

several vendors are likely to be involved in the origination, transmission, and reception of an electronic message. To determine costs, the billings of each vendor must be assigned to a segment of the telecommunications system such as long-distance, local, terminal equipment, and switching. When trying to resolve a malfunction, management often confronts a nightmare of "finger pointing" among the vendor multitudes, each of whom has contributed a piece to the system. With the elimination of end-to-end service, telecommunications is no longer a simple, consolidated cost center with a single, responsible vendor.

FINDING #1. THE STATE'S ACQUISITION OF TELECOMMUNICATIONS GOODS AND SERVICES SHOULD TAKE GREATER ADVANTAGE OF THE DEREGULATED, COMPETITIVE MARKETPLACE

Procurement administration and regulation protects the user from unsatisfactory goods and services, the taxpayer from uneconomic acquisitions, and the vendors from vague user expectations resulting from inadequately drawn specifications. Procurement in the State of California engages the competitive marketplace to provide equitable business opportunity, to encourage the vitality of small and minority-owned businesses, and to implement an informed process of decision-making. Where it is known in advance that only one vendor can meet a need, the Office of Procurement may approve a "sole source" contract. In this instance, the purchaser does not solicit competition. The sole source award is a last resort since it puts at risk the fulfillment of the State's principles of procurement. Vendors selected through competitive bidding or as sole sources may be offered "master purchase agreements" which allow repetitive purchases without duplicating the procurement process. On occasion, a group of vendors with similar offerings all may have master purchase agreements, and the purchasing agent of a department is free to choose among them.

These instruments of procurement -- the competitive bid process, sole sources, and master purchase agreements -- were

applied without special consideration to telecommunications goods and services until 1983. The march of deregulation stimulated legislative inquiry into telecommunications procurement and provided a context for legislative initiatives. One bill, AB 1119, Chapter 791 of the Statutes of 1983, provided that the Department of General Services would be responsible for telecommunications procurement using procedures developed for data processing. It inserted a "division of labor" between the Office of Telecommunications and the Office of Information Technology of tactical and strategic policy respectively. However, Chapter 791 took for granted that the State would have a strategic policy, rather than confronting the fact that it did not. AB 2074, Chapter XYZ of the Statutes of 1983, attempted to command the Department of Finance to issue a strategic policy in a required report. However, the Department did not take up the issue of telecommunications and consequently could not elaborate a policy for information management, strategic or otherwise.

Until 1984, the State was obliged to procure the bulk of its voice and data transmissions from a sole source, AT&T. Operating under a 1977 contract (in effect, a master purchase agreement), the State obtained most of its transmission services from AT&T Long Lines, Pacific Telephone and Telegraph, and independent telephone companies, especially General Telephone of California. In this circumstance, aided and abetted by a special discount for ATSS (Telpak) and low

local rates, there was little incentive for the State to examine alternatives to the so-called traditional carriers. Unquestionably, the State's current arrangements with Pacific Bell, General Telephone and AT&T Communications must be understood in their historical context when choice was not practical. Given that AT&T and its subsidiary, Pacific Telephone and Telegraph, were the sources of transmission, it was logical to simplify the procurement of switching services by using Centrex offering (see Chapter II, pages 71-74).

The divestiture of AT&T and the complete deregulation of customer premise equipment foreclosed the sole sources of transmission services (for long distance communications) and the lion's share of telecommunications equipment. However, the State of California has to date generally continued to maintain its pre-divestiture reliance on the traditional vendors. Overall, the State has not yet adequately analyzed its existing vendor commitments for their economies, appropriateness to State needs, or consistency with State procurement policies. Although vendors have been requested to provide information to the State about their offerings and have responded with extensive documentation of their goods and services, the State's principal purchases -- transmission and switching -- are planned to continue with primary reliance on traditional vendors. The State has not provided vendors with a clear telecommunications procurement policy of engagement of a highly competitive marketplace. Under these conditions, one major California vendor, the Rolm Corporation, has resolved

not to bid on State solicitations.

Vendors to the State, including those who enjoy sole source status, stand ready to argue their offerings and prices in the competitive arena. [2] However, the State believes that no vendor other than AT&T are able to meet the State's vast requirements at better prices than that paid today. [3] No analysis in support of this conclusion has been identified. In contrast, the Federal Government telecommunications administration, the world's largest telecommunications customer, has proposed to competitively bid the entirety of its long-distance requirements. Although the General Services Administration could have continued to use AT&T as a sole source, it is not recommending doing so.

The State Utilizes Unanalyzed Sole Source Agreements

Eighty percent of all telephone calls are local: typically, one person in a department calls another person in the same department. [4] In an organization's headquarters that may employ thousands of State workers, this strictly local form of traffic is considerable. The remaining 20% of calls are long-distance. Thus, the telephone system that manages local calling is the most critical from a user's standpoint. Today, the Office of Telecommunications requires a Centrex based system if the local telephone company makes it available.

The State of California has never engaged the competitive marketplace to see whether Centrex is the most cost efficient or beneficial configuration for departmental telephone systems. [5] Indeed, the State has defined its requirements in a way that no vendors other than the regulated telephone companies could compete. It virtually insists, as a matter of policy, that State telephone systems be planned, with few exceptions, on an exchange basis (e.g., "445" or "322" prefixes). The exchange is is a service area of enormous size. Local telephone companies take an exchange approach because they alone have the responsibility, as regulated monopolies, to provide universal access to business, government, and residences alike. By requiring "consolidated exchanges", the State obliges departments to use Centrex, the only switching service that could possibly provide this consolidation. The Office of Telecommunications indicates there have not been any proposals as yet for consolidated exchange systems from other vendors. [6] However, no analysis has been done to justify the "consolidated exchange" policy; it merely is the way that telephone companies plan their service offerings.

In Chapter II we pointed out that available analysis of Centrex from the Office of Telecommunications has been inadequate to the point of misrepresenting economic comparisons with PBX. Actually, <u>each technology has been found the most effective in certain circumstances</u>. As the former Deputy Director of the State Office of Information

Technology put it, "I think what you don't do is analyze Centrex and PBX...you start that comparison by determining what your needs are." [7] In other words, the anlysis of these technologies should be case-specific. There is nothing about either Centrex or PBX which precludes their comparison in a competitive process. [8] Within the public sector, users have been offered better priced Centrex configurations when they made clear their willingness to undertake competitive bidding.

The University of California, for example, has contracted with Pacific Bell for Centrex in the Bay Area. According to the Assistant Vice-President for Information Technology of the University of California, Pacific Bell offered a superior lease package in the Bay Area than it had previously after it lost a bid contest at the Irvine campus. [9] Vendors, quite simply, are encouraged to make their offers more attractive in cost and benefit if they perceive competition. An open-ended, sole source relationship will inevitably be more expensive in many cases. The County of Sacramento invited bids from both Pacific Bell and PBX vendors. In their case, cost comparisons were favorable to PBX-based systems. [10]

Many users, including recipients of State funds such as the University of California and various county organizations, do not have a universal policy on Centrex versus PBX. Rather, they have let the competitive bid process provide an actual, case specific analysis of the economies and services of both

ways of meeting switching requirements. In these instances, Pacific Bell has been invited to submit bids along with PBX vendors. Case specific approaches do not inevitably lead to one technology or another, as the University of California has documented. Among Federal users, the General Service Administration's policy requires a similar approach. Thus, the issue of Centrex versus PBX has consequences of how the State engages the competitive, deregulated marketplace -- or whether it does at all.

Insufficiently Planned Acquisitions and Sole Source Agreements are Denying State Telecommunications the Benefits of Competition

The Department of General Services is responsible both for the administration of competitive bids (a function of the Office of Procurement) and the technical specifications, judgements, and negotiations that underlie them (a function of the Office of Telecommunications). The two offices work closely together in developing, bidding, and awarding contracts for telecommunications goods and services. According to a letter to the Commission from the Deputy Director for the Office of Telecommunications, however, no formal delineation of responsibilities between these Offices has been set forth. They interact without management guidelines or policies specific to the acquisition of telecommunications goods and services from the competitive

marketplace. [8]

The Office of Telecommunications provides the Office of Procurement critical procurement parameters such as purchase estimates and equipment specifications. The Office of Procurement, however, does not require documentation or analysis of parameters and specifications, and these are included in bid invitations "as is." As a result of such limited controls exercised by the Office of Procurement and insufficient planning by the Office of Telecommunications:

- Inappropriate decisions were made in a procurement effort potentially of benefit to the whole of State government.
- The objectives of the competitive process were circumvented.
- Fair competition among vendors was not adequately protected.
- The State realized only marginal economic benefits when it engaged a competitive, deregulated marketplace.

The case study consisted of an examination of the major telecommunications procurement effort of 1984. In Chapter II we discussed the importance of the purchase of telephone receivers. Their purchase is motivated by the high, ongoing cost of rented receivers expected to become still greater when announced price increases take effect. To respond to this need, the Office of Telecommunications initiated an invitation-for-bid (IFB) for a master purchase agreement for telephones. The IFB was an uncomplicated itemization of specifications and reference brands for a range of single-line

telephone receivers with various options, autodialers, telephone answering machines, and announcing machines. While the IFB did not commit the State to any minimum or maximum purchase, it did include purchase estimates for these items. They ranged from a high of 6,136 basic desk telephone receivers to a low of 20 announcing machines.

These purchase estimates were not derived from any current study of departmental interests, needs, or availability of funds. Rather, they were based on the State's telephone purchase activity in 1982, before divestiture created the economic incentive to eliminate rental equipment. Thus, the purchase estimate was likely to be unrealistically low as it was based on a period of much lower activity.

Four vendors submitted bids. The bids were forwarded to the Office of Telecommunications for technical review and recommendation for award. When the Office of Telecommunications review of bids was completed, all were found to be noncompliant. PacTel Communications Systems was found to be noncompliant because its telephone receivers lacked a timed switch hook. Later, it emerged in a declination letter for a second bid round that PacTel Communications could not provide an additional feature, an electronic ringer in a basic model. High-Tech Communications, the low bidder, was unable to demonstrate financial capability and failed to provide all the financial documents required by the State. Graybar Electrics Co. could not provide a suitable answering machine or announcing machine.

Although each bid was considered noncompliant, PacTel Communications Systems was one of two bidders found acceptable for award by the Office of Telecommunications. On August 22, 1984, the Office of Telecommunications wrote to the Office of Procurement that "[o]nly two bids were found to be acceptable, High-Tech Communications, and PacTel. We recommend the bid be awarded to one of these vendors." On September 6, 1984 the Office of Telecommunications indicated that it had not received needed information from High-Tech Communications, and so "[w]e recommend that we move to the next bidder, Pac Bell [sic] and get on with the process." This recommendation was made in spite of the fact that according to the purchase estimates in the IFB, PacTel's total bid price was about $48,000 more costly than the Graybar Electrics Co. bid.

The State may accept a bid that differs from specifications only if it is not a "material deviation." The IFB's groundrules state that "IFB's must be so specific and detailed as to provide an environment where all competitors are bidding on the same end objectives." Furthermore, specifications are written so that the actual needs of the State will be met, and "the State will not tailor these needs to fit some solution a vendor may have available; rather the vendor shall propose to meet the State's needs as the State has defined them." [12]

Although PacTel Communications Systems was found noncompliant its bid was accepted by the Office of Telecommunications on the grounds that other, unspecified

features were compensatory. The Office of Telecommunications bid review given to the Office of Procurement did not include any analysis of PacTel's "alternative" features or state what they were. At the same time that the Office of Telecommunications recommended consideration of the non-compliant bid from PacTel Communications, it rejected other vendors because their proposals were not compliant.

The lower bidder for telephone receivers, Graybar Electric Co., had bid a noncompliant answering machine device. But the Office of Procurement recommended on September 13 that as the lower bidder, Graybar Electrics, it should be awarded for the items where it was compliant. (The lowest bidder had been disqualified because of inadequate financial showing.) This could be done procedurally by dropping the answering and announcing machine requirements. The Office of Procurement reasoned that since only seventy answering and announcing machines were needed, as compared to a much larger number of telephone receivers, the State would benefit from the lower bidder becoming eligible for award.

After a technical complaint from another bidder, the Office of Procurement resolved to issue a new bid solicitation, eliminating the answering and announcing machines and adding headsets. After the second bid was announced, PacTel Communications Systems notified the State that it would not rebid <u>because it could not meet specifications</u> for electronic ringing. [13] The Office of Telecommunications judges electronic ringing to be a

significant feature. In today's open space offices which utilize single-line telephones, employees often have their own single-line telephone and the noise of many mechanical rings creates an irritating work environment. In fact, the Office of Telecommunications spent four years attempting to procure this feature.

A Sole Source Agreement Circumvented the Competitive Process: Concurrent with the bid process but outside of it, the Office of Telecommunications had received an offer from PacTel Communications for "an inventory surplus" of new, basic model telephone receivers at $20.00 each. In the pending competitive bid process, PacTel Communications Systems had bid $45.25 each for telephones with more advanced features. They had not bid the less expensive basic model although the IFB requested that competitors do so. According to the Office of Telecommunications, PacTel was moving its surplus of basic models to market quickly and their offer would not long be available. The Office of Procurement arranged an "opportunity purchase," a term referring to a very good price that comes in a timebound offer. According to the Supervising Engineer for Voice and Data of the Office of Telecommunications, the Office of Procurement approved the "opportunity purchase" because of the price and the fact that the competitive bid was still in progress. [14]

The Office of Procurement consummated the Office of Telecommunications's negotiations by executing a sole source agreement with PacTel Communications for approximately 15,000 telephones, an amount of equipment nearly three times the purchase estimate of the IFB. Within a few months of availability, campuses acquired 10,650 and State departments 6,150 of these telephones from Pactel Communications Systems according to figures provided the Commission by the Department of General Services. In interviews, the Office of Telecommunications explained that it was able to commit to this larger quantity because it knew the sole source telephones quickly would be taken by college campuses. The Office of Telecommunications had conducted a special survey after PacTel Communications Systems offered its surplus telephones to the State. However, no survey was conducted to determine the purchase estimates of the competitive bid.

The "opportunity purchase," in addition to being a sole source, was not subject to a compliance review as were the IFB responses. According to the Deputy Director for the Office of Telecommunications, the "opportunity purchase" was made <u>without</u> issuing specifications. [15]. In contrast, competitive bid solicitations such as the IFB require that vendors demonstrate and document their equipment proposals.

In summary, the State has executed two contracts for terminal equipment: one, a sole source agreement with PacTel Communications for approximately 16,800 telephone receivers; the other, a competitively awarded contract with another

vendor for an estimated 6,000 telephones.

Although the State received a good price under the opportunity purchase, the State of California can never be sure that the master purchase agreement for telephones from the competitive bid could not have been executed at a lower price. The $20/telephone "opportunity purchase", while a "good price" for telephones, is not necessarily history making. A 1984 bulletin of the Office of Telecommunications stated that telephone receivers could be obtained for fifty percent less than going rates if the State acted with unanimity (e.g., offered vendors substantial sales). The PacTel Communications Systems "surplus", in fact, was just about 50% lower in price than their competitive bid. While there is no way to estimate the "elasticity" of receiver pricing, a larger IFB purchase estimate would no doubt have encouraged both more bids and lower bid offers. While the "opportunity purchase" did save the State money, how much has been lost by the minimal scope of the IFB purchase estimate is anyone's guess.

(The Office of Procurement told the Commission that acquisitions by State colleges and universities are not bound to Office of Procurement administration, and that the sole source agreement was undertaken on their behalf, which they -- the postsecondary education institutions -- could have done on their own regardless of whether the Department of General Services became involved.)

The Office of Procurement functions as the control

agency of the State's telecommunications acquisition process, even if initiated by another Office within the Department of General Services. Thus, it should ensure that the process of developing a solicitation to the marketplace adequately addresses all issues. As a control agency, it should ask questions regarding the bases for the purchase estimate. In this instance, the Office of Procurement did not review whether the specifications and purchase estimates provided by the Office of Telecommunications were based on a comprehensive current assessment of the State's needs for telephone receivers.

The sole source agreement with PacTel Communications was inappropriate. A sole source is justified when no other vendor can meet the needs of the State. However, the Greybar Electrics Co. could and did meet those needs, and it was obliged to demonstrate its ability to do so through a competitive process. In approving the "opportunity purchase," the Office of Procurement failed to insist that the State carry out the language of Invitation-for-Bid MPA-4010 that "[w]ith deregulation, the State is committed to acquiring telecommunications equipment through competitive bidding." The enforcement of policy that the State engage the competitive marketplace is the responsibility of the Office of Procurement.

At the same time, the technical skills, planning staff, and knowledge to carry out this policy are granted to the Office of Telecommunications. As staff of the Office of

Telecommunications observed, the State is new to the competitive acquisition of telecommunications goods and services. The lack of experience explains, in part, the inadequately prepared purchase estimate. However, the only defense in the unfamiliar territory of a competitive telecommunications marketplace is thorough planning. In many areas of procurement, past practice is a reliable guide. In telecommunications, where the marketplace is fundamentally changed from before, past practices may be misleading.

The State would have gained from implementing a planning strategy to acquire basic terminal equipment. The State needed to plan a multiple procurement strategy ultimately addressing the purchase of approximately 200,000 telephones, a purchase worth from $4 to $10 million to vendors. As the Office of Telecommunications has pointed out many millions of dollars more could be charged in rental fees if the State fails to act in a timely manner. However, it is equally important that the Department of General Services through its two offices avoids insufficiently planned, non-competitive approaches which inevitably cost the State money.

Enhancing ATSS Technologies

Although in a deregulated environment, the State of California has yet to systematically draw upon the competitive marketplace as the first resource in problem-solving. As a consequence, alternative vendors have not been provided a

sufficiently clear opportunity to compete. In 1982, Pacific Telephone and Telegraph identified high capacity, digital transmission cables known as T-carrier facilities (see Chapter II, page 59) as cost-avoiding enhancements. Movement on T-carrier installation was delayed because of the demands of divestiture planning on AT&T and PT&T. In 1984 AT&T made an offer to the State for this enhancement, and was told, in essence, that the State would accept the offer, but it first had to go through a solicitation process. [16] Although it received three affirmative replies (AT&T, RCA and MCI), no written follow-up was undertaken with any of the vendors. An informal meeting with RCA was held according to the engineer who coordinates the acquisition, but their offer was rejected because it entailed intra-state satellite transmissions. The Commission has been told that MCI could not meet the State's schedule.

The State Administrative Manual (SAM) provides that a "letter" of solicitation (similar to the RFI letter used by the Office of Telecommunications) is permitted in lieu of a formal invitation-for-bid when only a limited number of vendors can be expected to compete. The manual further requires the letter to state clearly an intent to acquire. In that way, vendors understand that their responses will affect purchase decisions, and not just data gathering. Since the State has issued extensive requests-for-information in telecommunications, the vendors need to know which is which. However, the RFI for T-carriers made no such statement,

consequently vendors could not be clear that the State was conducting a competitive process. The Office of Procurement testified to the Commission that this procurement item should have more thoroughly followed the competitive process. At the least, a sole source agreement with AT&T requires formal approval. T-carriers will comprise the backbone of the ATSS network for both voice and data communications. The Strategic Report emphasizes competitive acquisitions for these facilities. However, the State in its first procurement in a newly deregulated long-distance environment did not utilize a careful and thorough competitive process.

The Office of Telecommunications approached divestiture's impact on the ATSS network as primarily a set of issues between Pacific Bell, AT&T and the State. Its vendors and the State put the emphasis on the continuity of service of a network now with two corporate masters rather than one. [17] The Supervising Engineer for Voice and Data stated that the State needs to position itself between AT&T and Pacific Bell to maintain control of the network. Thus, the Office of Telecommunications invested considerable effort in splitting the ATSS network between the two telephone companies, and resolve for itself various divestiture disputes that had developed between AT&T and Pacific Bell over networks of the ATSS type. Subsequently, the Office of Telecommunications "gave" AT&T the role of developing a shared data network for State users. However, another way to maintain control is to direct the vending community to meet

the State's requirements through competitive bidding, thereby avoiding the risk of becoming a "shuttle cock" between two very powerful corporations.

Vendors Have Not Had Equitable Access to Decision-Makers

As would be expected, the long tradition of monopoly service has created a strong business relationship between the State and its traditional vendors, AT&T, Pacific Bell and General Telephone. For many years the State has had "co-located" representatives of Pacific Bell (previously, Pacific Telephone and Telegraph). Company personnel rented office space adjacent to the Office of Telecommunications and functioned as a virtual extension of State organization. These representatives were both technical personnel, responsible for trouble shooting service problems, and marketing personnel.

Although the State has long been aware of the presence of marketing personnel and their special access to Office of Telecommunications, it has relied upon a "shield" of employee judgment to prevent undue marketing influence. [18] In July 1984, the representative of AT&T Communications who worked within the Office of Telecommunications was asked to leave because his desk space was needed and because of "the Little Hoover Commission study." [19] A former marketing executive of Pacific Bell, responsible for the Pacific Telephone &

Telephone account team serving the State, estimates that each co-located individual costs $50,000 per year, an expense which is absorbed by all ratepayers, rather than charged directly back to the State. [20] It is his understanding that AT&T Corporate, prior to divestiture, did not want to co-locate with the State because it ties up their personnel, but that the State virtually insisted on this convenience. The Deputy Director for the Office of Telecommunications has stated to the Commission that when his office relocates to new quarters, ongoing co-location of vendors will not be continued. We endorse this decision.

FINDING #2. THE STATE NEEDS POLICIES AND RESOURCES TO ADDRESS THE MANAGEMENT OF CONTEMPORARY TELECOMMUNICATIONS OPERATIONS

Telecommunications organizations and management in State Government historically were developed to coordinate departmental users and telephone companies. Fundamentally, their mission focused on the orderly provision of service. Over many years well-oiled mechanisms evolved for tending the network, anticipating traffic, processing work orders, and tracking changing rates in an unchanging vendor environment. Suddenly with divestiture, organizations accustomed to a coordinating role have found themselves expected to implement networks, integrate traffic, execute plans, and choose among a myriad of rate and price alternatives. As the Marketing

Manager for AT&T put it, "...there was nothing like going through [divestiture] to truely fathom the degree of difficulty that was going to take place...everyone was pretty ill-prepared to deal with that." [21] Under these circumstances, telecommunication management is, almost by definition, ill-prepared. How could it be otherwise given the tasks of the present challenge and the structure of the past?

A year after divestiture and deregulation took place, though, the State of California has not yet enunciated a staff resource policy for its central telecommunications organizations or for program departments. Specifically, the Strategic Report does not address long term staff requirements of the telecommunications system except to identify a "training need." However, its distributed management architecture presupposes substantial management capabilities among departments. Thus, the implementation of a more economical, useful telecommunications system implies and requires sufficient staff. However, Office of Telecommunications analysts in a variety of positions have been told that new positions are a last resort, if a resource at all, due to the Governor's mandate of no new positions in State government. Certainly, the transformation of recommended staff positions in the Strategic Report into consulting positions in the Strategy BCP would seem to bear this out. At present, the Office of Telecommunications has been obliged to limit most of its developmental work to relocating offices. It simply has not had the staff to work

on comprehensive analyses of many agencies who would like to develop more sophisticated and efficient communications systems.

The Commission raises the issue of management priorities. Testimony and interviews to the Commission agreed on the insufficiency of State resources for telecommunications management. While there are differences among the State, vendor and consulting experts over the scope of these problems and their solutions, the Commission found a need for comprehensive and aggressive policies and programs to address every major component of telecommunications management.

The State Needs Comprehensive Training Programs for Telecommunications Managers, Executive Management, and Users

The State has few, sporadic training sessions of any kind in telecommunications although its importance to the State's capabilities was emphasized by the Strategic Report, leadership within the Office of Information Technology and the Office of Telecommunications, the Executive leadership of the Department of General Services and the State's major telecommunications users.

Employees of the Office of Telecommunications regularly attend short, generic seminars offered by educational consulting firms who specialize in courses for telecommunications professionals. However, participants comment that these courses, by their nature, can be remote

from their own work. There have been some sporadic, in-house seminars. By contrast, radio (microwave/mobile) engineers have a regular educational program with a supervising engineer responsible for its execution.

Only minimal training programs for user departments in Sacramento presently exist. None have been reported by the Office of Telecommunications outside of the Sacramento area. Our only effort over the past three years to develop a telecommunications training program for the whole of government was cancelled in midstream and no replacement program has yet emerged, although the Office of Telecommunications has recommenced curricula development. In 1982 the Department of General Services testified to the Legislature that new staff needs would result from the post-divestiture environment. To meet these needs, the Office of Telecommunications a year later assigned a position to develop and coordinate training programs and in 1984 planned a small conference of users on training and classifications requirements in the deregulated environment. However, this conference was cancelled by the Executive Office of the Department of General Services on the grounds that the Department of Personnel Administration foresaw potential conflicts between this conference and labor negotiations in progress. The Department of Personnel Administration, however, denies expressing any concern that should have led to cancellation of the conference, stating that the decision to cancel "was internal to the Department of General Services."

Subsequently, the Office of Telecommunications eliminated plans to meet and confer over staff training.

Perhaps the greatest need for training lies with management outside of the telecommunications area. In interviews we conducted during this study, telecommunications analysts stated that executive management within some departments and agencies were regarded as poorly informed, and as a result, concerned only at a point of crisis. Senior management may not be aware in all instances of the changes wrought or impending in their own departments by the new management responsibilities of telecommunications. Thus, they may not be prepared for the investment of staff resources and time required to maintain technology services or to introduce new ones. One analyst from the Office of Telecommunications summed up this view in saying, "I think the management in the departments views the telephone with the same importance as they do toiler paper: its not a problem unless there isn't any."

Until three years ago, the Office of Telecommunications did offer regular training programs for Communications Representatives. These programs were conducted jointly with Pacific Telephone and Telegraph. However, training programs for departments waned after the trainer retired from State service. In the past, Pacific Bell has had a dedicated user training organization. However, virtually all activity ceased when Pacific Bell promoted training personnel to other jobs and assigned the training function to its State of California

marketing team. Pacific Bell has stated that members of the Account Team are available for training purposes. However, analysts at the Office of Telecommunications told the Commission that requests to the telephone company for training support are turned down. No support to one analyst's clients has been available outside of the Sacramento area. Another analyst stated that, in her experience, training by Pacific Bell and the Office of Telecommunications was limited to brand new users of ATSS/Centrex, typically cities and counties.

The least expensive "alternative" to teachers and training programs is the manual. However, the last telecommunications manual was published in 1977 by the Communications Division [now the Office of Telecommunications], and thus it excludes discussion of nearly all of the prominent issues and problems a contemporary telecommunications manager will face. Summary descriptions of ATSS, Centrex, the State Microwave System are similarly dated. The sections on telecommunications in the State Administrative Manual have not been revised in several years and do not reflect current State policies or practices. Other documents, such as the Strategic Report, were developed for specialized purposes, and are not of assistance in day-to-day telecommunications management. Occasional bulletins from the Office of Telecommunications have provided some discussion of the new telecommunications environment. However, no compendium is available today which accurately summarizes or explains State of California telecommunications, its

procedures, or its objectives.

No comprehensive strategy is guiding the future of telecommunications training. The State's Deputy Director for the Office of Telecommunications would like to see California's postsecondary educational institutions develop professional education in this area, and thus create a supply of telecommunications managers for the future. New York University is beginning such a program; no doubt the State of California could encourage a similar effort. However, even if it did develop a university-based curriculum, it would not be of short term benefit to State departments. The Department of Personnel Administration foresees its technology curricula for Statewide, large scale training programs embracing personal computer use, and not telecommunications. (How, of course, these technologies can be separated when a modem converts a personal computer into a communications terminal is not clear!) However, it believes that the Department of General Services, as the lead telecommunications unit of the State, may take responsibility for training in this area. Accountability for telecommunications training needs to be made clear. Regardless of programs from central agencies, departments must be persuaded that training is critical -- and their budgets must provide support for technological literacy. Certainly, however, if State personnel leadership with the Department of General Services and the Department of Personnel Administration are not forthright about the importance of training, there is no reason to expect that user

departments and agencies will be.

To conduct the necessary training, funds would be needed. Staff from the Auditor-General's Office familiar with the Office of Telecommunications' reimbursement procedures notes that the Office of Telecommunications training programs could recover their costs from charge backs to the departments in ATSS billings. The Office Of Telecommunications agrees and has contemplated very modest, one-time, special assessments for training. The Commission notes, however, that a small charge back (less than 1.0%) would provide $600,000 annually, which could initiate a serious program. This would be the "tuition" equivalent of something more than $2,400 per user. According to a management consultant expert in high technology utilization, even a much larger expenditure would easily justify itself in productivity and management returns. The State has the organization, funding mechanism, and policy support of the Department of Personnel Administration for training. Perhaps no area of telecommunications management in the State of California has fewer material obstacles to its implementation than training the workforce.

The State Needs to Analyze and Meet its Requirements for Telecommunications Management

The hidden issue of telecommunications resource management is the payoff its brings in overall economies of the system. This issue is particularly elusive in the State

of California. Because very few budget change proposals are utilized in telecommunications, and because program budgets are not developed to bring together personnel expenditures with expenditures on telecommunications goods and services, it is difficult to correlate management costs with operating costs. The State does not know how its commitment to the former affects its payments for the latter.

Within the private sector, the acquisition of technological systems comes second to the retention of experts in telecommunications management. Knowledgeable people can be trusted to develop an appropriate system. However obvious this may be, all of the State's policies and procedures specific to telecommunications are technology driven because technology acquisitions are subject to exacting approval processes while the expertise needed to plan and operate telecommunications remains glossed. As one telecommunications manager put it, "its easier to be a cop than a consultant." That is, the State's fiscal systems make it easy to approve or disapprove a choice of technology while systems to develop management capability are quite demanding to establish and execute.

The incongruity of the State's present commitment to the management of voice and data communications is manifest. For example, the Office of Telecommunications spends a great deal more on the management of the microwave system than it does on the management of voice and data communications. However, gross expenditures are very much the reverse. Maintenance of

the radio system (including mobile radios), as assets owned and operated by the State, have grown as the use of radio has expanded. If present day management resources for voice and data communications are compared with those provided radio communications in relation to State expenditures, disparities that evolved over a long period are evident. The following table shows the disproportion between telecommunications cost centers of State government and central management expenditures. It should be noted that all radio support activities are handled by the State:

OFFICE OF TELECOMMUNICATIONS ('000s)

	FY1984-85 Voice and Data	Radio (Microwave)
Personnel	$ 0.937	$ 9.600
Total Central Expenditure	$23.900	$16.500
% Personnel to Total Expenditure	3.9%	58.1%

(Source: Office of Telecommunications, exclusive of 9-1-1 program)

Once upon a time, management support was provided by the monopoly telephone company for voice and data, but the State had to develop its own management capability in radio communications. On the other hand, data processing evolved with a "built-in" understanding of the need for specialized staff, although insufficient staff resources are also a problem. Telecommunications personnel was based, in the words of the State Administrative Manual, on the understanding that

"the telephone company is available to assist in...communications."

Private sector organizations, on the contrary, analyze management expenditures in relation to operating expenditures; that is, six figure salaries ($100,000 plus) would be cost justified if they produce seven figure reductions or cost-avoidance ($1,000,000 plus) in total telecommunications expenditures. In a public climate adverse to increased personnel expenditures, the economies of telecommunications management may be overlooked. Furthermore, a sizable management organization -- existing or proposed -- is a stationary budget target compared to a conglomerated expense derived for a special report from telecommunication cost centers from one end of government to the other. These economies are further obscured by inadequate analysis of economic result. Unfortunately, the State does not have a management information system able to demonstrate whether or not management is improving the economies of telecommunications (see Chapter IV). The accretion of management resources must be accompanied by evaluation of the economic benefits it would bring.

The Telecommunications Management Infrastructure

Because there is no telecommunications management policy, there is no system for developing related management

in State government. The vacuum this policy creates, in turn, is eclipsed by the lack of an overall strategic policy for information management. As a consequence, skilled personnel are distributed through government almost randomly. Our survey of State agencies shows that in 117 departments surveyed for their telecommunications management and related support positions, over one hundred different civil service classifications were identified, ranging from clerical to the highest civil service classification of the State. The State Administrative Manual only requires that departments appoint a communications representative, a position whose description is as varied as State government itself. Some departments have conceptualized and implemented their own telecommunications management while others have not. Some larger departments have recruited analysts and managers from the Office of Telecommunications (recruitment by the Office of Telecommunications has also occurred), thus meeting needs in one unit by creating gaps in another. No correlation could be found between the number of person-years assigned by departments to telecommunications functions and total budget, information technology budget (communications expenditures plus data processing expenditures), or communications budgets. The commitment of departments to telecommunications management, and the skills required thereof, follows no pattern or policy.

Through our distribution of a telecommunications survey, the Commission found that many department executive offices

are uncertain about who, if anyone, in their organization is actually responsible for telecommunications. In a number of instances, surveys traveled to five or more different desks before execution. Many surveys had to be completed by multiple respondents from the same department because telecommunications-related activities are diffused. For example, a business office will handle acquisitions and procurement while a data processing chief undertakes planning and a communications representative is responsible for the telephone system. In telecommunications, the State is not unlike an army which counts its guns, but does not organize its troops. "Guns" turn out to be far more available than "lieutenants."

Except when seeking budget support for a specific project, departments are not required to explain or plan their personnel needs for technology management. None of the control agencies prepares annual or occasional studies of telecommunications staffing or maintains a data base of this information. No set of organizational and minimum management standards with which to supervise telecommunications has been defined.

A study done by the Radio Advisory Committee to the Office of Telecommunications itemized 103 distinct functions of telecommunications management, attributing 53 directly to deregulation. None of these functions could be classified as technologically esoteric. In calling for new management capabilities, the study defined the problem as one of a "new

environment...characterized by increased technical complexity, a host of new economic factors, and a fundamental redistribution of responsibilities [to users]." [22]

The Report did not estimate how many new telecommunications positions would be required by user departments to meet the "new responsibilities." However, fewer than a dozen departments out of 117 reported using the available dedicated telecommunications classifications. If specific telecommunications management experience is key to management capability, as all seem to agree, immediate, annual management insufficiencies in telecommunications organization could easily exceed several hundred person-years, exclusive of clerical support, but inclusive of the implementation of the Strategic Report.

The only current proposal to develop telecommunication management has come from users through the Radio Advisory Committee study referenced above. It would expand the existing Telecommunications Manager series (civil service classifications) by two additional levels and encourage departments to centralize and consolidate their telecommunications functions. The Office of Telecommunications, which strongly supports this proposal, expects the Department of Personnel Administration to initiate steps required to make a more advanced classification series available. However, the Department of Personnel Administration says the initiative lies with the Department of General Services. At present, therefore, management resource

development in State telecommunications appears to be in limbo, afflicted by a "Catch 22" between the Department of Personnel Administration and the Department of General Services. However, in the absence of staff assessments and any directed policy about departmental organization, expanded classifications will probably only improve the management capabilities of already sophisticated users.

Under present conditions some users may need a complete management and technical team in residence for a period of time to help them analyze and execute a telecommunications plan from A to Z. This, at least, appears to be the explanation of why there are many examples of State programs that could benefit but are not benefiting from applications of telecommunications technology. One Commission witness suggested, as a case in point, that the State could offer some telecommunications training by the use of educational technologies such as video cassettes, audio conferences, etc. However, few of the State's 2.1 million hours of annual in-service training utilizes modern technologies although California's tax-supported colleges and universities are leaders in this application.

Many other staff issues remain. The Office of Telecommunications is persuaded, for example, that user departments do not need their own engineering capabilities in radio communications or in voice and data communications. Some departments vociferously disagree. The Office of Telecommunications is concerned that communications engineers,

isolated within a department from other technical professionals, will loose awareness of their field. This is one problem. The obverse problem, engineers who understand all the technicalities but not how they are applied to programs, is equally troublesome. At present, the debate is framed as an argument over the respective economies of centralized and decentralized technical support. Expertise should be distributed (or centralized) in government in the most efficient and effective manner. Central provision of technical expertise may be more efficient provided: (1) the user is sufficiently well organized and well managed to take advantage of short-term, outside support; and (2) the central agency is sufficiently well staffed to handle the demands its expert capability invites.

Even if centralized positions are more efficient, they are not acquired easily. The Office of Telecommunications has had a difficult time diversifying new management resources for voice and data communications. It submitted requests to the Legislature for two consecutive years for additional support positions. In FY 1982-83, the Office received funding for five positions to support planning. However, only three positions were assigned to planning, the others were absorbed by ongoing operations. Recently, the staff planning unit was dissembled, and the Office awaits redirected positions from within the Department of General Services before any planning group is reassembled. On the other hand, engineering support for the radio section has been increased by approximately

eleven positions.

The distribution of staff, technical and management, should achieve a structure of action at user and centralized levels. It may be the difference between spending $160 million wisely or just spending it.

Strategies for Telecommunications Expertise

Testimony presented to the Commission enumerated three possible strategies to provide expertise (other than hiring staff into existing civil service classifications): (1) training; (2) special, higher salary positions; (3) contracted expertise [consultants]. We consider these in turn. In Chapter II we considered the pros and cons of relying on management and technical support from vendors.

Training: In the private sector, individuals recruiting telecommunications management specialists place a premium on experience; telecommunications today is too new to be learned any other way. The State will no doubt have its hands full if it only undertakes the training of mid-managers and analysts. The nature of telecommunications management today and the State's own inexperience and limited offerings in telecommunications training would not make training a viable substitute for hiring experts.

State Salary Ranges Are Not Competitive With the Private Sector

Even if the State had a well-defined management approach to telecommunications, it would find State salaries an obstacle to meeting its needs for additional senior level experts. The demand for telecommunications management appears to be exceeding the supply throughout the United States. Salary offers in the private sector have jumped accordingly -- sometimes to as much as $120,000 annually for an information technology executive recruited at the vice-president level. The radio section within the Office of Telecommunications lost 30% of its engineers to other employers over the past three years -- a loss which the Office's personnel manager attributes entirely to salary differentials between the State and the private sector. [24] It is not yet known even whether a special 18% increase in radio engineering salaries recently provided will be sufficient to recruit and hold staff.

The State of California has created specialized civil service positions seeking private sector parity to resolve its needs for professionals throughout Government. Ready examples are provided by legal positions , engineering and architectural positions, medical and scientific positions, and so forth. Parity with private sector telecommunications organizations would be difficult. Corporations, including some among the Fortune 500, have found themselves obliged to

support telecommunications management positions with internally atypical salary levels.

The Appropriate Use of Consulting Expertise Needs to be Defined

Since experts are in high demand, low supply, and available only at a high cost, organizations inevitably turn to consulting support if they decide to develop their telecommunications capacity in ways outside their experience. Consultants are expensive; their cost includes a premium charge for availability over a fixed term. The higher rates paid to consulting firms per hour compared to employees are a calculated trade-off. Consultants have two interests, not one: their own business and the needs of their client. The consulting contract always pays for both. [25] At the same time, consultations can be cost-efficient as they avoid continuing salary commitments to permanent staff and the expense and difficulty of recruiting telecommunications professionals. Most importantly, some expert skills are only needed temporarily.

As with other resources, the consultation must be managed. As consulting firms are subject to procurement, and individual consultants are hired under civil service regulation, the management of consultancies flows in part from State employment and contracting codes. However, because of the high demand for telecommunications expertise, a brisk and

competitive marketplace is emerging in consulting services not unlike that of telecommunications goods and services. Just as the State must exercise caution in its relationships to telecommunications vendors, so, too, must it approach the purchase of consulting expertise with care. Uncritical reliance on consultants rather than partnerships with them, inappropriate sole source contracts with consulting firms rather than competitive selection, unjustified assumptions about the "expertise of experts" rather than thoughtful examination of track record and experience will not strengthen State telecommunications management. In one instance, for example, the State paid $147,000 for six person-months of consulting time on a sole source contract. [26]

To consider how the State is approaching telecommunications consulting, the Commission examined two major approaches to this resource: (1) the Strategy BCP (to implement the Strategic Report), which proposed placing the future of State telecommunications, in part, in the hands of consulting contracts; and (2) the management approach to the development of a master purchase agreement for consulting support to departments.

The Strategy BCP proposed inappropriate use of consultants

In 1984, the Office of Telecommunications proposed in the Strategy BCP both to replace and augment civil service positions by consultants. The use of consultants to perform work normally performed by State personnel may violate State civil service law, could weaken operating systems once the consultants leave, may cause an increase in management costs, and may underutilize consulting expertise not classified by the State by accommodating it to civil service assignments.

The Telecommunications Strategy for State Government proposes 35 person years of permanent, full-time staff to plan, implement, manage, and evaluate the results of implementing the State's strategic policy. The Commission was told that originally the Office of Telecommunications wrote a budget change proposal that reflected the planning staff recommended by the Strategy Report. [27] However, the analyst involved was instructed to shift proposed civil service positions to consulting contracts in a revision of the BCP's budget. An analysis of the two budget change proposals -- one based on employees, the other on consultations -- shows that to "save" $611,878 in person-year expenditures, consulting expenditures were increased by $1,243,000. In other words, the State would spend two dollars on consultants for every one dollar of staff reduction. The State doubled the expense by replacing staff with consultants. [28]

The shift of work to be performed from State personnel to consultants could be justified under a number of conditions, even though such a change is considerably more expensive. For example, if a project of limited duration requires experts to be completed, it may be preferable to hire consultants rather than instigate limited term civil service appointments. Such a condition, however, would seem to require a detailed analysis of "workload standards," the State's vocabulary for what has to be done, for how long, and by what class of skills to implement a program. No such analysis was provided in the Strategy BCP.

The workload for consultants in the Strategy BCP consisted of two parts. Five consultant years (out of 13 budgeted) were for specific, advanced telecommunications skills that were not needed on a continuing basis, typical of the expertise that consultants efficiently provide to an organization. The remaining seven consultant years are itemized simply as "supporting" work tasks assigned to principal permanent staff positions. All clerical support in the draft BCP for implementation of the Strategic Report was eliminated in the Strategy BCP. Clerical work would have to have been done by consulting firms.

However, in telecommunications planning there must be estimates of what ongoing tasks will develop from the installation of a new(er) system. The Strategy Report and the Strategy BCP envision the construction of a network management center and a custom computing facility for analysis of

telecommunications traffic, equipment configurations, and the like. However, the Strategy BCP did not provide any information about how these installations would have been run. Indeed, all of the permanent staff assignments beyond the first year (the period of the BCP) were in planning, research and policy; however, a network management center requires operating personnel. The Office of Telecommunications or any unit that "shorts" permanent staff positions by using consultants could find itself unable to manage the capabilities it has created. Certainly, a new, complex facility will also generate clerical work that must be budgeted. The Strategy BCP made no mention of ongoing tasks. Workload standards for telecommunications consultants need to be analyzed as thoroughly as permanent positions. Workload standards should be analyzed in the planning process itself; management and technical capabilities are as much a part of telecommunications as hardware and software.

Master Consulting Contracts for User Departments

The Office of Telecommunications is currently completing a bid process for "master consulting contracts." These contracts would identify a list of pre-qualified consulting firms available both to the Office of Telecommunications and to departments needing additional help in telecommunications. A number of questions have yet to be resolved by the Office of Telecommunications regarding this approach.

In interviews, the Office of Telecommunications could not define a process for managing consultants retained through master contracts. For example, it is not yet clear whether the departments would be entirely responsible for the work program and performance standards of consultants. Since firms would be selected by the Office of Telecommunications, its responsibility should be clearly defined. In the CI Communications, Inc., scandal, the Department of General Services stated to the press that it could not guarantee the performance of firms under master purchase agreements. Consultant performance has become a sensitive issue in telecommunications.

Other questions include how finite consulting time would be allocated among departments. Would those most ready, (e.g., large departmental users) commandeer consulting time as needful small users find themselves passed over because they cannot present specific projects? Who at the Office of Telecommunications would be ultimately responsible for this program? One telecommunications engineer suggested that directing these consultants would constitute a form of "training" for the Office of Telecommunications staff. One must ask if consulting time, at departmental expense, is an appropriate source of training. <u>The retention of consultants under master agreements should be accompanied by explicit, contractual understandings with user departments</u>.

The State Needs to Anticipate Ongoing Responsibilities That Cannot Be Met by Consulting Contracts

Major telecommunications consulting firms recommend, without exception, that clients work out in advance a plan for a transition of responsibility from consulting contracts to permanent staff. One firm, Touche Ross, conceptualizes this transition as progress from a "mix" of 80%/20% (consultants to staff), to 20%/80%, to 100% staff.

A phased approach has several advantages. It brings to the client technical sophistication that might not be available in any other way. At the same time, the client and the consulting firm are both working towards an explicit assumption of operating control by the user. Consulting work is managed by the client (and the firm) to that end. The finished "product" is as much as enlarged client management capability as it is a telecommunications plan or system. Of the four firms interviewed by the Commission, none foresee the consultant's workload leaving with him. That is, a budget must anticipate at the end of the project a need for staff time comparable to the earlier need for consulting time. Expert consultants may help the client establish a framework for management. Once established, the ongoing work within a framework can be often accomplished by less experienced, less costly, and less expert analytical personnel. [29] Thus, the premium costs of consulting contracts can be recouped in lower, future personnel costs.

However, for the consultant budgets of major telecommunications efforts reviewed in this report, the State has not established this approach. Rather, consultant time has been budgeted without planned transitions to permanent operating staff and without reference to ongoing staff requirements.

Insufficient Management Resources Are Creating Priorities Based on Work Rather than on Need

The clearest indicator of staff insufficiencies is found in the project priority system of the Office of Telecommunications. As a matter of policy, its priorities, in order, are: (1) emergency service; (2) new services; (3) moves and (4) upgrades of existing facilities. This is a reasonable set of priorities for an office that does not have the resources to function as an in-house consulting and development team.

The practical implication of this schema is illustrated by a timeframe the Office proposed to the Employment Development Department (EDD) when the user initiated a project. The Employment Development Department needed to upgrade its telephone systems because, in many locations, they were falling apart and disrupting client services. None the less, their need for support could not be met in a reasonable timeframe by the Office of Telecommunications because of

limited staff.

EDD received timebound Federal funds that could be used to upgrade telephone systems in 98 field offices, providing unemployment insurance and job banking. The Federal funds were to be encumbered in contracts within a certain period. The Employment Development Department requested the full participation of the Office of Telecommunications in developing specifications, bidding and installing new telephone facilities. In response, the Office -- using the priorities described above -- indicated that it could complete only one office per month; eight years would have been required to finish the 98 office upgrade project. Instead, the Employment Development Department accepted, as an alternative, total responsibility for the project (except for specification development and bid review, where the Office of Telecommunications played an active role).

The Office of Telecommunications has been obliged not only to apply their priorities to routine requests from departments, but to render them guiding principles for the evolution of user telecommunications. Thus, the Department of General Services testified in 1982 that, overall, the State would upgrade its telephone systems as offices relocated. The Office of Telecommunications is unable to take into account depreciation and even dilapidation of equipment that undermines services to the public. It does not have the resources to handle more than the State's most urgent requirements. Departments are on their own if they must

upgrade their telecommunications over a short term. For example, the Deputy Director for the Office of Telecommunications estimates that migration to PBX's -- if it became a policy -- could take 63 years for the whole of government to be served centrally under the present staffing levels of his Office. A lack of resources and untimely support for user agencies will undermine the concept of centralized telecommunications management and its economical concentration of resources.

FINDING #3. THE STATE NEEDS TO DEVELOP ITS SYSTEMS FOR THE CONTROL OF TELECOMMUNICATIONS ASSETS

Precise accounting of assets and expenditures is an important aspect of telecommunications management. The telecommunications marketplace is increasingly segmented with different vendors supplying various pieces of systems for purchase, lease, or rental. Without both a breakout and consolidation of costs across these segments, the user cannot analyze what the total cost of the system is, or which segments are becoming more expensive. Consequently, management becomes increasingly limited in effectively targeting decisions to those segments which offer maximum savings or cost-avoidance. Sudden changes in rates can make a service too costly to continue.

The proliferation of vendor billings for telephone

service already has become a classic example of segmentation after just one year of divestiture. Every State user now receives a flock of bills. These will include local telephone services (which itself incorporates a range of expenses from installation to operator assistance), long-distance service, ATSS billing, terminal equipment, and perhaps, lines for data communications -- to name only a few. A spreadsheet of all of these expenses, organized according to type, is the first step towards controlling telecommunications costs. Only with an array of expenses is the manager positioned to examine the factors behind the bill.

The division of a telecommunications system into analyzed cost elements requires staff time, extensions of the accounting system, special reports, etc., each month, thereby incurring its own administrative overhead. When telephone costs were lower and choices among vendors and technologies were limited, there was little incentive to collect detailed telecommunications information. Management could not implement alternatives. Today, higher prices and technological and vendor options for their reduction can enable more exacting telecommunications administration to pay its own way. Careful review of bills usually generates credits for billing errors (estimated at 10% of the typical total telephone bill) and may identify inefficient or high priced equipment and services. For this reason, the Office of Telecommunications is beginning to train communications representatives in user departments in telephone bill

analysis. An additional benefit is found in the greater appreciation upper management develops for telecommunications once it perceives the actual level of communication costs. Executive management may not have reason to take notice of telecommunications until its expenditures are made visible.

In the absence of a codified management approach to telecommunications, the State of California is ill-informed about the costs of telecommunications operations. As a consequence, decision-makers at all levels of government -- departmental, agency and control agency -- may not have the means to analyze clearly the financial implications of current practices. In this section, we consider how underdeveloped administrative practices in telecommunications management lessens the control the State exercises in this area.

Inconsistent Accounting Definitions Leave Total Expenditures Understated

Telecommunication costs are accounted for in the State's fiscal system differently throughout government. In response to a request by our Commission, the Auditor General conducted a study of telecommunications expenses and found that these expenses exceed reported "Communications Account" costs in selected agencies by as much as 55% because the design of the State's accounting system requires that numerous telecommunications' related costs be charged against a variety of the State's operating expense accounts. Telephone

expenses, for example, are typically charged to "communications," some data communication costs may be charged to "data processing", while other data communications appear on a telephone bill if it is transmitted over the State's voice network. On the other hand, the purchase of telecommunications systems is accounted for as "equipment."

The lack of uniform accounting of telecommunications makes comparisons across user departments difficult. It also has left some departments uncertain about their own expenditures: they do not know where to find them in their budgets. For example, of those agencies who reported using data communications in the telecommunications survey, many could not provide any figure for their data communications expenditures. None of their operating expense accounts are limited to telecommunications, but also include other types of expenditures. For example, postage is also a "communications" cost. Bottom line totals of even selected operating expense accounts effectively conceal the telecommunications portion. In the absence of uniform accounting principles for telecommunications, a department seeking to define its current telecommunications expenditures would face the time-consuming task of creating a special report from original invoices that themselves may be hard to identify. Many departments would probably not even bother.

Theoretically, the State could establish a set of subaccounts to capture telecommunications expenditures. In 1984, the Office of Telecommunications assigned a senior staff

member to meet with the Department of Finance analyst responsible for the State's chart of accounts. He proposed a chart of subaccounts to handle telecommunications the reaction by the Department of Finance to which was "traumatic." [30] Changes in any aspect of the State's chart of accounts are complex to execute as they require modification of computer programs, financial records, and transaction systems. In the context of overall State operations, sorting out $130 - $200 million of telecommunications expenditures may appear less than compelling.

No Standard Inventory System

Accounts for Telecommunications Assets and Rentals

Just as the State's financial accounting of telecommunications is fragmented across many account categories, the State's inventory of physical equipment is fragmented between the State and vendors. When the Office of Telecommunications sought to negotiate the purchase of telephones from AT&T Communications, no aggregate figures for the number of telephones being rented was available. [31] Divested AT&T was in the process of acquiring title to terminal equipment from Pacific Telephone and Telegraph. It and PT&T did agree to undertake a count of State telephones by each PT&T office reviewing its State bills to determine a total. The result was used by the State and by AT&T as the basis of negotiations. Because the count was undertaken

during a sometimes near chaotic period within the telephone companies, and because the State had no way to confirm or except AT&T's count, the State cannot be certain to this day how many telephones it has. The State remains in the position of depending upon the vendor to set the figure. (The Deputy Director for the Office of Telecommunications has stated that the State does have an accurate count of its telephone equipment. However, no independent verification of the AT&T accounting has been provided.)

Since departmental records of telephones and other telecommunications equipment do not follow any standard, a department could well be paying rental fees for telephones and hookups long removed from service. A similar problem, is emerging in plant wiring, where historically [pre-divestiture] AT&T owned and maintained the wiring. Now wiring is an asset sometimes owned by the State and sometimes by Pacific Bell. Without a system for telecommunications asset management, the State cannot properly discharge its responsibility to the public for custodianship of resources obtained with public funds.

Management and other Personnel Costs of Telecommunications are not being Tracked

The Auditor General study of telecommunications accounting pointed out that personnel expenditures for telecommunications is yet another lost expenditure. Of course, total personnel expenses are reflected in numerous control accounts; however, no breakout of expenses particular to telecommunications is available. For selected agencies, the Auditor General reviewed the cost of those positions assigned on a full-time or almost full-time basis to telecommunications and found a significant addition to telecommunications costs from that point of departure. However, in the telecommunications survey conducted by the Commission, it was revealed that the vast majority of telecommunications positions are part-time. Ninety-nine departments reported 131 total telecommunications personnel years, but 49 of these were found in three departments, with nearly all others under 1.0 personnel years. The balance of departments reported less than 0.1 personnel years, a commitment of less than three person-days per year. Although the State spends an appreciable amount on telecommunications personnel, it has yet to formalize their cost allocations.

When the Department of Finance's Office of Information Technology commenced work on the Strategic Report, its first effort was to establish current telecommunications

expenditures. Arthur Anderson, the consulting firm retained to assist development of the telecommunications strategy, told the Commission the absence of firm figures created a significant obstacle to developing a strategy. The figures finally used in the Strategic Report certainly represent the firmest statement to date of overall State expenditures for telecommunications. However, the fact that a special expenditure study was necessary to achieve even an estimate demonstrates that, at any point, departmental and fiscal leadership of the State can easily be without a firm measure of telecommunications activity.

The 9-1-1 Emergency Calling Fund
Could Be More Efficient with Adequate Management Resources

The Commission found, as well, that State responsibility for telecommunications assets and expenditures goes well beyond $130 million. The Office of Telecommunications manages system implementation and reimbursement of expenditures for 9-1-1 emergency calling, a program financed by a percent contribution of each telephone customer to a Special Fund. Total fund revenues are about $40 million annually.

A study done by the Office of Telecommunications showed that approximately five to fifteen percent of billings from telephone companies and reimbursement submissions from cities participating in the program are in error. To review and correct erroneous billings and reimbursement requests would

require about $120,000/year in additional personnel. Net savings could amount to approximately $1.9 million per year. For the past three years, however, the Office has been denied budget approval to add these additional positions, even though they would be at no cost to the State and would make the program more efficient. The Department of Finance has recommended to the Office of Telecommunications that automated bill review systems be investigated as an alternative to additional staff. The Deputy Director for the Office of Telecommunications believes that 90% of the billings could be possibly subject to machine analysis; however, his Office will still have to confirm whether automated review is feasible. The 9-1-1 program illustrates how a review of expenditures can lead to money-saving measures greater than the administrative cost of that review.

The State could fund the budget proposed for emergency communications planning by the Administration last year in the Strategy BCP out of the savings of this program. Since cities (and counties) have evidenced strong commitment to improving emergency communications, they might well agree to this approach. Several years ago, during the State's serious deficits, a surplus of $40 million in the 9-1-1 fund was redirected to other State programs. Evidently, the State is not unwilling to take advantage of the 9-1-1 fund when circumstances dictate. By reviewing and reducing erroneous expenditures of the 9-1-1 program, the State could generate a surplus to assure communications during disasters when the

9-1-1 system is useless, but when tens of thousands of State residents would face life-threatening emergencies (such as an earthquake) just as serious as a house on fire or a murderer in a movie theater.

Guidelines for Efficient Asset Management are Needed

The absence of a systematic and independent asset management system for telecommunications, including an appropriate accounting schema, makes informed decision-making extremely difficult by definition. However, users could undertake a case-by-case analysis in order to reach decisions about specific acquisitions. This approach is illustrated by a memorandum the Office of Telecommunications issued to those few users within State government who cannot access ATSS, but instead take advantage of alternative long-distance services such as GTE Sprint or MCI. This bulletin described how the user should total several months worth of long-distance bills and have an "as if" bill calculated by a variety of carriers in order to determine which one is most cost-efficient. Thus, the Office has provided this class of users information about what they need to do to manage their long distance resources well.

Guidelines are not available, however, for the much more common acquisition decisions that users need to make. For example, users frequently ask Office of Telecommunications analysts whether to lease, purchase, or rent a given type of

equipment. Leases and purchases may presume longer-term use of equipment than changing technologies would justify, and rental may be appropriate. The General Services Administration of the Federal Government, as a case in point, obliges vendors to provide hefty discounts for leases, up to 25% for those lasting three years or longer. Users, however, have not been provided criteria or goals which should be invoked in deciding among these various types of acquisition commitments. The State also could make use of numerous computerized and manual modeling techniques now available for telecommunications decision and acquisition analysis.

Rapidly changing tariffs create another need for monitoring and managing telecommunications assets. However, noteworthy changes in costs have not been flagged for departments. They are, in many instances, simply absorbing increased costs rather than being provided with cost-avoidance and cost-reduction strategies. For example, a department may utilize leased lines to provide five digit dialing to an office in a different telephone company exchange from the headquarters exchange or for data communications. Leased lines have been subject to significant rate increases. Without knowing their cost as distinguished from all other telecommunications costs, the user cannot judge whether the dialing convenience continues to justify the expense. The State has not issued since 1978 any guidelines covering the analysis of bills for telephone company installations, where mistakes often arise. Installation costs have risen

dramatically in recent years, and it is worthwhile to decode installation bills (which are itemized by incomprehensible telephone company equipment codes) to see whether charges fairly reflect what was ordered.

These are illustrations of the workday tasks of telecommunications management. As commonplace areas of analysis, the techniques needed to reach decisions about them can be standardized by telling the decision-maker in the department what data is needed and how it is to be used. As a whole, the decisions of telecommunications management do not need to be intimidating, but they become so in the absence of systems for the collection and application of management information.

CHAPTER IV

EVALUATION IN STATE TELECOMMUNICATIONS

Evaluation is an empirical process comparing the actual result of a decision to its predicted result. Evaluation is important in telecommunications management since even the best efforts at planning and the most demanding operating standards may not assure that a communications system will meet its goals. In every decision there is uncertainty about factors such as operating costs, the benefits of technology, the reliability of machinery, and acceptance by the workforce. Planning is prospective; evaluation is retrospective, asking, "was the newly installed facility used or did it lay fallow? Why? Were the expected savings realized, or was the budget overwhelmed by unanticipated expenses? Was the new machine fraught with maintenance problems? Is the new technology less efficient than its predecessor?" Without evaluation the assumptions behind management decisions become fugitives from confirmation.

In telecommunications management, evaluation is a recurring responsibility. The review of current practice is always timely. A management decision might have been appropriate in one period, but as technologies change, not in another. The State of California, for example, made decisions decades ago about the utility of owning and operating a Statewide microwave system. Today its future is being questioned because of its high operating costs and its relatively small number of users.

FINDING #1. THE STATE OF CALIFORNIA NEEDS TO INCLUDE EVALUATION OF TELECOMMUNICATIONS SYSTEMS AND THEIR USE AS A ROUTINE MANAGEMENT FUNCTION

Presently, the State of California does not conduct routine evaluation of telecommunications systems and their uses. It only establishes that equipment conforms to specifications. State administrative practice neither requires evaluation of new technologies by those acquiring them, nor assigns responsibility to user or to control agencies to perform evaluation as part of the ongoing management of telecommunications systems. The State Administrative Manual does not identify evaluation as a component of State telecommunications management. When, for example, a department is delegated authority to procure and install equipment, it is not directed to report back its experiences with machinery. Rather, informal communications about the success or failure of an installation are substituting for formal analysis.

As a result, the State has no mechanism in place that:

- establishes criteria by which systems can be judged;
- identifies inefficient or ineffective telecommunications systems that are in use;
- establishes explicit goals for the performance of central and departmental management in planning and operating telecommunications systems or analyzes in an objective manner the effectiveness of departmental and central planning efforts. Planning efforts are not strengthened by feedback as to the results they have achieved;

- o applies the actual experience of users with a system in one part of government to plans of users in another part of government;
- o judges whether or not newer technologies would return a greater cost/benefit to the State than those in current use.

The Commission found that the first step of evaluation -- the collection and organization of performance data into a management information system -- has yet to be taken, making comprehensive evaluation difficult, if not impossible.

The State Needs to Develop a Management Information System

Evaluation depends on accumulated data in much the same way a doctor depends upon a patient's medical history. The cost of evaluation would be prohibitive if each effort had to start anew collecting data. A Management Information System [MIS] reposes data about existing systems, their performance, cost and use, vendor specifications and other particularities of the technological experience for use in evaluation.

Nevertheless, the Office of Telecommunications does maintain components of a telecommunications data base. In 1984 the Office initiated a new, comprehensive survey of departmental voice and data traffic requirements. Files are maintained on many departmental projects, typically in conjunction with requests for approvals or competitive procurements.

However, a data base does not become a management information system [MIS] until it is organized and accessible for decision-making. The Office of Telecommunications has data that could be put to work, but is not. For example, analysts within the Office are not provided with profiles of systems of the departments to which they are assigned. They do not have price/performance information about systems in use elsewhere in government. Thus, they cannot support their consultations with users about new systems with information about what has and has not been successful. They must learn on their own the nature of the systems that are in use, or hope to "pick up" an understanding of the problems and progress of their clients.

For example, the analyst assigned to the Department of Corrections (a case reviewed in earlier sections of this report) was not given a summary of that department's telecommunications activities, inventory, systems, or communications objectives. Developing proposals for improvement become time-intensive efforts that, in the face of many assignments, may not be practical. Parole offices throughout the State relocate frequently as case loads increase and more space is needed. The analyst assigned to the Department of Corrections sees a potential to reduce costs by installation of hybrid systems that can be moved along with the furniture. However, the parole offices utilize telephone company junction boxes which must be reinstalled in each new location. A profile of these offices would tabulate how many

relocations have occurred and note the cost of reinstalling rental systems (as is currently done) in comparison with other types of telephone system that might yield greater economy. This, however, has not occurred.

The State Is Not Realizing the Benefits of Evaluation

The State has not established a clearly defined criteria or process by which the cost/benefits of operating systems can be judged. In Chapter III we observed that the State does not have a clearly defined foundation for analyzing the cost-savings of the ATSS network, and that its cost comparison to direct dial charges may be misleading. No overall assessment of this system is available. The Deputy Director for the Office of Telecommunications has stated that the ATSS network was evaluated and found to be the State's most cost-effective solution to meeting its long-distance communications requirements. [1] However, no evaluation documents were provided in response to the Commission's request for them.

When the State approves appropriations or expenditures for plans, it does not impose an evaluation requirement. Thus, it cannot determine whether the investment of public funds returned economic or service benefits that were anticipated. Departments undertake, on an ad hoc basis, evaluation of existing systems, typically as part of a proposal for a replacement system. The Commission reviewed

various planning documents submitted by departments to the Office of Information Technology, Department of Finance. In them, estimates are made about improved efficiencies of new systems. However, although the State might approve a proposal on the basis of such projections of efficiency, no evaluation mechanism has been established to compare projections with results. Moreover, the State misses the chance to apply an evaluation of technological experience in one department to a similar proposal from another. Instead, each department reinvents the wheel.

The State Needs to Monitor its Major Systems

With the exception of the ATSS network, no unit of government continuously monitors major systems to see how efficient they are, and to trigger, if needed, planning activities for their modification. Thus, the State's largest system (other than those provided by the telephone companies), the State microwave system, has not been reviewed for its efficiency or effectiveness. The fact that only a few departments of government use the microwave system has not been subject to analysis to determine why, or what might be done to broaden its benefits. Similarly, ATSS/DS has not been evaluated to define its problems, although criticisms abound. Thus, the State might embark on new consolidated data networks without being able to apply the lessons of ATSS/DS and thereby avoid duplicating its problems.

The State's Diverse Technologies Should be Analyzed

The State of California telecommunications leaders are concerned that product marketing proffers unrealistic claims, a problem almost endemic to intense competition for sales. Steadfast evaluation could provide the State with its own data base on technologies, quite independent of vending. In an organization as large as the State, with departments at many different levels of sophistication and application stages, a wide diversity of technology is inevitable. While technological diversity is complex to monitor, it brings the benefit of varied experience, of different kinds of solutions to sometimes similar problems. Rigorous, comprehensive evaluation would create for the State its own intelligence about the effectiveness of products, the circumstances under which they are useful, and the commitment of their vendors to support their marketing claims. The resultant data base would be an invaluable tool for decision-making by users and central agencies alike. It could reduce duplicative efforts to find technological solutions, increase the feasibility of group purchasing by various departments who have the same needs, and allow the State to compare the relative merits of newer and older technologies.

During its study, the Commission found various instances of conflict between users and control agencies about what is or is not appropriate technology. In some cases, these issues

might be resolved by the initiation of pilot projects; in others, by experimental projects in conjunction with vendors. However, their success at resolving issues requires rigorous, uncompromising evaluation which commands everyone's respect. Pilot projects and experiments give recognition to departmental efforts at innovation, while circumscribing the risk of State funds, time, and energy.

CHAPTER V

THE ORGANIZATION OF TELECOMMUNICATIONS MANAGEMENT

In order to respond to the significantly different telecommunications environment, new management functions have emerged. These functions and the resources allocated to them constitute the organization of telecommunications management. Management organization is a major issue. Where once the user would follow the strategic plans of the telephone company, the user of the mid-1980's has economic incentives to develop and implement his own strategies. Where once nearly all equipment was obtainable from one source, today there are both competitive sources and competing technologies from which to choose. This, in turn, has greatly complicated both planning and procurement; new skills and more person-hours are needed to ferret out choices. Management of a pre-divestiture organization proceeded quite nicely with scant attention to these tasks. However, inadequate attention to the management of telecommunications today produces functional inadequacies which may cost the large user tens, even hundreds of millions of dollars annually.

The rapid evolution of telecommunications is also influencing what kind of organization is necessary to manage in the changing environment. For example, as hardware and software evolve, State departments are discovering new

applications of telecommunications to their programs. Greater demand from multiple users encourages acquisition of shared systems to optimize transmission efficiency. Thus, management becomes the administrative and technical "integrator" of diverse requirements in voice and data communications. However, new technology promotes both centralized and distributed capabilities; management functions need to follow suit. Not all responsibilities can be left to central agencies.

The new telecommunications environment demands active management where a reactive one has existed in the past. Although some unit transmission costs may decline, overall costs are pushed higher by rate increases and greater demand. Any institutional cost-spiral is greeted by budget controls and campaigns for economy. These functions are joined by new kinds of telecommunications decisions about vendors and products, all of which require more management. However, what first appears as a problem of cost containment -- finding fifty ways to say no -- is misleading. The sheer ubiquity of communication insists, instead, that the institution find the right way to say yes. The organization must seek to identify and implement investments in technology and management that optimize system efficiency -- getting the most electronic communication for the least money. As the user becomes more sophisticated in the use of telecommunications technology,

other communications costs such as postage, hardcopy distribution, travel, and supervision of field activities from the headquarters, can be traded for more efficient investments in telecommunications technology. This encourages even further expansion of telecommunications management.

Institutions confronted by new telecommunications management functions may initially assign them to the existing structure, piling more and more duties upon positions that already have their hands full. Pushed to the limit, management interest in developing telecommunications competes with maintaining a continuity of service. Crisis management may become commonplace, if it is not already; in the words of a Supervising Engineer from the Office of Telecommunications, "from the time I got there until today the first thing they hand you is a fire extinguisher." [1] The management organization may be forced to make inappropriate choices between the new functions of planning and the continuing ones of operations. Inevitably, management effectiveness of both users and central agencies becomes an issue. At that point, two variables come into question: the amount of resources and the type of organization through which they are allocated. Four choices emerge:

- (1) maintain current resources and organization;
- (2) reorganize without additional resources;
- (3) increase resources of existing organization;
- (4) increase resources <u>and</u> reorganize.

Every large user of telecommunications in the United States has, is, or will come to terms with these mutually exclusive management strategies in the post-divestiture period.

FINDING #1. OTHER LARGE USERS, WHOSE TELECOMMUNICATIONS EXPENDITURES COMPARE TO THOSE OF THE STATE OF CALIFORNIA, HAVE UNDERTAKEN REORGANIZATION IN ORDER TO FUNCTION SUCCESSFULLY IN THE NEW TELECOMMUNICATIONS ENVIRONMENT

The demands of the State of California for telecommunications are not unique in the United States. Most governments -- Federal, State and local -- and nearly all large corporations are recognizing the need for efficient information handling. They share, with the State, a history of management fragmented between voice communication, which has developed centrally under end-to-end monopoly service, and data communications, which each user has developed individually. Large institutions examining their own capabilities want greater expertise, a more sophisticated approach to the deregulated marketplace, and clear plans for the future. Numerous state governments -- such as New York, South Carolina, North Carolina, Florida, Connecticut, Massachusetts, Wisconsin, Washington, Pennsylvania, and Maryland -- are revising their approaches to improve how much "bang for the buck" they achieve. Corporations across the Nation have reorganized their telecommunications along with

data processing to unify and advance all information technology activities.

The State of California, however, has more to learn from the private sector and even from national governments than most other state governments. The State needs to communicate across vast distances to California's population centers. It must knit together an enormous workforce through communications. The State's needs create telecommunications requirements comparable to those of the largest non-Federal telecommunications spenders, multi-national corporations. At the same time, the State's interest in effective communications with all parts of California, including rural areas, adds complexities more akin to those faced by national governments. For example, the State has remote regions which cannot be efficiently connected to the ATSS network. To the extent the State wishes to avoid the expense and delays of trial and error in its telecommunications development, it may study the experiences of other large users and apply the lessons they have learned.

Large users are resolving the organizational issues of telecommunications management in similar ways. The State of South Carolina, for example, has consolidated all information technology management under its Division of General Services, and granted that division "authority for...data processing, telecommunications, and office systems." [2] Within the Division, tasks are handled by an Office of Information Resource Management. In order to assure that

telecommunications planning is not overwhelmed by operating responsibilities, a separate Information Technology Planning Office also reports independently to the Division's executive office. In this instance, the State reorganized its telecommunications within an existing General Services framework.

The Bank of America decided to start from scratch in its consolidation of information technology management functions and created a brand new vice-presidency to which planning and operating units report. Hewlett Packard brought together units at a new executive level; they had been functioning separately. Boeing Aircraft provides yet another illustration of reorganizing telecommunications and data processing management to achieve a centralized, technology strategy for the whole institution. Each of these institutions undertook recruitment of experienced information technology managers as part and parcel of their reorganization.

In testimony before the Commission, Touche Ross & Company, a leading accounting and management consulting firm, summarized a market analysis it had conducted throughout the United States of approximately 2,000 of the largest end users of telecommunications. For the purposes of the Commission's hearing, the Touche Ross representative focused his summary on the twelve users who had billings in excess of $50 million and had multi-site locations.

The following patterns were identified in the survey:

(1) All twelve of the large users have a centralized decision-making process for both voice and data; most large users have a single telecommunications division with comprehensive authority for voice and data communications;

(2) the centralized telecommunications group is responsible for both planning and operations; planning and operations are kept distinct within the group, but each reports to the same executive management;

(3) certain decisions are delegated to local management; however, the central body has final authority over decisions involving capital equipment acquisitions and networks;

(4) the central telecommunications division does not "stand alone," but is part of a larger organization in which data processing, management information services, and data collection all report to the same executive. [3]

These are the ways Touche Ross has found that functional management concentrates on the entire institution. They confront and conquer the historic fragmentation of functions that developed in a marketplace of monopoly, end-to-end voice services and of competitive data processing and data communication services and equipment. With the changes in the marketplace has not only come the possibility of, but also the necessity for consolidated management. Changes in technology challenge the uneconomical separation of data and voice communications because consolidated management can implement a comprehensive strategic approach to information resources. Of greatest significance, however, is the "economies of expertise," a concept developed by Peter Keen, a theoretician of technology management. Since experts -- whether resident

or consulting -- are expensive and hard to find, they must be strategically placed to have the broadest impact on the institution. By establishing a management center with considerable authority, the institution maximizes the return on a substantial investment in human resources. The management is positioned to take fullest advantage of the buying power of the institution by developing telecommunications systems to accommodate the whole, and thus the many different parts.

These patterns have paid off to those who have applied them. All of the private sector companies who testified to the Commission about reorganizing their management structures -- and who thereby were able to reconfigure their telecommunications systems -- found costs to be reduced by twenty percent from what they would have been. [4] The Touche Ross study reported a similar level of economic benefit after reorganization, measured as a percentage gain over projected expenditures.

FINDING #2. THE STATE OF CALIFORNIA HAS BEEN CONSTRAINED FROM MEETING REQUIREMENTS OF THE POST-DIVESTITURE PERIOD WITH ITS CURRENT ORGANIZATION OF TELECOMMUNICATIONS MANAGEMENT

The State of California's central telecommunications management organization is the Office of Telecommunications which was developed over many decades to coordinate, promote

and reimburse traditional telecommunications vendors (e.g., Pacific Bell, AT&T and General Telephone of California). Over the past two years, the United States has completed a transition from monopoly telephone service to a composite of regulated and deregulated segments of service. However, during this period, the State of California has been significantly constrained from implementing any substantive change in telecommunications practices. Indeed, in one area -- training -- where the growing need for programs is without controversy, less is being implemented than in the past. Specifically, the telecommunications management of the State has lacked the resources and effectively managed functions to address major requirements of the new telecommunications environment. As a result, the State has had to defer actions that would improve the economies and usefulness of telecommunications:

In planning, the State has made little or no progress in:

- o developing tactical plans to implement the State's strategic policies, or to propose an effective procedure to do so;
- o developing plans, guidelines, standards or support for the acquisition of deregulated, customer premise equipment other than touch tone telephone receivers;
- o developing plans, specifications or procurement efforts for the procurement of long-distance telephone service from a deregulated marketplace;
- o providing more efficient transmission of data, or analyzing the economies and suitability of integrated voice and data services, in spite of widely available expertise and deregulated technologies for doing so; instead, non-competitive practices have left these issues to vendors;

In operations, the State has made little progress in:

- o establishing policies for an equitable State procurement process in a multi-vendor environment;
- o providing normative standards or direction for telecommunications management at the user level, in spite of broad recognition of the users' need to upgrade their management capabilities, and provide efficient oversight and support for accelerating user activity;
- o providing support to users with critical hardware needs falling outside of the product lines of traditional vendors;
- o establishing training programs for users of telecommunications technology, telecommunications management, or executive management within State government;
- o redefining through contracts or other instrumentalities the relationship of the State to traditional vendors, although those vendors, at their end, have fundamentally changed the nature and range of their services and management support thereof;
- o providing the State's branches of government with direction on the major policy issues of the period and to represent and advocate the State's policies before appropriate Federal and State regulatory bodies;
- o revising State Administrative regulations to take into account the changed telecommunications environment.

In evaluation, the State has yet to:

- o provide analysis and evaluation of acquired technology to test its efficiency and effectiveness, and to use scientific evaluation to inform the course of planning and procurement;

These tasks are not, in themselves, controversial. From 1982 forward, the Department of General Services has described in testimony to the Legislature and in various bulletins many of the new functions created by deregulation and divestiture.

And the Office of Telecommunications has good intentions to address them. The Strategic Report affirmed, in general, the economic and management incentives for changing the State's approach to telecommunications. Unlike other large users, however, the State has not resolved the organization and the resources that it takes to meet and master the new management requirements.

Even if the Office of Information Technology and the Office of Telecommunications were provided adequate staff resources -- which they have not been provided -- the current organization of centralized information technology leadership is incompatible with the efficient and comprehensive fulfillment of the planning, operational, and evaluative tasks of the new telecommunications environment. Three major areas serve to illustrate this conclusion.

First, the State's operating direction outlined in the Strategic Report on telecommunications calls for a telecommunications system able to meet the stringent requirements of data processing. The success and growth of data centers shows the fundamental role of telecommunications in providing efficient data processing resources. These two branches of information technology must be balanced. And yet the responsible central agencies are so isolated from one another that even coordination of basic review functions has proven to be extremely difficult. Under these conditions, it would be unrealistic to expect them to put together the requirements of hundreds of users of both information

technologies into a coherent tactical plan.

Second, the Office of Telecommunications does not have organizational parity with <u>any</u> other unit of government with whom it works except for the Office of Procurement; user departments report to their agencies, not to the Office of Telecommunications. Unless information technology leadership has <u>departmental</u> status, and parity thereof with users, it cannot exert the authority required to implement a shared telecommunications system for voice and data.

Finally, as a matter of policy, the Department of General Services is totally funded by reimbursements from other units of government. Necessarily, it seeks to minimize the expense of its management services rather than to adjust those services to minimize the operating expenses of users. Modern telecommunications leadership, on the other hand, provides sufficient management to minimize the cost of communications. The Department of General Services cannot, by its nature, develop the telecommunications management needed to address its contemporary functions.

FINDING #3. IN ORDER TO FUNCTION EFFICIENTLY AND EFFECTIVELY IN THE NEW TELECOMMUNICATIONS ENVIRONMENT, THE STATE NEEDS TO REORGANIZE ITS TELECOMMUNICATIONS MANAGEMENT AT CENTRAL AND USER LEVELS EVEN AS IT ALLOCATES ADDITIONAL RESOURCES.

When the airplane developed as a new technology of defense, the Armed Forces engaged in a major debate over

whether a new service was needed. Ultimately, the Department of War recognized that the new technology was so fundamentally different than others in use that a specialized branch of the military was needed for its deployment; the United States Air Force was born as a result. Today, the State of California faces a comparable challenge. Is the new environment of information technology and its marketplace so fundamentally different as to need a special organization for its management?

The State of California is increasing its telecommunications management resources, albeit slowly. Although Office of Telecommunications has gained positions from the redirection of Departmental personnel for planning and regulatory affairs, it has been an insufficient amount to respond to the requirements of the post-divestiture environment. Concurrently, the Office of Information Technology has developed a complement of telecommunications personnel while a number of the larger users within State government have redirected staff to telecommunications functions, often in conjunction with the assignment of additional telecommunications functions to data processing units.

The Budget Change Proposal submitted in the 1984-85 budget process after release of the Strategic Report called for personnel additions to the Office of Telecommunications and for substantial consulting budgets for new telecommunications facilities for the whole of government and

for user projects. Master consulting agreements are being executed, on behalf of users, in the current year. Departments are retaining or anticipate retaining consultant support for telecommunications development.

On its present course, the State is committing more staff to telecommunications management without changing its functional organization. Although the State has recognized the necessity to augment its overall current telecommunications resources to better enable it to respond to the post-divestiture environment, the State has not fully analyzed whether budget redirections and augmentations in and of themselves are sufficient to address the requirements of the new environment. The State must be organized so that the current management, at all levels, is able to obtain economic benefits from the new marketplace and its technologies. Nevertheless, the evidence strongly suggests that the State's current organization is neither the most efficient, nor structured to generate the maximum benefits.

As previously discussed, the collective experience of the Nation's large users, corporate and governmental, is that they have been better able to achieve efficient telecommunications in today's world of information technology by:

- uniting central leadership of telecommunications and data processing technology, rather than by dividing them as the State does today;
- separating planning and operations into distinct subunits, with their coordination achieved by an executive information technology management, rather

than by amalgamating planning and operational functions in the same unit as the Department of General Services has proposed;

- establishing strong, central authority over both voice and data communications; the authority has an unqualified obligation to meet diverse user requirements, rather than allowing each user to build an independent data communications system as is State practice today;

- creating a visible, ongoing, expert, and resident capability to consult to all users about how they can address their telecommunications requirements, rather than, in the manner of the State of California, expecting ad hoc decisions by users about whether, when, and how to acquire expertise;

The Commission finds that the State's failure to apply management organization typical of other large users, public and private, is neither justified nor optimal for the future. Rather, the current functional organization will become a growing barrier to efficient and effective telecommunications.

Technology Leadership Is Organizationally Fragmented

The State has divided its central management of telecommunications spawning confusion, inconsistency, and unsystematic supervision of State telecommunications activities.

The Office of Information Technology overlaps in function with the Office of Telecommunications, in spite of efforts to create a logical division of labor between them and assign the lead to the Office of Telecommunications. The Department of Finance has not been able to relinquish to the Department of General Services authority over major project

expenditures in telecommunications, as analyzed in Chapter II. At the same time, the Office of Telecommunications has been unable to provide planning or operational support to the user community in their accelerating applications of data processing technology through modern telecommunications systems. While the two Offices overlap in function, they also have established independent decision-making processes for the same decisions. Thus, some agencies have their telecommunications projects approved by one Office while others have theirs approved by another.

Better elucidation of procedures, while needed, would not totally resolve this problem. Procedures cannot overcome an inconsistent policy. Planning and operations need to be brought together if the former is to guide decision-making and the latter is to implement decisions. So long as planning is viewed as a budgetary matter and operations as a procurement issue, no common ground between these is possible, no matter what procedures are defined.

Dual centers of power, one in the Department of Finance and the other in the Department of General Services, present to State users two different approval processes for technological innovation, the former oriented towards budgeting and planning, the latter towards procurement and operations. The disjunction of planning and operations created by dual centers forecloses first analyzing and then acting on alternatives. The Office of Information Technology

was unable, in this environment, to include <u>any</u> discussion of telecommunications in a 65 page report on "strategic implementation policy." That is, there is no implementation policy. The State has not been able to articulate or even identify a need for assessing its telecommunications management structures or the preparation of the workforce in the "information age," as discussed in Finding #2, Chapter III. Thus, the State of California has no system for the review and upgrading of telecommunications technologies for the user of State government, relying on breakdowns and office relocation as substitutes for planning.

The Strategy BCP proposed to add planning capabilities to the Office of Telecommunications, thus replacing disjunctive authority with duplication. All other large users presented to the Commission, first and foremost, a <u>consolidation</u> of their technology management functions. The State of California users participating in the strategic planning process reached the same conclusion: organizational assignments will not work in the implementation of a comprehensive, economical, and technologically current telecommunications system.

The Director of the Department of Finance defends the dual roles of the Department of Finance and the Department of General Services as providing important "checks and balances" to the decision-making process. However, checks on <u>all</u> State activities are built-in to the budget process and the control

exercised thereupon by the Department of Finance. At present, information technology projects, including telecommunications, are unique in that they alone have an expert unit (by design, although resources are limited) that reviews plans and applications. Other complex, technical areas of government such as capital outlay programs for building construction are checked and reviewed by the budget personnel of the Department of Finance. Moreover, the concept of separation of powers involves the branches of government -- Executive, Legislative and Judicial -- and is designed to provide "checks and balances" to government. If the principles of checks and balances are applied to program administration, it would undermine program accountability.

The Department of Finance requires budgetary reviews <u>in addition to</u> review by the Office of Information Technology. Indeed, six different officers of the Department must approve information technology projects. No area of governmental activity presents as many hurdles to execution as the use of technology to improve productivity. Telecommunications is largely a scientific field. Therefore, while its analyses are not infallible, they are less susceptible to debate than the riddles of criminal recidivism, the problems of poverty, or the flow of precious water -- issues which do not, evidently, require a unique structure of <u>internal</u> checks and balances.

The hallmark of the new environment is its array of choices, a benefit that the State's current structure has generally been constrained from optimizing. The present

organization of telecommunications management grew when choice was limited. It was structured to make the most of a tightly regulated service to State operations. Today, the State of California faces the challenge of finding a structure to make the most of a deregulated, competitive service to the State.

The Division of Telecommunications and Data Processing Leadership Is Inconsistent With the Convergence of these Technologies

Current organization leaves unaddressed the relationship between voice communications, data communications, and data processing. However, modern transmission systems are communications breakthroughs precisely because they establish a common facility for both voice and data. The power of the microcomputer, given emphasis in the strategic policies of the Office of Information Technology, lies in part in its use of telecommunications to distribute information processing. Increasingly, modern organizations are finding that time-consuming and expensive voice communication can be replaced by electronic mail and other data transmission substitutes. Today, corporations are supervising worldwide operations, not by expensive travel, but by computer based management systems.

The Strategic Report proposed systemic economies by combining voice and data facilities. The distinction between a department's "data processing requirements" and its

"telecommunications" requirements is becoming obsolete. The State cannot divide its central leadership in technological applications and expect users to meet information needs that require both technologies efficiently. Recently, the Bureau of Seismic Safety established the most advanced earthquake detection system in the world; tremors detected in Mammoth Lakes will be reported by a complex telecommunications/data processing system to seismologists in their homes through the use of computers, the State microwave system, the telephone networks, and synthesized voice alerts. This is the type of integrated system a few departments are developing. Yet the State of California has no central organization with the same capacity.

For historic reasons, the Department of General Services and the Department of Finance have independent interests in telecommunications and data processing, respectively. The Department of Finance was directed by the Legislature to exert control over the out-of-control acquisition of multi-million dollar mainframe computers. The Office of Telecommunications was established to rationalize the State's growing demands for communications services from the telephone companies, and to establish central service in radio/microwave communications. This history has obscured the rapid convergence of all information technologies. Consequently, the management tasks common to both data processing and telecommunications technologies have been overlooked.

User Agencies Are Not Receiving Adequate Support

Telecommunications is a support system to State departments, not the State's business. Rather, the business of the State is various kinds of services to the public ranging from health care to parks and recreation. The acid test of an effective telecommunications system lies within the departments as they discharge their responsibilities to publicly financed programs. Therefore, telecommunications must aid and abet departmental missions.

However, the current structure has left many if not most users to fend for themselves producing widely divergent results. Telecommunications requirements are being met in one program, while being orphaned in another. Where they are being met, it is frequently due to the State department circumventing the current control processes because it is more expeditious. In other instances, departments are seeking "boiler-plate" solutions without actually analyzing their needs.

The Commission is well aware that departments often seek greater autonomy than accountable practice should allow. However, the Commission found, perhaps surprisingly, that major users in the State are willing to submit to the discipline of central telecommunications management. Indeed, they testified in support of central management and the telecommunications services which only a central organization can develop. They support, as well, the distribution of

responsibility and authority established as policy in the Strategic Report.

However, in the absence of organization to implement this policy, the major telecommunications users of the State are developing independent, less efficient, telecommunications systems. Inefficiency is the legacy of today's organization. Both the University of California and the California State University System are planning the construction of long-distance, digital networks that would parallel the routes of the State network. The Director of Information Services for CSUS said that, "[o]ur position is one of whomever is the first to provide a statewide capability is most likely the one we're going to join forces with," meaning that his nineteen campuses and systemwide organization cannot wait for the State to take action. The major data users of the State -- the Franchise Tax Board, the Controller, the Department of Motor Vehicles, etc. -- have all developed their own data networks in the absence of a State data system. Caltrans is developing regional networks for computer aided design systems, another case of disaggregation brought on by necessity.

The Administration's Strategic Policy Needs an Implementing Organization

Large users, other than the State of California, have found reorganization of telecommunications functions the key to implementing policy. The State of California invested

extraordinary hours of its telecommunications leadership, central and user, in developing the Strategic Report. In the history of State telecommunications, no policy can make greater claim to a participatory process. Its points of consensus should have provided a strong foundation for its implementation especially after adoption of the Strategic Report by the Administration. Although the Legislature chose not to appropriate the 1984-85 Budget Change Proposal for telecommunications, the Commission could not find any Legislative opposition to the Strategic Report as a policy document. However, the legislative analyses of the Strategic Report observed a lack of palpable, functional organization to carry out the tasks of the strategy. This weakness, the Commission found, was not an oversight; it resulted when significant differences arose regarding the type of organizational structure necessary to implement the strategy. The Office of Telecommunications wrote a management analysis on the organization of the Project Task Force (that would initiate the Strategic Plan) putting the issue clearly:

> The placement of the project within State government is critical to its success. As the project develops, many aspects will become ongoing operational elements of the State's telecommunications function and, as such must be placed with an ongoing functional operation. For this reason, it is felt that the placement of the project group should be with the Office of Telecommunications...
>
> The management task force of the design team, however, recommends that the project organization be placed at Agency level in the State and Consumer

> Services Agency. It is their view that the success of the program is dependent upon this for the following critical reasons:
>
> - The project organization must be placed at a level and with sufficient insulation that ensures that the energies of the project team are not diverted by day-to-day activities.
> - At a lower organizational level, the project could not recruit the personnel or compete for the funds and services needed to achieve the objectives of the project.
> - The development oriented goals of the project are in direct contrast to the control and procedure oriented goals of the Department of General Services. [emphasis added, 5]

These differences were "reconciled" by major deletions of Strategy Task Force conclusions from the published Report and by amendments to the Report's recommendations in the request for funding that succeeded it.

Users had proposed to the Task Force two distinct organizational steps. The first would have established a temporary body able to act independently of existing telecommunications management. The second would have appraised three alternative models of permanent functional organization including the current structure. (A chart of these models was developed by the users and is reproduced after page 182.) The Commission believes that the continued omission of organizational issues from critical appraisal is counter productive and inefficient.

The functional demands of the new telecommunications policy will increase in complexity, choice, and economic implications. The volatility of this field, however, does not

negate already well documented results achieved by large users. Large user institutions with networks identical to the State's have made changes in their telecommunications organization in order to manage new systems with spectacular economic benefits. They developed their management capabilities to wrestle with every dollar of cost and unit of service. Investments in telecommunications management began during a period of recession when tight money ruled. The reason: 20% savings over prior operations. All large users have had the benefit of private systems such as ATSS before implementing new telecommunications strategies.

The former Deputy Director of the Office of Information Technology and a project principal of A Telecommunications Strategy for State Government, believes that the State will forfeit on the order of $100 million dollars annually if the integrated, high capacity network and sophisticated local systems do not develop. It may be modest to speak of a twenty percent realization of savings and cost-avoidance equal to $30 million to $60 million annually, exclusive of qualitative benefits to productivity and public service.

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2/22/84

CENTRAL MANAGEMENT STRUCTURE

ASSIGNMENT OF MANAGEMENT RESPONSIBILITY (OPTIONS)

LOCATION	PRO	CON
DGS/OT	. Function should be assigned to a centralized service orientation agency. . Many states assign function to their "General Services" agency. . Current state structure charges responsibility with DGS	. Perception of lack of competent personnel - both technical and management. . Could be less work to establish a new entity than to add the required function, organization and resources to DGS. . DGS should remain its current function as an overseeing, control agency. . Lacks credibility. . Poor track record. . Too many diverse functions in DGS.
Establish a new Department in the State & Consumer Services Agency	. Could eliminate objections to DGS. . Fresh start, if new personnel are utilized. . Narrow, highly technical program, which is critical to state operations, would get focused attention.	. Not politically attractive — more government, more cost, more bureaucracy. . The time required for start-up may result in loss of immediate benefits. . Personnel would probably come from DGS.
Establish an Independent Non-Profit Corporation	. Could eliminate objections to DGS. . Fresh start. . Could pay competitive salaries to attract telecommunication expertise. . Not subject to civil service restrictions.	. Lack of control by users. . Least cost effective. . Not subject to civil service protection. . Authority to establish may not exist. . US Postal Service provides a poor example c. this type of organization.
Assign function to an Existing Department i.e., DMV, TDC, HWDC, DOJ, DGS (DPSS)	. Could allow state to receive benefits of deregulation immediately. . Could utilize the organization, expertise, user billing procedures already in place in some agencies. . Could provide an interim solution while some other organization is established.	. Other state departments would object. . Assignment to any one state department or data center would represent a "conflict of interest" . Data Center might attempt to spread part of its overhead costs to the telecommunications network users. . Lack of fundamental knowledge.

CHAPTER VI

RECOMMENDATIONS

INTRODUCTION

Until divestiture, the State paid for most of its voice and data communications management through monthly telephone bills. Its traditional vendors assumed major responsibilities not only for transmission services, but also for their technologies and organization. Today, telecommunications management costs and responsibilities are the State's to bear. The Office of Telecommunications and the Office of Information Technology have worked to address the management obligations of the new telecommunications environment in spite of a lack of resources commensurate to them. Their efforts have been augmented by telecommunications leadership within departments participating on various advisory and ad hoc planning committees. However, the State is trading higher costs and lesser capabilities of its telecommunications systems for limited management resources and historical management organization. It is tolerating limited and potentially decreasing control of telecommunications expenditures and assets at a time when many comparably large users are sparing no effort to take control of their telecommunications -- and gaining greater economy and productivity as a result.

The Commission recommends major reorganization of

telecommunications management. Grafting new functions onto existing organization will be, in the Commission's view, more difficult and far less effective than reclusing old ways of doing business in the new world of business. Reorganization must be given the fullest and most serious consideration.

We have called the hidden issue of telecommunications management the payoff it brings in bottom line economies to the system. This issue is particularly important to the State of California. In a public climate adverse to increased personnel expenditures the economies of telecommunications management may be overlooked. This Commission shares with the public, the Administration, and the Legislature an unwillingness to "throw money at a problem." We do not recommend doing so. Rather, we recommend reinvesting the current level of commitment to telecommunications and information technology management, augmented only by an amount in the range of the Administration's budget change proposal of last year to implement the telecommunications strategy. By "reinvesting" we mean taking today's central management budgets, primarily represented by the Office of Telecommunications and the Office of Information Technology, and directing them to a more efficient, united, and comprehensive organization. We are convinced by the economies achieved by the Nation's major corporations after they reorganized and implemented strategic planning. The State

will get far more for its money than it possibly can without reorganization.

We suggest that reorganization and/or redirection will also be necessary at the departmental and agency levels of government for full use of productive telecommunications and information technology. That, however, will best be accomplished under the leadership of a strong, centralized telecommunications and information technology group.

At the same time, the Commission rejects burdening existing central and user telecommunications management any longer with resources inadequate to the tasks assigned to them. This is a recipe for failure where hundreds of millions of dollars are involved. Thus, the Commission itemizes steps that would improve management practice by allocating resources to specific functional areas. We note, however, that doing so within the existing management structure will almost certainly be less efficient than through a new department. Following are the Commission's specific recommendations:

Recommendation #1. The State should reorganize existing central telecommunications and data processing activities and supervision into a new department responsible for the central management of all telecommunications and information technology.

The State of California presently suffers from inadequate organization of its central management functions in information technology. The Office of Telecommunications has two units -- one for the ATSS network, the other for "customer" services to departments -- which are structured to coordinate acquisitions of goods and services from the traditional vendors to the State. However, the State needs to plan, acquire, operate and evaluate telecommunications and information technologies from among the full range of systems and vendors available to it. If the Office of Telecommunications were to adopt these functions, the resultant organization would have little or nothing in common with what exists today. The Office of Information Technology has only two positions responsible for the entirety of State telecommunications. Were it, too, to acquire the resources it would need to design and oversee technology strategies, it would have to be reorganized.

Even if greater resources were provided, neither Office has been established to assure the State that its information processing technologies cohere with its information transmission technologies. Confusion abounds over the roles of these Offices. As "offices," both are required to implement departmental policies and procedures in their technical roles unrelated to advancing technological support for State programs.

Recommendation #2. The transfer of functions from the Office of Telecommunications should be phased over a six to twelve month period to assure continuity of existing communications services. The transfer of functions from the Office of Information Technology should be immediate.

The first task of the new department will be the establishment of a network(s) to provide shared, economical and high-capacity voice and data communications to all State users. However, during the planning and initiation phases of this project, the Office of Telecommunications should continue to coordinate communication services as they are now provided by ATSS and Centrex. These provisions of service will be assumed by the new department as its network(s) becomes operational.

However, all approval and reviews functions now performed by the Office of Telecommunications and the Office of Information Technology should be transferred directly to the new department to assure consistency with the new department's overall communications framework. The Commission does not believe that the new department should be saddled with special forms of accountability to or supervision by the Department of Finance. The standard accountability of departments to control agencies is sufficient.

The disposition of radio system responsibilities of the Office of Telecommunications should await an appraisal of the State microwave system called for by A Telecommunications

Strategy for State Government and also recommended by this Report (see Recommendation #39). The results of the appraisal would be considered by the Legislature and the Administration as a separate decision area.

THE DEPARTMENT OF TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY MANAGEMENT: AUTHORITY AND RESPONSIBILITY.

Recommendation #3. The new department should be responsible for the promotion, strategic and tactical planning, day-to-day operations, and ongoing evaluation of government's use of telecommunications and information technology.

The value of the new department lies in its consolidation of the management functions now dispersed throughout government and fragmented among control agencies.

Recommendation #4. The new department should be authorized to delegate to user agencies and departments authority to define and meet their local requirements for information technology, subject to architectural standards and shared use of facilities, and accountable to the new department for proven efficient and effective applications of information technology.

The report, A Strategic Plan for State Telecommunications

outlines a hierarchy of authority, with the central agency responsible for the network and network interface, and users authorized to meet their particular needs with compatible equipment. This hierarchy recognizes the diversity of State government while providing a coherent, well-defined and comprehensive approach to the whole of government. The Commission recommends this approach as both responsible government and responsive to users.

However, unlike the Strategic Report, the Commission concludes that telecommunications and information technology management at the departmental level is the most important asset of the user when applying technology. Thus, the new department should oversee not only technical systems but also their management. Departments should be aided as much as necessary to develop strong management capabilities, and they should be fully accountable for doing so.

Recommendation #5. The new department should be accessible to, a resource of, and benefit from the advice of the State's control agencies -- the Department of Finance and the Department of General Services. Proposals (such as budget change proposals) and other management actions in information technology subject to control agency approval should be reviewed and recommended by the new department in its expert capacity.

Control agencies superintend all governmental operations and must be concerned with any ubiquitous aspect such as information technology. However, it is the Commission's intent in this recommendation that control agencies rely extensively on expert, non-political judgements of the new department as to the appropriateness and efficacy of information technology applications.

Recommendation #6. The new department should assume significant responsibility in the relations of the State to the technology marketplace including the management of telecommunications and information technology acquisitions and competitive processes.

Specifically, the Legislature and the Administration should consider the statutory delegation of procurement authority and administration to the new department so that a consistent, efficient and technically proficient acquisition policy can be developed and implemented. Acquisitions must be based on rigorous planning of ways to meet user requirements and is therefore a fundamental exercise of telecommunications and information technology management.

The Commission has found that effective engagement of the competitive marketplace of telecommunications and information technology is a cornerstone of successful management today. It is the Commission's view that the new

department would be delegated major authority over procurement of telecommunications and information technology, subject to the review and guidance of the Department of General Services, Office of Procurement. It is the Commission's understanding that the Office of Procurement is currently examining its own procedures. For that reason, the Commission presents only certain recommendations regarding telecommunications technology procurement and its administration (see page B-4 in the Appendix). The Commission notes that telecommunications management expertise is needed to handle procurement well. Rather than duplicating expertise placed in the new department also in the Office of Procurement, the Commission recommends -- as a direction -- that the new department act as the State's purchasing and procurement agent in telecommunications and information technology. Its performance in this regard should be monitored closely and continuously by the Office of Procurement.

Recommendation #7. The new department should be the center of policy development and representation before regulatory and parliamentary bodies, both State and Federal.

The State of California cannot be an effective user of technology without an active, well-informed policy capability. In this regard, the new department would be a resource to all of government and particularly to the Administration as the State is increasingly called upon to

make its view known. The Commission believes specialized resources such as communications counsel will be needed to carry this responsibility out.

THE DEPARTMENT OF TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY MANAGEMENT: STRUCTURE AND RESOURCES.

Recommendation #8. The new department should report to either the Secretary of the State and Consumers Services Agency or to the Secretary of Business and Transportation Agency.

The new department would share characteristics of the Department of General Services in that it provides services to the whole of government. Thus, it would be logical for this new department to be placed within the State and Consumer Services Agency. However, the State's unique position as the largest California consumer of domestic information technology give it significance within the framework of the State's business policies. This is particularly important, given the prominence of technology industry within the State. Finally, the Commission believes that organizational politics within government must be minimized as the new department proceeds with its work. Thus, the Commission recommends that the placement of the new department be carefully considered.

Recommendation #9. The new department should have discrete sections for telecommunications and data processing, with further divisions of planning, operating and evaluation functions for both. These functions should be coordinated and unified through an executive office.

The structure of the new department should be consistent with the successful experiences of the private sector in organizing their technology managements. The Commission proposes that the State be creative with its uses of technology, rather than with its management structure as it is today.

Recommendation #10. The director of the new department should be appointed by the Governor and confirmed by the Senate.

The new department requires a strongly endorsed executive leadership, credible to all branches of government, and with a mandate to proceed from the Governor and from the Legislature.

Recommendation #11. The California Forum on Information Technology should be advisory to the new department and the principal vehicle through which user agencies and departments express their views to it.

CFIT has successfully structured the participation of all State users, from the largest to the smallest, in

government. This approach should continue into the new department.

Recommendation #12. The Administration and the Legislature should consider formation of a special advisory body of the State's political subdivisions to the new department.

While this Report did not address the State's interest in other public users of information technology, the Commission notes that both the Legislature and the Administration have expressed interest in the course of Commission hearings in solidifying State's relations to political subdivisions in the area of information technology. In addition, cities and counties are significant users of the State's ATSS network, and would probably continue to be users of the more advanced network conceptualized by the Strategic Report.

Recommendation #13. The Commission recommends that the budget of the Office of Telecommunications (Voice and Data Section and Administration) which is now financed by 100% reimbursement be redirected to an appropriation, with a corresponding reduction in the Communications Budgets of reimbursing agencies and departments.

The total budget of the new department should be derived from the operating budgets of the Office of Telecommunications (exclusive of passthrough payments to the telephone companies

and the operating budget of the Radio Section for the State microwave system and related expenses), the budget of the Office of Information Technology, and the budget proposed in FY1984-85 for the implementation of the Strategic Report.

Because of the State's great need for management development and training at the departmental level, the Commission recommends increasing the equivalent to a chargeback to user agencies and departments of 2.5% of the ATSS expenditure (the Office of Telecommunications now charges about 1.5%), of which 1% would exclusively finance training and departmental management development programs.

However, the Commission does not believe that central voice and data management services should continue as reimbursements embedded in the ATSS bill. The new department should receive annual appropriations and have its needs, activities, and expenditures reviewed through the program budget processes of the Administration and the Legislature.

Recommendation #14. The staff budget of the new department should reflect the mix of personnel and consulting contracts proposed by the Strategic Report (e.g., it should primarily consist of State employees).

The Commission does not believe that network development should primarily be accomplished for short-term consultants, as this would leave the State with a system, but nobody to manage it. Thus, the Commission recommends the budget

allocation of the Strategic Report rather than the Strategy BCP (the amounts were identical; only the composition of consultants/staff varied).

Recommendation #15. The Agency placement of the State's data centers should be reviewed for their appropriateness.

Although the State and Consumer Services Agency provides nearly all system-wide operational support in State government, the Teale Data Center and the Health and Welfare Data Center are located in other agencies, but they provide hundreds of State data users with data processing and related telecommunications services. Since data centers are major users of data transmission systems, their separation from central telecommunications management may encourage disaggregated, uneconomical transmission systems. The Governor and the Legislature should consider whether or not these other data centers should not be accorded the status and management support of other central services to State operations by reassigning them to central information technology and telecommunications management.

THE DEPARTMENT OF TELECOMMUNICATIONS AND INFORMATION TECHNOLOGY MANAGEMENT: OBJECTIVES.

Recommendation 16. The department should assess and make recommendations regarding the capabilities of programs and the State workforce, and the adequacy of specialist classifications to the deployment of telecommunications and information technologies to improve productivity and to better serve the public.

Recommendation 17. The department should, in discharging its responsibilities, first plan and acquire through lease or purchase one or more statewide networks providing efficient, long-term capacity for the transmission of voice and data.

Recommendation #18. The Commission recommends that if a new Department for Telecommunications and Information Technology is <u>**not**</u> organized, then <u>at a minimum</u> the functions of the **Office of Telecommunications and the Office of Information Technology should be consolidated within an existing department and accountable to the same departmental director.**

The fragmentation of these organizations is fundamentally confusing and disorganizing to user efforts to develop their technological systems. The Commission does not believe that any amount of effort at "improved coordination" can possibly overcome dual centers of power concerned with the

same issues. Rather, these two organizations, even if their functions continue to be separated, must report to the same executive if the State is to develop its information and telecommunications systems in a coherent manner.

Whether or not the State elects to reorganize its information technology and telecommunications functions into a new department, the State must move immediately to accomplish certain new tasks which have surfaced in the post-divestiture telecommunications environment. Although the Commission believes a new department would be most effective and efficient in attending to these tasks, we recommend that existing organization in consolidated form carry these tasks out if a new department is not created to do so. However, if existing organizations are to carry out the tasks of moment, additional staff positions are required beyond the current complement. We believe this investment in resources will be a small price for the millions of dollars in savings the State will realize.

TASKS REQUIRING IMMEDIATE ACTION

The Commission believes that the State of California cannot afford to wait any longer before addressing the new management tasks that have developed since deregulation of the telecommunications industry became fact. We have heard convincing arguments from a range of experts both within State

government and without that a "business as usual" approach will be both costly and ineffective in providing State programs the technologies they need to serve the public well. Thus, we recommend to the Legislature and to the Administration that the means and oversight needed to accomplish the following tasks be developed so their implementation begins no later than January 1, 1986. Without reorganization, we believe the Administration and the Legislature will have to take special steps to assure accountability and progress in carrying out these tasks, as we have observed more than a little confusion over who is responsible for what.

PLANNING

Recommendation #19. A thorough strategic plan for each user agency and department should be developed in conjunction with the Office of Telecommunications. This plan should identify the role of information management in the user's programs and assess needs for telecommunications and information technology to utilize information management in a productive, efficient manner.

Virtually none of the departments of the State have analyzed their telecommunications needs or have connected their use of technology to a strategic analysis of mission. The Office of Telecommunications should put muscle behind its

interest in replacing rented customer premise equipment with purchased equipment by organizing a department by department needs assessment program. The Office should be permitted to direct the department to zero-base its communications and data communications budgets where a fundamental examination is in order. As a result of systematic assessment, the Office of Telecommunications will be able to define specific objectives for better managing facilities utilized by departments, including customer premise equipment, network access, dedicated data communications, etc.

Recommendation #20. The State should develop a tactical plan to implement the network concept presented in A Telecommunications Strategy for State Government.

The State should proceed to implement the network conceptualized by A Telecommunications Strategy for State Government through development of a comprehensive tactical plan to do so. Delays in implementing an integrated, high-capacity network for voice and data will cost the State at least $10 million annually at current volumes of data traffic.

Recommendation #21. The tactical plan for a network should be developed by a special project planning task group outside of the Department of General Services as proposed by the major telecommunications users of the State.

The Administration should resubmit a Strategy BCP to the Legislature and outline the resources required to design, purchase or lease, and operate such a network. However, we believe that the modifications to the Strategic Report imposed on it by the Strategy BCP submitted by the Office of Telecommunications demonstrate that an independent planning unit within the State and Consumer Services Agency is needed to assure the integrity and focus of this project. We are not convinced that an appropriation for planning of the network to the Office of Telecommunications will, in fact, produce implementation of the strategic policy developed in the Report. After a tactical plan is developed and let for competitive bid, the Administration can consider shifting the project personnel to the Office of Telecommunications to meet its ongoing operational demands; however, we caution against an expectation that ongoing network responsibilities will be so minimal as to allow this personnel group to assume after twelve months "policy, planning and research functions" within the Office of Telecommunications as assumed by the Strategy BCP last year. The Office of Telecommunications should submit a separate proposal to expand its functional complement in policy, planning, and research. We certainly agree that such a group would be needed by the Office of Telecommunications.

The Commission suggests, however, that the Department of General Services, Office of Telecommunications, be requested

to provide quantification of workload standards -- the State's terminology for analyzing personnel requirements -- for the continuing operation of a network.

Recommendation #22. The Office of Telecommunications and the Office of Information Technology should clearly delineate their respective functions and prerogatives and those of user agencies and departments, with the following objectives:

- **that the Office of Telecommunications take the lead in all telecommunications projects and proposals, and not have its lead subject to review or exception by the Department of Finance;**
- **that user agencies and departments be given the authority to plan and implement systems to meet their local requirements, consistent with the overall network strategy of the State.**

The Offices of Information Technology and of Telecommunications should clarify their roles in initiating and reviewing telecommunications planning. These Offices should make specific commitments to State users as to central planning objectives for each fiscal year, especially for government-wide facilities, so that users do not duplicate at the local level what is being accomplished at the central level.

In conjunction with planning by objective, the Office

of Information Technology and the Office of Telecommunications should design a common, consolidated, and structured series of planning documents with well-defined purposes, so that user departments may prepare them efficiently.

The review of planning documents should be consultative in purpose; disapprovals of departmental plans should articulate alternatives to those presented by the user.

Present central management practice does not provide clear incentives to user departments for planning their telecommunications requirements since users perceive arbitrariness in the granting of approvals by the Office of Telecommunications and the Office of Information Technology. The Offices should make clear, through the State Administrative Manual, the constraints and prerogatives of departments in determining their telecommunications requirements, system preferences, etc.

Recommendation #23. Through cost/benefit analysis, the Office of Telecommunications should develop flexible policies for the acquisition of deregulated, customer-premise equipment, including switching services.

The element of greatest choice in today's telecommunications marketplace is the selection of customer-premise equipment. The current policy of the Office of Telecommunications has not

been based on rigorous analysis, and contradicts expert opinions, including those of Office of Telecommunications engineering staff and experts at Pacific Bell. It is a consensus of experts and also of the Telecommunications Strategy that customer premise equipment, including switching services such as Centrex and PBX installations, should be analyzed on a case by case basis, user by user and locale by locale. Current policies have the effect of discouraging and even prohibiting the engagement of the competitive marketplace. The Office of Telecommunications should encourage and assist every user department to explore fully its options for customer-premise equipment.

Recommendation #24. The Office of Telecommunications should develop, in conjunction with the Governor's Office of Emergency Services, a comprehensive plan for the use of voice, data and radio communications in the event of an emergency.

The people of California are not presently assured of effective communications in the event of a disaster. Certain regions of the State have no emergency communication plan. The effect of divestiture on the provision of emergency communications has not been analyzed. Emergency communications -- and the coordination of public safety forces it makes possible in a major disaster -- is a key public resource. New technologies have expanded the versatility of emergency radio communications, but their costs and benefits

have not been analyzed for the State of California. State agencies responsible for public safety and security are members of an emergency communications advisory committee that has not met in two years. In some instances, emergency communications plans for potential disaster areas are entirely informal and oral.

Recommendation #25. Funding for emergency communications planning should be provided by a more efficient administration of the 9-1-1 emergency calling fund. Staff should be provided to realize the estimated cost-savings of more efficient administration.

The Commission believes that the estimated savings realized by this recommendation, at least $1.8 million annually, would be appropriately used for emergency communications planning. If statutory adjustments to the Warren Emergency Communication Act are needed for this purpose, they should be implemented.

Recommendation #26. The Legislature should review the statutory basis of emergency preparedness, and in particular, emergency communications planning, to see whether adequate delineation of authority and responsibility has been accomplished.

The Commission is vitally concerned that such an important area should be so vague as to lead and responsible agencies.

Recommendation #27. The Office of Telecommunications should undertake a rigorous analysis of the social impact of State telecommunications strategies and recommend appropriate policies to the Administration and to the Legislature.

The State of California is currently operating on the basis of ad hoc theories of social impact which may not accurately reflect either the new telecommunications environment or the actual practice of the State. Given the State's impact on the marketplace and on the cost and pricing of regulated telecommunications, the State should be empirically clear about its impact and what policies appropriately follow that impact.

Recommendation #28. The Office of Telecommunications should develop a budget change proposal for telecommunications planning resources in addition to those needed for implementation of the network strategy.

The Office of Telecommunications has not, in our view, distinguished between planning requirements of <u>network</u> services and other planning requirements of the State. For example, the Office (and users) have a strong interest in developing local area networks. This type of activity requires planning capability additional to and distinct from network design and implementation for long-distance communication.

Recommendation #29. As the lead telecommunications agency, the Office of Telecommunications should have an advisory structure through which all State users can express their views.

At present, the Office of Telecommunications only has an advisory committee of the State's largest users of telecommunications, which represent a minority of total expenditures for telecommunications and a minority of State programs.

Recommendation #30. The Office of Telecommunications, in lieu of reorganization, should take the lead in the development of telecommunications policies through its planning and analytical efforts on behalf of government.

The Commission believes the absence of a unit of government responsible for the development of policy threatens State interests and may be adverse to the public interest. The Administration and the Legislature require the service of an agency equipped to identify, analyze and present major policy issues for adoption.

OPERATIONS

Recommendation #31. The Office of Telecommunications should undertake a thorough assessment of the State's staff capabilities in telecommunications management, and define appropriate classifications, user management structures, salary ranges and the viability of exempt positions for acquiring resident telecommunications expertise.

There is consensus among State telecommunications managers, experts in high technology recruitment, and vendors that the State needs greater expertise in telecommunications but that it faces difficulty in competing with the the private sector in recruiting experts. Users have recommended expansion of existing telecommunications management positions, but no assessment is available to confirm or question the adequacy of this proposal. Indeed, the tasks identified by users may require more elaborate revisions to current professional job descriptions. The Office of Telecommunications itself may need to expand human resources in ways not facilitated by current State classifications and salaries. The Office of Telecommunications should develop a comprehensive approach for the State to best meet its staff needs in telecommunications management.

Recommendation #31. The Office of Telecommunications should develop workload standards for the retention of consulting expertise, guidelines for their effective management, and a clear statement of consulting and support services it is able to provide user agencies and departments.

Apart from general personnel rules governing the retention of consultants, the State does not have policies or guidelines for the appropriate use of specialist consultants. Consulting contracts for telecommunications appear in some instances to be substitutes for regular employees and to undercut needed, long-term resident expertise. In other instances, criteria for the effective management of telecommunications consultants has not been developed. Since consulting expertise will be a frequent component in programs to develop State telecommunications, the Office of Telecommunications should analyze how consulting support can be both appropriate and productive.

There is not clarity at present about the consulting and expert support that the Office of Telecommunications can provide to user departments. In many instances, the Office of Telecommunications has lacked sufficient staff to support user departments in a timely fashion. The Office of Telecommunications should clarify its support services to user departments, and if necessary, request an augmentation of its budget for that purpose.

Recommendation #32. The Office of Telecommunications should be responsible for the design and implementation of training programs targeted to and differentiating among (a) telecommunications and data processing specialists in State service; (b) executive management of departments and agencies; (c) users of telecommunications and information technology; (d) individuals responsible for the acquisition, accounting and custody of information technology assets and related expenditures.

Recommendation #33. The Department of Finance should revise uniform accounting principles to enable users to properly reflect their telecommunications and information technology expenditures, and to provide the Legislature and the Administration accurate information about the level of information technology expenditures.

At present, the State does not know precisely how much it spends on telecommunications. This is due, according to the Auditor General, to divergencies in the way users account for their telecommunications and information technology expenditures. Without clear accounting of telecommunications expenditures, management is less able to change telecommunications practices to achieve greater economies.

Recommendation #34. The Office of Telecommunications voice and data activities should be funded by direct appropriation rather than by reimbursements embedded in ATSS billings.

At present, to finance all voice and data activities, the Office of Telecommunications adds a 1.50% surcharge on ATSS chargebacks to user departments. The Commission recommends that users pay actual telephone charges for ATSS use and that the Office of Telecommunications be funded by direct appropriation. Given the many demands on the Office of Telecommunications in the post-divestiture period, that Office should be given the opportunity to represent its needs for resources directly, rather than mixing those needs with the charges for long-distance telephone calls. Furthermore, voice and data communications are capabilities involving all of government. Users need assurance that adequate management resources are available, and are not subject to artificial constraints of minimization by the Department of General Services for policy reasons unrelated to telecommunications.

Furthermore, in order to provide the ATSS billings, the Office of Telecommunications needs the Centrex-based billing service of Pacific Bell; PBX's no longer have the technical features needed to incorporate them into this billing system. Thus, the current reimbursement system ties the Office of Telecommunications to switching services that may not be, in all cases, the most cost beneficial.

Recommendation #35. The Office of Telecommunications and the Department of Finance should assume responsibility for the currency of State publications, reports and the State Administrative Manual in those areas related to information technology.

Recommendation #36. The Department of General Services should revise contracts with principal vendors such as Pacific Bell to reflect and to define the current provision of services and associated management and technical support.

Recommendation #36. The Department of General Services should establish and promulgate formal rules regarding the opportunities, rights and responsibilities of the private sector in its vending of information technologies to the State.

The contract with Pacific Bell has not been revised since 1977 when it was executed with pre-divestiture Pacific Telephone and Telegraph. As a result, it does not define precisely that vendor provides the State of California and under what terms. As a result, the State has no legal instrument accurately governing expenditures which are in excess of $60 million annually.

The Commission found significant differences in the ways in

which vendors are able to market their telecommunications products to the State. There exists significant confusion regarding the purpose of requests-for-information, letters of inquiry, letters of agreement and other instrumentalities (except for the competitive bid process) which define the marketing and transaction relationships between vendors and the State in the acquisition of telecommunications goods and services. In the deregulated marketplace, vendors should be clear about their marketing and competitive opportunities to do business with the State.

EVALUATION

Recommendation #38. The Office of Telecommunications should establish a comprehensive management information system suitable to its responsibilities and to the needs of the Administration and the Legislature for proper oversight of State programs and operations.

Recommendation #39. In lieu of reorganization, the Auditor-General should retain, through competitive bid, a consulting firm expert in microwave communications to conduct an independent appraisal of the State's microwave system, its uses and rate of utilization, and funding structure and make recommendations for its future use, management, maintenance and financing.

Both the capabilities and incapacities of the State microwave system have their advocates. Its low level of utilization and nondigital system led the Strategic Report to recommend serious consideration of the system's abandonment or of its operation by a third party. For several years, the Office of the Legislative Analyst has raised questions about the system's efficiency, overhead, and accessibility to users on a reasonable cost basis. Although proposals have been made over the years to expand the system's use for inexpensive telephone communications, they have never been presented to the Legislature. At the same time, the system provided the critical link of communications during the Coalinga earthquake. It's net value to the State remains unclear.

However, the Office of Telecommunications deleted review and appraisal of this system from the Strategy BCP it submitted last year (to implement the recommendations of the Strategic Report), and in current year, the Office is requesting more than three million dollars for the system, the second largest budget request for FY1985-86 in State telecommunications. The Office of Telecommunications is analyzing new applications of the system which may render it a more useful communications tool. However, at present, the Office of Telecommunications is not prepared at this time to undertake a critical, assumption-free examination of the future of this system. The Chief of the Office reports that 80% of his time is spent on related radio communications, and the lion's share of staff

and management in central State telecommunications is devoted to maintaining the system. The Office of Telecommunications has a large investment of resources in the present management and technical approach to radio communications.

Given the major questions about the microwave system, the interest of the Office of Telecommunications, and the system's substantial demands on limited management resources, the Commission believes an independent, objective analysis is long overdue. This should be accomplished through the Auditor-General's retention of a consulting firm with freedom to reach independent conclusions. The work of the firm should be presented to the Administration and to the Legislature for their consideration and action.

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APPENDIX A

OVERVIEW OF STATE TELECOMMUNICATIONS MANAGEMENT

For three decades, the California Legislature has sought to perfect a direction for the management of State telecommunications. After establishing communications management in the Department of General Services in 1953, laws on this subject have been infrequently adopted. They consider in the main (1) the economics of telecommunications, primarily achieved through avoiding duplication; (2) the procurement of telecommunications goods and services; (3) the technologies of telecommunications; and (4) the organization of telecommunications management.

Noteworthy actions by the Legislature have occurred throughout the past 30 years. The concept of a State telecommunications policy was first introduced ten years ago by a special joint legislative telecommunications committee. It was not until 1983 that telecommunications was identified as a specific management problem. During that year, the Office of the Legislative Analyst stated:

> "...we believe that it is essential that the state develop a unified approach to telecommunications -- one that retains flexibility with respect to planning for the state's telecommunications future." [emphasis added, 1]

Implicit in this Report and later explicit in Chapter 1327, Statutes of 1983, was the view that telecommunications <u>and</u>

data processing are two sides of the same coin.

It was also in 1983 that legislation began to respond to developments brought on by deregulation and divestiture. In Chapter 791 of the Statues of 1983, the Legislature found and declared that, "...with the advent of deregulation in the telecommunications industry, substantial cost savings can be realized by the state through the specialized evaluation and procurement of alternative telecommunications systems." Thus, the management of telecommunications was seen for the first time to involve decisions about acquisition alternatives the State might consider for the same service.

In the area of telecommunications technology, the State has evolved away from specific, named technological systems, such as "teletype" or "microwave," towards generic references to "data communications," "information technology," or "telecommunications." The abundance of technological choices would have made specific references a virtual impossibility.

Generic approaches to technology led the Legislature to consider the relation between data processing technology and telecommunications technology, since sorting out their management implied an analysis of their technical intertwine. In the words of Chapter 1327 of the Statutes of 1983, "...a need exists to consolidate and integrate the state's policy and planning functions with regard to information technology to ensure coordination of the state's information technology needs, [where] 'information technology' means all

computerized... information handling... [and] voice, video, and data communications..."

The Organization of State Telecommunications Responsibilities

As the findings will discuss, the organizational table of State telecommunications responsibilities is complex and provides overlapping functions. Formally speaking, however, there are four levels to the organizational table, each with its own principal mission:
(1) the Department of General Services, Office of Telecommunications [OT/DGS]; (2) the Department of Finance, Office of Information Technology [OIT/DOF]; (3) Teale Data Center and the Health and Welfare Data Center; (4) State departments, agencies, boards, commissions, and the postsecondary education systems of the University of California and the California State University System. We consider each in turn.

The Office of Telecommunications (Department of General Services) is responsible for all centralized operating systems of State telecommunications. This includes the statewide microwave system used for public safety applications, the ATSS network for telephone and some data communications, the ATSS/DS network for data communications, and specialized technologies such as pocket pagers, car telephones and the like.

The Office of Telecommunications is also responsible for the approval of central and user acquisitions from telecommunications vendors in terms of their technical specifications. Typically, this responsibility is conducted in conjunction with the Office of Procurement, Department of General Services, where a competitive bid process is required. However, equipment and service orders to local telephone companies, which are not handled competitively, also flow through the Office of Telecommunications. Where the State procures or acquires telecommunications services on a centralized, shared basis, the Office of Telecommunications is the purchasing agent for the State.

The Office of Telecommunications approves user level telecommunications facilities and equipment such as data networks, customer premise switching devices, telephone receivers and so forth. The Office of Telecommunications has been granted "tactical" responsibility to implement strategic policy that was to have been developed by the Office of Information Technology. In the absence of such a policy, the Office of Telecommunications has developed its own policy outlooks. (See Chapter II, Finding #4.)

The Office of Information Technology (Department of Finance) is responsible primarily for reviewing budgetary and expenditure-related planning and proposal documents such as the annual Information System Plan and the Feasibility Study

Report. These documents and their attending review processes allow users to submit budget change proposals or expend funds already appropriated for information technology projects.

The Office of Information Technology has been granted, as mentioned above, strategic policy authority. However, as we discuss below, the State of California has never developed a comprehensive strategic plan and a corresponding information policy to guide its technology development. As a result, the State does not have a strategic policy that connects its goals as government to its introduction or use of technology.

The data centers establish data communications links with users they serve, and are delegated by the Office of Telecommunications the authority to do so.

Departments, Agencies, Boards and Commissions: These units of government are responsible for planning and operating all telecommunications systems unique to them, e.g., systems whose only purpose is to support their particular mission. Units initiate proposals by submitting them to the Office of Telecommunications and to the Department of Finance. Depending on the amount of expenditure proposed and whether or not a new appropriation is needed, one control agency or both become involved in project approval. Implementation schemes are as varied as State government itself.

Operating units of State government also provide telecommunications services to one another on a reimbursement basis. They advise the Office of Telecommunications and the

Office of Information Technology, through various user based committees such as the Radio Users Committee (which advises the Office of Telecommunications on a broad range of telecommunications issues not limited to radio) and the California Information Technology Forum (which advises the Office of Information Technology).

Finally, as fiscally responsible units, users are responsible for the review and internal approval of their telecommunications expenditures, monitoring and enforcement of telephone abuse, etc. Expenditure approvals may or may not further involve Agency approval.

Postsecondary Institutions: The University of California, as a constitutionally established public trust, enjoys autonomous telecommunications management, although it was obliged to join the ATSS network and may share other centralized, operating systems such as the microwave network. The California State University system, on the other hand, is subject to the authority of the Office of Telecommunications, for expenditures greater than $100,000. Less expenditures are statutorily delegated. Both of these systems employ management and management in their telecommunications activities, according to internal hierarchies of responsibility.

Certain specialized areas of telecommunications have been assigned to other branches of government. For example, the Governor's Office of Emergency Services is responsible for

emergency communications; it draws upon the resources of Office of Telecommunications on a project by project basis. The Department of Justice operates the law enforcement communications network, and ties into related Federal systems. The Department of the Military coordinates with and implements requirements of the U.S. Department of Defense. The Supreme Court, the Legislature and legislative offices like the University of California make specific decisions autonomously, use central services such as the ATSS network.

State Telecommunications Resources and Budget

The resources for telecommunications that are subject to "management" are extensive. The State is said to use approximately 200,000 telephones, connected to 150,000 different telephone lines. Of these telephones, approximately 150,000 connect to Pacific Bell and most of the balance to General Telephone. Each month the State spends an aggregate of 2,500 calendar years "on the phone," or about a week per employee. Of course, not all of this is "talk" since it includes data communications transmitted over voice circuits. In addition to telephone receivers, the State manages in excess of 15,000 terminals for computer communications. A relatively small number of departments also use other terminal equipment such as facsimile ("telecopying"). Finally, video communications are used for instructional applications in

postsecondary education institutions, some traffic control systems and for purposes of building security.

In addition to the above discussed equipment, the State of California, through the Office of Telecommunications manages an extensive array of transmission devices and systems. Based upon the criteria of cost and usage, the major system is the "automatic telecommunications switching system," which has come to be called ATSS. The State leases private lines and the associated switching equipment to comprise a private network with controlled access. In order to use ATSS, one must either employ a telephone line connected through switches to the network or become temporarily switched to it by means of an access code or authorized operator connection. ATSS management functions are distributed among several telephone companies and the State of California.

In addition to switching "devices" that route calls as they make their way to their ultimate destination, the State also rents switching "services" for local calls and as intermediaries for network access. These services are called Centrex services, and utilize machinery installed at telephone company offices. Forty one Centrexes are currently serving the State of California (and other users). As an alternative to Centrexes, some agencies have switches on their own premises which they have leased or purchased. These devices are variously called PBX's, PABX's, CBX's and EPABX's depending upon the vendor or the customer. (In this report,

the nomenclature is "PBX.")

The State also leases or rents transmission lines employing various technologies to convey voice and/or data, each with its particular pricing, capacity, aggregation of signals and purpose. Private lines for data communications are prolific. One private line system, ATSS/DS, emulates ATSS (voice) in that it offers a consolidated, switched data communications network that would serve a variety of data communicators, independent of one another. ATSS/DS has, however, few users; its principal user, the Department of Motor Vehicles, intends to use an alternative (its own leased private lines) as soon as possible.

The State also owns and operates a microwave system applications of which include linkages for mobile communications with base stations, data transport for public safety organizations and a private telephone system sometimes called the "green phone." The geographical spread of this system is impressive, with circuit miles exceeding 65,000.

Finally, the State deploys six satellite communication devices for emergency access to the ATSS network. Other specialized equipment is deployed for data communications, including machinery that allows different signals to share a common transmission facility, and modems to convert computer signals into a form that can travel over ordinary telephone lines.

Within the general areas of voice and data

communications, the State of California employs virtually every device available in the marketplace today. The result is an impressive, but awesome diversity of technologies -- and a management challenge second to none.

What These Resources Cost

There are no absolute figures on how much the State of California spends each year on telecommunications. Expenditures for FY1984-85 will exceed $130 million in reported communications costs only. However, there is compelling evidence that actual telecommunications expenditures may be much greater -- more on the order of $200 - $250 million annually. No precise figure is available due to variations in reporting techniques. [2] The Office of Telecommunications expends on the order of $81.2 million, of which $22.2 million reimburses telephone companies for State usage and approximately $40 million reimburses local jurisdictions and telephone companies for 9-1-1 emergency service related expenses. No precise figure is available for data communications since among all telecommunications activities that is the most decentralized. The 1984 Strategy Report estimated data communications at $11 million for current year.

Since telecommunications is budgeted solely as an operating expense, personnel expenditures cannot be isolated.

Departmental estimates of their annual personal services (State terminology for personnel costs) for telecommunications range from less than 0.01 person years (the equivalent of three person days) to over 500 person years.

APPENDIX B

SCOPE AND METHODOLOGY

In general, the divisions of labor within the Office of Telecommunications are reflective of broader divisions of State telecommunications activity: voice, data and radio. This study concentrates on the management of voice and data communications, those technologies which incur more than 90% of the State's telecommunications expenditures.

The study concerns, in particular, how the State of California manages its responses in a competitive, technologically advanced environment with one foot in the future and one in the present. As a management analysis, this Report is <u>not</u> an audit. The Report addresses <u>structure and systems</u> for planning, operations, and evaluation; together, these define the management approach the State utilizes in acquiring and utilizing telecommunications.

Although a question of prominence, the State's telecommunications relations to political subdivisions (cities and countries) or to the public sector as a whole has not been considered. Regardless of whether or not the State should change its relationships to other public sector users, the State is first concerned with whether its own departments, agencies, boards and commissions are enjoying enhanced productivity and other benefits of telecommunications as completely as possible.

To examine how telecommunications is managed in a changing regulatory and technological environment, this study employed a variety of research based methodologies. Virtually all relevant information could be obtained only from original research. Within the State (and without), more effort has gone towards <u>using</u> telecommunications than to <u>studying</u> its use.

In order to circumnavigate an information void in a sea of information technology, the following research was conducted:

(1) two public hearings were held, with 24 participants from State Government, the private sector, major telecommunications management consulting firms (see below), and departmental level users;

(2) a survey was conducted of all State agencies, emphasizing a variety of measures of telecommunications activity, especially as reflected in expenditures;

(3) interviews were held (apart from public hearings) with 26 individuals in State service at central management organizations and from user organizations, and in the telecommunications industry;

(4) a literature search was conducted regarding the contemporary telecommunications environment and responses to it, with a particular interest in how other states and comparably sized users (to the State of California) are managing telecommunications resources;

(5) briefings (apart from public hearings) were held with management and technical consultants familiar with large telecommunications users;

(6) review of selected, internal and published documents related to management functions from the Office of Telecommunications and the Office of Information Technology;

(7) case analyses were developed, including:

(a) the procurement of telephone receivers by the Department of General Services,
(b) the procurement of telephone systems by the Employment Development Department,
(c) the planning of PBX installations for ten new State prisons by the Department of Corrections,
(d) procedures for telecommunications planning required of State telecommunications users by the Department of General Services and the Department of Finance;
(e) the development, especially FY1984-85, of the State's policy on PBX acquisitions;
(f) and strategic directions in consolidating data communications networks undertaken by the Office of Telecommunications, particularly in relation to the installation of digital, "backbone" facilities;

(8) a review of chaptered law regarding telecommunications management;
(9) a Performance Audit conducted concurrently with this project by the Office of the Auditor-General regarding the accounting of and departmental review of telecommunications expenditures in selected departments;

(10) extended interviews with marketing and governmental relations staffs of Pacific Bell, General Telephone and AT&T Communications.

The focus of research and the ensuing analysis was <u>management process</u>, <u>not technology</u>; this study does not intend to determine which technological system is preferable in a specific instance or in general. However, in considering processes for decision-making, it was necessary to consider how technology choices were made, and where differences would arise, how those differences were resolved. This in turn required consideration of some technological issues. For example, certain issues developed over technology in the

course of Employment Development Department procurement of telephone systems; the evolution of those issues was an important part of the procurement process overall.

As the most prominent feature of the new telecommunications environment in its effect on sharp competition within the marketplace, the State's consideration of acquisition alternatives was of special interest of the Commission. This interest notwithstanding, the Office of Procurement in the Department of General Services was only incidental to the management overview. It is primarily concerned with the administration of the procurement function, a concern embedded in the State's overall procurement policies. The Budget Act of 1984 stipulated that a management study be conducted of the Office of Procurement; in light of that study, this report restricted itself to specific, case-based telecommunications procurement issues.

APPENDIX C

ACKNOWLEDGMENTS

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Management Analysis Corporation;
Touche Ross and Company.

The following individuals participated in the Commission's two public hearings. Under Commission groundrules, their statements do not necessarily represent the views of their organizations, which are listed for identification (* indicates written testimony only was submitted):

Hearing of July 31, 1984
(in order of appearance)

Steve Barnes, Vice-President for Telecommunications, Bank of America;

Hank Taylor, Corporate Telecommunications and Office Systems Manager, Hewlett Packard Corporation;

Phillip Mishler, Office of Information Technology, California State Department of Finance;

Allan Telman, Deputy Director for the Office of