

**REPORT OF THE
JOINT LEGISLATIVE
AUDIT AND REVIEW COMMISSION**

Review of Information Technology in Virginia State Government

**TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA**



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PREFACE

Section 2.1-196.1 of the *Code of Virginia* directs the Joint Legislative Audit and Review Commission (JLARC) to monitor working capital funds. This JLARC staff review of the management of information technology in Virginia State government was authorized by the Commission at its meeting in December 1985. The impetus for the study was the growing concern about service costs and other issues raised both by members of the General Assembly and the executive branch.

This review represents a joint executive and legislative initiative. The Department of Planning and Budget (DPB) played a key role by identifying issues, reviewing key research products, and providing funds to hire a consultant, Ernst & Whinney, to evaluate technical and financial issues.

Information technology is an important and growing area of State government. More than \$500 million will be spent on automated data processing and telecommunications services during the current biennium. The mergers and co-location which gave rise to the Department of Information Technology (DIT) were sound actions. These actions consolidated in a single agency the State's previously fragmented efforts to manage and deliver services. Emphasis now needs to be placed on improving DIT management and administration.

There is a clear need for strong planning and control of information technology resources at the State level. The report proposes creation of an independent Council on Information Management, which would develop statewide plans and standards. For the Commonwealth to have truly effective use of information resources, it needs comprehensive strategic direction that is sensitive both to agency requirements and to necessary State controls.

This report identifies over \$2 million in cost savings opportunities. However, it is important to note that executive agencies other than DIT account for two-thirds of total State expenditures on information technology. Increased efforts to plan and control the use of technology by all agencies, especially the design and development of application systems, could result in considerable efficiencies and cost savings in the future.

On behalf of the JLARC staff, I acknowledge with appreciation the cooperation and assistance provided to our office and to Ernst & Whinney by DIT and the other State agencies involved. The assistance provided by DPB, the Auditor of Public Accounts, and the Division of Legislative Automated Systems is also greatly appreciated. Finally, I want to thank the private and public organizations which participated in our comparison of service costs and rates.



Philip A. Leone
Director

August 19, 1987

REVIEW OF INFORMATION TECHNOLOGY IN VIRGINIA STATE GOVERNMENT

August 1987

Joint Legislative
Audit and Review
Commission

The State has a sizeable investment in information technology. The State's information technology budget (which includes data processing personnel and equipment purchases in all agencies) more than quadrupled between 1976 and 1986, from \$87.7 million to \$383.5 million. The escalating budget trend is likely to continue even as the costs of computer and telecommunications technologies decrease — agencies that previously could not afford to automate will do so, and other agencies will greatly expand their use. Including telecommunications budgets, the total anticipated expenditures for information technology will equal one-half billion dollars for the FY 1986-88 biennium.

The Department of Information Technology (DIT) was created with the merger of the Department of Computer Services (DCS) and the Department of Management Analysis and Systems Development (MASD) on September 1, 1984. The Department of Telecommunications (DOT) was merged with DIT on January 1, 1985. Consolidation of these three "high technology" service agencies focused planning, budgeting, acquisition, development, operation, and management of information processing and communications within a single agency. DIT's expenditures in fiscal year 1986 were approximately \$78 million — approximately one-third of State agencies' total expenditures for information technology.

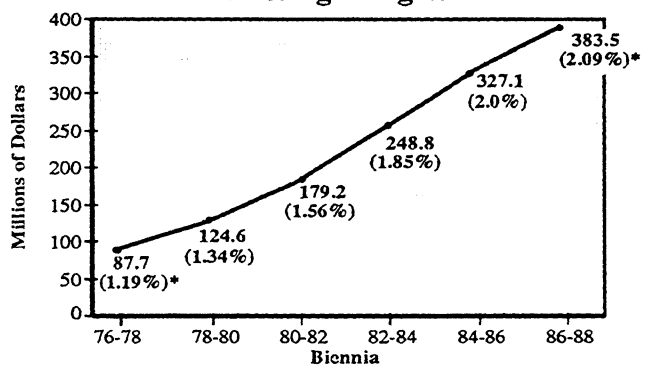
A JLARC REPORT SUMMARY

Study Mandate

DIT is primarily an internal service fund agency, recovering 89 percent of its revenues through charges for telecommunications, systems development, and computer services. JLARC is required by §2.1-196.1 of the Code of Virginia to oversee State internal service funds.

The Commission directed JLARC staff to review the performance of DIT. The study was conducted in cooperation with the Department of Planning and Budget (DPB), staff for the House Appropriations and Senate Finance Committees, and the Auditor of Public Accounts.

Growth in Information Processing Budgets



* Percent of total State budget.

Source: MASD, DIT.

DPB set aside funds to pay for consulting assistance. JLARC staff were assisted by the consulting firm of Ernst & Whinney (E&W) in evaluating DIT.

The study assessed the extent to which DIT was achieving the reorganizational goals set forth for the consolidated agency. These included effective and efficient delivery of services, staffing economies, integration of related technologies, timely and simplified procurement processes, and facilitation of State planning for information resource management.

NEED FOR STATEWIDE INFORMATION MANAGEMENT (pp. 11-30)

A clear need exists for strong planning and control of information technology resources at the State level. An alternative that deserves serious consideration is the creation of an independent Council on Information Management, which would have statewide planning, standard-setting, and procurement responsibilities. The Council would rely heavily on the agencies and institutions of higher education in developing plans and standards.

Preparing a Statewide Plan

During the past 20 years, Virginia State government has periodically developed statewide plans for information management. However, the State's success in implementing and updating these plans has been limited. Virginia does not currently have an information management plan. By participating in the development of a statewide plan, DIT and other State agencies can take an important first step toward a comprehensive approach for effectively and efficiently managing information technology, now and in the future.

Recommendation. *The General Assembly may wish to enact legislation to require development of a statewide plan for information technology management.*

Integrating the Planning Process

Development of a statewide information management plan alone is not sufficient for ensuring implementation of the goals underlying the plan. The success of information management planning will depend, in part, on effective links with other State processes which can facilitate

implementation: agency planning, budgeting, procurement, and performance evaluation.

Recommendation. *The State plan should serve as the guide for information management planning by all agencies. Budget requests for information technology should be reviewed by a central agency to determine conformance with the statewide and agency plans, and the results of these reviews should be used to recommend priorities to the Governor and General Assembly. Central procurement staff should review and approve procurements that correspond to statewide and agency plans, including DIT procurements, which are not currently reviewed by an independent source. Finally, the State plan and agency plans should serve as benchmarks for measuring implementation success.*

Establishing an Oversight Structure

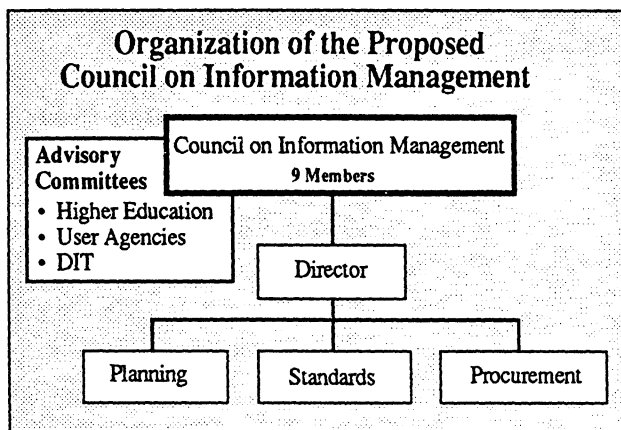
During the past 20 years, the central data processing agency has not successfully implemented a permanent, continuous planning process. In the past, planning has been hindered by a lack of continuity and frequent turnover in leadership. Moreover, leadership at the highest executive level is required to guide and oversee agency implementation of information management plans.

JLARC staff concluded that a supervisory board, independent of DIT, should be created to fill the current statewide planning void. The alternative types of boards established in statute (advisory and policy boards) would have insufficient authority to ensure effective implementation of statewide planning by overseeing links with agency planning, budgeting, and procurements for information technology.

As discussed in Chapter IX of this report, JLARC staff propose establishment of an independent supervisory board, the Council on Information Management, to serve as the focal point in the continuous planning cycle for the State's use of information technology. With advice from DIT, agencies, and institutions of higher education, the oversight council would establish statewide plans, policies, and standards. The council would also review agency plans, budgets, and major procurements to ensure conformance with statewide objectives.

Recommendation. *The General Assembly may wish to establish a supervisory board,*

the Council on Information Management, to oversee statewide information management planning. The council should be comprised of seven public members and the Secretaries of Administration and Finance as ex-officio, voting members. Three advisory committees should be established which include representatives from higher education institutions, agencies, and DIT. The council should receive independent staff support.



Source: JLARC staff graphic.

PROCUREMENT (pp. 31-56)

In FY 1986, agencies procured more than \$100 million in information technology equipment and services through DIT. It is important to ensure that controls over these procurements are firmly in place. Centralized procurement review and approval is a vital method for ensuring that DIT's and agencies' requests for information technology are in direct support of planning objectives.

In assessing DIT's statewide review and approval responsibilities, JLARC staff found that (a) procurement decisions are frequently made without the benefit of statewide or agency plans, (b) DIT's service mission conflicts with the State's need for effective procurement controls, and (c) there needs to be more effective oversight of DIT's own large computer purchases and telecommunications contracts. JLARC staff also reviewed DIT's compliance with procurement policies and oversight responsibilities.

Inherent Conflict in Mission

The State recently lost the two major methods for independently evaluating DIT's pro-

urements, which comprise 15 percent (\$15 million in FY 1986) of all information technology purchases. First, as a result of reductions in staff for the Governor's secretaries, information technology procurements are no longer reviewed at the secretarial level. Second, since the creation of DIT in 1984, procurement control responsibilities (formerly vested in MASD) are no longer separate from computer services responsibilities (formerly vested in DCS). DIT cannot effectively control procurements as a service agency, and cannot independently evaluate its own procurements. Also, without management information plans to use as a guide, agencies and DIT procurement staff cannot adequately evaluate the need for equipment or services.

Recommendation. *State controls over information technology procurements should be strengthened. The first step in implementing stronger controls should be separation of central procurement responsibilities from DIT. Agencies' and DIT's procurement requests should not be approved unless they support documented objectives in the statewide or agency information management plans.*

Inadequate Implementation of Procurement Policies

In general, DIT has established adequate procedures for reviewing agencies' compliance with the Public Procurement Act. However, DIT procurement staff do not consistently interpret or implement these procedures in procurements that require competitive bids, sole source determinations, and minority vendor solicitations.

Competitive Procurements. JLARC staff reviewed a sample of 225 agency procurement requests processed by DIT during 1986. Sixty-three percent of the informal solicitations for items between \$500 and \$10,000 contained less than the mandatory three telephone bids. JLARC staff found no violations of formal solicitation requirements. However, DIT had difficulty producing documentation that indicated awards were made to the lowest bidder or highest scoring proposal.

Recommendation. *DIT should establish a formal training program to ensure that all procurement staff consistently interpret and implement procurement requirements. Internal audits should be conducted annually to ensure that procurement staff comply with procurement laws and procedures.*

Sole Source Procurements. Approximately 35 percent of all information technology items procured and 46 percent of the total dollar awards are made on a sole source basis. Many sole source procurements are necessary in order for items to be compatible with existing systems. However, it is important to ensure that the State does not miss cost-saving opportunities when competitive sources are available. JLARC staff found that safeguards for determining when only one source is practically available should be strengthened.

Recommendation. *Specific State requirements for justifying sole source procurements of information technology should be developed, including a cost analysis of alternatives and documented contacts with other vendors. Agencies should be required to provide written justifications of sole source requests. Central procurement staff should document independent validations of sole source justifications.*

Awards to Minority Vendors. DIT encourages minority vendor participation. From 1984 to 1986, awards to minority vendors increased from 2.1 to 7.7 percent of all awards. However, a large share of DIT's awards to minority vendors are made to one minority-owned computer company with 31,000 employees and annual earnings of \$2 billion. This vendor meets the State's statutory definition of a minority business owned by socially or economically disadvantaged persons.

Also, in reviewing DIT's solicitation procedures, JLARC staff found that half of the solicitations for items between \$500 and \$10,000 did not contain at least one documented contact with a minority vendor as required. For formal solicitations, DIT is planning to increase the number of direct solicitations of minority vendors.

Recommendation. *In order to encourage participation in State procurements by disadvantaged minority-owned businesses, the General Assembly may wish to amend §2.1-64.32 of the Code of Virginia to define a "minority business enterprise" as owned by socially and economically disadvantaged persons. Procurement staff should routinely select and call one or more minority vendors from the registered vendors list for all informal solicitations. Procurement staff should establish and contact a minimum number of minority vendors for all formal solicitations.*

Strengthening DIT's Oversight of Agency Procurements

DIT has developed certain safeguards for overseeing agencies' use of delegated authority. DIT offers a brief orientation for agencies before delegating procurement authority. DIT also requires agencies to periodically request renewals of delegated authority. These methods are not adequate, however, for ensuring compliance with procurement policies. More rigorous training and auditing programs are needed. State monitoring of vendors' performance is also needed.

Recommendation. *In delegating procurement authority to agencies and institutions, the State should establish procurement documentation requirements. A formal audit program should also be developed to monitor compliance with public procurement laws and procedures. Audits should be conducted within six months of the initial delegation and biennially thereafter. A periodic training schedule should also be developed. In addition, a centralized method for monitoring vendor performance should be established.*

SYSTEMS DEVELOPMENT (pp. 57-74)

Section 2.1-563.19 of the Code of Virginia establishes an internal service fund for systems design, development, and testing. The Systems Development Branch (SDB) of DIT provides these services. As a result of a changing environment, SDB's services have expanded to include special studies, temporary operation of systems, procurement and hardware installation, and data processing applicant screening.

Future Role of SDB

In 1973, SDB was created as a centralized staff with a twofold mission: (1) developing interagency systems, and (2) providing central support for agencies which had occasional needs for systems-related services. DIT now needs to carefully evaluate the mission of SDB in light of three continuing trends: (a) declining Interagency Systems Development revenues, (b) restrictions on the size of internal service fund projects to encourage competition on systems development projects, and (c) increased use of commercial vendors and internal staff by State agencies.

opportunities to develop distributed data processing networks, which combine the advantages of centralized and decentralized processing, need to be explored. Without statewide guidance, agencies' development of autonomous systems might miss cost saving opportunities available by effectively linking the various computer technologies.

Recommendation. The State should evaluate agency information management plans and computer needs for the purpose of identifying opportunities for distributed data processing networks. The State should develop standards that ensure compatible systems. The State should also accept policies that specify under what conditions agencies should be permitted to develop their own systems. Criteria for determining which systems should be linked with other systems should also be established.

TELECOMMUNICATIONS (pp. 99-110)

Recent industry deregulation and technology advances present opportunities for State government to achieve substantial cost savings for telecommunications. The Department of Planning and Budget (DPB) hired a consultant to study statewide telecommunications needs. DPB expects the telecommunications study to be completed in October 1987.

Strengthening DIT Support Services

Coordinated efforts in network maintenance, performance monitoring, and capacity planning would improve the availability and quality of voice and data transmissions. Agencies could also benefit from additional DIT assistance in redesigning and upgrading telecommunications systems. At the same time, DIT's procedures for ordering telephone equipment are unnecessarily cumbersome.

Recommendation. DIT should develop and implement a formal capacity planning methodology for the statewide telecommunications system. DIT should expand its current trouble reporting service to encompass all voice and data communications. DIT should clarify its internal procedures for reviewing and processing orders of telecommunication equipment and facilitate direct purchases by expanding the number of items on the hardware contract list.

Network Sharing Can Result in Significant Cost Savings

State government does not receive the full benefits of shared telecommunications networks. DIT estimates that the State could save approximately \$359,000 annually on shared data communication lines alone. These savings may represent only a small portion of the total savings possible through a statewide data and voice communications network. As a service agency, DIT cannot require agencies to share networks. Consequently, the State needs plans, policies, and standards for ensuring that telecommunications networks are appropriately shared.

Recommendation. The General Assembly may wish to authorize the development of plans and policies that require agencies to share telecommunications networks wherever feasible. The results of the DPB study should be considered when developing statewide policies and plans. The State should adopt uniform communications standards and review procurements in order to ensure compatibility of systems and compliance with standards.

FINANCIAL MANAGEMENT (pp. 111-136)

DIT manages three of the State's nine internal service funds. Total revenues from the computer services, telecommunications, and systems development funds exceeded \$70 million in FY 1987. DIT also manages approximately \$10 million in general funds.

Tightening Fiscal Controls

Because DIT receives a "sum sufficient" appropriation for 89 percent of its operational costs, it is especially important to ensure that DIT's expenditures are adequately controlled. Internal budgetary restraints and external controls over DIT spending could be strengthened.

Recommendation. DIT should develop management and performance objectives and link these objectives with spending plans. DIT should develop standards for costs per unit of service. Changes in the amount of service should be included as a basis for adjusting expenditures and rates. The Department of Planning and Budget and the Department of Personnel and Training should more actively review DIT's resource needs.

High Rates Generated Surpluses in the Computer Services Fund

In a comparison with five other data centers in Virginia, E&W found that DIT's costs per resource unit were generally higher than four of the five other data centers. E&W also found that DIT's cost per unit of service to operate the IBM technology is substantially less than DIT's Sperry costs. In effect, agencies using the IBM technology appear to be paying a portion of Sperry users' costs.

In general, DIT computer services rates are higher than necessary; the rates are over-recovering expenses. DIT plans to reduce rates for the third time in less than two years to avoid a \$3 million surplus by the end of FY 1988. One of the principal factors causing fund balance surpluses and higher rates is DIT's and agencies' inaccurate projection of computer services use. Also, the complexity of DIT's computer services bills remains a problem — 26 percent of DIT's customers reported they did not understand their bills, as compared to 16 percent in 1981. Complex bills hinder agencies' abilities to validate accuracy and project usage.

Recommendation. Agencies should attempt to better identify the impacts of major changes or additions to computer services. DIT and the State's largest users of computer services should form a task force specifically for the purpose of developing methods for accurately projecting computer services use.

Recommendation. DIT should simplify its current billing system for computer services. At a minimum, Sperry and IBM usage should be billed separately. In addition, billing information on resource usage should be linked to meaningful job identification codes.

DPB Findings May Impact the Telecommunications Fund

Concerns with the timeliness of DIT's telecommunications bills were cited by 42 percent of other State agencies and institutions. However, multiple vendors and inaccuracies in vendors' bills appear to require DIT's involvement in bill preparation and validation — which typically adds about one month to the billing process. In studying DIT's role in providing telecommunications services, the Department of Planning and Budget may identify more timely billing procedures and cost saving opportunities that might reduce vendor's charges and DIT's surcharge.

Recommendation. Upon completion of DPB's study of telecommunications, DIT should assess the impacts of the study recommendations on the costs and rates of telecommunications services. If changes are expected, DIT should submit a revised cost allocation plan and recommended rates to JLARC for approval.

Systems Development Fund Deficit

DIT projects a deficit of \$955,980 by the end of FY 1988. Based on contacts with 15 major customer agencies and the recent addition of two large emergency projects, JLARC staff project a \$282,000 deficit. Some increases in DIT's rates may be necessary to accommodate salary increases and differences in the number of hours typically billed by higher-level and lower-level staff. The Systems Development Branch (SDB) may also need to reduce expenditures. Staffing reductions may also be necessary in the future, if revenues continue to decline as SDB focuses on smaller projects.

Recommendation. SDB should evaluate the number of billable hours used in its hourly rate calculation for systems development staff. SDB should also prepare a plan for reduction of expenditures to match revenues. SDB should submit a revised cost allocation plan and hourly rate schedule to JLARC for approval.

STAFFING AND ORGANIZATION (pp. 137-164)

DIT has emerged from two major consolidations in less than two years. Co-location of five major computer centers into one (1983-1984) was barely complete when merger had to be implemented (1984-1985). Problems inherent with such a large scale reorganization now need to be addressed in order to achieve the service integration and streamlined service delivery that was intended.

Staffing and Compensation Warrant Adjustments

Anticipated savings and personnel reductions were never realized as a result of the computer center and agency consolidation. Co-location has not begun to achieve the cost avoidances projected by DCS: \$16 million over a 16-year period. In addition, 54 of 78 position changes during co-location were upgrades, at an annual salary expense of \$142,091.

Declining Interagency Project Funds.

Recent studies of Interagency Systems Development funds indicated that SDB often used these general funds for projects that did not meet legislative criteria. Consequently, the General Assembly reduced the levels from approximately \$2 million in FY 1986 (47% of SDB's revenues) to \$388,000 in FY 1988 (11% of projected revenues). Controls over the use of the funds have been instituted by the Governor's secretaries, but additional measures are necessary.

Recommendation. Interagency systems development projects should be justified and prioritized according to objectives in a statewide plan. Consideration should be given to awarding these types of contracts on a competitive basis.

Competitive Requirements Limiting Project Size. Since 1984, agencies have been required to competitively bid on all but the smallest projects (\$50,000 or less). SDB has responded to this limit in two ways. First, SDB does not competitively bid on any projects. (It is important to note that under internal service fund guidelines, SDB is unable to recover costs for developing proposals which are not awarded.) Second, SDB and agencies are circumventing the intent of the competitive requirement. JLARC staff found eight examples of projects greater than \$50,000 that were segmented into multiple contracts, each below the limit.

Recommendation. The General Assembly may wish to amend Section 4-506(b) of the Appropriations Act to require that total anticipated costs of systems development or modification be included in the purchase estimate. Consistent with legislative intent, State agencies should competitively bid all projects for which the total anticipated costs exceed \$50,000.

Expanded Use of Other Sources.

Forty-four percent of SDB's customers, including some of the largest ones, expect to decrease requests for SDB's services. Agencies are relying increasingly on private vendors or their own staff for major systems development projects. Customer agencies reported that they intend to spend \$2.8 million less than originally budgeted for SDB in FY 1988. However, two large emergency projects approved by the Secretary of Administration will temporarily offset SDB's declining internal service fund revenues, at least during FY 1988.

Recommendation. SDB should make every effort to maintain sound business relationships with customer agencies. Consistent with Section 2.1-563.19, SDB should continue to focus its mission on designing, developing, and testing systems. Additional emphasis should be placed on assisting agencies in evaluating systems needs and temporarily maintaining and periodically modifying automated systems.

Project Management Needs Improvement

SDB's efforts to improve project planning have resulted in more accurate estimates of costs than in the past. Between FY 1981 and FY 1986, the accuracy of estimates (within plus or minus ten percent of actual costs) has increased from 15 to 52 percent, but is still far short of SDB's 90 percent goal. Greater attention needs to be given to estimating costs and hours more accurately.

Improved project planning would also help SDB optimize staff assignments. JLARC staff found instances in which higher-level SDB staff were assigned to tasks usually performed by lower-level staff. Thirty-five percent of the lower-level activities were conducted by staff above the senior programmer analyst level. JLARC staff also found instances in which additional planning might have avoided extensive use of contractors; up to 25 contractors were added as supplemental staff during FY 1986. In addition, E&W found that project accounting procedures and controls need to be further developed and implemented.

Recommendation. SDB should develop detailed project plans, using full customer agency participation in the planning process. Until SDB demonstrates a higher level of accuracy in its estimates, the use of fixed price contracts should be suspended. SDB should develop and follow documentation standards for all projects. All changes in project scopes should be documented and added to the automated tracking system.

COMPUTER SERVICES (pp. 75-98)

DIT's computer center is currently one of the largest and most powerful computer centers in Virginia. The size of the State's computer center has grown significantly over the years. Expenditures for computer services have almost

doubled within five years (from \$18 million in FY 1983 to an expected \$32 million in FY 1987). Transaction volumes have increased from 265,000 per day to more than 1.5 million per day.

Although agencies' use of DIT's computers has increased, additional efforts to efficiently and effectively use the mainframe resources can slow the rapid growth in costs. Moreover, as advanced computer technologies reduce agencies' dependence upon the State's mainframes, the State will need to establish policies that guide centralized and decentralized data processing.

Enhancing Computer Center Operations

In reviewing DIT's computer center, E&W concluded that DIT's success in keeping the State's mainframe computer system operating was comparable to other computer installations of this size. Additional planning and management controls, however, would help DIT efficiently manage the State's computer center. All reasonable efforts to improve performance should be exhausted before DIT resorts to hardware upgrades. Moreover, the State incurs considerable costs by maintaining multiple computer technologies, operating systems, and applications software.

Recommendation. In order to minimize costs while maintaining acceptable levels of service, DIT should place greater emphasis on monitoring the performance of its computer systems and planning their capacity. DIT should develop a multi-year hardware acquisition plan. The costs and benefits of maintaining multiple computer technologies, particularly the IBM and Sperry mainframe systems, also should be evaluated.

Expanding DIT Support Services

Efficient and effective use of the computer resources requires a commitment by DIT to help agencies achieve this goal. Agencies desire greater assistance in problem resolution, technology research, and training. Expansion of DIT's "cost containment" reviews could also help agencies identify more economical programming techniques. DIT may need additional authority to control production runs, data storage, and database management. In November 1986, DIT's computers were operating at 65 percent of capacity during the day but only 20 percent of capacity at night. By attempting to shift some

of the day processing to the evening, DIT could better balance the workload, and upgrades might be needed less frequently. The absence of uniform performance standards also hinders DIT's and agencies' abilities to balance acceptable service levels with operational costs.

Recommendation. DIT should increase its emphasis on helping agencies efficiently and effectively use computer services. DIT and agencies should jointly identify more efficient data processing and storage techniques. Operational performance standards should be adopted. DIT should provide additional assistance in areas such as product research, training, and cost-containment reviews.

Planning and Controlling Agency Use

The design and use of computer systems by agencies is the most significant factor affecting service costs. Other executive agencies apart from DIT account for two-thirds of total State expenditures for information technology. Agencies typically use computer services more than they anticipate, and this increases their costs. Also, when agencies design and implement new computer systems, the systems frequently cost more to operate than anticipated.

In general, agencies do not have or use comprehensive management information plans to guide and control their use of computer services. Also, agencies sometimes operate outdated technologies that are costly to maintain. In addition, appropriately expanded use of smaller computers could help reduce mainframe computer costs.

Recommendation. Agencies should develop information management plans to exert greater controls over computer service use. Planned schedules for evaluating software and hardware capabilities and for replacing outdated, inefficient equipment should be developed. Agencies should be governed by standards and statewide planning objectives in their use of various programming languages when designing computer applications. As a part of statewide planning efforts, opportunities for using minicomputer and microcomputer applications should also be explored.

Maximizing the Benefits of Centralized and Decentralized Processing

One of the principal information technology issues confronting Virginia is: How can the State maximize the benefits of centralized and decentralized data processing? Additional

A January 1984 executive report to the General Assembly cited reductions of at least 26 administrative support positions and \$1 million annually could be reduced as a result of merger. However, 15 more administrative positions are included within DIT than in the total for MASD, DCS, and DOT prior to merger. Of the 101 employees reallocated to new positions, 85 received an increase of one grade or more for a total additional salary expense of \$215,081 per year.

In conducting an analysis of DIT's current positions, JLARC staff found that 114 of DIT's 480 positions may be inappropriately classified, costing the State between \$500,000 and \$800,000 in annual salary and fringe benefit costs. In addition, 128 other positions are in technical classifications without meaningful distinctions in duties.

***Recommendation.** DIT should establish a formal manpower planning function and develop valid statistical forecasts of the agency's future manpower needs. DIT should develop measurable productivity criteria for all service-related and support positions. This data should be used in conjunction with workload forecasts to project changes in the number and type of staff the agency will need.*

***Recommendation.** DIT should write new position descriptions for all inappropriately classified positions and for each subsequent position change that results in different job duties. The Department of Personnel and Training (DPT) should revoke DIT's delegated classification authority. DPT should routinely conduct on-site audits of DIT positions in each classification to ensure that position descriptions accurately reflect position duties. DPT should clarify distinctions among job duties, expertise, and training for the Computer Systems Engineering, Telecommunications Services, and Communications Services series.*

Organizational Concerns

Incomplete consolidation of service functions in each of the three separate agencies has resulted in widespread functional diffusion, as well as blurred distinctions between internal and external service support. Staffing efficiencies could be achieved by realigning and consolidating common functions.

Internal Reorganization. DIT's director recognizes the need for further reorgani-

zation and has established an internal task force to propose solutions. Actions to reorganize DIT are planned soon. However, as of July 1987, DIT's proposals did not include a rigorous assessment of staffing needs.

***Recommendation.** DIT should be reorganized to address classification, service fragmentation, and other organizational concerns. As required by the Virginia Personnel Act, DPT should review and approve all position descriptions prior to DIT's restructuring. DIT should submit a revised cost allocation plan to JLARC and DPB which includes a description of all changes in the amount and allocation of personnel costs.*

Mission Consistency. JLARC staff identified two services that did not appear consistent with DIT's mission. General management consulting services do not fit within the technology mission of a central computer and telecommunications agency. Also, the educational programming and public broadcasting mission of the Public Telecommunications Board more closely matches educational rather than technology purposes.

***Recommendation.** The General Assembly may wish to establish a Department of Management Consulting within the Administration secretariat. In addition, the General Assembly may wish to transfer the Public Telecommunications Board to the Education secretariat. Staff support positions for the board should be transferred to the Department of Education.*

REORGANIZATION PROPOSAL (pp. 165-190)

The merger of information technology service functions in DIT consolidated in a single agency the State's previously fragmented efforts to manage and deliver services. Clearly, the integration of these services will provide for better coordinated and more efficient service delivery.

Yet the inclusion of certain control and oversight functions in the agency has resulted in customer agencies raising serious questions about DIT's ability to properly fulfill either its service role or its oversight role. A service agency such as DIT cannot also serve effectively as a planning, oversight, and control agency. As previously discussed, JLARC staff recommend establishment of an independent supervisory

board, the Council on Information Management, to serve planning, oversight, and control functions. JLARC staff also recommend significant internal reorganization of DIT.

Summary of Reorganization Proposal

JLARC staff propose that DIT be comprised of six major divisions: operations support, data center, telecommunications, customer services, systems development, and administration. This proposal would also result in a more uniform division size, ranging from 52 to 84 positions (rather than the current range of 11 to 183 positions in DIT's six divisions). As a result, managerial layers would be reduced to no more than four (three divisions of DIT's divisions have five layers) and the number of management positions would be reduced from 123 to 93. The maximum

employment level for DIT would be reduced from 480 to 419.

Summary of Staffing Impacts

Although JLARC staff propose establishment of the Council on Information Management, no additional positions or personnel costs would be needed to staff the new organization. In fact, the JLARC staff proposal estimates a reduction of 72 positions (28 established and 44 hourly) and a \$2.7 million savings in annual personnel costs. These savings are anticipated even after transferring 36 positions to the Council on Information Management, 14 positions to the proposed Department of Management Consulting, and two support positions for the Public Telecommunications Board.

Staffing Impacts of Proposed Reorganization		
<i>CURRENT</i>	Positions	Personnel Costs
DIT Maximum Employment Level	480	\$18,890,428
DIT Additional Established Positions	19	0
DIT Hourly Positions	44	524,145
TOTAL	543	\$19,414,573
<i>PROPOSED</i>		
DIT Maximum Employment Level	419	\$14,581,284
DIT Hourly Positions	0	0
Council on Information Management	36	1,472,313
Department of Management Consulting	14	592,189
Public Telecommunications Board	2	65,044
TOTAL	471	\$16,710,830
<i>NET IMPACT</i>		
Proposed Elimination	72	\$ 2,703,743

Source: JLARC staff analysis.

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I. INTRODUCTION

The Department of Information Technology (DIT) is a young organization when compared to other State agencies. The General Assembly created DIT by merging the Department of Computer Services (DCS) and the Department of Management Analysis and Systems Development (MASD) on September 1, 1984. The Department of Telecommunications (DOT) was merged with DIT on January 1, 1985. Consolidation of these three "high technology" service agencies focused planning, budgeting, acquisition, development, operation, and management of information processing and communications within a single agency.

Virginia is one of only a few states which have consolidated telecommunications and computer-related services within one centralized agency. Therefore, DIT has a unique opportunity to assist State agencies in exploring and using sophisticated, interrelated technologies for communicating and processing information. Using these technologies, all agencies can achieve program objectives more efficiently.

Management of information technology is a difficult and demanding function for organizations as large as Virginia State government. It requires an understanding of technology, application of the technology to agency needs, and delivery of efficient and effective services. Some problems are inherent in such a complicated set of tasks, and many of the problems associated with information technology management are evidenced in Virginia. The difficulties in managing information resources are further complicated because DIT is a new agency, and has had relatively little time to respond to the challenges of merger. Despite the difficulties, however, DIT does a good job of operating and maintaining the State's mainframe computers and in providing many of the technical services needed by customer agencies. Furthermore, the DIT director seems committed to bringing about necessary improvements in agency structure, management, and administration.

DIT ADMINISTRATION

DIT staff operate State government's central mainframe computers, coordinate various telecommunications facilities, and develop information systems. DIT also reviews and approves data processing and telecommunications procurements, provides management analysis assistance, and explores the use of information technology for educational purposes. DIT's maximum full-time employment level was 480 positions at the time of this review. DIT's expenditures in fiscal year 1986 were approximately \$78 million.

Creation of DIT

Organization studies of the executive branch of State government cited concerns regarding fragmented data processing, and data and voice

communications services among three State agencies: DCS, MASD, and DOT. Acting upon these concerns, the General Assembly established DIT as a consolidated information technology agency (Title 2.1, Chapter 35.2, *Code of Virginia*).

Rationale for Consolidation. Studies initiated in 1982 by the Governor resulted in a number of recommendations for realigning the executive branch and achieving more efficient and effective delivery of services. The Governor's final report, "An Assessment of the Secretarial System and Proposed Realignment of the Executive Branch," cited the following concerns with three separate agencies providing information technology services:

- State agencies had to interact with the three separate agencies for information technology services;
- service delivery was manpower intensive;
- trends toward integrating related technologies contrasted with fragmented services in Virginia;
- procurement was complicated and time consuming; and
- the separation of telecommunications, systems development, and computer services complicated the development of an overall State plan for information resource management.

Proposed reductions in administrative positions and overhead costs were among the advantages noted in the Governor's report to the General Assembly for consolidating information technology services. According to the report, the merger of DOT, DCS, and MASD was expected to save \$2 million and eliminate the need for at least 26 full-time administrative and support positions during the FY 1984-86 biennium.

Statutory Responsibilities. To address concerns regarding the fragmentation of data processing and communication services among DCS, MASD, and DOT, the General Assembly focused accountability for control, oversight, and provision of information services in the new DIT. Section 2.1-563.17 of the *Code of Virginia* directs DIT to control and oversee information services by planning, budgeting, acquiring, using, and disposing of communications (referring broadly to data processing and telecommunications) equipment and services. Section 2.1-563.18 directs DIT to provide communications services by developing, operating, and managing these services (Exhibit 1).

DIT is also authorized by §2.1-563.16 to establish fees which can be used to recover costs of services for which general fund appropriations are not applicable. Statutes establish separate internal service funds for automated services (systems development), computer services, and telecommunications.

When DOT was merged into DIT, the Virginia Public Telecommunications Board was retained as a separate entity affiliated with DIT. This board is generally responsible for overseeing the development and provision of public broadcasting services. The board also disburses grants from

Exhibit 1

STATUTORY RESPONSIBILITIES OF DIT

CONTROL AND OVERSIGHT

§2.1-563.17: Planning, budgeting, acquiring, using, and disposing of communication services and equipment

- 1) formulate policies, standards and specifications,
- 2) analyze and approve all procurements of equipment,
- 3) review and approve contracts for services,
- 4) evaluate executed contracts and billing and collection systems,
- 5) exempt from DIT review requirements State agencies which demonstrate effective and efficient procurement.

PROVISION OF SERVICES

§2.1-563.18: Developing, operating, and managing communications services and equipment

- 1) manage and coordinate facilities, centers, and operations;
- 2) acquire, lease, construct, and maintain facilities and equipment;
- 3) provide technical assistance in such areas as:
 - designing management information systems,
 - performing systems development services,
 - conducting research and sponsoring demonstration projects of telecommunications services,
 - effecting economies in telephone systems and equipment,
 - planning and forecasting future needs,
 - conducting management studies; and
- 4) develop and implement information, billing and collection systems to aid State agencies in forecasting their needs and managing their operations.

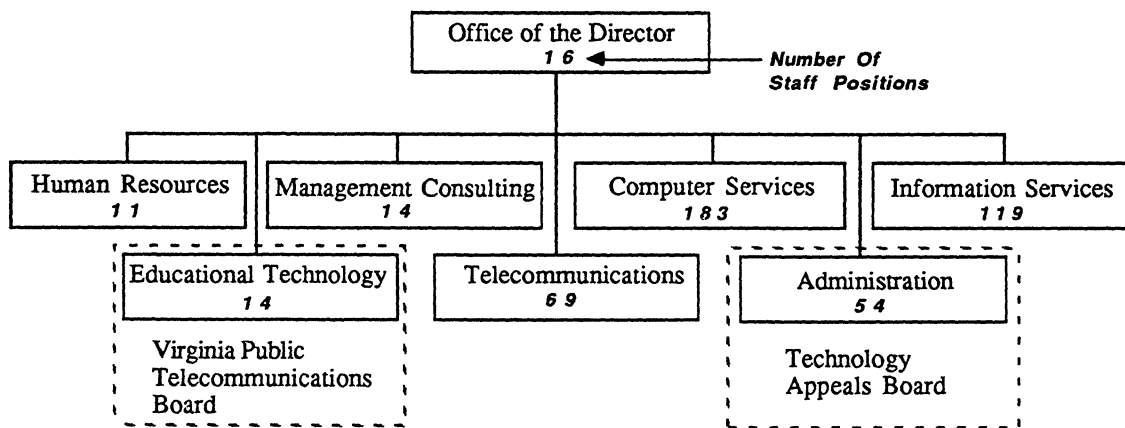
Source: *Code of Virginia.*

a special fund, the Public Telecommunications Fund, apart from the telecommunications internal service fund.

Organization and Staffing

The 1986 Appropriations Act sets the total for DIT's maximum full-time employment level at 480. Currently, DIT has approximately 470 of these positions filled. The staff are organized into five service divisions, two internal support divisions, and the director's office. However, there are a combination of service and support functions within several of these organizational units (Figure 1).

Figure 1
**Organization of the
 Department of Information Technology**



Maximum Employment Level = 480.

Source: DIT semi-monthly personnel report, March 1, 1987.

Service Divisions. The computer services division, the largest DIT division (183 positions), operates the Commonwealth's mainframe computers, supports the operating systems software, and provides technical assistance to other State agencies. The telecommunications division (69 positions) is responsible for operating the State's telephone facilities, providing data communication links with the State's mainframe computers, and exploring integration of voice and data telecommunications networks. The educational technology division (14 positions) assists State agencies and institutions in developing telemedia resources for educational purposes and coordinates teleconferences within State government. This division also serves as the primary liaison with public broadcasting organizations and provides professional support to the Virginia Public Telecommunications Board.

The information services division (119 positions) and the management consulting division (14 positions) are primarily responsible for providing systems development services and management studies to other State agencies. However, they also provide internal support. Staff within the information services division also develop systems for DIT's own internal use and provide technical assistance to other DIT staff. The management consulting division conducts management studies of other organizational units within DIT.

Support Divisions. The human resources division (11 positions) is responsible for personnel management within DIT and external public relations. Internal support functions of the administration division (54 positions) include accounting, budgeting, and rate-setting. Within the administration division, the procurement and contracting branch reviews and approves all procurements of data processing and telecommunications equipment and services for State agencies. A technology appeals board reviews vendors' complaints regarding procurement decisions.

Office of the Director. The director, deputy director and 14 other positions comprise the director's office. Staff in the director's office have both internal support and external service functions. The internal audit section is responsible for auditing DIT's operational procedures. The customer liaison section directs customers to the best source within DIT for customer assistance and helps other State agencies develop information management plans.

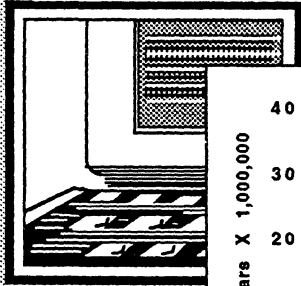
Sources and Uses of Funds

DIT currently receives funding from two sources: internal service fund operating revenues and general fund appropriations. The General Assembly appropriates to DIT a "sum sufficient" for supplying telecommunications, systems development, and computer services to user agencies. DIT bills agencies at a rate to recover its direct and indirect costs. DIT's general fund appropriations are for educational technology, inter-agency systems development, management consulting, and procurement functions. DIT expenditures for FY 1986 totaled \$78,481,700, of which 89 percent were internal service funds, and 11 percent were general funds.

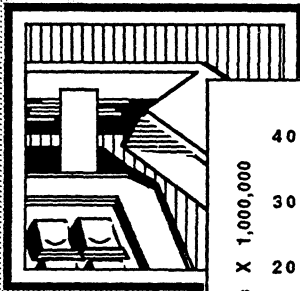
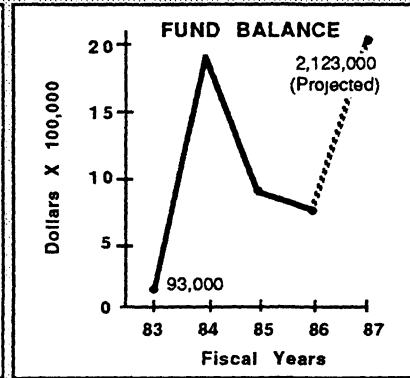
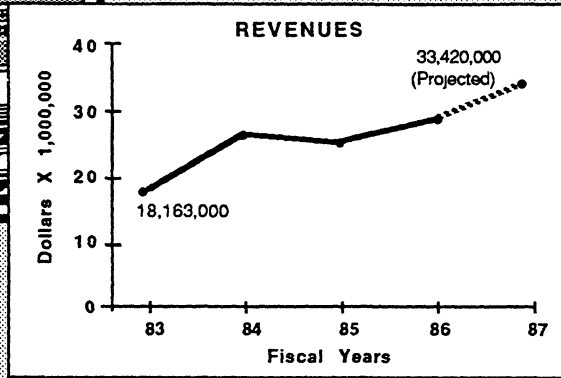
Internal Service Funds. Internal service funds are deemed appropriate when goods and services can be charged directly to user agencies in billable units. Administered properly, internal service funds should recover their costs of operations without accumulating long-term deficits or surpluses. State internal service fund policies, established by JLARC, state that "the managers (of internal service funds) shall establish procedures to ensure charges to customers are sufficient to recover the actual cost of providing the service but not at a level to accrue a surplus." JLARC has recognized the need for slight surpluses in order to avoid revenue shortfalls and to provide for operating working capital.

DIT's three internal service funds have usually maintained a surplus during the last five years (Figure 2), except for recent deficits in the systems development fund. DIT anticipates that declining project revenues will result in a \$150,000 deficit in the systems development fund by the end of fiscal year 1987. DIT projects a \$2.1 million surplus for the computer services fund and a \$260,350 deficit for the telecommunications fund by the end of FY 1987.

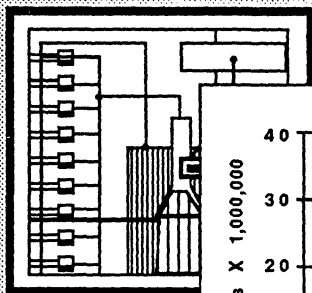
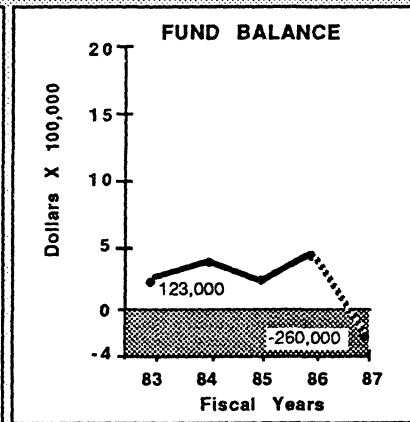
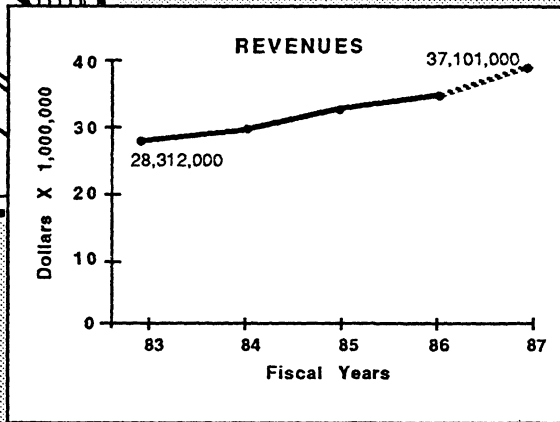
Figure 2
 DIT's Internal Service Fund Revenues and Fund Balances



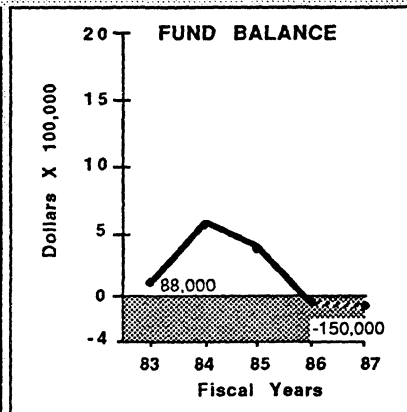
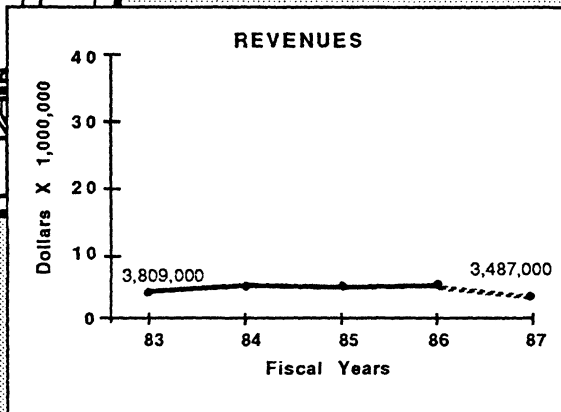
Computer Services



Telecommunications



Systems Development



Source: DIT financial statements for FY 1983-1987

The greatest fluctuation and largest fund balances occurred in the computer services fund. Customer agency use of computer services exceeded DIT's projections and generated revenues far in excess of DIT's expenditures. In the past, DIT provided rebates to customers as a way to reduce the surplus amount. More recently, DIT reduced its rates twice within six months (July 1986 and January 1987) to avoid \$9.15 million in additional charges to agencies for the 1986-88 biennium.

There are differences in the types of major expenditures from each internal service fund (Table 1). Nearly 90 percent of telecommunications expenditures are contractual services -- telephone vendors' charges for local and long-distance services. In contrast, 90 percent of expenditures from the systems development fund are for DIT staff and supplemental contract personnel with expertise in systems design and computer programming. Equipment- and staff-related expenditures comprise the major portion of the computer services fund.

Table 1

EXPENDITURES FROM DIT'S INTERNAL SERVICE FUNDS
(FY 1986)

<u>Expense</u>	<u>Telecommu- nications</u>	<u>Computer Services</u>	<u>Systems Development</u>
Contractual	87.5%	12.5%	19.8%
Personnel	7.9	25.3	69.9
Depreciation/Interest	0.5	35.8	0.6
Rent/Insurance	0.2	7.7	4.2
Expendable Equipment	1.4	1.0	0.2
Supplies	0.1	2.5	0.1
Distributed Indirect Costs	<u>2.4</u>	<u>15.2</u>	<u>5.2</u>
Total	100.0%	100.0%	100.0%

Source: DIT FY 1986 Annual Report.

General Funds. General funds (Table 2) are appropriate when services cannot be performed on a cost reimbursed basis. The educational technology division receives funds entirely from general fund appropriations (Educational Telecommunications, Public Broadcasting, and Telemedia Services programs), except a small portion for teleconferencing costs which DIT recovers through a rate for this service. The management consulting division and the procurement and contracting branch of the administration division are supported entirely by general funds. The general fund portion of the systems development branch was reduced substantially because of a decline in the number of projects meeting inter-agency criteria: from approximately \$2.0 million in FY 1986 to \$600,000 in FY 1987.

Table 2

GENERAL FUND APPROPRIATIONS FOR DIT PROGRAMS
(FY 1987)

<u>Program</u>	<u>Appropriation</u>
Educational Telecommunications	\$ 5,669,630
Inter-agency Systems Development	600,000
Public Broadcasting	1,988,250
Telemedia Systems	659,100
Management Analysis	734,302
Data Processing Procurement	<u>716,487</u>
Total	\$10,367,769

Source: 1986 Appropriations Act.

JLARC REVIEW

JLARC is required by §2.1-196.1 of the *Code of Virginia* to oversee State internal service funds. At its December 9, 1985, meeting, the Commission directed JLARC staff to conduct a study of DIT, including a cost analysis of the DIT's internal service funds as well as a performance review of DIT.

The study was initiated in response to concerns jointly identified by staff of JLARC, the House Appropriations and Senate Finance Committees of the General Assembly, and the Department of Planning and Budget (DPB). To facilitate the review, DPB set aside \$200,000 to pay for consultant assistance. The workplan of the consultant was reviewed by DPB and the staff of the Auditor of Public Accounts.

Methodology

The reorganizational goals for consolidating DCS, MASD, and DOT into one information technology agency, and the statutory responsibilities of DIT served as the benchmarks for evaluating DIT's performance. JLARC staff were assisted by the consulting firm, Ernst & Whinney, in evaluating DIT.

Evaluation Criteria. JLARC staff assessed the extent to which DIT was achieving the reorganizational goals set forth for the consolidated agency: effective and efficient delivery of services, staffing economies, integration of related technologies, timely and simplified procurement processes, and facilitation of State planning for information resource management. The study used three broad criteria for evaluating DIT's performance:

- (1) Do State agencies receive adequate guidance and support (through planning, standards development, and procurement) for developing effective and integrated information systems?
- (2) Does DIT manage its own resources and assist State agencies in managing their computer and telecommunications resources in the most cost effective manner?
- (3) Is DIT organized and staffed in a manner to promote efficient management and operation of the State's computer and telecommunications resources?

Research Activities. JLARC staff used a number of major methods in its study of DIT. These methods included a review of data processing procurement records and procedures, an assessment of project management and demand for systems development, a survey of all DIT customer agencies, an analysis of DIT's staffing and organization, and an assessment of planning for the development of the Commonwealth's computer and telecommunications resources.

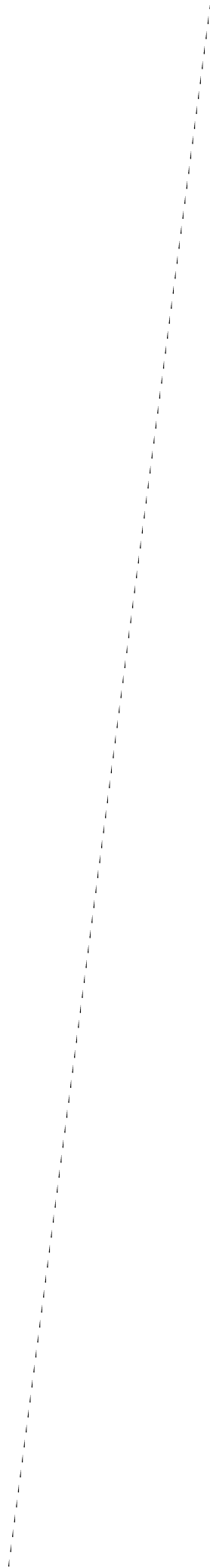
With funds provided by DPB, JLARC staff procured the consulting services of Ernst & Whinney (E&W) for assistance in technical and financial areas of the study. E&W reviewed DIT's accounting and cost allocation procedures and compared DIT's computer services costs and rates with other organizations. E&W also reviewed the efficiency and effectiveness of DIT's operational procedures and assessed computer use by seven customer agencies: the Departments of Accounts, Alcoholic Beverage Control, Motor Vehicles, Personnel and Training, and Social Services; the State Corporation Commission; and the Virginia Supplemental Retirement System. The results of E&W's analyses are included in this report. The E&W technical supplement is available for inspection at the JLARC office.

An explanation of the study methodology is contained in the separate technical appendix to this report, which is also available at the JLARC office. A summary of the contents of the technical appendix is included in this report as Appendix A.

Report Organization

The following chapters present JLARC staff's findings, conclusions, and recommendations for enhancing management of the State's information processing and communications resources. Chapter II focuses upon the need for statewide planning and oversight. DIT's procurement mission and practices are evaluated in Chapter III. In Chapter IV, the need for State-provided systems development services is evaluated.

Provision of computer services by DIT and use of those services by other State agencies is discussed in Chapter V. Chapter VI focuses upon the telecommunications support services provided by DIT. An assessment of DIT's financial management practices is contained in Chapter VII. Chapter VIII presents an overall assessment of DIT's staffing and organization. The report concludes, in Chapter IX, with a reorganization proposal for DIT.



II. STATEWIDE INFORMATION MANAGEMENT

State expenditures on information technology, one-half billion dollars in the current biennium, are escalating at a rapid rate. Clear direction and effective controls for the use of this technology are lacking. Virginia does not currently have a statewide information management plan, nor do DIT and other State agencies effectively plan for the use of information technology. In its review of DIT and other State agencies, Ernst & Whinney (E&W) concluded:

We consider this lack of planning to be a critical deficiency in the Commonwealth's ability to manage, control, and budget for a very complex and very expensive technology. Without a formal plan, it is not possible in most instances for management to quantify, monitor, and evaluate the extent of inefficient use of technology....

By participating in the development of a statewide plan, DIT and other State agencies can take an important first step toward a comprehensive approach for effectively and efficiently managing information technology, now and in the future. However, a statewide plan cannot successfully guide the State's use of its "high tech" resources unless methods are developed for implementing directives in the plan. In order for plans to be implemented effectively, information technology planning needs to be an integral part of State budgeting, procurement, and performance evaluation.

Moreover, implementation will require a commitment to planning at all levels within State government: at the highest executive levels, at the centralized agency level (DIT), and at the administrative agency level. A mechanism for statewide information technology planning and direction at the highest executive level is currently lacking in Virginia. Past attempts at instituting such a mechanism have not been successful.

NEED FOR STATEWIDE PLANNING

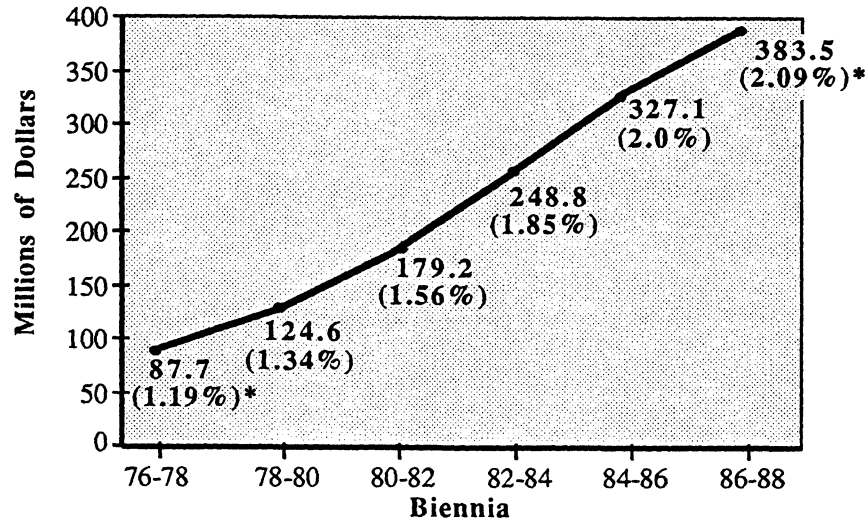
The Commonwealth has a sizeable investment in information technology. Expenditures for DIT services represent only a portion of the State's total commitment to this resource. The State's information processing budget (which includes data processing personnel and equipment purchases in all agencies) more than quadrupled during the period from 1976 to 1986. The budget increased from \$87.7 million in 1976 to \$383.5 million in 1986. Moreover, the budget understates total anticipated expenditures on information technology. DIT estimates that the inclusion of agencies' telecommunications budgets would increase the total budget for processing and communicating information to approximately \$500 million for the 1986-1988 biennium.

As a portion of the total State budget, the information processing budget has increased from 1.2 percent to 2.1 percent from 1976 to 1986. This trend is likely to continue even as the costs of computer and telecommuni-

cations technologies decrease. Agencies that previously could not afford to automate will do so, and other agencies will greatly expand their use of automation (Figure 3).

Figure 3

Growth in Information Processing Budgets



* Percent of total State budget.

Source: MASD, DIT.

To support agency programs effectively, the State needs a plan for harnessing valuable new technologies that communicate and process information rapidly and economically. Because changes are occurring in the computer and telecommunications industries, a number of major issues are confronting the Commonwealth. Without a statewide strategy for addressing these issues, costly and uncontrolled use of information technology will continue.

Information Technology Issues

A number of major information technology issues require immediate attention by the Commonwealth. The significance of each underscores the need for a comprehensive and decisive statewide plan. Expressed as questions, the issues are:

- How can the State efficiently and effectively manage its information resources?
- In view of current technology trends, should the State centralize or decentralize information processing?

- How can the State efficiently link communications networks and avoid the costs of redundant systems?
- How can State procurements of information technology meet compatibility and competition objectives?
- How can the State encourage agencies to exchange information on data, hardware, and software?
- In an effective State management structure, what roles should the centralized information technology agency and administrative agencies serve in planning, controlling, providing, and using information technology resources?
- How can the General Assembly and the Governor knowledgeably prioritize current information technology needs and anticipate future needs?

These issues are briefly discussed in the following sections and elaborated on in the remaining chapters of this report.

Managing Information Resources. Expenditures for information technology are anticipated to be \$490 million for the 1986-88 biennium. While DIT and other State agencies recognize the need to manage telecommunications and computer-related resources wisely, JLARC staff found that coordination and management of information resources is inadequate. DIT could take a number of additional measures to provide centralized services more effectively and efficiently. In reviewing computer applications in seven other State agencies, E&W also found that agencies did not always use computer services efficiently. In addition, management oversight was limited. By emphasizing planning, DIT and its customer agencies could better ensure wise use of information resources.

Adequate safeguards for the State's investment in information technology are also needed. In recent audits of DIT and other State agencies, the Auditor of Public Accounts found major deficiencies in disaster contingency recovery plans. DIT and agencies were not well-prepared to protect their automated systems in the event of a disaster such as a fire, although they are now working toward developing such plans. Additional measures are also needed to ensure security of physical facilities, and confidentiality and privacy of automated information.

Centralized Versus Decentralized Processing. Data processing on large mainframe computers is centralized primarily in DIT. Recent computer center co-locations and agency mergers have reinforced the centralization of data processing in Virginia. However, more sophisticated technologies and agency desires to operate their own computing facilities have increased pressures to decentralize information processing.

Powerful and less expensive "minicomputers" (smaller-sized than a mainframe) and desk-top "microcomputers" have increased agencies' capabil-

ities to automate and improve office and analytic functions. Comprehensive office automation systems, using computer-based word processing and electronic messaging, are rapidly replacing typewriters and manual office procedures. "Micro" desk-top computers enhance agencies' capabilities to analyze information. When linked with office automation, they form an integral part of computer-based decision support systems. Many of these applications do not require the power and size of the State's mainframe computers and can be performed far less expensively.

This trend in automation with smaller computers is having a decentralizing effect on information processing within State government. Many of the larger agencies, such as the Departments of Motor Vehicles, Mental Health and Mental Retardation, Health, and Corrections, operate agency-owned minicomputers. Some smaller agencies, such as Planning and Budget, Alcoholic Beverage Control, and Legislative Automated Systems, also own and operate minicomputers. Desk-top computers are common in most agencies. In FY 1986, for example, DIT processed 365 requests for microcomputers.

To achieve the maximum benefits, the State must determine the most effective and efficient location for information processing, based upon the type of processing that is needed. For example, expansive information processing with large amounts of data, or statewide shared systems such as accounting and budgeting, still require the power and size of the State's centralized mainframe computer. Nonetheless, smaller computers are more practical and economical for smaller-scale, localized processing. A distributed processing environment, which links centralized and decentralized facilities, may provide the answer to this dilemma in Virginia. However, the State needs a comprehensive strategy and clear standards to govern when agency applications require each type of technology and when they should be linked together.

Communication Linkages. The need to plan for communicating information is important for two major reasons. First, communication lines serve as the network link between computers, offering agencies the advantages of both the State's mainframes and smaller computers. Second, recent advances in telecommunications technology make it possible for the State to transmit data, text, and voice with one integrated system.

Developing more communication links between computers as part of a "distributed data processing" design could help the State solve the centralization-decentralization dilemma. Through a single terminal, a State employee could access the State's mainframe for major computer runs, access an in-house mini-computer for word processing, or perform a microcomputer spreadsheet analysis of a subset of data transferred from the mainframe. Data could also be shared within and among agencies. Telecommunications lines make such an information processing network possible, but decisions regarding what should be linked must first be made.

Multiple types of information could be communicated with one integrated communication system that included microwave transmitters and receivers, satellites, and digital lines. For example, a single line can now

transmit voice and data; separate lines for each were once necessary. By eliminating redundant equipment and taking full advantage of shared communications networks, the State could realize substantial cost savings. The Department of Planning and Budget is currently studying the feasibility of an integrated telecommunications network.

Compatibility Versus Competition. The Virginia Public Procurement Act intends to foster competition and secure the best price and product for the State. A computer or telecommunications product with the lowest price may not always be fully "compatible" with other components of the system. Therefore, it is important that both performance and price be evaluated in the procurement of computer hardware, software, and telecommunications.

Compatibility is the most critical requirement for achieving effective distributed processing and fully functioning computer systems within the State. Computer systems are comprised of multiple components including the main processor, front-end processors that convert transmission signals to machine language, and controllers that regulate the flow of data. Systems are also comprised of communication lines, data storage devices, terminals used to access and display information, printers, and "software" (the machine language that directs information processing). Unless each component is designed to interface with the other components, the system will not function properly.

Numerous manufacturers and vendors offer multiple designs for each component of a computer system. Since the recent deregulation of the telecommunications industry, many vendors are entering this market as well. State agencies must effectively screen these products to ensure that they are fully compatible with existing components.

By adopting general use design standards, the State could achieve compatibility goals without sacrificing competition. Already, market conditions dictate certain standards; many smaller manufacturers and vendors now offer products that are compatible with products of the largest manufacturers. However, State standards would need to be sufficiently defined to prevent acquisition of products that are inaccurately portrayed as fully compatible.

Decisions regarding appropriate design standards will have far-reaching impacts. These decisions will affect the type of technologies that the State will be committed to in the future. However, these decisions must be made if the State is to ensure effective use and interface of systems as agencies incrementally add and replace thousands of components each year. Moreover, by determining agencies' anticipated needs and consolidating purchases, the State could achieve volume discounts on frequently purchased items.

Information Exchange. The volume of data and the number of systems maintained by the State suggest that efforts to share information and identify redundant systems could achieve substantial cost savings. For example, seven of the largest State agencies maintain more than 3,000 data files. The State could avoid redundancy of data and systems and save costs by sharing information in at least two important ways: (1) developing a statewide

inventory of databases and their contents and (2) maintaining a statewide inventory of computer system applications.

State agencies use and store similar information. In some cases, it may be feasible to reduce data storage costs by eliminating some redundant data. State agencies might also better merge and analyze information if uniform labeling standards were adopted for common data elements: social security numbers, dates, and locality names, for example. In 1983, a State data administrator position was established to coordinate and foster statewide database development. This position has remained vacant because this function has not yet been elevated to a priority within DIT.

An inventory of agency computer systems has been developed and is periodically updated by DIT. If this information is used properly, agencies which are planning to add or modify systems can learn from the experience of others.

Management Roles. State agencies cannot adequately address technology issues unless management responsibilities for resources are clearly defined, understood, and implemented. A void in the current State policy structure and insufficient attention at appropriate managerial levels within DIT and other agencies are significant issues which need to be addressed as part of a statewide, comprehensive strategy.

In interviews with DIT's customer agencies, JLARC staff found that six of DIT's major customers were concerned with DIT's dual control and service functions. Agencies repeatedly asked questions such as:

Should the centralized agency responsible for supporting mainframe applications dictate statewide policies and control acquisitions of all information processing equipment? It appears as if DIT's interest in mainframe technology might hinder agencies' access to other technologies.

JLARC staff found no instances in which DIT denied a procurement for a system that would detract from the amount of processing at DIT's mainframe computer center. Nonetheless, agencies' perceptions that DIT would promote centralized mainframe data processing could hinder acceptance of DIT's role in setting statewide policies.

Individual agencies, however, may not have the perspective to appreciate statewide information processing needs. Senior agency executives may not necessarily understand their own agencies' automation needs. Typically, the complex field of information technology has been delegated to technical specialists. Senior executives, however, should participate in deciding how automation could better support program objectives.

On JLARC staff's survey of DIT customers, 49 percent of these State agencies and institutions reported that they do not maintain a current agency plan for using telecommunications and computer-related services. In on-site reviews of seven large agencies, E&W found that even among agencies

with plans, the plans were not comprehensive enough to effectively guide and control agencies' use of information technology resources.

Ultimate decisions regarding statewide direction for information technology must be made at an executive level above DIT and the user agencies. If statewide direction can be set at this executive level, DIT can serve a valuable role in implementing statewide plans by assisting agencies in meeting agency-specific objectives that support statewide objectives.

Statewide Priorities. The General Assembly and the Governor cannot knowledgeably allocate financial resources for achieving statewide information technology objectives if no objectives have been stated and documented. In the absence of objectives, allocations will continue on the basis of individual agency needs. DIT will continue to provide services at unquestioned levels demanded by agencies, and DIT's rates will be used to recover the costs of this expansion. As a result, uncontrolled use of information technology and rapidly escalating costs will continue, and slow, if any, progress will be made to integrate systems.

A statewide information management plan could help the General Assembly and Governor prioritize needs and effectively participate in achieving statewide objectives.

Information Management Plan Objectives

The purpose of an information management plan is to provide a central source of guidance for addressing the information technology issues that face the Commonwealth. Recent efforts in Virginia to develop State plans for information technology fall far short of the comprehensiveness and participatory process necessary for developing a meaningful plan. In order to identify principal statewide objectives, JLARC staff contacted ten other states which had recently evaluated their information management programs or developed statewide plans.

Information Management Planning in Virginia. Virginia does not have a statewide plan for information technology. In 1982, MASD with assistance from DOT and DCS prepared a document, "Information Management Strategies for the 80's." Although this document identified some of the pending information issues and suggested some broad ideas for addressing them, it has not served as an effective guide for agencies' use. MASD revised the document in 1983 and 1984, but it has not been updated since the creation of DIT.

In November 1985, DIT developed a draft document entitled "Strategic Technology Directions." This document cannot be considered a State plan, however. The draft notes the purpose and some intended activities of DIT in the near future, but it was developed internally without participation by other agencies.

Information Management Planning in Other States. Information technology issues confronting Virginia are not unique. Other states also are attempting to address these issues. Recognizing that information technology is a valuable yet costly resource, a number of states have recently renewed their

efforts to better manage this resource. JLARC staff compiled a list (Exhibit 2) of example objectives contained in other states' plans which might serve as a base for developing a plan in Virginia. However, in order for the statewide plan to be a useful guide, DIT and other executive agencies must develop comprehensive objectives and agree upon specific actions to achieve these objectives.

Recommendation (1). The General Assembly may wish to enact legislation to require development of a statewide plan for information technology management. At a minimum, the plan should identify methods for effectively integrating information processing networks; protecting information systems and data; ensuring competitive, timely, and compatible procurements; stimulating information exchanges; and sustaining a participative, continuous planning process.

INTEGRATING THE PLANNING PROCESS

Development of a statewide information management plan is not sufficient for ensuring implementation of the goals underlying the plan. The success of statewide information management planning will depend, in part, on effective links with other State processes which could facilitate implementation. The statewide planning process should be linked with DIT and agency planning, budgeting, procurement, and performance evaluation.

Full integration of statewide information technology planning with these other important State functions is essential. The State plan should serve as the umbrella for all information technology plans. The State plan should also serve as a guide in the budgeting process. Budget requests for information technology should be reviewed to determine conformance with the statewide and agency plans, and the results of these reviews should be used to recommend priorities to the Governor and the General Assembly.

The statewide plan should also serve as a guide for procurements. Central procurement staff should review and approve procurements corresponding to statewide and agency plans. Finally, the State plan and agency plans would serve as benchmarks against which implementation success would be measured. Results of these assessments should be used to modify the statewide plan, policies, and standards as necessary.

Statewide, DIT, and Agency Planning

Statewide information technology planning will not be effective unless it builds upon the plans of all agencies, including DIT's plans. The State plan must also provide direction and guidance for agencies to use in developing information management plans. In this manner, agency plans would become an integral and consistent part of the overall course for State government.

Statewide Guidance. Statewide guidance regarding essential elements of information technology planning were developed in 1984. However, use of these guidelines by agencies has been limited. In order for the

Exhibit 2

EXAMPLE OBJECTIVES FOR A
STATEWIDE INFORMATION MANAGEMENT PLAN

Integrated Technology

- Establish a policy for distributed network processing.
- Determine telecommunications needs and implement, as necessary, a statewide integrated telecommunications network with standards to permit terminals to communicate with other terminals.
- Provide for economical and efficient integration of office automation.

Resource Protection

- Develop a statewide contingency plan for disaster recovery.
- Establish standards and procedures for physical security of computing facilities and for privacy and confidentiality of data.

Practical Acquisition

- Develop standards and general use specifications for guiding hardware and software acquisitions.
- Continually improve procurement and contracting methods to achieve cost savings, timely processes, and necessary flexibility.

Information Exchange

- Develop and maintain an inventory of computer applications.
- Develop a directory for State government databases.

Participatory Planning

- Support a central planning function and a permanent, continuous, and participatory process for planning.
- Establish multi-level advisory groups.

Source: JLARC review of other states' information technology plans.

State plan to effectively build upon agency plans, specific requirements for the contents of agency plans are needed. For example, efforts to explore system integration and network sharing opportunities will not be successful without information on current agency systems and proposed new systems.

State guidelines should require that agency plans describe how information technology will be used to support program and operational objectives. At a minimum, agency plans should contain information on the level of resources that will be needed to accomplish agency objectives, including hardware and software needs, anticipated major changes to computer systems or development of new systems, telecommunications use, and disaster contingency plans. This information will be useful for statewide prioritization of technology needs. Sufficiently detailed agency plans would also help the State identify opportunities to share information technology and potentially reduce costs.

Planning Within DIT. In reviewing DIT's operations, E&W found that DIT does not have an effective planning process that guides its own management and resource allocation decisions. Because DIT is the centralized State provider of telecommunications and computer-related services, E&W expected DIT to have well-developed plans for hardware acquisition, software maintenance, systems development, and telecommunications utilization. Other than the usual budgetary planning, E&W found that DIT did not have the following formal plans in place.

- DIT does not have a long-term computer hardware plan that projects capital outlay needs for a three-to five-year period. Computer capacity needs are not adequately planned over an extended period of time.
- DIT also lacks a systems software plan. Such a plan should identify how the various products will be used to monitor and enhance the performance of the hardware. The plan should also contain decision rules on how the results of performance monitoring will be used in hardware and software acquisitions.
- DIT does not maintain an inventory of upcoming systems development projects, either for internal projects or for other agencies. Without systems development plans, DIT cannot accurately predict the effects of major systems changes on computers and staff workload. This information is needed in order to make corresponding adjustments in equipment capacity and staffing levels.
- DIT does not have a formal long-term telecommunications plan, nor does DIT have an inter-agency plan that emphasizes shared facilities. DIT does conduct telecommunications studies for individual agencies as requested. However, planning that considers all of the State's telecommunications needs, based on a detailed analysis of system use, is not performed on a continuous basis. A study of statewide telecommunications needs is currently in progress.

- In recent audits, the Auditor of Public Accounts found that DIT does not have adequate plans for protection of the State computer center. Efforts to identify alternative processing sites and methods for protecting the State's computer center have been initiated but are not completed.

Planning needs in each of these areas are further discussed in the following chapters of this report.

Moreover, planning within DIT is not currently coordinated among several organizational units. Hardware capacity planners are located in the computer services division -- separated from the staff in the administration division who are responsible for financial planning and procurements when upgrades are necessary. DIT's rate-making function is in the administrative division. Other staff, located in the computer services, telecommunications, and information services divisions, plan expenditures and collect utilization data used in rate calculations.

Staff in the customer liaison section of DIT provide some assistance to customer agencies in developing information processing plans. However, this section is not fully utilized for agency assistance. DIT's customer liaison section also is not effectively linked with other DIT units which plan the level of support needed to meet agencies' demands. Information that would be valuable for agency-wide planning purposes is not formally shared between these various organizational units. A proposal for coordinating and focusing internal planning activities within DIT is discussed in the final chapter of this report.

Recommendation (2). DIT should develop and implement a comprehensive management plan for the agency's operations. The comprehensive plan should include capital expansion plans for acquiring computer hardware. The plan should also identify how the performance of the computer and telecommunications systems will be monitored and improved. Plans for accommodating major changes in DIT's and agencies' computer applications should also be included. Disaster contingency plans should be completed.

Agency Planning. In its survey of all State agencies and institutions, JLARC staff found that 88 percent of the higher education institutions and 42 percent of the agencies reported that they have developed plans for acquisition and utilization of information processing resources. Of those agencies and institutions with plans, 23 reported that they used DIT staff assistance in developing the plans (Table 3).

In its review of seven major customer agencies, E&W found that what agencies report as plans may not actually be the comprehensive types of plans needed to effectively guide information technology use. The Departments of Accounts and Motor Vehicles were the only agencies of the seven that had any component of an information management plan in place. The plans in these two agencies contained only a system development component that addressed long-term needs for system applications. None of the agencies had hardware and software plans, for example. Hardware planning

Table 3
**INFORMATION TECHNOLOGY PLANNING
 WITHIN STATE GOVERNMENT**

	<u>Higher Education Institutions</u>	<u>State Agencies</u>
Number (percent) with plans	15 (88%)	30 (42%)
Number (percent) without plans	<u>2 (12%)</u>	<u>41 (58%)</u>
Total	17 (100%)	71 (100%)
Number reporting assistance from DIT	8	15

Source: JLARC survey of State agencies and institutions.

could help agencies routinely upgrade equipment in order to obtain more efficient and advanced technologies.

In reviewing computer systems within customer agencies, E&W found that the Departments of Accounts and Motor Vehicles, and the Virginia Supplemental Retirement System all operate Data-100 data entry equipment. This equipment is no longer manufactured, and spare parts are hard to find. There are no plans by the agencies to replace the equipment and take advantage of possible volume discounts through a joint purchase.

Comprehensive information technology plans within agencies could help senior executives identify how automated information processing and communications will support agency program objectives. As tools for helping agencies identify processing and communications economies, the plans also need to contain specific strategies for protecting, efficiently using, and monitoring those resources. In South Carolina, for example, accountability for developing and overseeing each agency's plan is focused in a single agency official who reports to the agency director. In Virginia, a designated person in each agency could serve as the focal point for agency planning.

Recommendation (3). State requirements for agency information management plans should be established. All executive agencies and institutions should be required to develop information technology plans in

compliance with State requirements. These plans should be updated biennially and used to revise the statewide plan.

The director of each agency and president of each higher education institution should designate a senior staff member to serve as information resource manager. The information resource manager should be responsible for coordinating development of the agency information technology plan and overseeing its implementation.

Planning and Budgeting

Statewide and agency plans would also serve as a guide for reviewing and prioritizing budget requests for information technology. Centralized review of proposed expenditures would ensure that funding requests for hardware, software, or services support objectives in statewide and agency plans. This process would require DIT and other agencies to reference budget requests for information resources to objectives in their information management plans.

DIT Requests. Because DIT's budget represents centralized State support for information technology, DIT's entire budget should be closely scrutinized. DIT should be required to link all budget requests to the appropriate planning objectives. This requirement would apply to all planned expenditures for internal support of DIT and external services to customer agencies. Close review of DIT's budget requests, as referenced to plans, would help to ensure that DIT's decisions to expand equipment, systems, services, and staff comply with statewide objectives and appropriately correspond to anticipated expenditures by agencies.

Agency Requests. In order to determine how budget requests are related to implementation of statewide and agency plans, each agency should be required to reference budget requests to corresponding objectives. While it may not be appropriate to require a budget justification for every \$200 software package, budget requests should certainly justify major hardware, software, and maintenance needs, and how the systems or components relate to the agency plan.

Because all funding requests could not likely be accommodated, these budget justifications would help the State determine the most critical information technology needs. Agency budget requests could also be used to assess the level of demand for DIT services, which in turn, could be used to assess DIT's funding needs. As further discussed in the financial management chapter of this report, more accurate methods for projecting agency utilization is particularly important for the establishment of DIT's computer services rates.

Recommendation (4). All executive agencies should reference budget requests for information processing or communications equipment, software, or services to the corresponding information technology plan. DIT's entire budget should be referenced to the agency and the statewide plan. Agencies' budget requests should be used to assess DIT's funding needs.

Planning and Procurement

The acquisition of hardware, software, or services is one of the most important aspects of implementing an information management plan. Procurement approvals and denials are the principal enforcement mechanism to ensure that agencies develop and upgrade systems that comply with planning objectives. Although DIT has statutory authority for approving agencies' procurement requests for information technology, its decisions are not based on any statewide or agency objectives. As a result, DIT's role in procurement is confused: Should DIT process all agency requests, or should DIT deny requests which agencies do not adequately justify?

In interviews with JLARC staff, some DIT procurement staff reported that they challenge agency procurement requests. In contrast, other DIT procurement staff claim they will process all agency requests, even if justifications are cursory or lacking. Procurement guidelines would help to ensure that acquisitions support statewide and agency planning objectives.

Procurement Guidelines. In order to ensure greater accountability within agencies and DIT, State government needs criteria for guiding procurement decisions. At a minimum, the guidelines should require agencies to justify all procurements by referencing the corresponding statewide or agency plan objectives. Central procurement staff should review procurement requests to ensure compliance with plans, and the staff should approve adequately justified requests.

Agency Accountability. Procurement guidelines would help to ensure that procurements became a method for implementing agency plans, rather than a piecemeal approach for building and using information systems. Agencies could expect central procurement staff to approve all justified requests. Approval would be based on established criteria rather than on any perceived preferences to maintain the mainframe technology versus other technologies, for example.

DIT Accountability. DIT should also be expected to adhere to State procurement criteria and justification requirements for its own procurements. However, the State currently lacks an independent source that can review DIT's information technology procurements, which are some of the largest in the State. As further discussed in this chapter and in the next chapter of this report, central procurement authority for information technology should be separated from DIT but linked to responsibilities for information management planning.

Recommendation (5). State policies for information technology procurements should be revised. The policies should include a requirement that all procurement requests be justified on the basis of information management plan objectives. Central procurement staff responsible for reviewing information technology requests should ensure that procurements comply with statewide and agency plan objectives.

Planning and Evaluation

Success in implementing statewide and agency information technology plans cannot be adequately determined without a method for measuring accomplishments. Performance monitoring is needed not only to assess progress and compliance with plans, but also as a source of information for adjusting plans and standards when necessary. Periodic progress reports would be useful for internal and external reviews.

Internal Reviews. Agencies would benefit from monitoring their own performance with respect to their information technology plans. Internal reports would help top management monitor current agency progress and anticipate future needs for information processing and communications equipment, software, and services. Progress reports could also be used for internal audits in areas such as facility and data security, for example.

External Reviews. Methods to track the State's progress in implementing the statewide plan and agencies' success in achieving objectives are also needed. Periodic progress reports could be used for this monitoring purpose. Progress reports could also be used to identify areas in which statewide policies might need to be adjusted. By maintaining records on information technology expenditures, operations, and procurements, State agencies would also facilitate external reviews by, for example, the Auditor of Public Accounts and the Department of Planning and Budget.

Recommendation (6). The State should require agencies to biennially prepare a report on their progress in achieving information technology objectives. The progress reports should be used by the State to monitor accomplishment of statewide and agency objectives and to revise policies and standards when necessary.

ESTABLISHING AN OVERSIGHT BOARD

Accountability for statewide information management planning and implementation must be clearly focused in State government. However, the State does not currently have a permanent organizational structure which is committed to information technology planning. During the past 20 years, the State's central data processing agency has not successfully implemented a permanent, continuous planning process. DIT has fared no better than its predecessors in this regard.

Leadership at the highest executive level is required to guide and oversee agency implementation of information management plans. In analyzing organizational alternatives, JLARC staff concluded that a supervisory board, independent of DIT, should be created to fill the current statewide planning void.

Need for a Permanent Planning Structure

Previous statewide planning efforts have not fully achieved their objectives. In the past, planning has been hindered by a lack of continuity and

frequent turnover in leadership. Recognizing the limitations of previous approaches, State government should include a permanent board with an exclusive commitment to statewide information planning.

Limited Implementation. Historically, State government has had limited success in implementing a statewide information plan. During the past 20 years, the State's three major statewide planning efforts have identified issues similar to those currently facing the Commonwealth. For example, previously identified needs for developing standards, sharing automated information, and establishing timely and effective procurement procedures remain as issues today.

Lack of Continuity. Statewide information planning in Virginia is not a process which continually refines and adjusts previous plans. Rather, statewide planning has consisted of the sporadic development of independent plans by different sources.

A consultant developed the first major plan, "A Statewide Plan for the Computer Age," in 1969. In 1973, the former Division of Automated Data Processing (DADP) developed "The Virginia Plan for Data Processing." Most recently, the former Department of Management Analysis and Systems Development developed a statewide plan called "Information Management Strategies for the '80's." The final plan was completed in 1982. None of the plans were intended as updates of previous plans.

Frequent Turnover in Leadership. During the past 20 years, DIT and its computer services predecessors, DADP, MASD, and DCS, have had nine different directors. Emphasis on statewide planning has varied according to each director's understanding of his agency's mission in providing services to State government.

Moreover, various advisory groups were created over the years. Unfortunately, they also lacked continuity. For example, the Governor's Computer Advisory Committee, established in 1967, was comprised of private industry representatives. In 1968 agency representatives formed the Virginia Advisory Council on Administrative Management. In 1974 private and public sector representatives formed the Automated Data Processing Advisory Committee. These various advisory groups, each lasting only a few years, proposed standards and policies but had no authority to require compliance.

Permanent Organizational Commitment to Planning. Clearly, the State lacks a permanent commitment to information technology planning. Throughout the past 20 years, it was assumed that the central data processing agency would develop statewide plans. However, a permanent, continuous planning process was never established by the central agency. As a result, special committees were created to perform planning and policy development functions. These efforts were also short-lived.

In order to achieve a continuous commitment to statewide information technology planning, responsibility for planning should be clearly focused in a permanent organizational structure. In reviewing ten other states, JLARC staff found that boards are frequently used as the organizational

structure responsible for statewide planning and policy development. However, the breadth of responsibilities and composition varies:

The Information Resources Commission in Florida has extensive regulatory powers and an independent staff. The governor and members of his cabinet serve on the commission.

* * *

In Hawaii, the Governor's advisory committee on electronic data processing is comprised of the directors of major State agencies. The committee is limited to an advisory role and has no independent staff.

* * *

The policy committee of the Central Data Processing Authority (CDPA) in Mississippi is comprised of division heads within the central data processing agency. The committee recommends statewide information technology policies to the board which oversees CDPA.

Virginia could also benefit from a permanent board responsible for information technology planning. DIT recognizes the need for a board with statewide planning responsibilities and is currently considering a proposal to establish an advisory council. This alternative and others are evaluated in the next section.

Alternative Levels of Board Authority

Section 9-6.25 of the *Code of Virginia* establishes three types of boards based on their level of authority: advisory, policy, and supervisory. Any one of the three types could meet the State's need for a permanent organizational structure exclusively committed to statewide information management planning. Because of differences in the boards' levels of authority, however, only an independent supervisory board could ensure that planning was effectively linked to policy and standards development, budget review, procurement oversight, and evaluation (Figure 4). Each of the three alternative boards are evaluated in the following sections.

Advisory Board. An advisory board is currently being considered by DIT. This board would be responsible for advising the Governor on information technology issues. The board would also be responsible for developing a statewide, comprehensive plan for the acquisition, management, and use of information technology. Responsibility for annual updates of the plan would also be vested in the board.

This type of board meets the State's need for a permanent and continuous organizational commitment to information management planning. However, statutory limits on the authority of advisory boards would prevent this type of board from developing needed statewide policies, standards, or

Figure 4

Alternative Levels of Board Authority for Statewide Information Management Planning

<u>Responsibilities Corresponding to Level of Authority</u>	Level of Authority		
	<u>Advisory</u>	<u>Policy</u>	<u>Supervisory</u>
Planning	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Policy and Standards Development	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Independent Oversight	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<ul style="list-style-type: none"> • Budget • Procurement • Evaluation 			<input checked="" type="checkbox"/>

Source: JLARC staff analysis.

regulations for acquisition and use of information technology. The board could develop a plan, but it would have no authority to require compliance.

Policy Board. As defined in statute, a policy board could develop necessary policies, standards, and regulations. Vested with these additional responsibilities, a policy board could, for example, establish requirements for sharing communications networks, and adopt general design standards for technology compatibility. If the State intends to establish policies that will support the statewide plan, then a policy board is clearly superior to an advisory board. However, statutory limitations on the authority of policy boards would prevent this type of board from exercising budget, procurement, and evaluation oversight responsibilities which are also necessary to ensure plan implementation.

Moreover, policy boards are not independent bodies. In order to effectively implement policy responsibilities, these boards must receive adequate staff support. Policy boards must draw staff support from an existing agency, because they do not have authority to appoint a staff director or other personnel. Therefore, a policy board for information technology would logically be affiliated with the State's information technology agency -- DIT.

A policy board affiliated with DIT has two principal disadvantages. First, agencies would likely resist policies dictated by a board directly affiliated with the central agency primarily responsible for mainframe data processing. Agencies might perceive that they would have less influence than DIT staff in establishing State policies. Second, a policy board affiliated with DIT could not independently monitor DIT's budget, procurements, and performance. In effect, service and control responsibilities would be vested in

DIT. This alternative would continue to confuse DIT's mission with regard to other agencies and provide no additional external control over DIT.

Supervisory Board. The breadth of authority granted in statute to supervisory boards suggests that this type of board could more effectively ensure implementation of a statewide plan than other types of boards. A supervisory board for information technology could:

- prepare and regularly update a statewide information management plan,
- establish policies and standards that support the objectives in the statewide plan,
- review DIT's and agencies' budget requests for information technology, and based on statewide planning objectives, recommend priorities to the General Assembly and Governor,
- review and approve DIT's and agencies' requests for major hardware, software, and service acquisitions to ensure that procurements are justified according to statewide and agency information management plans, and
- periodically evaluate DIT's and agencies' implementation success and use this information to revise statewide plans, policies, and standards when necessary.

In summary, a supervisory board for information technology could serve as the much needed focal point in State government to effectively address the information management issues facing Virginia. Moreover, an oversight board could serve as an independent check on DIT's plans, budgets, and procurements -- a check that does not currently exist.

The principal disadvantage of a supervisory board is that it would require creation of a separate staff with all of the costs associated with a new agency. As discussed in Chapter IX of this report, however, JLARC staff propose an organization for a supervisory board and for DIT that would result in no additional cost to the State. This organizational proposal places control responsibilities in the board, while clarifying DIT's role as one of strictly service provision. The composition and responsibilities of the board and the staff support organization are also discussed in Chapter IX.

Recommendation (7). The General Assembly should consider creating a supervisory board to oversee statewide information management planning. The board should be independent of DIT.

III. PROCUREMENT

Section 2.1-563.17 of the *Code of Virginia* authorizes the Department of Information Technology (DIT) to review and approve all State procurements of data processing and communications services and equipment. The procurement and contracting branch within DIT's administration division administers DIT's procurement function. The 14 staff in this branch processed approximately 1,500 agency procurement requests (APRs) in FY 1986.

Information management plans should be implemented, in part, through acquisitions of hardware, software, and services. Centralized procurement review and approval is a vital method for ensuring that DIT and agency procurements are in direct support of planning objectives. In assessing DIT's statewide review and approval responsibilities, JLARC staff found that (a) procurement decisions are frequently made without the benefit of statewide or agency plans, (b) DIT's service mission inherently conflicts with the State's need for effective procurement controls, and (c) there needs to be more effective oversight of DIT's large computer purchases and telecommunications contracts.

JLARC staff also evaluated the adequacy of DIT's procurement practices. In general, DIT has established sound procedures for reviewing agency compliance with the Public Procurement Act. However, DIT procurement staff do not consistently interpret or implement these procedures in procurements that require competitive bids, sole source determinations, and minority vendor solicitations. Procurement decisions need to be better documented, especially for sole source contracts.

DIT's efficiency in processing procurement requests was also evaluated by JLARC staff. DIT has attempted to improve processing timeliness. By expanding delegation of small purchases to agencies, DIT could achieve additional processing efficiencies. However, safeguards for overseeing agency procurements need to be strengthened in order to ensure appropriate use of delegated authority.

MISSION

Until the creation of DIT in 1984, procurement control responsibilities were separate from computer services responsibilities, except for a brief period from 1976 to 1978. The Department of Management Analysis and Systems Development (MASD) was responsible for reviewing all data processing procurements. MASD's responsibilities included review of procurements by the agency responsible for some of the State's largest data processing acquisitions: the Department of Computer Services (DCS). Before DCS was created in 1978, MASD (created in 1976) was responsible for procurements and computer services. Staff for the Governor's secretaries also reviewed agencies' procurement requests.

In 1982, secretarial staff sizes were reduced significantly by Governor Robb. Consequently, the State lost one of the methods for independently overseeing some of the largest data processing procurements. Then, when MASD and DCS were merged in 1984, the State lost its only other method for independently assessing the centralized data center's acquisitions.

Evolution of the Procurement Function

As data processing became a more prominent part of State government activities, procurements of technical services and sophisticated equipment were recognized as unique. Special procurement procedures, multi-level reviews, and planning-related justifications were required as methods for controlling State expenditures on information technology. Recently, procurement controls have become weaker.

Location of Procurement Function. Recognizing the unique nature of data processing procurements, Governor Holton exempted data processing procurements from procedures established by the Department of Purchases and Supply. Authority for developing procurement procedures for data processing equipment was transferred by the Governor to the Division of Automated Data Processing (DADP) in January 1974. In 1976 when MASD was created, authority for developing data processing procurement procedures was separated from the service functions of the centralized data processing agency (DADP) and placed in the new systems development and planning agency. When the central computer services agency (then DCS) was merged with MASD in 1984, procurement authority was located in the same agency as computer services.

Multi-Level Reviews. Until recently, procurements were approved by sources at a level above the administrative agencies. In 1975, the Secretary of Administration and Finance reviewed data processing procurements. The 1978 Appropriations Act and Section 4-9.03 of the *Code of Virginia* restricted agencies from purchasing data processing equipment and services without the prior written approval of the Governor. In that same year, Governor Dalton delegated procurement approval authority to the Secretary of Administration and Finance. Approval of smaller procurements (less than \$25,000) was delegated by the secretary to the director of MASD.

In an effort to expedite smaller procurements, MASD established further distinctions in the review and approval procedures. Beginning in 1979, procurements for less than \$10,000 were reviewed and approved by MASD. Procurements between \$10,000 and \$25,000 were sent to the Governor's secretaries for review and then to MASD for final review and approval. Procurements greater than \$25,000 were sent first to the Department of Planning and Budget and the Governor's secretaries for concurrent reviews, then to MASD for further review, and finally to the Secretary of Administration and Finance for approval.

The multiple review process faded into disuse when Governor Robb restricted the size of the secretaries' staffs. The former directors of management information systems within each secretarial office previously reviewed procurement requests. These positions were abolished in 1982. No further external reviews of procurements have since been instituted.

Linkage With Planning. In the past, the procurement review process was intended to be linked closely to agency planning. Although statewide planning was not widely accepted, agencies were responsible for developing individual information management plans. Secretarial and MASD staff reviewed procurement requests to determine compliance with agencies' plans. No similar linkage between planning and procurement currently exists.

Need for Re-Establishing Independent Procurement Controls

Since the creation of DIT, procurement controls have diminished. There is no longer a method for independently evaluating DIT's large computer purchases and telecommunication contracts. Moreover, because of DIT's mission to provide mainframe computer services, its ability to objectively review customer agency requests may be compromised. Independent, objective reviews of information technology procurements are needed.

Independent Oversight for DIT Procurements. Prior to the creation of DIT, procurement authority was vested in MASD. Merger of MASD with DCS resulted in the loss of external procurement oversight for mainframe computer acquisitions. Currently, DIT procurement decisions need only be justified internally. For example, Ernst & Whinney (E&W) found that DIT's justification for its most recent \$4 million mainframe procurement was not well-documented and not related to the achievement of business objectives that could be documented in strategic and hardware plans.

When upgrading the State's IBM mainframe computer in January 1987, DIT developed a number of technical requirements. These included 50 MIPS of processing power, "split image" operation (one-half of the machine would serve as backup for the other half), 128 megabytes of memory for central storage and 128 megabytes for expanded storage, and 80 channels of access. Although DIT clearly stated the technical requirements for the new machine, E&W found that the reasons were not well-documented and could not be related to business objectives because of the absence of plans. If DIT had prepared a full explanation of the need for each requirement of this \$4 million acquisition, justifications for dismissing alternative solutions to an upgrade and alternative vendors would have been stronger.

In FY 1986, DIT's 183 internal procurements constituted 15 percent (\$15,368,067) of the value of its total purchases made for ADP goods and services.

Because DIT receives a "sum sufficient" appropriation, it is not subject to the same budget restrictions as other agencies. If DIT determines that it needs a new mainframe computer, the costs of this computer will be recovered eventually through charges to customer agencies. External controls over major acquisitions would help to ensure that DIT procurements are planned and needed.

Agency Procurement. The purpose of establishing procurement controls is to ensure that agencies only purchase hardware and software that is justified on the basis of approved information management plans. When adequate and appropriate justification is made on the basis of the plans, the procurement should proceed on a timely basis. A key to the review of the procurements, and to agencies' acceptance of the process is the objectivity and fairness of the reviewing agency.

Implementation of stronger procurement controls, if administered by DIT, may raise serious concerns about the perceived objectivity of the review. Because DIT's primary mission is to provide centralized mainframe computer services, agencies may question DIT's role in reviewing procurements for systems which do not utilize DIT's mainframe technology. JLARC staff found no instances in which DIT denied a procurement request that might have detracted from mainframe data processing. However, in comments on the JLARC survey of customers, six agencies raised strong objections to DIT's dual role as both a service provider and a central procurement oversight agency. Such concerns could make implementation of stronger controls more difficult.

Recommendation (8). State controls over information technology procurements should be strengthened. The first step in implementing stronger controls should be the separation of central procurement responsibilities from DIT. Agencies' and DIT's procurement requests should not be approved unless they support documented objectives in statewide or agency information management plans.

COMPLIANCE WITH PROCUREMENT POLICIES

The Virginia Public Procurement Act establishes State requirements for all public procurements. DIT has also developed additional procedural requirements for each of the major types of data processing and telecommunications procurements it processes for agencies (Figure 5). These procurement types include informal solicitations (for items under \$10,000 or purchases of items from the State contract list), formal solicitations, and sole source procurements. DIT staff also review procurements delegated to agencies and higher education institutions.

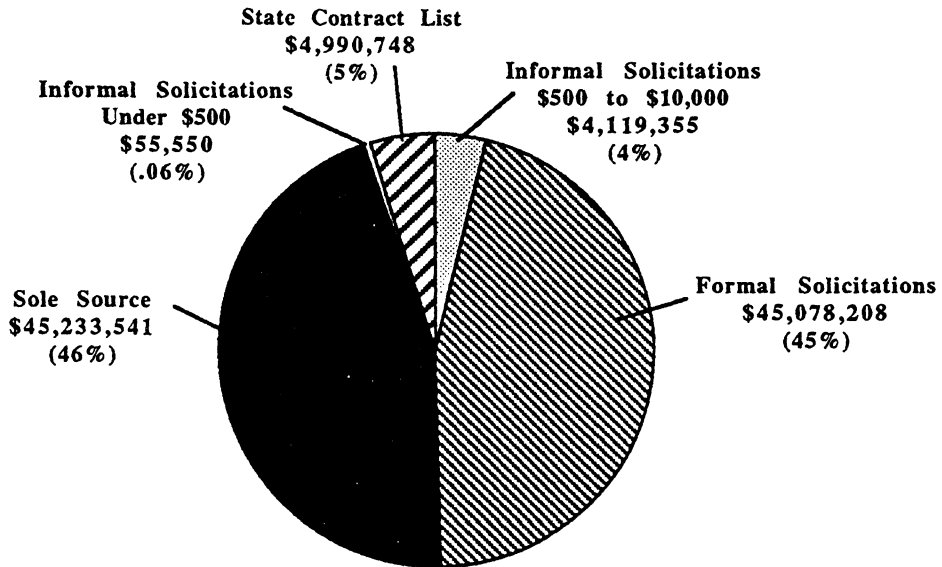
JLARC staff reviewed a random sample of 225 DIT procurements, stratified by type of procurement. The JLARC sample included 50 formal solicitations, 30 sole source procurements, 105 informal solicitations, and 40 delegated procurement replenishments. The review was designed to evaluate compliance with the most significant procedural requirements for DIT's procurements. Competitive procurements, sole source determinations, and minority vendor solicitations are discussed in the following sections.

Competitive Procurements

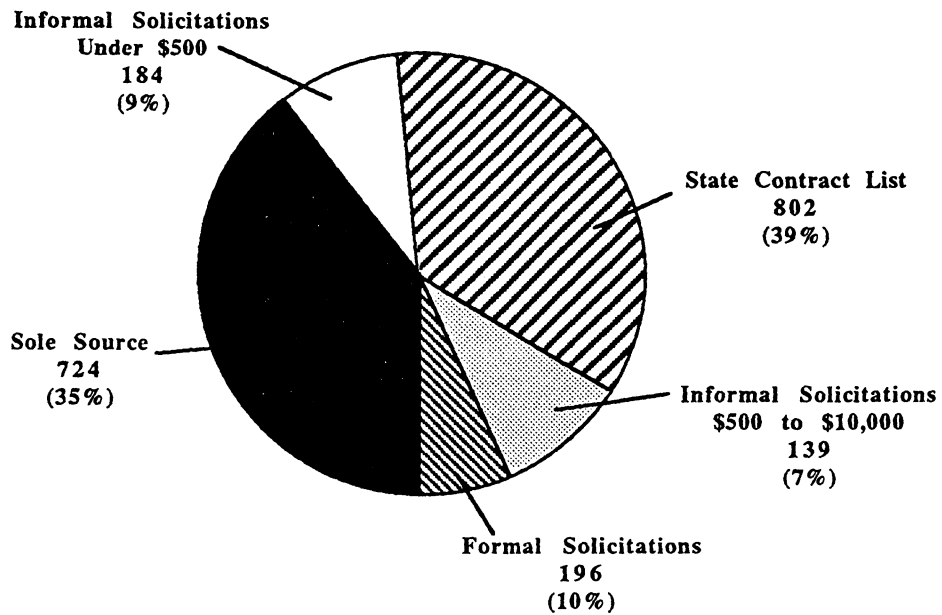
As required by the Public Procurement Act, DIT has established procedures for competitive procurements. These procedures include telephone solicitations for small purchases, and competitive sealed bidding and competitive negotiation for larger purchases.

Figure 5
Types of Procurements Processed by DIT
 (FY 1986)

DOLLAR AMOUNTS



NUMBERS OF AWARDS



Note: DIT also processed 142 requests from agencies and higher education institutions for replenishment of delegated authority in the amount of \$19,955,000 during FY 1986.

Source: DIT procurement statistics.

Informal Solicitations. Article 2, Section 11-41 of the Public Procurement Act states, "a public body may establish purchase procedures, if adopted in writing, not requiring competitive sealed bids or competitive negotiation for single or term contracts not expected to exceed \$10,000; however, such small purchases procedures shall provide for competition wherever practicable."

Complying with this section of the Public Procurement Act, DIT has established the following procedural requirement for informal, small purchase solicitations:

One quotation which may be by telephone or in writing, is required for purchases of less than \$500. For all acquisitions where the estimated cost of the acquisition transaction is between \$500 and \$10,000, three bids must be obtained, if available. For all telephone bids a record must be kept of the vendors contacted, the name of the individual giving the bid, the date, and the amount of each bid, and to whom the award was made.

In reviewing DIT's procurement files, however, JLARC staff found that competitive procedures for informal solicitations were not followed by procurement staff. Sixty-three percent of the APRs between \$500 and \$10,000 contained less than the required three solicitations.

DIT's five procurement staff inconsistently interpret the three-bid requirement. Two of the procurement engineers reported to JLARC staff that they would obtain three bids, regardless of the number of telephone calls needed to solicit the bids. If unfamiliar with the requested item, one procurement officer makes more than three telephone calls. The other three procurement staff stated that they would call only vendors who might carry the product, even if the number is less than three. These staff make no more than three telephone calls even if only one call resulted in a responsive bid.

The State's one-bid requirement for items less than \$500 is not a competitive procurement. Obviously, more than one bid is necessary in order to achieve competition. However, a requirement to solicit additional bids might result in administrative costs that exceed the costs saved by identifying a lower price. Agencies and DIT may still wish to make multiple calls, but it does not appear necessary to require a multiple-bid procedure for items less than \$500.

Formal Solicitations. For acquisitions exceeding \$10,000, the Virginia Public Procurement Act requires competitive bidding or negotiation. Section 11-41 of the Public Procurement Act states:

All public contracts [for more than \$10,000] with nongovernmental contractors for the purchase or lease of goods, or for the purchase of services, insurance or construction shall be awarded after competitive sealed bidding, or competitive negotiation.

The Act also states that awards should be made to the lowest "responsive" and "responsible" offeror (§ 11-37, *Code of Virginia*). As determined by the procuring agency, "responsible" offerors are qualified to provide the product. "Responsive" offerors offer products that meet the requirements of the procurement request. Vendors must meet both conditions in order to be considered for the award.

The sole criterion for selecting among bids, whether formally or informally solicited, is cost. The *Code* requires agencies to award contracts to the responsible and responsive offeror who submits the lowest bid. When agencies plan to negotiate with vendors for services, agencies must develop criteria for evaluating and scoring vendors' proposals. DIT requires that cost be included as one criterion and counted as at least 25 percent of the total score.

In reviewing 48 formal solicitations, JLARC staff found that in all cases DIT awarded the contract to the vendor (determined by procurement staff to be responsive and responsible) who submitted the lowest bid or offered the highest scoring proposal. However, during the review, JLARC staff could not determine if DIT complied with selection requirements in 23 percent of the procurements. During the exposure draft stage of the study, DIT provided documentation that awards were made to the lowest bidders or highest scoring proposals in these cases.

Recommendation (9). In all informal competitive procurements, staff should solicit at least three bids from qualified vendors capable of providing the requested item. In all formal solicitations, procurement staff should document that awards were made to qualified vendors submitting the lowest bids or highest scoring proposals. At a minimum, documentation should contain all bid amounts or proposal scores, and justifications used in determining which vendors were not responsive or responsible. Internal audits should be conducted annually to ensure that procurement staff comply with competitive procurement laws and procedures.

Sole Source Procurements

The Public Procurement Act and DIT policies set out the requirements for sole source procurements. "Sole source" applies to procurements in which only a single vendor is determined to be capable of providing the requested products or services. Competitive procedures do not apply to these procurements. In FY 1986, DIT processed 724 sole source procurements, or about 35 percent of all items procured and 46 percent of the total dollar awards.

A greater portion of automated data processing items are likely to be sole source than procurements of other types of goods. Computer-related equipment and software need to be compatible with existing systems in order to function properly. Only one vendor may be capable of providing compatible products. However, because of the greater tendency to procure computer system components via sole source, it is especially important to ensure that State controls over these procurements are firmly in place.

In reviewing DIT procurement files, JLARC staff found inadequate documentation of sole source determinations. Moreover, confusion regarding the oversight and service roles of DIT's procurement staff prevent adequate and effective screening of sole source determinations.

Sole Source Requirements. State procurement laws encourage competition to the maximum extent possible. Therefore, sole source procurements should be avoided whenever possible since they provide no opportunity for competition. A sole source procurement is justified if the purchasing agency has determined that only a single vendor is capable of providing the product or service.

The need for compatible equipment, especially in the case of upgrades and additions to existing computer systems, does not necessarily require sole source procurements. In some instances, several manufacturers or vendors offer comparable alternatives for the components of a computer system. Even proprietary acquisitions, in which a specific item from one manufacturer is required, do not necessarily justify a sole source procurement. Proprietary items may be available from several distributors. Therefore, procurements of compatible equipment or proprietary items may still require an analysis of alternative vendors.

As set out by the *Code of Virginia*, a procurement is deemed sole source when there is only one source practicably available. Although "practicably available" in the definition from the *Code* could refer to a vendor's ability to deliver on time, DIT's guidelines require that a sole source procurement not be based on availability alone. There should be no justification for sole source procurements based entirely on a single vendor's capability to deliver in the least amount of time.

Insufficient Documentation. As required by the Public Procurement Act, sole source procurements must be justified in writing. This written justification should document the determination that only one source is available for the goods or services to be procured. Agencies and DIT procurement staff are responsible for justifying sole source determinations in writing.

JLARC staff found that 21 percent of the sole source requests from agencies did not include a written justification. Seven percent of the sole source requests also did not have a justification written by DIT procurement staff. An additional 36 percent of the justifications written by DIT procurement staff contained only a simple statement that no other vendors were available. These files contained no supporting evidence that other vendors were contacted, that the items were unique, or that only one vendor was capable of supplying the items.

Inconsistent Interpretation by DIT Staff. DIT procurement staff do not consistently interpret DIT's role in sole source procurements, and therefore they carry out the review function differently. Some DIT procurement staff assume a service role; others assume a control role.

One DIT procurement officer interviewed by JLARC staff believes there are few instances in which items are

truly a sole source procurement. The procurement officer reported that he challenges or investigates 90 percent of the sole source justifications received from agencies. He attempts to make an independent determination that an item is available from only one vendor.

Another DIT procurement officer stated that he questions only about 15 percent of the sole source justifications submitted by agencies. The officer believes it is the agency's responsibility to justify sole source determinations. Only when he definitely knows that other vendors offer the requested item does he challenge the determination.

These different staff interpretations of DIT's role in sole source determinations affect the State process for reviewing procurements of hardware and software. Limited reviews by some staff have resulted in inadequate evaluations of alternatives. On the other hand, other staff decisions have been overridden by DIT management.

Inadequate Evaluation of Alternatives. If an agency represents to DIT that goods or services are available from only one source, then the agency is clearly responsible for justifying this determination. DIT's role in confirming or denying this determination is not clear, as demonstrated by procurement officers' different interpretations of their responsibilities.

A recent sole source procurement by the Department of Social Services (DSS) illustrates an inadequate evaluation of sole source alternatives and the potential consequences of that decision. DSS procured a \$395,000 automated system for the child support enforcement program from Sperry Corporation, after DSS determined that Sperry was the only practicably available source. However, in reviewing the project files and supporting documentation, JLARC staff found no evidence that DSS attempted to contact other vendors to determine if they could offer a proposal comparable to Sperry's proposal. The Sperry system that DSS procured has exceeded the deadline for completion, although it was this deadline that was used to justify the sole source procurement. A more detailed discussion of this case example is provided in Exhibit 3.

In reviewing this case example, JLARC staff did not attempt to retrospectively determine if other sources were available at the time of the procurement. The sole source procurement may have been appropriate. However, the sole source determination by DSS was not supported by a thoroughly documented evaluation of alternatives. And DIT did not request a more thorough evaluation or conduct an independent evaluation of alternatives.

Need for Independent Assessments. There are instances when a neutral, well-informed third party is needed to objectively assess sole source procurement requests prepared by another State agency or by DIT. Two case examples demonstrate this need. The first illustrates complex technical and program issues surrounding the sole source purchase of an automated line scanner by the Department of Transportation in the face of implementing a

Exhibit 3

INADEQUATE EVALUATION OF SOLE SOURCE ALTERNATIVES
EXAMPLE: DSS CHILD SUPPORT ENFORCEMENT SYSTEM

In August 1984, comprehensive federal changes in the child support enforcement program were enacted. The changes included more aggressive measures for collecting support payments, such as garnishing wages and intercepting tax refunds. These changes, coupled with State legislative changes which transferred the program from courts to DSS, were to be implemented by October 1, 1985.

Anticipating that the changes would have a significant impact on DSS' administration and automated support of the program, DSS reported that it began planning to accommodate the changes as early as the spring of 1984. On September 21, 1984, staff from DSS' Division of Child Support Enforcement presented a conceptual design to DSS managers, DIT, and Sperry Corporation. A week later, DSS met with the federal Office of Child Support Enforcement (OCSE) to discuss DSS' advanced planning document.

On September 28, 1984, Sperry gave a demonstration of a system that had been developed for Pierce County in the State of Washington. During the next few weeks, Sperry provided additional demonstrations to DSS central office and field staff, and to DIT.

On November 11, 1984, Sperry submitted a preliminary proposal to DSS that described how the one-county system in Washington could be transferred to Virginia. However, DSS understood that Virginia would be used as a test site -- the system would be developed and tested in Virginia using the Pierce County system as a starting point. Sperry submitted a more detailed proposal to DSS in December 1984.

DSS decided to award the proposal to Sperry on a sole source basis in February 1985. DSS explained the sole source decision to the federal OSCE on February 5, 1985, and submitted a sole source procurement request to DIT on February 6, 1985. DIT received the request on February 8, 1985, and approved the sole source procurement on February 11, 1985. DSS explained that Sperry was the only source capable of meeting the October 1, 1985, deadline.

In May 1985, Sperry entered into a contract with the State promising to deliver by October 1, 1985, "software products that will meet the Federal requirements for computerized Support Enforcement Programs as stated in the *Code of Federal Regulations*, 45 CFR, Part 307.10 as published in the Federal Register September 19, 1984." The promise has not been kept.

From the date the contract was awarded, the automated system has not been implemented as scheduled. The system still has not been fully tested, nor are all components operating as planned. In fact, DSS and Sperry may renegotiate the contract. Nonetheless, the federal government has not withheld funds for Virginia's social services programs -- the presumed penalty if the system was not operational by the federal deadline in October 1985.

Exhibit 3 (continued)

In reviewing this procurement, JLARC staff conclude that the evaluation of alternatives was inadequate. This conclusion is based on four major findings.

First, DSS did not adequately evaluate the feasibility of completing a major system redesign or replacement within one year. If DSS had conducted a more thorough evaluation, the full complexity of the project and the infeasibility of meeting the federal deadline might have been identified. DSS assumed that the Sperry proposal could meet the deadline, and did not attempt to seek an extension from the OCSE.

Second, DSS evaluated the cost of Sperry's proposal, which used MAPPER as the computer programming language, against the cost of upgrading the current system using another language, DMS-1100. DSS estimated that the MAPPER based system was less expensive to develop (\$565,712) than the DMS-1100 system (\$1,395,281). However, DSS estimated that the annual operational costs of the MAPPER system (\$2,034,216) would be greater than the DMS-1100 annual operating costs (\$1,424,304). DSS assumed that the new system would need to last at least five-years. Consequently, the total cost for the DMS-1100 system would have been approximately \$2 million less than the MAPPER system over the five-year period. Nonetheless, one of the principal reasons that DSS decided not to pursue the DMS-1100 alternative was because it would not meet the federal deadline.

Third, when DSS decided to pursue the MAPPER-based alternative, DSS did not contact any other vendors until after DSS had decided to award the contract to Sperry on a sole source basis. DSS reported that four other vendors were contacted on February 11, 1985, in order to determine if they could provide supplemental support to implement Sperry's proposal. These contacts were made a week after DSS had submitted to DIT a sole source procurement request for Sperry's services. DSS dismissed these alternatives because the vendors could not provide the level of staff support necessary to meet the federal deadline.

Moreover, DSS presented the conceptual design to Sperry five months in advance of this initial contact with other vendors. Had other vendors been informed of the impending large contract in advance, it is possible that they would have attempted to allocate sufficient staff in order to compete for the award.

Fourth, DIT did not thoroughly evaluate other alternatives. DIT assisted DSS in evaluating Sperry's proposal as early as September 1984. However, JLARC staff could find no evidence that DIT challenged DSS' sole source determination. DIT's procurement staff approved the sole source procurement request three days after the request was received from DSS.

Source: JLARC staff analysis.

massive highway construction program. The second case example involves differences within DIT between the procurement officer and the Director over an office automation system.

On March 20, 1986, the Virginia Department of Transportation (VDOT) requested equipment to upgrade its existing VAX 11/785 CADD system (for computer-assisted construction design). VDOT also requested an automated line scanner (for reading and automating construction plans). VDOT requested DIT to conduct a sole source procurement, stating that Intergraph was the only vendor which could provide the equipment. VDOT wanted delivery by June 1, 1986.

The DIT procurement officer who processed the APR approved the upgrade totaling \$450,255, but declined the request for a used automatic scanner costing \$493,994. The procurement officer justified the denial for several reasons which included: (1) the vendor was only able to provide one customer reference in North America, (2) the vendor stated that the price would be reduced in the future, (3) the vendor stated that the scanner would be replaced with a higher-performance system in the future, and (4) the system was in early stages of technological development -- the vendor stated that the software was not fully developed so output would not be reliable. Data processing staff at VDOT also recognized that the scanner technology had its limitations.

After the procurement officer denied the request, the Commissioner of VDOT wrote a memorandum to the Director of DIT stating an immediate need for the scanner in order to facilitate implementation of an extensive highway construction program. The Director of DIT approved the procurement.

Six months later, in December 1986, VDOT requested a new model of the scanner -- at a cost of \$284,000. DIT staff negotiated the contract with the vendor so that VDOT could exchange the old scanner for the new one and receive a credit for the difference in price. In an April 16, 1987, letter to the vendor, VDOT identified some problems with the software for the scanner. VDOT reported to JLARC staff that they are working with the vendor to resolve the problems and that the scanner is adequately serving the need for automating maps and plans. VDOT estimates that the scanner will reproduce plans at approximately twice the speed of current methods.

* * *

On January 27, 1986, DIT's computer service division initiated an APR to procure a DIT-based office

automation system for users with IBM compatible terminals throughout the State of Virginia. The estimated cost of the system was \$230,997. DIT's director approved the procurement on January 16, 1986. DIT's procurement section received the APR on January 28, 1986. A procurement officer reviewed the sole source justification and the analysis of alternatives. The procurement officer felt that there was insufficient information to support a sole source procurement, and did not approve the APR. Nonetheless, a decision to award the procurement was made the next day without a signature from the procurement officer. According to DIT's director, his signature was not intended to imply approval of the procurement, but rather that it should be reviewed and processed appropriately.

The intent of these case examples is not to question the need for the sole source procurements or the decisions of the agency heads. Rather, these examples are used to illustrate that agencies and DIT procurement officers do not always concur on sole source determinations. When procurement staff disagree with an agency's determination, a neutral third party should make the final decision.

Currently, DIT's managers are serving in this third party capacity. However, often they may not have the technical expertise to adequately evaluate the reasonableness of the sole source justifications or the need for the specifically requested item. Nor can DIT management provide objective decisions with regard to DIT procurement staff decisions. Without knowledgeable and objective support, central procurement staff cannot effectively evaluate and control sole source procurements.

Methods for Strengthening Reviews. Information management planning is a first step in strengthening sole source and other procurement reviews. Planning would help agencies better anticipate hardware, software, and service acquisitions. Planning helps to ensure that agencies have adequate lead time to evaluate procurement alternatives. Information management plans also would serve as a reference point for evaluating procurement needs, help to avoid ad hoc procurement decisions by agencies, and limit unwarranted denials by central procurement staff. However, differences of opinion regarding compliance of procurements with plans or inadequately justified sole source determinations will continue to occur.

Reviews of sole source procurements can also be strengthened by investing the procurement function in an independent agency with sufficient authority to force compliance with procurement policy. Moreover, an independent procurement agency could serve as a more objective evaluator of DIT's sole source determinations.

Procedural methods for strengthening sole source determinations are also possible. In an audit of sole source procurements, the federal General Accounting Office recommended market searches for competitive sources, unless competition clearly is not feasible. The Division of Purchases and

Supply (DPS) routinely conducts supervisory reviews of all sole source procurements to determine if the procurements were adequately justified. DIT's managers sign APRs, but procedural and justification inconsistencies suggest that these are not thorough reviews.

Recommendation (10). The State's procedures for reviewing sole source procurements of information technology should be strengthened. As part of information plans, all State agencies should be required to develop a biennial procurement plan. Specific requirements for justifying sole source procurements should be developed, including cost analyses of alternatives and documentation of contacts with alternate vendors. Central procurement staff should periodically conduct market searches for items frequently procured as sole source. Agencies' and institutions' use of sole source procurements, if conducted under delegated authority, should be reviewed as part of biennial procurement audits.

Minority Vendor Solicitations

DIT actively encourages minority vendors to participate in its information technology procurements. The portion of total awards to minority vendors has increased from 2.1 percent to 7.7 percent from FY 1984 to FY 1986. A significant share of these awards were made to one large minority-owned company. If the General Assembly intends to encourage solicitation of businesses owned by socially and economically disadvantaged persons, then the State definition of a disadvantaged minority vendor may need to be revised.

In compliance with statutory requirements, DIT has developed special solicitation procedures for minority vendors. Consistent application of the existing procedures could increase participation of minority vendors in State data processing procurements even further.

Definition of Minority Business. The *Code of Virginia* requires agencies to develop procedures for encouraging minority vendor participation in public procurements. Section 11-48 of the *Code* states:

All public bodies shall establish programs consistent with all provisions of this chapter to facilitate the participation of small businesses and businesses owned by women and minorities in procurement transactions. Such programs shall be in writing, and shall include cooperation with the Department of Minority Business Enterprise, the United States Small Business Administration, and other public or private agencies. State agencies shall submit annual progress reports on minority business procurement to the Department of Minority Business Enterprise.

Furthermore, §2.1-64.32 of the *Code of Virginia* states:

"Minority business enterprise" means a business enterprise that is owned or controlled by one or more

socially or economically disadvantaged persons. Such disadvantage may arise from cultural, racial, chronic economic circumstances, or background or other similar cause.

Under this State definition, a minority business is defined as one owned by socially or economically disadvantaged persons. If it is the intent of the General Assembly to ensure affirmative solicitation procedures for disadvantaged minority-owned businesses, the statutory definition of a minority business enterprise may need revision. As illustrated by DIT's awards to minority vendors, a large corporation can meet the current definition solely because its owner qualifies as a racial minority.

In contrast to State law, federal regulations restrict the size of companies defined as disadvantaged minority-owned businesses. For example, a company cannot have more than 1,000 to 1,200 employees (depending upon the type of products) in order to qualify as a disadvantaged minority-owned business.

DIT reported that minority vendors were awarded 7.7 percent of the total awards in FY 1986. Almost one-third of all DIT's awards to minority vendors were made to one large company. These awards accounted for almost three-fourths of the total dollar amounts awarded to minority vendors (Table 4). This minority-owned company has 31,000 employees and annual earnings of approximately \$2 billion.

Recommendation (11). The General Assembly may wish to amend § 2.1-64.32 of the *Code of Virginia* to define disadvantaged minority vendors as socially and economically disadvantaged. Consideration should be given as to whether the intent of the statute is to define large corporations as disadvantaged on the basis of minority ownership, and if these organizations should benefit from special solicitation procedures.

DIT Solicitation Procedures. As required by the *Code of Virginia*, DIT has developed procedural guidelines to include minority vendors in informal procurements. These guidelines state, "when conducting an informal solicitation (for items between \$500 and \$10,000) at least one of every three vendors contacted for bids will be a minority firm whenever possible."

As part of all formal solicitations, DIT sends a copy of the invitation for bids, (IFB) or requests for proposals (RFP) to DMBE. This procedure is intended to ensure that minority vendors who might not otherwise be aware of State procurement opportunities are given a chance to compete on DIT procurements. In addition, DIT utilizes the services of "Bid Net," a subsidiary of Dun and Bradstreet, which advertises governmental solicitations to over 1100 subscribers, including 71 minority business development councils nationwide.

In response to a legislative request, DIT also routinely sends RFPs for consulting services to all minority vendors which offer this type of service. DIT does not have a similar procedure for sending IFBs or RFPs to minority vendors which offer other types of services or equipment. Similar procedures are warranted as a method to actively recruit minority vendors for all types of formal procurements.

Table 4

PERCENT OF PROCUREMENT AWARDS TO MINORITY VENDORS
(FY 1984 - FY 1986)

Percent of Total Awards

Minority Vendors

<u>Year</u>	<u>Large Company</u>	<u>All Others</u>	<u>Total</u>
1986	2.6%	5.1%	7.7%
1985	2.8	1.7	4.5
1984	2.0	0.1	2.1

Percent of Dollar Amount in
Categories Offered by Minority Vendors*

Minority Vendors

<u>Year</u>	<u>Large Company</u>	<u>All Others</u>	<u>Total</u>
1986	8.9%	4.0%	12.9%
1985	11.7	1.0	12.7
1984	12.1	3.6	15.7

*Based on DIT's determination of the types of equipment or service procurements in which minority vendors compete. Minority vendors do not offer certain products such as mainframe computers.

Source: DIT's procurement statistics and minority vendor reports.

Active recruitment of minority vendors for formal solicitations is also important because the State hardware and software contract list is competitively bid. Items on the State contract list cannot be independently procured from other vendors after the bids are awarded. Items on this list are frequently purchased by agencies. In order for minority vendors to receive a greater share of the contract list purchases, products offered by minority vendors must be included on the list. On the April through September 1986 contract list, for example, six of 42 contracts were with minority vendors. Thirty-nine of the 436 contract list awards were made to minority vendors.

Compliance with Procedures. In interviews with DIT procurement staff, JLARC staff found inconsistent interpretations of solicitation procedures. Three of the procurement staff reported that they call a minority vendor only if they know that the vendor offers the product. Otherwise, these staff do not contact a minority vendor at all. On the other hand, two of the procurement staff believe they are required to call a minority vendor even if the vendor might not offer the product.

By checking the names of vendors contacted against DIT's list of registered minority vendors, JLARC staff found that 50 percent of the APRs between \$500 and \$10,000 had no documentation that a minority vendor was contacted. Twenty-seven percent of those minority vendors that were contacted made a bid, and three percent of those bids were actually awarded.

DIT currently maintains an automated list of all registered vendors, categorized by the type of product or services that each vendor offers. In order to avoid discretionary selection of minority vendors for informal solicitations, procurement staff could use this list to randomly select a minority vendor that offers the requested type of product. Staff should be required to call at least the pre-selected vendor, but others could be called also.

For formal solicitations, the commodity codes on the automated list could be used to identify all minority vendors that offer the requested service or product. Formal solicitations should be sent to all minority vendors that offer the requested item, in the same way that minority vendors are solicited for consulting services. As the number of registered vendors increases, a minimum number of contacts could be established for formal solicitations.

Recommendation (12). DIT should continue in its efforts to increase participation by minority vendors. Procurement staff should routinely select and call one or more minority vendors from the registered vendors list for all informal solicitations. Similarly, procurement staff should establish and contact a minimum number of minority vendors for all formal solicitations.

Training

Additional training would help procurement staff more consistently interpret and implement procurement policies. As previously discussed, DIT's procurement staff follow different procedures when soliciting bids for competitive procurements, evaluating agencies' sole source determinations, and soliciting minority vendors. Policies in each of these areas should be clearly defined and communicated to all staff.

Current training is limited. DIT's procurement staff receive no formal training as part of their jobs. New staff are expected to learn the procedures as they work. Formal training that establishes clear expectations for all staff might help DIT ensure consistent implementation of procurement policies.

Recommendation (13). A formal training program should be established for all procurement staff. The training should include clearly

defined procedures for conducting competitive procurements, sole source determinations, and minority vendor solicitations. Periodic supervisory reviews of procurements should also be conducted to ensure consistent interpretation and implementation of procedures.

PROCESSING EXPEDIENCY

DIT recognizes agency needs for prompt processing of procurement requests. DIT has established processing time standards and is achieving these standards for non-competitive procurements. However, competitive procurements take considerably longer than other purchases, and are not meeting DIT's processing standards.

Agency Satisfaction. On JLARC staff's survey of customer agencies, 68 percent of DIT's customers reported that procurements were processed in a timely fashion, but 32 percent reported that they were not. Some processing delays might be avoided if DIT improved its system for tracking agencies' procurement requests. Other delays are outside of DIT's control and are a necessary part of public procurements. In particular, the complex nature of formal solicitations and statutory requirements for competition contribute to long processing intervals for larger procurements.

Small procurements could be expedited, however, if agencies assumed this portion of DIT's current workload. Agencies do not have to use DIT for processing informal solicitations or purchasing items from the State contract. Nonetheless, more than half of the agency requests that DIT processes are for small procurements. The current practice of delegating these small procurements to institutions of higher education and some agencies should be extended to additional agencies.

Procurement Processing Standards

JLARC staff reviewed all 1,460 automated procurement records for FY 1986 to determine DIT's success in meeting processing standards. JLARC staff reviewed the number of days between the date on which DIT received the APR and the date procurement staff approved the APR. The procurement standards are shown in Table 5.

Distinctions Among Standards. Recognizing that competitive bidding and negotiating require more procedural steps than three telephone calls for a specific item, DIT has established longer durations for formal solicitations than for informal solicitations. Formal solicitations require DIT and agencies to develop written requests for bids or proposals. These requests usually contain unique technical specifications in addition to standard State contractual provisions. Preparation of the written solicitation may require multiple drafts before DIT and an agency agree upon the final wording in the document.

Because vendors must develop specific written bids or proposals in response to formal solicitations, the standards allow additional response time. The standards also allow additional time for evaluating proposals submitted in

Table 5

STANDARDS FOR DIT PROCUREMENT PROCESSING

<u>Type of Procurement</u>	<u>Processing Activities</u>	<u>Procurement Standard (in days)</u>	<u>Contract Standard (in days)</u>
Request for Proposal (RFP)	Prepare RFP Procurement	28	
	Solicit Bids	28	
	Review and Select Proposals	28	
	Post Intent to Award Notice	10	
	Negotiate Contract (or use pre-negotiated master contract)		28 (3)
Invitation for Bid (IFB)	Prepare IFB Document	21	
	Solicit Bids	17	
	Product Testing (or simple determination of lowest bid)	21 (3)	
	Post Intent to Award Notice	10	
	Prepare Contract		2
Sole Source	Review Request	10	
	Post Intent to Award Notice	10	
	Prepare Contract		No Standard
Informal Solicitations	Solicit Telephone Bids	10	
	Prepare Small Purchase Contract or Delivery Order		No Standard
Contract List Purchase	Order Items	10	10
	Prepare Small Purchase Contract		10
Replenish Delegated Authority	Review and Approve Request	10	Not Applicable

Source: DIT's Division of Administration memorandum, November 22, 1985.

response to an RFP. Less time is needed to simply select the lowest bidder among responses to an IFB, unless DIT or the agency determines that the products must be tested before selecting a bid.

According to DIT's policies, an "intent to award" notice for all formal solicitations and sole source procurements must also be posted for 10 days prior to awarding the contract. This policy is intended to provide other

vendors with the opportunity to protest the award decision before the contract is actually awarded.

Two types of DIT procurement activities require no solicitations: contract list purchases and delegated authority replenishments. Items on DIT's hardware and software contract list have been previously bid. Therefore, procurement staff simply order items from the pre-approved list. In the case of replenishments, DIT staff review agencies' and higher education institutions' requests for renewal of delegated procurement authority.

DIT was most successful in meeting the standards for non-competitive procurements, that is, sole source, \$500 items requiring one telephone call, and renewals of agencies' requests for delegated procurement authority. Formal solicitations (IFBs and RFPs) and procurements between \$500 and \$10,000 most frequently failed to meet standards (Table 6).

Table 6

PROCUREMENT PROCESSING PERFORMANCE
(FY 1986)

<u>Type of Procurement</u>	<u>DIT Processing Standard* (in days)</u>	<u>Average Processing Time (in days)</u>	<u>Percent Achieving Standard*</u>
Request for Proposals**	94	157	27%
Invitation for Bids**	69***	101	32
Sole Source	20	9	89
\$500 - \$10,000	10	15	52
Under \$500	10	4	92
Contract List	10	5	86
Replenishment	10	9	85

*Does not include contracting standard or durations.

**Based on JLARC staff's sample. DIT automated files do not distinguish between types of formal procurements.

***IFB standard assumes product testing.

Source: DIT's Automated Procurement Records.

Although DIT has established standards for the steps involved in approving a procurement request, contracting standards have not been developed for all types of procurements. DIT has established contract standards for formal solicitations, but not for informal procurements. In order to establish specific expectations for timely processing throughout the entire procurement, contracting standards are also needed.

Automated APR Tracking. As one way to improve timely processing, DIT should improve its method for tracking the progress of agency procurement requests (APRs). Currently, DIT cannot respond to an agency's inquiry regarding the status of an APR without conducting a manual search through the files. In some instances, if the APR is at the Attorney General's Office, DIT may not be able to immediately identify the APR's location. An automated tracking system would enable staff to immediately determine the status of APRs.

A second important purpose for tracking is monitoring compliance with processing standards. Although DIT has established processing standards, staff and supervisors do not receive performance reports on achievement of standards. This information would be useful for management purposes, and could also be used as a "tickler" mechanism. For example, a report could be issued that lists all APRs approaching a given processing standard. Staff would be alerted by this report that certain APRs should be given immediate attention.

Recommendation (14). Procurement staff should establish and increase efforts to meet processing standards for procurement and contracting. As one method for monitoring performance, procurement staff should develop an automated system for tracking procurement requests. The system should be used to produce reports which identify all agency requests that exceed processing standards. Supervisory staff should routinely review the status reports and take necessary steps to ensure prompt completion of agency procurement requests.

Procurement Workload

DIT's ability to meet procurement standards is also affected, in part, by workload. During the last six years, the number of procurements processed by DIT (formerly MASD) has increased from 903 in FY 1980 to 1,576 in FY 1986. During this period, procurement staffing increased by only two positions, from five to seven procurement engineers. Many of these procurements did not necessarily require DIT's participation.

Delegated Authority. Currently, DIT has delegated procurement authority to 29 agencies and 17 educational institutions. As provided for by DIT's procurement policies, agencies' total purchases from the hardware and software contract list cannot exceed \$25,000. Generally, agencies can purchase an item that is not on the contract list if the item's cost does not exceed \$1,200. Four agencies, the Virginia Department of Transportation, the Department of Education, the State Council of Higher Education in Virginia, and the Virginia Institute of Marine Science are permitted to procure items of up to \$10,000 which are not on the contract list. The limits of this "blanket" delegated authority range from \$20,000 to \$50,000.

DIT delegates higher amounts of procurement authority to higher education institutions. These "blanket authorizations" range from \$20,000 for smaller colleges and universities, such as the Virginia Military Institute, to \$500,000 for larger universities such as Virginia Polytechnic Institute and State University. The institutions' total purchases cannot exceed these limits. Procurements of individual items which are not on the contract list cannot exceed \$10,000.

The limits on delegated authority serve as a review point for DIT. When an agency or institution nears the limit, it must submit a list of procurements to DIT for review. DIT reviews the list and attempts to determine if the agency has complied with procurement laws and procedures. If all procurements appear to have been conducted appropriately, DIT authorizes the agency to conduct additional procurements until the limit is reached again. Institutions may request higher limits at the time of subsequent reviews.

Because colleges and universities typically purchase greater amounts of computer hardware and software, it may be appropriate for these institutions to have higher limits of delegated authority than agencies. State procurement requirements, established by the Division of Purchases and Supply (DPS), restrict agencies to a \$1,200 limit for an item not on the contract list. However, the same informal solicitation procedures (three telephone calls) for items less than \$1,200 apply to items less than \$10,000. With adequate training and proper auditing, agencies could use informal solicitation procedures for all items that qualify at an amount less than \$10,000.

Procurements Processed by DIT. JLARC staff reviewed DIT's current workload to determine how much of that work could have been delegated to agencies and institutions. If all procurements less than \$10,000 and contract list purchases had been delegated to agencies, 55 percent of the procurements processed by DIT in FY 1986 could have been processed by agencies. JLARC staff summed the processing times for each procurement type and calculated that 20.3 percent of total processing time is spent on small procurements (less than \$10,000) and purchases from the pre-bid State contract list.

Recommendation (15). DIT should increase its efforts to delegate procurements from the State master contract to agencies and higher education institutions. In delegating procurement authority to agencies, DPS should consider increasing the limit on individual purchases of data processing products to \$10,000. Authority to informally solicit bids for items less than \$10,000 which are not on the contract list, should also be delegated to agencies, as is currently the practice for higher education institutions.

OVERSIGHT RESPONSIBILITIES

Effective delegation of procurement authority to agencies requires adequate central oversight. Otherwise, DIT's workload will be reduced, but public procurement safeguards might be jeopardized.

DIT has developed minimal safeguards for overseeing agencies' use of delegated authority. DIT offers a brief orientation for agencies before delegating procurement authority. DIT also requires agencies' to periodically request renewals of delegated authority. These methods are not adequate for ensuring compliance, however. More rigorous training and auditing programs are needed.

State monitoring of vendors' performance is also needed. Although DIT maintains some records on vendors' defaults, a more comprehensive database on State contracts for information technology should be developed. This information could be used by agencies in making more knowledgeable selection decisions. However, the success of a statewide system for monitoring vendor performance will depend upon all agencies providing complete information to a central source.

Reviewing Delegated Procurements

DIT attempts to ensure that agencies and institutions comply with procurement laws and procedures. DIT staff review a list of each agency's procurements before authorizing the agency to conduct additional procurements. DIT also provides some training and imposes disciplinary sanctions as warranted.

Additional measures to monitor use of delegated authority are necessary, particularly if all smaller purchases are delegated to agencies. Measures for strengthening oversight include specific documentation requirements, periodic audits, firm disciplinary sanctions, and continuous training.

Documentation. Agencies and institutions with delegated authority which have purchased up to the dollar limit of their authority cannot make additional purchases without submitting an agency procurement request for DIT's approval. DIT requires agencies to submit procurement documentation along with the APR. This documentation includes the purchase order number, the date of the procurement, the vendor awarded, whether or not the item procured was on the hardware/software contract list, the item procured, the quantity, and the unit and total prices. In reviewing agency requests for replenishments of delegated authority, JLARC staff found inconsistent and inadequate documentation.

For example, 59 percent of the requests did not identify which items were procured from the contract list. Without this information, DIT staff cannot adequately determine if customer agencies are appropriately buying items from the contract list and competitively bidding others. Although 72 percent of the requests contained the names of vendors from whom items were purchased, the documentation did not identify minority vendors, or provide evidence that appropriate numbers of bids were solicited (Table 7).

Disciplinary Sanctions. Documentation accompanying requests for delegated authority is incomplete; therefore, JLARC staff could not determine if procedural violations occurred. JLARC staff identified possible violations in eight percent of the cases, which included purchases above the authorized limit and orders that were split into multiple purchases as a way to circumvent

Table 7

TYPE OF DOCUMENTATION SUBMITTED WITH REQUESTS
FOR DELEGATED PROCUREMENT AUTHORITY

<u>Type of Documentation</u>	<u>Percent of Requests Containing Documentation</u>
Description of items	80%
Cost of items	80
Identification of vendors	72
Purchase orders	31
Notation of items purchased from the contract list	41
Other miscellaneous information	79

Source: JLARC review of DIT procurement files.

limits. Because the files contained inadequate documentation, the violations could not be verified. However, the files do raise serious questions about compliance with procurement policies.

When DIT finds a procedural violation, it may take disciplinary action. For agencies, a warning letter is sent to the agency for first and second violations. A third violation results in withdrawal of the agency's delegated authority for one year. Current policy sets out the following actions for higher education institutions and agencies with blanket authorizations:

First Violation. A letter of warning to the blanket administrator documenting specific violation(s).

Second Violation. Reduction of the institution's blanket authorization by 50 percent.

Third Violation. Further reduction of the institution's blank authorization by 50 percent and reduction of the institution's delegated purchasing authority for non-contract list items to \$2,500.

Fourth Violation. Withdrawal of the institution's blanket authorization and delegated purchasing authority for a period of not less than one year.

In FY 1986, DIT issued one warning letter to an agency (the Department of Health) citing a first violation of procedures or policies. In one instance, DIT reduced an institution's authorized limit. In addition, DIT will only grant a request for an increase in the authorized limit if the regulating agency has no violations.

These sanctions appear adequate for encouraging agencies to comply with procedural requirements. However, DIT cannot adequately determine if agencies are fully complying with public procurement laws or procedures without more complete information and periodic audits.

Audits. DIT requires agencies to maintain the following information in internal procurement files:

- (a) A copy of the purchase order for audit purposes.
- (b) Summaries of bids for items not contained on the contract list. The summaries must include vendors' names, individuals contacted, date, bid amount, and item description.
- (c) Additional documentation that agencies may require of internal staff in order to justify requests.

However, central procurement staff cannot determine if agencies comply with the requirements because DIT does not conduct any on-site audits.

Reviews of replenishment requests, if properly documented, can identify procedural violations. However, on-site audits are necessary in order to determine full compliance with competitive requirements. DIT is currently attempting to develop a cooperative audit program with the Division of Purchases and Supply.

Training. Before delegating procurement authority to an agency, DIT provides approximately two to three hours of training to agency staff. Approximately 83 percent of the agencies which received training reported on the JLARC staff survey that the training was adequate. Seventeen percent of the agencies reported that the training was inadequate.

If agencies are to knowledgeably and competently administer delegated authority, additional training should be made available. A formal training program, and "refresher" courses should be developed in order to facilitate delegation of all informal solicitations and contract list purchases to agencies. Moreover, a probationary period, during which central procurement staff closely audit agencies' practices, should be incorporated as a training and oversight component of delegation.

Recommendation (16). In delegating procurement authority to agencies and institutions, procurement staff should establish procurement documentation requirements. A formal audit program should also be developed to monitor compliance with public procurement laws and procedures. Audits should be conducted within six months of the initial delegation and biennially thereafter. A periodic training schedule should also be developed.

Monitoring Vendor Performance

Vendors' compliance with contractual obligations also needs to be monitored. DIT staff currently assist agencies in preparing contracts, ranging in complexity from simple delivery orders to sophisticated technical performance requirements. However, DIT does not systematically monitor vendor performance after the contracts have been developed. In order to effectively monitor vendors' performance on all information technology contracts, a central State source needs to routinely receive performance information from agencies.

Without a central source of information on the performance of vendors, State agencies cannot fully assess a vendor's capability to provide requested products or services. If agencies promptly notified central procurement staff of unsatisfactory vendor performance, the central personnel could assist agencies in resolving problems. The central staff could also maintain up-to-date information data on vendor performance, and make this information available to agencies.

Recommendation (17). A centralized method for monitoring vendor performance should be established. Agencies should inform the central procurement staff of all instances of unsatisfactory vendor performance on State contracts for information technology. This information should be available to agencies for use in making subsequent vendor selection decisions.

IV. SYSTEMS DEVELOPMENT

The Systems Development Branch (SDB) develops, modifies, and maintains automated information systems for other State agencies. SDB also conducts special studies, serves as a consultant, and assists agencies in procuring and installing systems. In a manner similar to private contractors, SDB bills customer agencies at hourly rates. SDB's activities also are partially supported by general funds for projects that benefit multiple agencies. SDB has 75 staff positions.

SDB was originally established in 1973 as an organizational unit within the Division of Automated Data Processing, and later in 1976 as a division within the former Department of Management Analysis and Systems Development. When SDB was originally established in 1973, the State perceived a need for a centralized pool of systems development staff. The centralized staff had a twofold mission: (1) developing interagency systems; and (2) providing central support for agencies which had occasional needs for systems-related services.

In recent years, the General Assembly and the executive branch have raised concerns regarding the role of a centralized systems development staff and have taken a number of actions. General funds appropriated to SDB for interagency projects have been significantly reduced in recent years as the number of these projects has declined. Furthermore, SDB was authorized in 1976 to exercise a "first right of refusal" on all State systems development projects. This policy was designed to support the centralized staff. Agencies were directed to first seek SDB's assistance before attempting to obtain services from private contractors. However, this policy was reversed in 1984; agencies are now required to competitively bid on all but the smallest projects (\$50,000 or less).

Under current internal service fund guidelines, SDB cannot effectively compete with private contractors. SDB is unable to recover costs for developing proposals which are not awarded. Agencies are relying increasingly upon private contractors and internal staff for systems development services. As a result, the mission of the centralized staff for systems development services needs to be reassessed. In addition, SDB's management of projects needs to be improved.

FUTURE ROLE OF SDB

The State has a need for central staff support to assist agencies in identifying automation needs and the methods for meeting those needs. Also, small agencies without adequate systems staff can benefit from periodic assistance in maintaining and modifying automated systems. SDB's mission should emphasize these roles.

Mission of the Systems Development Branch

A centralized systems development staff (SDB) was created in 1973 for the purpose of developing interagency projects and for providing systems maintenance, modification, and development services to State agencies on a cost-reimbursed basis. However, the centralized staff currently provides a broad range of services in addition to the original development, modification, and maintenance projects.

Creation of Centralized Systems Development Services. The Commonwealth's centralized systems development services were initially organized in 1973 within the Division of Automated Data Processing to provide two important functions for State agencies. First, the unit would identify, plan, and develop centralized systems that could benefit more than one State agency. This function became the Interagency Systems Development program, which grew from \$735,000 in FY 1977 to \$3.6 million in FY 1981. Funding for the program remained at approximately \$2 million per year from the end of FY 1981 through FY 1986. It was reduced to less than \$500,000 for each year of the 1986-1988 biennium.

Second, the unit would serve as a "pooled" resource for State agencies without full-time systems development expertise. Any State agency could use these services to develop, modify or maintain automation capabilities. Because this was a support service, the costs were charged to users through an internal service fund.

The systems development services were transferred to the Department of Management Analysis and Systems Development (MASD) in 1976, and subsequently to the Systems Development Branch (SDB) of the Department of Information Technology in 1984. The statutory mission of systems development remained essentially the same during these moves.

Evolving Role. Two provisions of the *Code of Virginia* provide the statutory framework for SDB to carry out its work. Section 2.1-563.18(3) directs DIT "To provide technical assistance to state agencies in such areas as: (i) designing management information systems; (ii) performing systems development services, including design, application programming, and maintenance....." Section 2.1-563.19 establishes an Automated Services Working Capital Fund to be used exclusively to finance automated systems design, development, and testing services and staff. This last provision is specific about the role of SDB as a designer and developer of automated systems for State agencies.

Until 1984, SDB was primarily providing systems development and maintenance support to agencies. During the next two years, SDB's role was influenced by two important events -- a \$50,000 limit on project size and, later, sharp cuts in the Interagency Systems Development fund. These events reduced the number and size of traditional agency systems development projects and made SDB more dependent on smaller agencies for work. For the most part, larger State agencies accelerated their use of private vendors for larger projects. This changing environment for systems development projects led SDB to broaden the scope of its mission and to expand its service offerings. Currently, SDB is providing such services as:

SDB developed an information management plan for coordinated automated support of emergency services at State and local levels. The plan provided for a change from decentralized emergency services to a coordinated form of interagency support. The plan was issued to the Department of Emergency Services and various localities at a cost of \$108,047.

SDB prepared for and attended meetings of the Criminal Justices Information System (CJIS) committee. The role of the SDB staff was to provide support and assistance in developing a statewide data dictionary for criminal justice information. SDB was also expected to assist the committee in developing goals and standards for the CJIS system. SDB was paid \$15,836 for this consulting contract.

SDB has an experienced staff of professionals. But because the staff size is fixed, it is difficult for SDB to possess the wide-ranging experiences and multiple skills necessary to respond effectively and efficiently to all customer requests for systems development related assistance. Discussions with other State agency staff indicate that "commercial vendors can adapt more quickly to changing technologies and provide more varied experiences and generally more specific application experiences."

DIT needs to carefully evaluate the mission of SDB in light of three continuing trends: (a) declining Interagency Systems Development revenues, (b) restrictions on the size of internal service fund projects to encourage competition on systems development projects, and (c) increased use of commercial vendors by State agencies.

Declining Interagency Systems Development Funds

Interagency Systems Development (IASD) funding was sharply reduced during the 1986 and 1987 sessions of the General Assembly. Recent studies of the IASD funds indicated that SDB often used these general funds for projects that did not meet legislative criteria. Consequently, the General Assembly reduced the levels from approximately \$2 million in FY 1986 to \$463,000 in FY 1987 and \$388,000 in FY 1988. The decline in qualifying interagency projects and SDB's loss of this major source of revenues are among the indicators that point to the need to reassess the role of SDB.

Compliance with Legislative Intent. Two general criteria apply to the use of IASD funds for development and maintenance projects:

- The focus of the development program is to provide automated information systems that support multiple agencies.
- Appropriate uses of general funds for maintenance projects include: latent program errors (SDB programming errors undetected at the time of development), and computer environment changes (systems changes required because of DIT hardware or

software changes). General funds can be applied to any maintenance project, including a project that was developed with internal service funds.

Studies conducted during the last two years concluded that DIT did not use IASD funds in a manner consistent with the fund's criteria. DIT's internal auditors found that the program had expanded from its original purposes to include development of systems that served the "broad interests" of the Commonwealth. In addition, the fund was used to assist those agencies which did not have data processing staff.

Department of Planning and Budget staff found that the fund supported multi-agency systems, as intended. However, use of the funds had extended to agency-specific systems which were not related to the original purposes of the fund. In addition, SDB management had not clearly established when the costs of systems developed with IASD funds should be transferred to user agencies.

By reviewing FY 1986 projects, JLARC staff also found that SDB had used the funds for some projects that did not appear to meet legislative intent, as illustrated by the following examples:

SDB used IASD funds to finance a study for the Department of Education (DOE). The objective of the study was to develop an information management plan for DOE. The cost of the contract was \$150,000. The only State agency receiving a direct benefit from the project is DOE. SDB assumed this project met interagency criteria because local school divisions might eventually benefit from DOE's system.

* * *

SDB applied IASD funds to help the Department of Correctional Education (DCE) develop the "Student Data System." The system was financed with \$60,000 of IASD funds, and \$80,000 from DCE. The system is used exclusively by DCE. Thus, IASD funds were used to subsidize an agency's specific project. SDB contends that the Parole Board and the Department of Corrections will also access DCE's system. However, to date the system is only accessed by DCE.

Reductions in IASD Funding. While the agencies may have demonstrated a real need for these systems, it is clear that SDB interpreted interagency applications more broadly than the General Assembly intended. During the 1987 Session, the General Assembly further reduced the level of IASD funding to \$388,000 for the second year of the 1986-1988 biennium. Funding for the previous biennium had been approximately \$2 million per year.

The House Appropriations Subcommittee on General Government recommended a reduction in funding because "projects were developed for a single agency, non-general fund agencies, and for the sole use of the host

agency [that is, SDB].... The project list for the current biennium included only two or three projects that meet original criteria for the fund." During the 1987 Session, the General Assembly also approved the Governor's recommended additional decreases of \$137,000 and \$212,000 from each year of the biennium "in anticipation of surplus balances in the IASD maintenance accounts."

During recent years, IASD funds have accounted for almost half of SDB's total revenues. However, in FY 1987, IASD funds account for only 13 percent of SDB's expected revenues (Table 8). SDB estimates that revenues from internal service funded projects will partially offset the IASD fund loss. But DIT projects an internal service fund deficit of \$150,000 at the end of FY 1987.

Table 8

IASD APPROPRIATIONS AND SDB REVENUES
(FY 1983 - FY 1987)

<u>Fiscal Year</u>	<u>IASD Appropriation</u>	<u>Total Revenues</u>	<u>IASD Funds As Percent of Total</u>
1983	\$1,876,360	\$3,809,460	49.3%
1984	1,956,445	4,449,601	44.0%
1985	1,955,195	4,045,637	48.3%
1986	2,040,990	4,317,617	47.3%
1987	463,000	3,569,972*	13.0%
1988	388,000	3,463,940*	11.2%

*DIT's projected revenues.

Source: DIT and 1986 Appropriations Act.

New Oversight Procedures. Since the recent reductions of general funds for systems development projects, SDB has developed additional oversight procedures for determining appropriately qualified projects. Proposed projects are now reviewed and authorized for funding at a higher administrative level:

- (1) SDB staff develop a list of proposed projects for each Governor's secretary.
- (2) Each secretary reviews, prioritizes, and approves the projects.
- (3) An agency proponent has direct responsibility for the system.
- (4) A board composed of representatives of the affected agencies is established for each project to ensure that automated systems meet the needs and requirements of the targeted agencies.

In FY 1987, two IASD-funded development projects with a total value of \$200,000 (the Intellectual Property Project and the Children's Residential Facilities Project) were administered under the new guidelines.

The application of maintenance funds will be subject to the approval of the Deputy Director of DIT. The deputy will be responsible for ensuring that fund use complies with the maintenance criteria.

Although these additional oversight procedures have been introduced, DIT still plays a key role in determining which projects are funded. The need for the projects are not linked to any statewide objectives or plan.

Recommendation (18). Interagency systems development projects should be justified and prioritized according to objectives in a statewide plan. The State should consider awarding these types of project contracts on a competitive basis.

Encouraging Competition by Limiting the Project Size

In 1984, the General Assembly enacted legislation designed to increase competition on systems development projects. The Appropriations Act requires agencies to competitively procure any project in excess of \$50,000. Agencies may award a contract to SDB for \$50,000 or less without soliciting proposals from other vendors.

In effect, the \$50,000 limit restricts SDB to small projects. SDB cannot recover costs incurred in preparing proposals which do not result in a contract award. Consequently, private vendors are the primary source for major systems development projects in State agencies, except agencies which develop systems with their own staff.

Rationale for Current Limit. By establishing a \$50,000 limit on project size, the General Assembly intended to ensure that agencies competitively procured systems development services for larger projects. Consistent with public procurement policies, the competition requirement was intended to foster multiple proposals so that agencies could select the best service at the lowest price. The following language was included in the 1984 Appropriations Act and each subsequent Act:

Before agreeing to purchase services for systems development....any state agency....may follow the procedures for competitive negotiation. Such procedure shall be mandatory for any purchases in excess of \$50,000.

At the time the policy was developed, the House Appropriations Subcommittee on General Government perceived "higher costs to agencies with the services provided by SDB (formerly MASD)." State policies had required agencies to purchase systems development services through MASD, "unless MASD determined that they [were] unable to complete the project as efficiently as an outside vendor." The Subcommittee reported that in some instances this had resulted in higher costs because:

- (1) The user agency received no other alternative proposals for accomplishing the same goal.
- (2) The cost and time for MASD to complete the project had run over estimates. (The Subcommittee recognized that MASD had improved their estimation techniques, but cost overruns still occurred and were reflected in the rate to all user agencies.)
- (3) The agency (MASD) had to generate sufficient revenue to pay operating costs. Given commitments to employees, a steady flow of projects was required to keep revenues and expenses in line.

SDB Response to the Limit. SDB's policy is not to bid on projects. SDB cannot bill customers for hours spent on developing project proposals which do not result in a contract. Thus, if SDB competed for projects, the rates would have to be increased in order to recover proposal expenses from other agency contracts. SDB cannot levy such an increase and expect customers, in effect, to pay for services they do not receive. Internal service fund requirements and the \$50,000 limit are rendering SDB-provided development services an infeasible alternative for agencies considering larger projects. However, SDB and agencies have begun to segment projects into \$50,000 contracts.

Compliance with the Limit. Because SDB does not identify and record all contracts associated with a particular project, JLARC staff could not determine the full extent to which SDB complies with the \$50,000 project limit. However, in interviews with SDB and customer agency staff, JLARC staff found eight examples of projects that exceeded the \$50,000 limit. These included:

A \$193,500 project (the Mine Safety Information System) for the Department of Mines, Minerals and Energy (DMME) was segmented into five separate contracts. None of the individual contracts exceeded the \$50,000 limit.

* * *

The Department of Education segmented its "Beginning Teacher Assistance Program" into multiple contracts in order to comply with the \$50,000 limitation. The total value of the project is \$200,000.

* * *

The Health Regulatory Board segmented its "Complaint Tracking and Reporting System" into contracts under \$50,000 to comply with the limitation. The total cost of the project was \$74,303.

By segmenting projects into multiple contracts, each \$50,000 or less, SDB and agencies are technically complying with the Appropriations Act.

However, this practice circumvents the intent of the Act and should be discontinued. The provision was designed to ensure competition on all except small systems development projects.

Agencies miss opportunities to review alternative proposals when they circumvent the competitive requirement. For example, DMME reported to JLARC staff that it was not satisfied with SDB's performance on the \$193,500 mines safety information project. If DMME had competitively bid the project, it would have received other proposals to choose from and possibly more satisfactory results.

Recommendation (19). The General Assembly may wish to amend Section 4-5.06(b) of the Appropriations Act to require that the total anticipated costs of systems development, enhancement, or modification shall be included in the purchase estimate. Total anticipated costs should include the costs of requirements specification, general design, detailed design, implementation, and evaluation. Consistent with the intent of the Act, State agencies should competitively bid all projects for which total anticipated costs exceed \$50,000. When requested, SDB should assist agencies in reviewing automation needs, writing requests for proposals, and selecting private vendors to develop systems.

Declining Requests for SDB Services

The project size restriction has impacted SDB's workload, but so has customer dissatisfaction. Some of SDB's major customers are dissatisfied with services and are turning to outside vendors or agency staff for these services. Based on the agency survey and on interviews with 15 of SDB's major customers, JLARC staff estimated that approximately \$2 million originally budgeted for SDB services in FY 1988 will be spent on other sources. However, as permitted by the Appropriations Act, the Secretary of Administration recently granted exemptions to the \$50,000 project size limit for two project emergencies. Revenues from these projects will likely offset most of the losses from other agencies at least in FY 1988.

Customer Satisfaction. In response to JLARC staff's customer survey, 72 percent of the agencies who used SDB were satisfied with the services. This level of satisfaction was lower than that for the other major services at DIT (83 percent were satisfied with telecommunications services, and 87 percent were satisfied with computer services). As discussed later in this chapter, some of SDB's largest customers were among the most dissatisfied. They do not intend to use SDB's services in the future.

Agencies noted concerns regarding the quality of work, attitude of staff, timeliness, and costs of the projects.

The Department of Criminal Justice Services (DCJS), cited three major problems with SDB's services: low level of technical expertise, inadequate project management, and inappropriate time requirements for project completion. They intend to purchase future development work from outside vendors instead of SDB.

* * *

The Department of Housing and Community Development (DHCD) commented that one project cost \$24,000, and was "scrapped" because it never functioned. SDB estimated it could be moved to another computer for \$30,000. Instead, DHCD revised the project requirements and developed the system in three days using a commercial software package.

These case examples represent the views of SDB customers as reported on the JLARC survey of agencies. SDB staff disagree with the agencies' assessments of their performance.

SDB staff suggested that some agencies should better define their systems needs before undertaking a systems development contract. SDB admitted that some SDB-designed systems were more complex than the agency may have needed. However, agencies did not realize this until projects were already partially completed. SDB would benefit from a clearer understanding of customer expectations before beginning a project. And agencies would benefit from a better understanding of the systems capabilities before committing to the project.

SDB staff should not debate who is at fault when agency customers are dissatisfied with their performance. In the private sector, service-oriented businesses make every effort to address customer needs. SDB is in a similar situation in that it needs to rely on agency business to exist. Moreover, SDB has a limited customer base in State government.

A survey respondent from a major SDB customer agency stated, "our viewpoint is that DIT has changed its policies on the way it is approaching and providing systems development services..... SDB operates from a telling, dictating approach as opposed to a typical service oriented role of asking, listening, and guiding the client to desired results." Because SDB is a service organization in Virginia State government, it needs to continually assess customer satisfaction and find ways to improve customer relations.

Recommendation (20). Because it is an organizational unit with a service mission, SDB should make every effort to maintain sound business relationships with customer agencies. SDB should ensure that the quality of its products and services is high. Moreover, training courses emphasizing "customer relations" skills should be developed and made mandatory for all project staff.

Agencies' Expected Use. In interviews with customer agencies, JLARC staff found that some dissatisfied customers do not intend to spend systems development funds for SDB services as originally anticipated. For example, the Department of Motor Vehicles (DMV) budgeted \$1.7 million for SDB projects in FY 1988, and the Department of Criminal Justice Services (DCJS) budgeted \$309,400. These two agencies have since decided not to expend these funds for SDB services.

On JLARC staff's survey, 44 percent of SDB's customers expect to decrease requests for services; the remaining 56 percent expect to increase

services. Four of SDB's largest customers in the past (DMV, DCJS, DHCD, and DMME) reported that they do not intend to use any SDB services in the future.

Between FY 1983 and 1986, SDB revenues (actual agency expenditures) exceeded agency budgeted expenditures. This relationship between budgeted and actual expenditures will be reversed in FY 1987 and FY 1988: SDB projects that agencies will spend less on SDB's services than agencies had originally intended to spend (Table 9).

Table 9
 APPROPRIATIONS AND REVENUES FOR SDB
 (FY 1983-1988)

Fiscal Year	Agency Appropriations for SDB	SDB Revenues (Actual Agency Expenditures)
1983	\$3,408,536	\$3,809,460
1984	\$3,377,120	\$4,499,601
1985	\$4,003,486	\$4,045,637
1986	\$4,057,890	\$4,317,617
1987	\$4,974,963	\$3,569,972*
1988	\$4,977,308	\$3,463,940*

*Projected by DIT.

Source: DIT financial statements and SDB budget.

SDB also projects that its revenues (agency expenditures) will fall short of its expenses in FY 1988. As a result, SDB anticipates a sizeable fund balance deficit -- \$955,980.

As of May 1987, JLARC staff estimated that SDB's deficit would be even greater -- approximately \$1.6 million. JLARC staff contacted 15 agencies which had budgeted the largest amounts for SDB's services in FY 1988. Some of the agencies (such as the Board of Elections and the Department of Medical Assistance Services) may spend more on SDB services than originally budgeted. Others intend to spend less than budgeted (such as DMV, DCJS, DMME, and the Governor's Employment and Training Department). The net impact of these agencies' revised expenditure estimates is a fund balance deficit of approximately a \$1.6 million for SDB in FY 1988 (Table 10).

SDB revenues in FY 1988 could be even less than projected by JLARC staff if agencies are required to comply with the \$50,000 size limit. Ten of the agencies' revised estimates exceed this limit for SDB services, ranging from \$80,000 to \$466,125. Only if these budgets include a number of individual projects less than the limit will the agencies and SDB be complying with the intent of the Appropriations Act.

Table 10

FY 1988 DEFICIT PROJECTIONS FOR SDB

	<u>JLARC Staff Estimate</u>	<u>SDB Estimate</u>
Sum of Agency Appropriations for SDB	\$4,977,308	
Sum of Agency Budget Revisions	(\$2,289,530)	
SDB Revenues	<u>\$2,687,778</u>	\$3,463,940
SDB Expenditures*	<u>\$4,269,920</u>	<u>\$4,269,920</u>
Revenue Shortfall	(\$1,582,142)	(\$805,980)
FY 1987 Fund Balance*	<u>(\$150,000)</u>	<u>(\$150,000)</u>
FY 1988 Fund Balance	(\$1,632,142)**	(\$955,980)

*JLARC staff used SDB's FY 1988 expenditure estimate and FY 1987 fund balance estimate.

**As of May 1987. In July 1987, SDB plans to sign a contract with DSS for a \$1.3 million emergency project in FY 1988 and \$1.3 million in FY 1989.

Source: DIT, Appropriations Act, interviews with SDB customers.

As permitted by the Appropriations Act, the Secretary of Administration can grant exemptions to the limit. As of May 1987, the Secretary had already granted one exemption to the Board of Elections for a \$546,000 project. The contract is for completion of the central registration system, a contract which was breached by the original vendor.

In the course of this study, after JLARC staff had computed SDB's revenue estimates, another exemption was tentatively planned. SDB plans to sign the contract with DSS for an emergency project that will cost \$2.6 million over two years. This contract will be used to support the data systems bureau in DSS and to complete automation of the child support enforcement program. This unanticipated project, if approved, should eliminate most of the projected deficit for FY 1988.

Use of Private Vendors and Agency Staff. DMV, DCJS, and other agencies are relying increasingly on private vendors or their own staff for systems development work. In FY 1987, State agencies expect to spend \$8.9 million for private vendors. Also, as of March 1987, almost 1,253 State personnel were employed in systems development-related positions within

agencies. DMV, for example, has an internal staff of 66 positions dedicated to systems development. As a result of increasing agency and vendor involvement in systems development projects, SDB's role in providing these services is changing.

Focusing the Mission of SDB

In recent years, the mission of SDB has broadened in scope by significant constraints on funding, agency use of other sources for systems development-related work, and SDB's expansion into a broad range of services. SDB's role in State government needs to be re-assessed and clearly defined.

Agencies can benefit from a central support staff that provides technical consulting, systems design assistance, and periodic maintenance and modification services. SDB's mission should be focused in these areas. SDB can no longer be expected to serve a primary role in developing large systems. Large systems development projects should be competitively procured. SDB cannot effectively compete with private vendors for these large projects.

Clearly, agencies with small computer systems staff or none at all need assistance in assessing automation needs and designing systems. Forty-one percent of SDB's customers, primarily smaller agencies, reported on the JLARC staff survey that they would be affected adversely by the absence of SDB-provided services. Two principal concerns were reported: (1) perceived loss of maintenance and modification support, and (2) uncertain quality of private vendors' work. Even large agencies, such as the Department of Social Services (DSS), have encountered problems in defining automation needs and selecting qualified vendors for systems development work.

Staff in SDB could assist agencies in reviewing automation needs, establishing general expectations for systems functions, writing requests for proposals, and selecting private vendors to develop systems. SDB could also continue to periodically maintain and modify systems for agencies which do not have staff to perform such functions. In addition, SDB can fill the need for immediate supplemental staff support in emergencies.

In order for DIT to justify current staffing levels for these activities, SDB will need to receive far more requests for services than in the past because project sizes will be smaller. Consistent with the Appropriations Act, all contracts should be \$50,000 or less except for emergency projects. SDB cannot expect to regularly receive large emergency projects such as the very recent contracts with the Board of Elections and DSS. In fact, SDB's technical assistance with "front-end" evaluation and preliminary design should help agencies avoid such emergencies. In the future, it is likely that SDB's revenues will decline and staffing levels should be decreased accordingly.

Recommendation (21). Consistent with Section 2.1-563.19, SDB should continue to focus its mission on designing, developing, and testing systems. Additional emphasis should be placed on providing technical assistance to agencies in evaluating systems needs and temporarily maintaining and periodically modifying automated systems. SDB and all State agencies should comply with the project size restriction established in the Appropriations Act.

PROJECT MANAGEMENT

Although SDB has attempted to enhance project management practices, some improvements are still necessary. Greater attention needs to be given to estimating costs and hours more accurately. Improved project planning would also help SDB optimize staff assignments. Project accounting procedures and controls need to be further developed and implemented.

Project Planning

Since JLARC reviewed systems development services in 1981, SDB has improved project planning. SDB establishes performance expectations for project managers, more closely monitors the progress of projects, and attempts to involve customers in planning. SDB has also developed an elaborate model for estimating the costs of projects, based on typical project tasks and durations.

SDB's efforts have resulted in more accurate estimates of costs and project durations than in the past. However, approximately half of SDB's project estimates exceed or fall short of actual costs by more than ten percent. The lack of sufficient information in project plans may impede SDB's efforts to achieve its goals for higher estimation accuracy.

Need for Detailed Project Plans. E&W reviewed all FY 1986 contracts with the seven customer agencies included in the review. Three of the agencies (DPT, DMV, and DSS) had a total of 20 contracts with SDB during this period. E&W interviewed SDB managers responsible for the projects and reviewed files to determine if staff complied with SDB's project documentation and procedural standards. E&W found that SDB's project planning packages need more detail. For example, the package reviewed did not provide a clear understanding of the work steps necessary to complete the project, nor did it contain a list of the personnel participating on the various work steps.

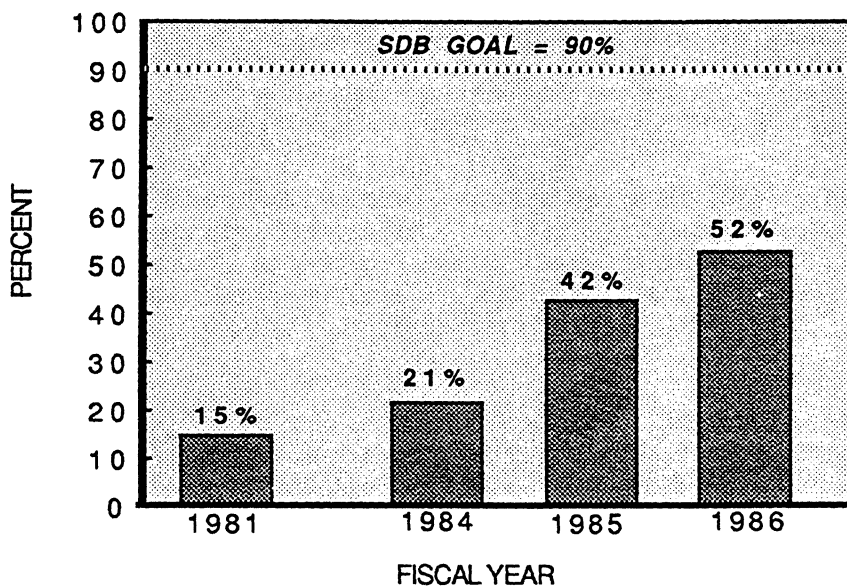
In reviewing the 20 contracts, E&W also found that agency service requests were not well-defined. Without sufficient information on the customers' expectations, project plans consequently were not adequately detailed. Changes in project plans or results of customer discussions were also not fully documented. Documented project changes are needed for accurately estimating and revising timetables and costs.

Accuracy of Estimates. In FY 1981, JLARC staff found that only 15 percent of SDB's projects were completed within ten percent (over or under) of the estimates. In recent years, the accuracy of SDB's estimates have improved to 52 percent within this 10 percent tolerance (Figure 6). SDB's ability to accurately estimate project costs has improved since 1981 but is still significantly short of its own goal of 90 percent of the projects being completed within ten percent of the estimates. According to SDB managers, staff are evaluated on their success in achieving this goal.

In FY 1986, actual costs were less than estimated costs (by more than ten percent) in 37 percent of the projects. Although it may appear

Figure 6

Accuracy of SDB's Project Cost Estimates
(Percent of Project Estimates Within 10 Percent of Actual Costs)



Source: DIT's Management and Control System, and JLARC's 1982 report "Working Capital Funds in Virginia".

acceptable for actual costs to be less than what an agency anticipates, this occurrence poses two problems. First, SDB is now using fixed-price contracts, and therefore it would accrue a "profit" on projects that cost less than the estimated fixed-price contract. This result is contrary to internal service fund policies. Second, agencies would not know the extent to which estimates may have been inflated. Because SDB does not compete with other vendors, there is no market method to ensure that SDB's project estimates are reasonable and necessary to just recover costs.

In FY 1986, costs were greater than estimates (by more than 10 percent) in 11 percent of the projects. Cost overruns have occurred, in part, because agencies and SDB do not have a full understanding of the work involved in the projects. In other cases, SDB has not appropriately matched staff qualifications to the project requirements.

The Department of Rehabilitative Services (DRS) contracted with SDB for a microcomputer-based "client tracking system." The system was to be used on Hewlett Packard 150 microcomputers using DBASE II as software. The original contract was for \$9,530, and had to be extended to \$19,200 five months after the original

contract was signed. DRS and SDB did not fully understand the complexity of the system when the estimates were made.

* * *

One DMV project, the Virginia Automated Drunk Driving system, did not stay within its targeted estimates because appropriately qualified staff were not assigned to the project. These staff could not perform the contracted work within budget and were subsequently replaced by a second SDB project team.

Recommendation (22). SDB should develop detailed project plans, using full customer agency participation in the planning process. Specific work tasks should be identified in the plans. Changes in the scope of the projects should be discussed with the customer agencies, and the results of these discussions should be documented and maintained in the project files.

Staff Training and Utilization

If SDB intends to continue providing knowledgeable assistance to agencies, it is particularly important for SDB staff to be used effectively and be kept abreast of rapidly changing technologies. E&W found that SDB does not formalize its staffing, recruiting, or training plans. When these types of plans are not integrated into the project cycle, staff are assigned on an "as available basis" instead of on project skill requirements. Availability of staff is one important factor that SDB considers in making project assignments. However, SDB should also increase its emphasis on identifying agency needs. Staff training programs should be developed accordingly.

In addition, JLARC staff found instances in which higher-level SDB staff were assigned to tasks usually performed by lower-level staff. JLARC staff also found instances where additional planning might have avoided project emergencies in which contractors were added as supplemental staff.

Utilization of SDB Staff. To test appropriate assignment of SDB staff to projects, JLARC staff reviewed lower-level activities performed by SDB staff. As defined by SDB, these activities included coding computer programs, writing documentation, revising programs, and testing data. These activities correspond to the Department of Personnel and Training's class specifications for programmers and programmer analysts. Higher-level staff in the systems development series, beginning with senior programmer analysts, should typically perform the more complex segments of projects such as design, management, and evaluation.

In FY 1986, the composition of SDB's staff changed. Attrition in the lower ranks of staff, coupled with additions of higher-level staff, has shifted lower-level activities onto higher-level staff. SDB lost 11 positions from the programmer and programmer analyst classifications during FY 1986. During this same period a net increase of three positions occurred in classifications above this level. In reviewing SDB's work activity files, JLARC staff found

that 73 percent of the lower-level activities were conducted by staff above the programmer analyst level. Thirty-five percent were conducted by staff above the senior programmer analyst level, which was billed at the same rate (\$27 per hour) as the programmer analyst (Table 11).

Occasionally, higher-level staff may be used appropriately for lower-level functions if other staff are unavailable. However, SDB should attempt to minimize such practices because use of senior staff for lower-level functions increases costs to customer agencies. Staff at levels above the senior programmer analyst were billed at rates that ranged from \$30 to \$39 per hour. Lower-level staff were billed at \$22 or \$27 per hour.

On an individual basis, most higher-level staff spent relatively little time (20 percent or less) in lower-level activities. However, JLARC staff found three instances where higher-level staff spent excessively large amounts of time in lower-level activities during FY 1986. One systems analyst spent 81 percent of the billable hours in lower-level coding activities, another systems analyst spent 56 percent, and one program systems development supervisor spent 47 percent of the time in lower-level activities.

Utilization of Contractors. During most of FY 1986, SDB never used more than five contractors per month as staff supplements on projects. However, projects within one unit of SDB fell behind anticipated timetables. Between 18 and 25 contractors were used during the months of March 1986 through June 1986 in order to complete these projects. SDB reported that the contractors were used primarily as staff supplements and not for special expertise.

For a large development project for the Department of Mines, Minerals, and Energy (DMME), SDB contracted for two computer systems senior engineers to supplement SDB staff. The contractors had no special expertise in this agency's computer environment. In fact, the contractors went through the same training as SDB staff to learn the DMME computer environment.

To test appropriate assignment of contractors to project activities, JLARC staff reviewed lower-level activities in the same manner as for SDB staff. SDB billed more than 3,400 hours of contractor's time for lower-level activities, accounting for 20 percent of the total hours billed by contractors. Moreover, SDB assigned contractors, billed at \$45 per hour, to perform more than 1,200 hours in coding and other lower-level activities (Table 12).

Recommendation (23). SDB should review its personnel structure to determine the appropriate number and classifications of staff needed to complete project tasks. SDB should develop and use project plans for matching staff skills with project tasks. SDB should improve its planning methodologies to ensure that contractors are used only when special skills are required on projects. A formal training program should be developed to keep staff aware of changing technologies.

Table 11

LOWER-LEVEL ACTIVITIES PERFORMED BY SDB STAFF
(FY 1986)

<u>Position</u>	<u>Rate per Hour</u>	<u>Number of Hours</u>	<u>Percent of Total Hours</u>	<u>Costs</u>	<u>Percent of Total Costs</u>
Information Technology Manager	\$39	16	0.0%	\$ 624	0.1%
Chief Engineer/ Systems Development Manager	\$36	274	1.5	9,864	2.0
Program Systems Development Supervisor	\$32	1,105	6.0	34,880	7.0
Systems Analyst	\$32	3,838	20.8	118,588	23.7
Senior Systems Engineer	\$30	1,152	6.3	33,693	6.7
Systems Engineer	\$30	11	0.0	330	0.0
Senior Programmer Analyst	\$27	7,105	38.6	183,562	36.7
Programmer Analyst	\$27	2,214	12.0	59,186	11.8
Programmer	<u>\$22</u>	<u>2,737</u>	<u>14.8</u>	<u>59,854</u>	<u>12.0</u>
TOTALS		18,452	100.0%	\$500,581	100.0%

Source: JLARC staff analysis of DIT's Management and Control System.

Table 12

LOWER-LEVEL FUNCTIONS PERFORMED BY CONTRACTORS
(FY 1986)

<u>Contractor</u>	<u>Rate per Hour</u>	<u>Number of Hours</u>
A	\$45	1,265
B	42	658
C	39	852
D	34	384
E	<u>27</u>	<u>264</u>
TOTAL	\$40.30 (Weighted Average)	3,423

Source: JLARC staff analysis of DIT's Management and Control System.

Project Monitoring

In reviewing SDB records, E&W and JLARC staff found that SDB does not consistently record project costs or monitor contracts. E&W also found incomplete documentation of project changes and project oversight.

Project Accounting. SDB maintains project plans on its automated Management Accounting and Control System (MACS). This system is used for recording project staff's timesheets and for monitoring projects. However, MACS project numbers are not linked on a one-to-one basis with agencies' contracts. E&W found that multiple contracts are included within a single project. Consequently, project work cannot be directly correlated to each specific agency contract. Moreover, E&W found that a number of project revisions were not entered on the MACS data files. When the maintenance of the automated management files allow for such confusion the accuracy and value of scheduling and tracking reports are of limited use for project monitoring.

Controls. E&W also found that project documentation was incomplete. Technical reviews, working papers, project plan revisions, resource changes, and customer interactions were not uniformly contained in all project files. SDB management reported that all projects were subject to technical reviews by the chief engineer and project managers. However, E&W did not find any documentation that technical reviews had been conducted.

Recommendation (24). SDB should revise its project accounting procedures to identify and record all contracts included within projects. All project changes should be documented and added to the automated tracking system. SDB should develop and follow documentation standards for all projects.

V. COMPUTER SERVICES

DIT operates two mainframe computer systems, IBM and Sperry, in support of agencies' data processing needs. Eighty-three agencies access the State's mainframe computers through approximately 8,500 terminals located throughout Virginia. The computer services division within DIT, staffed by 183 employees, operates and maintains the mainframe computers and helps agencies to use them (Exhibit 4).

The size of the State's computer center has grown significantly over the years. Expenditures for computer services have almost doubled within five years (from \$18 million in FY 1983 to an expected \$33 million in FY 1987). During this same period, transaction volumes have increased from 265,000 per day to more than 1.5 million per day. DIT's computer center is currently one of the largest and most powerful computer centers in Virginia, and DIT staff do a good job in operating and maintaining the State's computer systems. Although agency use of DIT's computers has increased, additional efforts to efficiently and effectively use the mainframe resources can slow the rapid growth in costs.

DIT needs to help customer agencies make best use of the mainframe computers. DIT cannot continue to provide services at unquestioned levels demanded by customers. Yet as a service agency, DIT has not been able to control agencies' use of computer services. Agencies need to better plan and control their own use.

Also, additional planning and management controls within DIT would facilitate more efficient management of the State's computer center. Hardware upgrades, for example, should be a last resort after all reasonable efforts to improve performance have been exhausted.

JLARC staff, with assistance from Ernst & Whinney (E&W), found a number of instances in which DIT could improve the performance of its computer operations. DIT should evaluate the need for its two quite different mainframe computer technologies. DIT could also increase its efforts to help customer agencies efficiently use the mainframes. Further, agencies should exercise greater controls over computer use and place additional emphasis upon planning computer and system development needs. Moreover, as advanced computer technologies reduce agency dependence upon the State's mainframes, the State will need to establish policies that guide centralized and decentralized data processing.

DIT OPERATIONS

DIT's computer center is a complex configuration of IBM and Sperry computers and a host of peripheral devices, including more than 350 disk drives and 76 tape drives for data storage, 9 printers, and various card readers and punch machines. This mainframe computer system enables agencies to process batch computer jobs and on-line transactions, enter jobs at remote sites, print

Exhibit 4

DIT'S COMPUTER SUPPORT SERVICES

Operation Support

- Maintain various computer systems in order to meet customer production processing requirements.
- Coordinate the workflow and scheduling between customer agencies and the computer facilities.
- Install and manage all modems, cables, and test equipment, as well as conduct capacity planning to support the teleprocessing requirements of customers.
- Assist customers in resolving data processing problems.

IBM and Sperry System Support

- Install and maintain program products used by customers for information on each technology.
- Assist customers in designing application systems to ensure operating efficiency in the mainframe environment.

Telecommunications Support

- Assist customers in the areas of data communication equipment and network capacity planning.
- Maintain an inventory of data on customer terminals, lines, offices, programs and files to assist customers in diagnosing line, hardware, and software problems.

Database Support

- Distribute information on database products offered by DIT.
- Assist agencies in establishing new databases.
- Assist in reorganizations of agencies' databases as requested.
- Provide weekly backups and validations of customer databases.

Source: DIT's "Virginia Information Technology Services Handbook."

output, and utilize applications and database software. E&W concluded that DIT's success in keeping the system operating (as measured by the average time for problem resolution) was as good as other computer installations of this size.

The ways in which DIT monitors, expands, and maintains the central computer center directly affects the efficiency and costs of operations. In order to minimize costs while maintaining acceptable levels of service, DIT must place greater emphasis on planning capacity and monitoring systems performance. The costs and benefits of maintaining multiple computer technologies also needs to be evaluated.

Capacity Planning

Capacity planning helps DIT ensure that essential computer resources are obtained in sufficient time to maintain acceptable levels of service to customers. However, planning must also ensure that DIT does not prematurely obtain hardware or software and incur unnecessary costs. In fiscal year 1986, DIT spent \$16.2 million on computer hardware and software. E&W found that DIT could improve its methods for planning upgrades: the accuracy of forecasting computer service needs could be increased, DIT's computer usage could be better regulated, and DIT's justifications for acquisition decisions could be strengthened.

Need for Improved Estimates of Utilization. In order to determine when the capacity of its systems will be reached, DIT needs an accurate method for estimating future customer use of the mainframe computers. DIT does not have an effective methodology for accurately projecting customer utilization. As discussed in the financial management chapter of this report, DIT typically underestimates utilization. In FY 1986, for example, unanticipated use of DIT's mainframe computers generated revenues 17.6 percent greater than DIT's costs for providing computer services.

Inaccurate estimates hinder DIT's ability to effectively plan and anticipate when additional equipment may be necessary to accommodate customers' demands for services. Projection of utilization is a difficult and complex task, and some variance from the estimates is expected. However, the importance of the estimates means that DIT should make greater efforts to improve the accuracy of its projections.

DIT's projections are based on historical usage information from agencies. However, agencies may not fully inform DIT that unusual circumstances, such as computer system changes, upgrades, or expanded processing expectations, will affect historical projections.

The Department of Social Services (DSS) consumed twice the amount of computer resources anticipated for FY 1986; DIT projected \$2.6 million in usage and DSS actually spent \$5.2 million. The unanticipated increase was attributed to a new automated system for the department's child support enforcement program. DSS is

the largest user of DIT's computer services and accounts for more than half of the entire Sperry system use.

DIT primarily uses projections for setting rates, although data center managers also attempt to identify customers' expected use. This information is not formally shared between DIT's rate-setting staff and data center managers as part of a coordinated capacity planning effort.

Recommendation (25). DIT should develop a formal capacity planning methodology for use in critical decisions regarding the modification or replacement of its computer hardware and software systems. DIT rate-development staff and the data center managers should jointly participate in projecting customer utilization and the capacity of DIT computers to accommodate expected service use. DIT should identify additional opportunities for including customer agencies, particularly the largest users of computer services, in projecting utilization.

DIT Computer Usage Could Be Better Regulated. Accurate projections of total computer utilization are hindered by the absence of information and controls on DIT's usage. DIT itself is one of the largest users of the State's mainframe computers; E&W estimates that approximately 19 percent of the computer capacity is consumed by internal administration and programming efforts. Although DIT does not have control over agencies' use of the mainframe computers, it is in a position to control its own use.

E&W found that DIT has no procedures for monitoring or controlling staff's computer use. Billing summaries or utilization data is not recorded or distributed to DIT managers; therefore, they cannot determine if staff are effectively and economically using computer resources. No management objectives have been established to define needs for internal automated systems, system testing needs, and other uses that affect computer workload.

Recommendation (26). DIT should develop an information management plan in order to direct staff use of its computers. DIT should establish accounting and reporting procedures for recording internal computer use. This information should be distributed to DIT managers and used by them to monitor and restrict use to essential and economical applications.

Acquisition Decisions. In reviewing DIT's capacity planning efforts and procurement decisions, E&W concluded:

Capacity planning in [DIT] is treated as a special rather than a permanent process. A capacity plan should not be developed as justification for a new system, nor as an upgrade to an existing system. Capacity planning should be a continuous study that alerts management to the future resource needs of the facility, and it should be performed on a continuous and proactive rather than reactive basis.

As discussed in the procurement chapter of this report, E&W found that DIT's acquisition of a \$4 million IBM 3090-400 mainframe computer in January 1987

should have been linked with well-developed strategic and hardware plans. However, in the absence of such plans, DIT's technical rationale and specifications for size and computing capacity were not explained. Capacity needs were not documented, nor were alternative methods for addressing capacity needs fully analyzed.

In order to adequately identify when and why computer system upgrades will be necessary, DIT needs a multi-year hardware and software acquisition plan. Accurate utilization projections will help DIT identify when upgrade decisions will be necessary. Alternatives to acquisitions should also be included to ensure that upgrades are actually necessary. In order to adequately determine why acquisitions are necessary, alternative solutions for addressing capacity needs should first be explored. Before deciding that an upgrade is necessary, DIT needs to ask:

- How can the performance of the existing system be improved?
- How can the data processing workload be distributed more evenly throughout the day?
- How can customer agencies be helped to more efficiently and effectively use the mainframe computers?

Methods for more efficient and effective use of DIT's computer services are discussed in the following sections of this chapter.

Because DIT's acquisition decisions have far-reaching impacts on the costs and kinds of computer services offered by DIT, these decisions should be reviewed and evaluated by a source independent of DIT. An independent oversight board could serve in this role by reviewing DIT's capacity planning results and analyses of alternatives. Such an independent review would help to ensure that upgrades are needed and are an effective solution.

Recommendation (27). DIT should develop a multi-year hardware and software acquisition plan. DIT's acquisition plan should contain procedures for ensuring that non-upgrade solutions have been attempted first and are no longer adequate to meet needs for additional data processing capacity.

Performance Monitoring

DIT places a great deal of emphasis upon monitoring the performance of its mainframe systems. DIT uses 28 different software products and hardware devices to monitor the performance of IBM, Sperry, and telecommunications systems and equipment. DIT primarily uses these tools to daily monitor system response times, processing bottlenecks, and communications line utilization, for example. Although these are appropriate uses of the monitoring tools, E&W found that DIT does not have coordinated methods for analyzing performance data. Moreover, by improving formal change management procedures, DIT can better anticipate and minimize adverse impacts of DIT's mainframe system changes on the performance of agencies' applications.

Uncoordinated Monitoring Efforts. DIT spent approximately \$350,000 in 1986 for monitoring products and staff. In some cases, the same data are collected by several products. For example, three different products (NPM, NPDA, and TESTDATA) all report information concerning line utilization. Efforts to improve methods for interpreting different, and sometimes conflicting, information from these monitoring products can help managers effectively use the data. E&W found that DIT is producing a wide range of analyses and reports on performance, but no consolidated interpretation is provided.

E&W concludes that without a consistent methodology for interpreting performance data, DIT cannot adequately pinpoint operational problems and decide on the best approach to improve performance. Planning is also impeded. Moreover, conflicting measures of utilization *vis-a-vis* capacity, for example, make it difficult for DIT to decide on the timing and necessity of upgrades.

Recommendation (28). DIT should develop a formal methodology for monitoring the performance of its mainframe computer systems. Consolidated results of performance evaluations should be used by DIT's data center managers to establish specific criteria for initiating system adjustments and upgrades. DIT should evaluate the usefulness of its 28 different performance monitoring products in order to reconcile conflicting performance indicators.

Change Management. DIT has developed methods for managing changes in computer hardware, systems software, and applications software. A change control committee in DIT evaluates change requests in order to help DIT avoid instituting changes that adversely affect computer operations and customer services. In some instances, however, changes in DIT's systems have adversely affected agency operations, as illustrated by the following example:

DIT implemented EXEC-8 level 39, a new Sperry operating system in 1986. The product had not been fully tested by Sperry, but DIT chose to implement the test version. Consequently, agencies using the Sperry system, such as the State Corporation Commission, reported that their Sperry computer applications did not function properly.

More rigorous pre-testing and analyses of the impacts and risks could help DIT minimize adverse effects on agencies. "Back-off" procedures in the event that the change destabilizes computer operations should also be fully developed. The change control committee should evaluate more thoroughly requests for hardware installation and operating system enhancements in order to determine if changes have been adequately tested and can be terminated quickly if necessary. Improved methods for alerting all customers potentially affected by the change should also be adopted.

Recommendation (29). DIT should improve its methods for testing and monitoring changes to the State mainframe systems. DIT should notify all agencies which could be affected by the changes and seek customer assistance in monitoring the impacts of the changes.

Maintaining Multiple Technologies

The State incurs considerable costs by maintaining multiple computer systems. IBM, Sperry, DEC, Hewlett-Packard, and Wang are among the largest. Each technology requires specially-trained staff and separate components and software. IBM and Sperry are the State's two mainframe systems; DIT devotes separate staff within the computer services division to each technology (61 staff for IBM and 44 staff for Sperry). The need for the State to maintain two major mainframe technologies needs to be evaluated in light of the relatively higher costs of one of those systems.

DIT also maintains multiple operating systems and applications software for customer agencies. Some of these products are redundant, outdated, and costly to maintain. The need for maintaining these multiple software products also needs to be evaluated.

Dual Mainframe Computer Systems. Virginia is one of 12 states that simultaneously operates two major mainframe computer systems, IBM and Sperry, in the same data center. In reviewing and comparing the costs of maintaining two mainframe technologies, E&W found that DIT's costs were \$964,451 per month on IBM hardware, software, personnel, and facilities (in November 1986). DIT's costs were \$777,891 for Sperry in these same categories. Processing costs per resource unit for IBM are less than for Sperry, however. DIT's IBM computers have a rated processing capacity of 53 MIPS (millions of instructions per second) versus 26 MIPS for the Sperry mainframe. The cost per MIPS for IBM is \$18,197; the cost per MIPS for Sperry is \$29,919. E&W also estimated that on the average it costs \$13 per batch job on IBM and \$18 per job on Sperry. E&W concluded that DIT has implemented the IBM technology at relatively lower costs than it has implemented the Sperry technology. DIT's costs are compared with other organizations' costs in the chapter of this report on financial management.

Moreover, the equipment configuration of one technology does not accommodate access to the other technology. Special software products must be used to give users access to both technologies.

The cost differences and compatibility concerns associated with operating the two systems suggest that migration to one mainframe technology should be considered. However, considerable costs would be incurred to accomplish such a conversion. Using a technical guide developed by the Federal Conversion Support Center, E&W estimated that it would cost \$10,135,000 for DSS to convert from Sperry to IBM, for example. Conversion costs would need to be weighed against the long-term savings of operating only one mainframe technology as part of the State's decision to maintain one or two mainframe technologies.

Outdated and Redundant Products. In its service role, DIT must maintain software products that agencies use in their computer applications. However, when agencies do not upgrade systems, DIT must maintain outdated products, such as TCAM and older versions of DYL250, DYL260, and TOTAL. In some cases, DIT maintains both the early and the recent releases of the

same software, such as DYL280. In other cases, only one or two agencies use a particular product, such as TCAM and TOTAL.

The Department of Alcoholic Beverage Control is the only agency that uses TOTAL. In order to operate TOTAL, DIT must use outdated IBM 3350 disk drives. This older model does not perform as efficiently as the newer 3380 drives. Channel speeds are slower, and it costs more to maintain.

Although DIT has a responsibility to support its customers, State policies are needed to ensure that the usefulness of outdated and redundant products outweigh the costs associated with maintaining those products. Moreover, plans for agency upgrades should be included as part of a statewide plan, and funds should be allocated to accomplish necessary upgrades when cost-beneficial.

Product Requirements. Because DIT operates in a multi-technology environment, the agency needs clearly specified requirements for product performance. E&W found that DIT does not have computer hardware or technical environment plans that specify DIT's expectations for product performance and compatibility. Without these performance standards, it is more difficult for DIT to defend its procurement decisions and the products that it uses in the data center.

A major computer vendor suggested that DIT consider a non-stop processing environment. The vendor suggested that its minicomputers could replace DIT's Amdahl and Sperry communication controllers and provide 100 percent processing availability. In reviewing the performance of DIT's existing controllers for two months (November and December 1986), E&W found that the Amdahl controllers were available 100 percent of the time and the Sperry controllers were deliberately stopped only twice for a total of 18 minutes (99.9 percent availability). Moreover, if one controller fails, the lines can be switched to a backup unit within minutes.

In addition to finding that DIT's controllers offered comparable performance, E&W also found that DIT did not need 100 percent availability 100 percent of the time. By reviewing DIT's transaction workload and prime processing hours, E&W found that DIT realistically needed 100 percent availability only 30 percent of the time. E&W concluded that DIT's current controller configuration was adequate to meet its processing needs. DIT estimated that staff spent an average of a half day per week over a three-month period considering the vendor's proposal.

If DIT had well-documented hardware and technical environment plans, evaluation of unsolicited proposals for the modification of the systems could be conducted within a framework of documented needs.

E&W also noted that DIT has not documented acceptable performance levels for vendor maintenance. DIT's information on the average time to repair problems could be better used to identify areas for improvement and guide subsequent procurements and contracts. For example, when the Sperry 1100/94 mainframe was installed in 1986, DIT experienced stability problems with the central processing unit and other key components. According to DIT, it took nine months to resolve these problems.

Recommendation (30). As part of a State plan for data processing, the benefits and costs of maintaining multiple mainframe technologies and outdated or redundant software products should be evaluated. DIT should specifically review the feasibility of converting to a single mainframe computer technology. Results of these evaluations should be used to establish compatibility and uniformity policies. In particular, policies that require agencies to move from costly, outdated technologies to newer technologies should be established.

DIT should develop hardware and technology environment plans. These plans should document necessary levels of performance and compatibility for vendors' computer-related products. Vendor performance information should be recorded and used to guide subsequent acquisition decisions.

DIT SUPPORT AND AGENCY USE

Efficient and effective use of computer resources requires a commitment by DIT and by agencies to achieve this goal. DIT can help agencies to better manage use of the State's mainframe computers. Although customer agencies are generally satisfied with DIT's computer services, agencies desire additional assistance in areas such as problem resolution, product research, and training.

Although DIT can help agencies use computer services efficiently, DIT cannot control agencies' use. Agencies need to exercise greater controls over computer services use. Agencies' costs for computer services are driven more by their own use than by any operational inefficiencies within DIT.

Monitoring Resource Use

As the centralized data processing center, DIT has the necessary technical staff and software products to economically monitor agencies' use of its computer resources. Although agencies must assume primary responsibility for use of DIT's computers, agencies do not have a statewide perspective or the same sophisticated tools for monitoring utilization. DIT has these capabilities. Therefore, DIT needs to increase its emphasis on assisting agencies to efficiently use computer resources in areas such as production runs, data storage, and database management. DIT could also expand its commitment to "cost-containment" reviews in order to help agencies identify more economical programming techniques.

Production Control. DIT executes approximately 15,000 job steps in batch processing each day. Approximately 58 percent of these steps are processed between 8 a.m. and 5 p.m. -- the peak processing period for on-line transactions. E&W estimated that, as a result, DIT operated at approximately 65 percent of capacity during the day, but only 20 percent of capacity at night. (These statistics were compiled before DIT's January 1987 upgrade). By moving batch processing into the evenings, DIT could better balance machine workload, enhance its performance, and attain greater time intervals between equipment upgrades.

DIT currently offers a 25 percent rate reduction for night processing (6 p.m. to 7 a.m.). This reduction is intended to encourage customers to process batch programs in the evening. However, a large amount of batch processing continues during the day. E&W recommends even more significant price incentives: a 25 percent rate surcharge during the day and a 25 percent reduction for agencies which permit DIT to schedule batch production runs.

Even this price incentive method may not, by itself, be sufficient, however. With additional authority, DIT could also use available software products to monitor and control batch processing. If DIT could ensure that the workload were more evenly distributed, mainframe upgrades might be required less frequently. Before DIT implemented such a control procedure, standards for batch processing would have to be developed. DIT and agencies would need to agree upon major batch production runs that could feasibly be processed in the evening without adversely affecting agency operations.

Recommendation (31). To achieve more evenly distributed mainframe data processing, DIT should be given greater authority to manage batch processing for customer agencies. DIT should help agencies identify major batch production runs which could be scheduled during non-peak hours. Standards which govern the appropriate scheduling of batch processing should be developed, and DIT should be given specific authority to enforce those standards.

Data Storage. DIT maintains more than 300,000 disk files on the IBM system. DIT's disk drives and related controllers are valued in excess of \$8 million. In order to meet agencies' continuing demand for data storage, DIT continues to acquire disk storage devices. However, DIT could take additional measures to ensure efficient utilization of data storage and slow accelerating data storage costs.

DIT is upgrading its disk drives in order to use newer, more efficient machines. As an additional efficiency measure, E&W noted that DIT could also use commercial software products to manage data storage on disk. These products monitor frequency of file access and automatically compress and archive files which are not accessed within a pre-defined number of days. These products are capable of releasing up to 30 percent additional disk storage space on existing equipment. By helping agencies identify outdated or infrequently accessed files, DIT could free additional storage space. As a result, agencies' storage costs could be reduced and disk drives could be acquired less frequently.

E&W found that DIT is more efficiently managing data storage on magnetic tape. DIT uses automated tools to maintain tape quality, catalog tape information, protect tape data, and provide security controls.

However, additional measures to help agencies efficiently manage tape use are necessary. Tapes should primarily be used only for file back-up and data transfer between physically separate computer systems. Nonetheless, agencies continue to use tapes for storing frequently accessed data.

Tape storage is costly: tape libraries consume much more physical space than disk drives. Tape technology is also labor-intensive: DIT staff must manually retrieve, mount, and dismount tapes. E&W suggests that an exceptionally high charge per tape mount should be established as a method for discouraging use of tapes for frequently accessed data and production runs. However, use of tape for archiving data should be encouraged.

Recommendation (32). DIT should help customer agencies to better manage data storage files. DIT should identify storage files which are infrequently accessed and decide with agencies how to most efficiently store the data. DIT should also consider using software products that will free additional disk storage space without adversely affecting agencies' access to files.

DIT should develop a two-tiered tape charge. A tape mount surcharge should be established as a method to discourage use of tape for frequently-accessed data and production runs. A discount for use of tape in archiving data should be developed. The rate adjustment should be submitted to JLARC for approval.

Database Management. The ways in which information on large agency databases is organized and stored affects the costs of retrieval and interface with other databases. E&W found that DIT maintains database software but does not adequately advise agencies on how to construct, access, and plan databases. DIT does, however, offer price incentives for agencies wishing to reorganize databases. DIT provides a 70 percent reduction in charges for programs executed solely for database reorganizations.

Agency computer programs for accessing databases may not be designed efficiently. For example, DMV was using a program that used 16,000 read commands. After refining its database access techniques, DMV was able to conduct the same file read search with one command, reducing the monthly processing cost for the program from \$10,000 to \$1,000.

As the focal point for State data processing, DIT could also help agencies adopt data labeling conventions that would facilitate merging databases for composite information purposes. The State Board of Elections might benefit from vital statistics maintained by the Department of Health. Voter registration records could be automatically purged using death records. Multiple State human services agencies may maintain records on some individuals. Efforts to coordinate case management could be achieved if data from various automated systems could be merged.

In order to achieve these data interfaces, labeling conventions are needed. Uniform procedures for recording names, social security numbers, and addresses, for example, would facilitate data exchange. A commitment by DIT to a data administration function would also help the State manage information efficiently.

Recommendation (33). DIT staff should provide agencies with greater assistance in establishing efficiently constructed databases. DIT should also assist agencies in identifying opportunities for sharing information. Database management guidelines which include uniform labeling standards for common information should be established. An independent board, as part of its planning and policy responsibilities, should identify needed database interfaces and require uniform labeling standards when applicable.

Cost-Containment Reviews. Agencies frequently encounter unanticipated and unnecessary costs when using DIT's computer services. Although data processing methods may produce the desired results, alternative processing procedures could achieve the same results at a lower cost. Agencies could reduce costs by processing in a manner that uses less expensive resources with regard to DIT's billing algorithms.

Currently, DIT staff with expertise in the billing algorithms assist agencies in identifying cost-saving opportunities, but this function should be expanded. During FY 1986, two staff have conducted eight reviews of agency systems. This DIT initiative can be an important step in reducing agency data processing costs.

In September 1986, DIT identified cost savings opportunities at the Department of Social Services (DSS). Using job listings statistics, DIT identified a series of batch jobs that were run during the day. These jobs were consistently run late in the work day, and the results were not available to DSS until the following day. By delaying the runs until the 25 percent discount period in the evening, DSS could save approximately \$88,000 per year without experiencing a reduction in services. DSS noted that some of the jobs may still need to be run at the current times so that technical staff can review the output before distributing copies the next morning.

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Also in September 1986, DIT performed an analysis of the Department of Taxation's (DOT) tape storage operations. The team identified more than 2,000 separate tape files that could be condensed onto multi-file tapes. DIT found that DOT could reduce tape files to less than 600. This action would result in an annual savings of \$40,504. Other recommendations for purging unused tapes, for example, would further reduce DOT's costs by approximately \$6,000 per year.

DIT found these cost savings opportunities by reviewing billing data and workload information accumulated within DIT. On-site reviews of systems operations and documentation might result in additional cost-saving findings.

Recommendation (34). The cost-containment function should be expanded within DIT. DIT should place additional emphasis on helping agencies understand DIT's billing algorithms and identify more economical data processing procedures.

Customer Service

Based on the JLARC staff survey of all customer agencies, an average of 87 percent of DIT's customers are satisfied with the range of computer services that DIT provides: batch and on-line processing, technical consulting, and IBM and Sperry support, for example. A third of DIT's customers reported that the overall quality of services has improved since DIT was consolidated in January 1985. Only three customers reported that the overall quality had declined.

Although customer satisfaction is generally high, agencies desire greater assistance from DIT in certain areas. These areas include problem resolution, technology research, and training. In addition, DIT might consider reinstating computer user groups with its customers. Performance standards that customers can expect DIT to meet are also necessary.

Problem Resolution. In 1986, DIT created a "help desk" as a focal point for receiving agency questions. The intent of this function is to centrally log customers' concerns and questions and route those questions to appropriate staff within DIT for resolution. Customers' reactions to the usefulness of this help desk are mixed:

According to staff at the Attorney General's Office, "Once you find the person who specializes in your problem, it is usually resolved quickly. The help desk is an improvement but more efforts should be made to educate users on who is responsible for coordinating [problem resolution] efforts within DIT."

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In interviews with JLARC staff, personnel of the State Corporation Commission (SCC) reported that DIT's help desk retards problem solving. DIT's responses to the agency's questions are delayed, or problems are routed to inappropriate staff for resolution. As a result of these problems, SCC staff prefer to call knowledgeable contacts within DIT and circumvent the help desk.

The success of DIT's help desk will depend on agencies' use and DIT staff's support. Properly operated, the help desk should serve as a focal point for recording and routing all agency requests for assistance. DIT staff should intensify their efforts to encourage agencies to contact the help desk.

E&W found that DIT's Sperry support staff are not consistently logging problem status and solutions information on the automated problem management system. DIT personnel staffing the help desk may need additional training to understand the Sperry technology as well as they understand the IBM technology. Sperry customers do not have the same level of confidence in the help desk function and are seeking assistance from other staff within DIT. In order to function properly, the staff should have sufficient expertise to answer most customers' basic questions. Only the most complex problems should be routed to technical specialists elsewhere within DIT.

Recommendation (35). In order to record and successfully track all requests for assistance, DIT staff should direct agencies to first contact the help desk. DIT should maintain data on all requests and responses, and build a problem management database. This database should be used to develop specific management and technical strategies for addressing recurrent problems.

Technology Research and Training. Customer agencies reported that they would like DIT to provide more information on available new technologies. Informal investigations of new technologies are currently conducted throughout DIT's various organizational branches. E&W found that product research "is not tied to strategic direction or hardware/software acquisition plans. There are no documented procedures for conducting requirement studies. The result is a random rather than a systematic approach to recognizing opportunities presented by new technology."

According to DIT staff, customer agencies frequently become aware of new technology opportunities through vendors. E&W noted that plans are formulated for new product installation before DIT finds out that an installation is under consideration. Vendors convince agencies of the merits of a specific product that may be incompatible with DIT equipment. When an agency commits to a product, DIT becomes responsible for making it work somehow in the current environment. Statewide planning would help set directions for the types of products and technologies DIT can economically and effectively support.

DIT is currently considering a "computer store" as a method to partially accomplish product research. Computer products from various vendors will be available for testing by DIT and agencies. However, this approach is not designed to effectively link all DIT's informal research activities, nor should it be considered a substitute for a formal technology research program.

Agencies also expressed an interest in additional training. Training functions within DIT are currently fragmented among various organizational units. DIT does not have a coordinated approach for providing this training or utilizing vendors and manufacturers for training purposes.

Recommendation (36). DIT should develop a planned approach for conducting technology research. Statewide and agency information management plans should provide the focus for DIT's research. With assistance from agencies, DIT should identify, test, and evaluate new computer products

with likely applications in agencies. When agencies plan to evaluate new technologies, DIT should be included in order to assess the impacts on DIT's operations. Information regarding new products and their test results should be summarized and distributed to all agencies. DIT should also establish a formal, continuous training program, after identifying the most crucial needs within agencies.

Computer User Groups. DIT sponsors six computer user groups. Three of the groups are focused on Sperry-based products, and three are focused on IBM-based products (including ADABAS). Use of these computer groups should be expanded. As reported on the JLARC staff survey, only 12 percent of DIT's computer services customers participate in the user groups.

These computer user groups can serve a valuable purpose in an inexpensive way. Rather than relying on outside consultants or vendor sales representatives for product information, State employees can learn from the experiences of others.

Staff at the Department of Motor Vehicles have refined their use of ADABAS, a complex database system. Like any other system, if the product is not used properly, it will be costly to use. This information would have been helpful for Department of Accounts staff when they encountered unanticipated costs in operating the CARS II accounting system on ADABAS.

Recommendation (37). DIT should establish and promote agencies' use of computer information groups and establish additional groups focused on the common technologies. Agencies should actively participate in these groups.

Performance Standards. At one time, DCS also had formal service agreements with some of its largest computer services customers. The agreements were designed to achieve mutually satisfactory performance expectations for DCS's computer centers.

Service agreements were abandoned about the time that DIT was established because DCS and customers did not always agree upon acceptable levels of performance. Moreover, acceptable performance levels for some agencies were unacceptable for others. For example, if DIT's system was designed to meet the needs of the customer with the highest expectations, all others would pay a share of the cost for a larger, more powerful mainframe computer.

Although service agreements were unsuccessfully used in the past, the underlying need for performance standards is still valid. Computer processing response time, for example, is an important factor in agency productivity.

E&W calculated that each second of response time costs approximately \$0.002 per second. This factor was based on the average salary of computer terminal users (\$16,021) divided by a standard 40-hour work week. The Department of Motor Vehicles has approximately 1,100

on-line computer terminal users, processing 160,000 transactions per day. Consequently, each second of response time costs DMV about \$342.33 per day in "unproductive" time, or \$82,659.26 per year.

In the case of a large agency, such as DMV, the difference between a three-second and four-second response time has important cost considerations. On the other hand, the cost of larger mainframe computers that DIT might have to purchase in order to provide three-second response time could offset productivity savings. Consequently, the State needs standards that balance efficient levels of service with costs of providing services.

Using these standards, DIT could better project when a system or equipment upgrade is necessary. If excessive computer utilization degrades response times to unacceptable levels, then decisions to upgrade could be considered. Without this information, DIT may initiate upgrades later or earlier than necessary.

In the past, service agreements were not effectively implemented because agencies and DIT could not necessarily agree on uniform levels of service. Moreover, no method for enforcing the agreements existed. In order to effectively implement performance standards, a neutral third party needs to decide on the standards and monitor compliance. These standards should be directly linked to the State's data processing plans and objectives.

Recommendation (38). In order to identify necessary, economical, and uniform service levels, uniform performance standards for DIT's data center should be established.

Agency Utilization

Although DIT is responsible for efficiently providing computer services, agencies are responsible for efficiently and effectively using those services. Recognizing that the State use of information technology is most significantly affected by agency use of computer services, JLARC staff directed E&W to review seven customer agencies: the Departments of Accounts (DOA), Motor Vehicles (DMV), Personnel and Training (DPT), and Social Services (DSS), plus the Virginia Supplemental Retirement Systems (VSRS), the State Corporation Commission (SCC), and the Alcoholic Beverage Control (ABC) Board. Selection of these agencies was intended to represent a cross section of data processing activities on the IBM and Sperry systems.

In reviewing these agencies' computer applications, E&W found that none of the agencies had a comprehensive information management plan. DMV and DOA had one component: a plan to guide systems development efforts. Among these customer agencies, documentation of the systems is generally not complete, making it difficult to maintain and modify systems. Some systems are redundant, outdated technology which are ineffective and costly to maintain.

Scope of Data Processing Activities. The seven selected agencies maintain 78 major computer application systems, 3,150 major data files, and 6,619 programs. An average of 455,788 transactions are processed per day, and more than 2,860 different reports are generated. The average age of the systems is 9.2 years; implementation was initiated as early as 1966 and as recently as 1986. E&W surveyed all applications to identify general documentation characteristics. E&W also reviewed ten applications in more detail.

Agency Planning. When agencies fail to adequately plan for major applications systems, the expected benefits of the systems may not be fully realized. Planning is especially important when systems are to serve integrated, statewide functions.

The State's central automated systems for personnel and payroll have not yet achieved full integration that might still be possible. There are some redundant components in each system. Also, special communications links are necessary in order for users to access both systems. The personnel system (Personnel Management Information System) operates on the Sperry system. The payroll system (Commonwealth Integrated Payroll and Personnel System) operates on the IBM system.

Moreover, the payroll system has not been implemented on the schedule originally planned. In turn, agencies reported that their plans to access and use the system have been disrupted. Efforts to convert functionally-redundant leave accounting systems in agencies, for example, will be delayed.

As discussed throughout this report, information management plans are a crucial starting point for ensuring effective use of automation to meet agencies' policy and program objectives. E&W found that none of the agencies formally linked all systems functions to agency policy. Agencies place a high degree of reliance on individual programmers' knowledge of agency operations and abilities to adjust systems when policy changes are made. Agencies are, therefore, exposed to the adverse impacts of personnel turnover when inadequate documentation exists.

System Documentation. In surveying all of the seven agencies' applications, E&W found varying degrees of systems documentation (Table 13). Documentation standards are needed for management control, audits, and maintenance. Systems documentation should include functional requirements of the system, service level requirements, narratives and work flow diagrams, data dictionaries, testing criteria, and report samples among other items.

Only 18 percent of the systems had documentation of the service levels necessary to adequately operate the systems. Three of these seven agencies did not know what their service requirements were. Ninety-three percent of the systems had descriptive narratives, but only 56 percent had work-flow diagrams that described the organizational and automated

Table 13

CUSTOMER AGENCY APPLICATION SYSTEMS:
SUMMARY OF DOCUMENTATION ATTRIBUTES

<u>DOCUMENTATION</u>	<u>Percentage of Systems with Documentation</u>							<u>Average</u>
	<u>DOA</u>	<u>ABC</u>	<u>DMV</u>	<u>DPT</u>	<u>DSS</u>	<u>VSRS</u>	<u>SCC</u>	
Service-Level Requirements	100%	42%	4%	0%	29%	0%	0%	18%
Documentation Standard	100	100	92	100	38	100	100	77
Functional Requirements Document	100	67	88	100	58	100	100	77
System Narrative	100	100	96	100	83	100	100	93
Work-Flow Diagrams	100	75	81	0	42	0	100	56
Data-Flow Diagrams	100	83	92	100	71	0	100	73
Structure Charts	100	75	81	100	67	0	100	66
Program Specifications	100	75	96	100	67	100	100	84
Data Dictionary	100	100	12	100	21	100	0	62
Testing Criteria	100	33	77	0	29	0	0	42
Transaction Descriptions	100	100	85	100	46	100	100	90
Screen Formats	100	100	92	100	75	89	100	94
Report Samples	100	100	100	100	79	89	100	92
Software Function/ Agency Policy	0	0	0	0	0	0	0	0

Source: E&W review of applications systems.

interfaces. Sixty-two percent of the systems had documented data dictionaries describing the data residing on the systems.

Functionally Redundant Systems. Agencies maintain a number of functionally redundant systems, particularly in accounting and personnel areas (Table 14). For example, ABC maintains an automated general ledger system apart from the State's CARS II general ledger system. Although different systems are needed because ABC operates on an accrual basis and is an enterprise fund, there is no automated interface with CARS II. Similarly, there is no automated interface between IBM users' personnel-related systems and DPT's central personnel system on Sperry. ABC, DMV, and DSS all maintain their own personnel-related systems. Additional opportunities for developing unified central applications should be explored.

Table 14

FUNCTIONALLY REDUNDANT SYSTEMS

<u>Agency</u>	<u>Vendor Payment</u>	<u>General Ledger</u>	<u>Payroll</u>	<u>Personal Leave</u>	<u>Human Resources</u>
Department of Accounts	•	•	•	•	•
Department of Alcoholic Beverage Control		•	•	•	•
Department of Motor Vehicles			•	•	•
Department of Personnel and Training					•
Department of Social Services	•		•	•	•
Virginia Supplemental Retirement System		•			

Source: E&W technical supplement.

Outdated Technologies. DOA, ABC, and DMV still use outdated Data-100 minicomputers for bulk data entry and as remote job stations. The equipment is experiencing reliability problems and is difficult to replace. ABC also maintains a database management system, TOTAL, which has not been updated since 1973. This software cannot be used on the more efficient IBM-3380 disk drive, so ABC must also maintain outdated hardware. E&W also

found that DMV maintains outdated telecommunications software for accessing data files.

Agencies often may recognize that technologies need upgrading in order to achieve greater operational efficiencies. However, they do not have strategic or acquisition plans to guide system improvements. Decisions are made as a reaction to problems, rather than anticipating and endorsing periodic evaluations of and enhancements to systems.

Applications Prototyping. "Fourth generation" computer languages are typically used to develop system models and for automated decision support systems. These languages, such as MAPPER used by DSS, are relatively simple to understand and use. Therefore, they are frequently used to develop prototypes of systems. These languages are not efficient languages to use on major application and production systems because they consume far more machine resources than basic languages such as COBOL or DMS-1100. For example, E&W found that DSS uses MAPPER-based code for the refugee management information system. Use of this system has expanded, and DSS intends to convert parts of this system to more efficient operating languages in COBOL.

E&W noted that the State does not have any written policies or standards on how application prototyping and fourth generation languages should be used. As a result, some applications may not make the best use of the resources at DIT. E&W cited the new CARS-II system as one such application:

CARS-II is the "official" general ledger of Virginia government. It is maintained by the Department of Accounts, and was implemented for statewide use on July 1, 1986. CARS-II uses the Commonwealth's chart of accounts. Some agencies modify or use subsidiary accounts to meet unique agency accounting requirements.

General ledger applications generally do not require complex data structures. Detailed journal entry records are typically accessed by agency identification, fund, accounting period, and account number. ADABAS is capable of this, and much more, and the NATURAL language does provide an easy facility for report writing and user inquiry. However, it is questionable whether the power of ADABAS/NATURAL is efficiently utilized by this application. The same functionality might have been achieved through the use of CICS/VSAM with individual agency extract files for the summary data. Special reports could be run by agency-written routines via COBOL, Easytrieve or SAS, and inquiries supported via CICS.

Opportunities for Using Other Computer Technologies. E&W also reviewed agencies' mainframe systems to determine if some might be more efficiently run on minicomputers or microcomputers. E&W found that the SCC's Corporate Information System is appropriate for a minicomputer

application. The system has relatively few updates but a large number of inquiries. It also has a limited number of users, all in one location.

Recommendation (39). Agencies should develop information management plans and exert greater controls over computer services use. The State should develop uniform standards to ensure that systems are adequately documented to facilitate maintenance and modification. Planned schedules for evaluating software and hardware capabilities should be developed, and plans for replacing outdated, inefficient equipment should be developed and reviewed by central planning staff. Agencies should be governed in their use of various programming languages when designing computer applications by standards and statewide planning objectives. As part of statewide planning efforts, opportunities for using minicomputer and microcomputer applications should also be explored.

CENTRALIZATION VERSUS DECENTRALIZATION

One of the principal information technology issues confronting Virginia is: Should the State continue in its attempt to centralize computer services, or should agencies be permitted to purchase and operate their own computer systems? This issue has been partially addressed: DIT was created as a consolidated information technology agency. However, a number of agencies are using computer systems other than DIT's mainframe. This trend toward decentralization is likely to continue as agencies acquire smaller, less expensive computers.

The State needs a planned approach for appropriately using the various computer technologies. All technologies can be linked together by communications networks in a distributed processing design. However, policy directions and standards must be adopted in order to achieve this objective.

Computing in State Government

Recent efforts to co-locate the State's mainframe computer centers and consolidate three agencies into DIT have centralized the State's use of information technology. However, agencies continue to add and upgrade their own smaller computing facilities. The advantages of centralized and decentralized computing need to be explored further.

Centralization. Virginia is among a few states (such as Kansas and New Jersey) with a highly centralized information technology agency. In 1984, the State's five mainframe computer centers were consolidated into one under the direction of the Department of Computer Services (DCS). University computer centers remained independent. In late 1984 and early 1985, computer services (DCS), systems development services (Department of Management Analysis and Systems Development), and telecommunications services (Department of Telecommunications) were united in DIT. Furthermore, the Appropriations Act reinforces DIT's role as the State's central computing facility by preventing agencies from using private facilities for automated information processing unless DIT grants exceptions:

No state agency shall contract for the purchase of or for the continuous use of any item of automated data processing or word processing equipment, or contract for automated data processing services from a non-state agency without the prior written approval of the Department of Information Technology (§ 4-5.06b).

Virginia's centralized approach has advantages. Economies of scale (in equipment, personnel, and facilities) can be achieved by maintaining only one mainframe computer facility. Interdependent technologies (computers and telecommunications) can be more effectively linked, controlled, and serviced.

Nonetheless, highly centralized mainframe centers have disadvantages. Agencies relinquish some local control of information processing. They cannot directly control costs when the centralized center decides to upgrade, for example. Also, small locally-installed computers can process smaller amounts of information more efficiently and economically than large mainframes.

Decentralization. Although DIT's size and scope of responsibilities characterize Virginia as a "centralized" state, many State agencies and institutions do not rely on DIT for data processing. Thirty-two agencies and institutions use computer facilities other than DIT. Most of the higher education institutions operate their own computer centers. Some agencies, such as the Department of State Police, rely primarily on their own computers. Other agencies operate their own large computers in addition to using DIT -- the Departments of Motor Vehicles, Mental Health and Mental Retardation, and Agriculture and Consumer Services, for example.

The trend toward decentralized data processing is likely to continue. As reported on the JLARC staff survey, 23 agencies expect their utilization of DIT's mainframe to decrease as the agencies expand their minicomputer or microcomputer systems. Eleven agencies expect utilization of DIT's mainframe to increase. Thirty agencies expect use of minicomputer systems to increase, and 37 agencies expect microcomputer use to increase.

There are some advantages associated with agencies using their own computers. Minicomputers and microcomputers can more efficiently and economically process text and smaller amounts of data than DIT's large mainframes. Also, agencies can exercise greater control over the costs of their own systems, and they can custom design those systems to meet unique needs.

However, smaller computers do not have the necessary computing capacity to efficiently process large amounts of information. Also, agencies may not be able to afford or access sophisticated software for their smaller computers. Some software may only be available on the mainframe; other software may be available on the mainframe, but its costs may be prohibitive if infrequently used. Opportunities to access common statewide systems, such as budgeting and accounting, would be impaired if agencies exclusively used their own small systems without links to a central system.

Directions for the Future

By planning and building a distributed information processing network, State government can use the strengths of its centralized mainframe technology and the decentralized minicomputer and microcomputer technologies. However, efforts to build such a network will only be successful if statewide policies and standards are adopted. This guidance is necessary in order to ensure compatibility of data, software, and equipment as State agencies and institutions add and upgrade their computer systems.

Distributed Data Processing. Many of the larger State agencies and some smaller agencies are using all three computer technologies in a distributed data processing network. Through a single terminal, agency staff can access DIT's large mainframe computer (for complex analyses or large production runs), minicomputers (for word processing and electronic messaging), and perform microcomputer analyses (on smaller subsets of data).

The future success of distributed data processing in State government will depend on compatibility of systems and telecommunications networks. Agencies which purchase computer systems that cannot be linked with the State's mainframe will not have the option to access central budgeting or accounting systems, for example. Statewide policies and standards have not been developed for the purpose of ensuring sufficient compatibility and supporting communications networks.

Some agencies may not need to access all three computer technologies. However, policy decisions must be made regarding which agencies currently need access to all technologies or may need access in the future.

Statewide Policies and Standards. As a first step toward fully utilizing appropriate computer technologies and networks, the State must adopt the concept of distributed data processing as a planning objective. Otherwise, agencies will continue to press for piecemeal upgrades and additions which may inhibit subsequent efforts to achieve networks or hierarchical mainframe, minicomputer, and microcomputer processing.

By adopting uniform standards, the State can take a second important step toward ensuring an economical and effective distributed processing environment. The International Organization for Standardization, for example, is developing standards to promote functionally compatible computer systems that accommodate diverse designs. These standards and others need to be explored as a method for achieving compatibility without unduly restricting competition.

Recommendation (40). The State should evaluate agency information technology plans and computer needs for the purpose of identifying opportunities for distributed processing networks. The State should develop standards that ensure compatible information processing and communications systems. The State needs to adopt policies that specify under what conditions agencies should be permitted to develop their own computer systems. Criteria for determining interface requirements with other systems should also be established.

VI. TELECOMMUNICATIONS

Recent industry deregulation and technology advances present two significant telecommunications challenges in State government:

- (1) Within the current competitive market, what kinds of services need to be provided by DIT in order to ensure economical and effective use of telecommunications technology?
- (2) How can the State efficiently use integrated technology networks for transmitting voice, data, text, and video among agencies?

As the centralized information technology agency, DIT will play a key role in addressing these challenges.

Prior to industry deregulation, the State relied on C&P Telephone Company of Virginia for most services. Now, DIT must play a more active role in managing the State's telecommunications system, coordinating service from various vendors, and helping agencies design and procure economical systems. In order to achieve economical and effective telecommunications systems, DIT needs to increase its emphasis on planning and optimizing the system at the statewide level. DIT also needs to help agencies accomplish the same objective at the agency level.

The State has taken an important first step toward integrating telecommunications and computer technologies. Virginia is one of only a few states which have consolidated telecommunications and computer services within one centralized agency. However, additional steps are necessary. The State can achieve substantial cost savings by sharing communication networks among agencies and by transmitting multiple types of information through integrated networks. Studies designed to explore these opportunities and efforts to implement the available economies of scale are in progress.

JLARC staff reviewed DIT's support services and identified major statewide telecommunications issues. However, JLARC staff placed less emphasis on the review of telecommunications than on other areas of this study. The Department of Planning and Budget (DPB) hired a consultant to study statewide telecommunications needs. DPB expects the telecommunications study to be completed in October 1987.

DIT SUPPORT SERVICES

State government is one of the largest users of telecommunications services in Virginia. DIT secures these services (Exhibit 5) through the 21 telephone companies (vendors) in the Commonwealth. Voice communication via telephone is the most frequently used service -- approximately 5.5 million minutes of service per month. A significant portion of the State's data, processed by DIT mainframe computers, is transmitted to 8,500 remote terminals in agencies via 15,000 miles of data communications lines.

Exhibit 5

DIT'S TELECOMMUNICATIONS SERVICES

<u>Type of Service</u>	<u>Description</u>
SCATS Service	- The State Controlled and Administered Telephone System (SCATS) is a private telephone network owned by the Commonwealth and maintained by the C&P Telephone Company of Virginia. It serves all State agencies and has 2,500 access lines.
Data Lines/Data Equipment	- Data lines and equipment are part of the Commonwealth's private telephone network. The network consists of the dedicated lines, modems, and circuits used for the transmission of data to DIT computers and other computer centers found in certain agencies and institutions.
Mainline Service	- This is the CENTREX service which is one of the actual voice lines serving each State agency. CENTREX dedicates a portion of the C&P central office switch and assigns sequential extension numbers to the various users.
Direct Services	- Direct Services include telecommunications equipment such as handsets, intercoms, extensions, special features, etc.
Tolls	- This element represents customer usage of the normal common carrier long distance facilities.
Other Charges and Credits	- This service includes vendor installations, deinstallations, service orders, partial month service, etc.

Source: E&W representation of DIT services.

DIT spent approximately \$35.4 million for telecommunications services in FY 1986. Of this amount, approximately 90 percent was paid to telecommunications vendors, and approximately 10 percent was spent for DIT staff support. DIT's telecommunications division is comprised of 69 staff positions.

State agencies and institutions are generally satisfied with DIT's support services. On JLARC staff's customer agency survey, an average of 84 percent of the agencies reported they were satisfied with DIT's range of telecommunications services. Some services warrant additional attention,

however. Coordinated efforts in network maintenance, performance monitoring, and capacity planning would improve the availability and quality of voice and data transmissions. Agencies could also benefit from additional DIT assistance in redesigning and upgrading telecommunications systems. At the same time, DIT's procedures for ordering telephone equipment are unnecessarily cumbersome.

Network Management

Prior to May 1, 1987, DIT contracted with C&P Telephone Company of Virginia for maintenance service to manage voice and data network problems. DIT, as well as individual agencies and institutions, reported problems to C&P. C&P analyzed the problems, determined which vendor was responsible for resolving the problems, and tracked resolution of problems until they were completed. Periodically, C&P provided DIT's telecommunications division with a report of all trouble calls.

The maintenance service contract expired at the end of April. DIT determined that it could provide the same service less expensively. This arrangement will provide DIT with more timely network performance and maintenance data. However, in order to effectively manage the State's telecommunications network, DIT needs additional line utilization data, coordinated capacity planning, and a focal point for recording and resolving customers' service problems.

Network Problems. Although most customers were satisfied with the statewide telephone network maintained by DIT, 15 customers (including some of the largest users) did not think the network had sufficient capacity (communications lines) to handle their volume of voice and data transmissions:

The University of Virginia (UVA) reported that long distance service has improved, but is still unsatisfactory: "The network is frequently busy or noisy. DIT has installed additional trunk lines but additional lines are necessary." The College of William and Mary, Longwood College, the Department of Alcoholic Beverage Control, and the Virginia Employment Commission were among other large users who noted similar concerns.

When agencies notify DIT of network problems, DIT attempts to diagnose the problem. DIT uses special line monitors to identify transmission difficulties on individual lines. However, DIT does not have a comprehensive strategy or supporting technical tools to monitor the entire system's capacity and performance. By developing its system monitoring capabilities, DIT could better anticipate telecommunications needs and prevent system failures.

Inadequate Information. Voice and data communication information accumulated by DIT is inadequate for acceptable maintenance and capacity planning purposes. Without adequate network information, DIT cannot adequately address line problems, determine when to add new services, upgrade existing services, or explore technology upgrades.

On-line monitoring of voice communications services (incomplete calls, minutes of use, and other line utilization information) is not routinely available on the State mainline telephone service (CENTREX). In addition, data communications information is incomplete. DIT operates a computer system which monitors incoming data as it enters the computer center. This system, TESTDATA, provides data line utilization information, user response time rates, and line availability percentages. However, Ernst & Whinney (E&W) found that the capacity of TESTDATA to collect information is limited.

TESTDATA does not monitor approximately 40 percent of the data lines that originate at DIT and provide computer access to agencies. Data collected on the remaining 60 percent of the circuit is unreliable because TESTDATA fails to record network activity at all locations on the circuit. If a line is unmonitored and a request is made to have the line monitored, an operator must physically disconnect a line cable from TESTDATA in order to provide space for the requested line. This is time-consuming and jeopardizes the stability of the network.

DIT recognizes the limitations of TESTDATA. Telecommunications staff are attempting to find a suitable replacement.

Uncoordinated Capacity Planning. The Telecommunications Division is responsible for monitoring the statewide network, for capacity planning, and for evaluating network performance. However, agencies or institutions with their own data centers (such as the largest state universities) monitor, evaluate, and plan individual data center telecommunications networks which connect with the statewide network. In addition, DIT's Computer Services Division monitors the data center network at the Plaza Building.

The telecommunications division has three separate groups involved in network planning, design, and performance monitoring. The integrated technology branch is responsible for performance monitoring, design, and capacity planning for the SCATS voice network. The engineering section of the data communications branch plans, designs, and monitors the State's data lines, while comparable efforts for CENTREX telephone service are handled by the telephone section of the voice communications branch.

By the spring of 1988, State agencies and institutions with separate telecommunications networks for data centers will all be a part of a shared statewide network. Consequently, voice and data signals will be run together through common pipes forming a "backbone" network across the State. Once this network is fully operational, it will be imperative that agencies and institutions provide network performance and capacity data to DIT. Without this data, DIT cannot effectively monitor and plan the statewide telecommunications network.

The computer services division in DIT operates the hardware devices which monitor DIT's data center network. While these tools are primarily used to monitor the computers, network information and statistics are channeled to the telecommunications division for use in monitoring the statewide tele-

communications network. Exchange of information between the two divisions is necessary to ensure that telecommunications planning incorporates all voice and data lines.

Need for a Comprehensive Help Desk. The telecommunications division does not operate a central problem monitoring function comparable to the computer services help desk, nor does DIT maintain one central focal point for resolution of all technical problems. As a result, problems with data communication lines may be reported to the computer services division but never relayed to the telecommunications division. Proper telecommunications maintenance and planning will require DIT to consolidate its problem monitoring and response functions.

Recommendation (41). DIT should develop and implement a formal capacity planning methodology for the statewide telecommunication system. DIT should collect additional performance data on voice and data communications by upgrading software and hardware used to monitor the system. DIT should also coordinate data collection efforts split between the telecommunications division, the computer services division, and State agencies which operate telecommunications networks linked to the statewide network. DIT should expand its current trouble reporting service to encompass all voice and data communications. All problems should be centrally recorded and tracked to ensure expedient resolution.

Engineering Studies

Now that the telecommunications industry is more competitive, State agencies can achieve substantial savings by redesigning their telecommunications systems. As the State's central repository of telecommunications expertise, DIT can serve a vital role in helping agencies design economical systems.

Agencies' Concerns. As reported on JLARC staff's customer agency survey, 81 percent of the agencies were satisfied with DIT's technical consulting and systems design services:

Staff for the Virginia Supplemental Retirement System reported that the quality of DIT staff has improved: "They seem more knowledgeable and experienced."

Agencies noted a few concerns, however, regarding the expertise and responsiveness of DIT:

The State Corporation Commission (SCC) noted that DIT's study of their telephone system was interrupted by a study request from another agency. The SCC reported that DIT staff originally assigned to their study had superior skills and knowledge. When DIT resumed the SCC study, less qualified staff were assigned and a conflicting design was produced. (According to DIT, multiple requests for services required staffing

adjustments. In response to SCC's preference, however, DIT reassigned the original staff to the SCC project.)

Fragmented Service Delivery. Currently, 24 technical staff in DIT's telecommunications division spend at least a portion of their time conducting engineering studies for State agencies and institutions. The voice and the data communications branches provide specialized expertise related to their respective technologies. The integrated technology branch provides expertise in either technology.

A customer agency's request for an engineering study may be handled by multiple branches within DIT. The branches have been known to offer different advice:

The Department of Mental Health and Mental Retardation (MHMR) used the Integrated Technology Branch (ITB) and the Data Operations and Engineering Branch (DOEB) of DIT to conduct a needs assessment for its administrative offices in Richmond and facilities in 18 locations. MHMR intended to develop a local area data communications network. At the same time, data and voice communication services were extensively realigned in Richmond at the request of the Governor. As part of this effort, the Voice Operations and Engineering Branch of DIT recommended use of a specific type of equipment, DATAKIT. However, because DATAKIT would not be available in time to meet MHMR's needs, another system, Electronic Key System, was selected.

Engineering personnel in field offices of the voice communications branch design systems but also provide non-technical assistance by writing service orders for voice equipment and services. Clerical personnel actually process the orders. In the data communications branch, one unit of data engineers design the systems, and a second engineering unit within this branch write and process the service orders. Furthermore, the data communications engineers are centrally located in Richmond, while voice engineers are geographically dispersed in field offices. The integrated technology branch designs statewide networks and writes service orders related to the networks.

Recommendation (42). DIT should designate specific staff to provide technical consulting and engineering studies of agencies' telecommunications systems. DIT's field offices should be staffed by data communications engineers in addition to voice communications engineers.

Service Order Processing

DIT processes between 2,000 and 3,000 service orders each month as agencies add or delete telecommunications services and equipment. Multiple participation in processing these orders contributes to procedures which are sometimes cumbersome and time consuming. Moreover, the majority of both

data and voice service order requests should not require DIT's engineering input in order to be finalized and processed.

Processing Timeliness. Of all the telecommunications services that DIT offers, agencies were most dissatisfied with service order processing. Twenty-seven percent of DIT's customers were dissatisfied with this service. Although more direct interaction between agencies and telecommunications vendors might expedite order processing, DIT needs to track most service orders for network planning and billing purposes. Nonetheless, DIT could take steps to improve processing expediency and simplify ordering procedures.

Multiple Order Processing Efforts. As a first step, responsibility for telecommunications procurements, split between the Division of Purchases and Supply in DGS and Procurement and Contracting in DIT, could be better delineated. The absence of clear-cut guidelines concerning this division of telecommunications procurement responsibility complicates the process:

The Department of Rehabilitative Services (DRS) needed to procure a packet switching network. The APR was sent to DIT, but Procurement and Contracting would not handle the procurement because the network was not a part of the DIT data center network. Consequently, DGS handled the procurement, with DIT Procurement and Contracting personnel on the bid evaluation committee.

* * *

"DIT did not provide any suggestions and did not process part of the order," according to staff for the Council on the Status of Women. Extra effort on the part of council staff was necessary to obtain the equipment and installation desired.

* * *

DIT's Computer Services Division had to go through DGS to procure a \$60,000 data communications test package for the data center.

In April 1987, DGS released a revised procurement manual which is intended, in part, to clarify DIT and DGS procurement responsibilities. Even so, the process remains complex. DIT's telecommunications division writes orders for services and equipment. If requests for services must be competitively bid, DIT's procurement and contracting branch conducts the procurement. If equipment purchases must be competitively bid, DGS' division of purchases and supply conducts the procurement. Orders from existing contracts can be sent directly to the vendors, after DIT's telecommunication staff write the orders.

As a second step, service order processing within DIT might be simplified. Telecommunications procurements are further complicated by branch delineations within DIT's telecommunications division. CENTREX service and equipment requests are routed through the voice communications

branch; requests relating to SCATS are handled by the integrated technology branch. Data communications requests for equipment and service are routed through the data communications branch.

Moreover, it does not appear that engineers and service ordering staff are needed to process a majority of service orders. According to DIT staff, approximately 75 percent of the requests for data communications services and equipment are routine. In regard to voice service and equipment, approximately 80 percent of requests from agencies and institutions are routine. Routine requests require little or no engineering expertise to determine system needs and alternative means of meeting these needs. Consequently, agencies could deal directly with service ordering staff for most of these requests.

Use of the Contract List. As a third step to simplify and expedite telecommunications procurements, DIT could expand the hardware contract list. By expanding the hardware contract list, similar to the one utilized for frequently procured data processing equipment, agencies could more often procure less expensive, frequently purchased telecommunications equipment directly from vendors.

Recommendation (43). DIT should clarify its internal procedures for reviewing and writing telecommunications service orders. Engineering staff should not be involved in processing routine orders. In order to expedite order processing, DIT should facilitate direct purchases by attempting to expand the number of telecommunications items on the hardware contract list.

NETWORK SHARING

State government does not receive the full benefits of shared telecommunications networks. DIT has identified a number of opportunities to achieve cost savings by sharing networks among agencies and integrating communications technologies. However, the State has no plans or policies that endorse shared networks. As a centralized service agency, DIT cannot require agencies to share networks. Consequently, the State needs plans, policies, and standards for ensuring appropriate sharing of telecommunications networks.

Opportunities for Shared Networks

DIT has done a good job of identifying network sharing opportunities that could result in substantial cost savings. These savings could be achieved by increasing the use of shared networks among similarly located agencies and integrating voice, data, video, and other communications technologies within a comprehensive statewide network. The Department of Planning and Budget is currently studying the feasibility of implementing shared networks.

Sharing Networks Between Agencies. Of the existing 393 data circuits serving approximately 830 remote sites, only 16 of these circuits are shared between two or more agencies. Many different State agencies have offices located in the same population areas, sometimes the same building. By sharing data lines, these agencies could achieve cost savings for the State.

DIT currently spends approximately \$2.4 million annually for data communications that connect the mainframe computers with customer agencies. By implementing a shared network, DIT estimates that a 15 percent savings is possible on data communication lines alone (Table 15). These savings may represent a small portion of the total savings possible through a statewide network that includes voice lines, data lines, and equipment.

Table 15

POTENTIAL SAVINGS FROM NETWORK SHARING:
DATA COMMUNICATIONS LINES

<u>Location</u>	<u>Present Cost Per Month</u>	<u>Estimated Cost Per Month</u>	<u>Estimated Savings Per Month</u>
Arlington	\$ 14,688	\$ 12,256	\$ 2,432
Charlottesville	8,327	7,966	361
Fredericksburg	11,254	10,121	1,133
Lynchburg	9,481	8,276	,205
Norfolk	26,305	21,954	4,351
Richmond	84,244	71,125	13,119
Roanoke	<u>42,105</u>	<u>34,755</u>	<u>7,350</u>
	\$196,404	\$166,453	\$29,951

Annual Savings = \$359,412 (12 x \$29,951)

Source: DIT network optimization study.

For example, the Virginia Employment Commission, the Department of Taxation, and the Department of Motor Vehicles each have offices located in Tidewater, Northern Virginia, and Roanoke. Each agency has a separate network running from these locations back to the DIT data center in Richmond. Consequently, each is paying for the same number of network line miles. Once the statewide network is operational, these three separate network circuits will be run through the same line, thereby reducing total line miles by two-thirds of the previous total. The cost of the shared line will be greater than each individual line, but not as great as the combined three-line total.

Similarly, agencies could share local communications networks that do not require the transfer of voice or data information with distant locations. This would require a change in DIT's current billing algorithms so that agencies with shared local circuits would pay only their portion of the line cost.

Cost savings could also be achieved by sharing or eliminating redundant equipment, as illustrated by the following example:

DIT's private branch exchange (PBX) switch was purchased at the time of co-location for \$558,932 (including five years of maintenance) to provide the digital communications capacity needed for the computer operations center. This switch is also used to provide telephone services to the DIT employees in the Plaza Building location. This switch is not shared by Virginia Commonwealth University, which has staff located in the Plaza Building or by DIT staff located in other buildings. Furthermore, once the statewide network is fully implemented in 1988, this switch will provide redundant digital communication services. The switch should be either sold or used to provide digital services to State agencies which will not have access to digital CENTREX service (such as the agencies and institutions located in Farmville, Virginia).

Multi-Technology Networks. Rapid technology advances in the telecommunications industry are providing the State with opportunities to use advanced technology in developing shared communications systems. For example, digital lines can now transmit both voice and data simultaneously. However, the State does not currently utilize this technology. The statewide network simply runs multiple digital lines through a common line in order to reduce network miles and costs. Further savings could be realized if each single line were used to transmit both voice and data.

DPB Study. The Department of Planning and Budget (DPB), in cooperation with DIT, is currently evaluating opportunities for network sharing within State government. DPB has hired a consultant to conduct a statewide needs assessment, recommend technology configuration for a statewide system, develop an implementation plan, and comment on the role of the central agency (DIT). DPB expects the study to be completed before the 1988 Session of the General Assembly.

Statewide Policies and Standards

The State will not be able to take full advantage of network sharing opportunities without a plan and supporting policies and standards for accomplishing this objective. Results from the DPB study will assist the State in developing a comprehensive information technology plan which includes data processing and telecommunications.

Network Sharing Policies. Although DIT has identified cost savings that would result from network sharing, it cannot compel agencies to share with others. Without a plan that identifies which agencies could share telecommunications networks and a State policy that requires network sharing when feasible, cost savings may not be fully achieved. For example, State government uses a mixture of point-to-point and multi-drop lines for voice and data communications. The charge for one multi-drop line is based on the number of drops, but is less than an equivalent number of separate lines. However, all locations cannot utilize the main circuit at the same time. Because multi-drop lines are similar to the "party line" telephone concept, line protocol is necessary to control line access.

DIT cannot establish network sharing policies, set line protocols, or require compliance. An independent supervisory board, if given adequate authority, could require network sharing.

Communications Standards. In order to share communications networks, agency telecommunication systems would need to be compatible. The following example illustrates the impact of incompatible networks and the lack of authority to enforce a statewide telecommunications master plan:

The Virginia Department of Transportation is currently implementing a separate statewide communication network that will link the DEC computers in its nine field offices with terminals in its 45 residencies and with the mainframe in Richmond. VDOT offices are located in some of the same geographic locations as other State agencies. However, local circuits cannot be shared economically with other agencies because VDOT is using a different line protocol for its distributed processing network. Special converters would be necessary to translate communications signals between different technologies.

If the State intends to achieve network sharing, the State will need to develop uniform communications standards for ensuring compatibility and for determining when distributed processing is cost effective. Organizations such as the Institute of Electrical and Electronics Engineers and the International Telecommunications Union are developing such communications standards that might be useful for the State to consider. The State would need to review subsequent telecommunications and computer-related procurements in order to ensure compliance with the standards.

Recommendation (44). The General Assembly may wish to authorize the development of plans and policies that require agencies to share telecommunications networks wherever feasible. The results of the DPB study of telecommunications should be considered when developing statewide policies and plans. The State should adopt uniform communications standards and require review of procurements in order to ensure compatibility of systems and compliance with standards.

VII. FINANCIAL MANAGEMENT

DIT manages three of the State's nine internal service funds. Total revenues from the computer services, telecommunications, and systems development funds are expected to exceed \$70 million in FY 1987. DIT also manages approximately \$10 million in general funds.

Internal service funds are funds used to account for the financing of goods or services provided by one agency primarily or solely to other agencies on a cost-reimbursed basis. Managed properly, internal service funds should just recover the costs of providing services. DIT establishes rates, approved by JLARC, which are used to charge agencies for the services received.

A perception of many executive agencies is that DIT services are expensive and that improvements are needed in DIT's financial management. One of the major thrusts of the JLARC staff and Ernst & Whinney (E&W) studies was to assess the accuracy of this perception. In large part, the costs that agencies incur, especially for computer services, are more directly related to agency use than to DIT's costs or rates. But some problems were found with DIT's overall financial management, costs, and rates:

- DIT has not developed adequate internal management controls over expenditures, and external controls are also lacking;
- Controls over five equipment leases were found to be deficient, resulting in costs over the life of the leases of nearly \$1.3 million in excess of outright purchase costs;
- The cost allocation plan meets federal requirements, but needs additional refinements;
- DIT annually incurs between \$500,000 and \$800,000 in annual salary expenses and fringe benefit costs because a number of positions may be inappropriately classified;
- DIT's costs for providing computer services are higher than other data processing centers reviewed in this study;
- DIT's rates for computer services, based on inaccurate estimates of use, are higher than necessary to recover costs;
- DIT's telecommunications support services could be streamlined to reduce the overhead surcharge;

JLARC staff did not conduct a detailed review of DIT's accounting practices, because a full financial audit of DIT was begun by the Auditor of Public Accounts in April 1987.

FISCAL RESPONSIBILITIES

DIT's responsibilities for administering internal service funds require special financial controls and procedures. DIT develops a cost allocation plan for attributing direct costs to each service element and for distributing indirect costs in a fair and consistent manner. In order to ensure that agencies are appropriately charged for services, JLARC and the federal Department of Health and Human Services approve DIT's cost allocation plan. DIT is also responsible for the usual accounting and financial reporting procedures, which are complex because of the cost allocation requirements. DIT currently uses nine automated accounting systems.

Cost Controls

Because it is primarily an internal service fund agency, DIT receives a "sum sufficient" appropriation for 89 percent of its operational costs. DIT does not operate under the usual fixed limit on appropriations, so it is especially important to ensure that DIT's expenditures are adequately controlled. DIT's internal budgetary restraints and external controls could be strengthened.

Budgetary Restraints. DIT's controls over personnel and acquisition-related expenditures, the two major expense categories of the agency, are weak. Personnel costs account for approximately 20 percent of DIT's total costs. As further discussed in the next chapter of this report, DIT has not developed productivity measures or methods for manpower planning. Without such information, DIT cannot effectively determine the personnel needs of the agency. Moreover, DIT does not adequately review compliance of actual work duties and activities with position classifications. JLARC staff found that DIT annually incurs between one-half million and eight-hundred thousand dollars in additional personnel costs because positions may be inappropriately classified.

Acquisition-related expenditures include contractual services and major equipment purchases or leases. Contractual services accounted for approximately 50 percent of DIT's costs in FY 1986; these services are primarily the contracts that DIT negotiates with telephone vendors. Depreciation and interest are operating expenses which DIT incurs as a result of its major purchases or leases -- primarily for computer-related hardware and software. In FY 1986, depreciation and interest accounted for 36 percent of the internal service fund for computer services, or approximately 15 percent of total agency expenditures.

As discussed in the procurement chapter of this report, controls over DIT acquisitions need to be strengthened. E&W noted that planning for DIT's recent \$4 million mainframe computer acquisition and evaluations of alternatives were not well-documented.

In a review of DIT's financial records, E&W also found that controls over past lease agreements were weak. During the period of September 1982 through December 1984, DIT and its predecessor, DCS, executed five

equipment leases with exceptionally high charges. Payments over the life of the leases will be \$1,298,005 in excess of the costs to purchase the equipment outright. DIT has incurred unnecessary expense as a result of these inappropriate lease/purchase decisions. The majority of this expense was incurred prior to DIT's creation, and DIT's current management had no part in executing these contracts. DIT could cut its expenditures by exercising available buy-out options on remaining leases, where cost beneficial.

In reviewing DIT, E&W concluded:

DIT does a good job in operating the computer and facilitating the implementation of telecommunications systems changes. DIT does not do an effective job in controlling its resources. DIT's management control system is invariably focused upon what they think is the right thing to do, as opposed to being outwardly focused on the achievement of business objectives documented in strategic and operational plans....

E&W suggested that DIT could benefit from systematic procedures for on-going management decisions. DIT's cost allocation plan would serve as the foundation, in which costs, resources, and services would be linked. With a systematic decision support method, DIT could identify the impact of changes in service demand on its costs and resource needs. Currently, DIT has no methods to quantify service units. As a result, DIT has difficulty in adjusting its resource levels to match customer demand.

Recommendation (45). DIT should establish operational objectives for the agency and develop specific plans to achieve those objectives. In particular, these plans should include methods for projecting and controlling personnel, contractual, and equipment-related expenditures. In order to better anticipate and monitor expenditures, DIT should link spending plans with operational objectives.

DIT should attempt to quantify productivity wherever possible. DIT should also develop standards for costs per unit of output. In rate requests submitted to JLARC, DIT should include a description of the output measures and the link with rates. Changes in the amount of output should be included as a basis for adjusting rates.

External Oversight. Weak internal controls reinforce the need for stronger external controls over DIT spending. Unanticipated expenditures and subsequent requests for spending adjustments on short notice have impeded reviews by the Department of Planning and Budget (DPB). As discussed later in this chapter, DPB needs to be more involved in efforts by DIT and agencies to project service needs -- particularly for computer services.

External oversight of DIT's procurements is also needed. Recommendations in the procurement chapter of this report are designed to provide stronger external controls. JLARC staff recommend that authority for statewide procurements of information technology should be separated from DIT and vested in an independent agency.

As discussed in the next chapter of this report, the Department of Personnel and Training needs to more closely monitor DIT's personnel practices. Specifically, DIT's delegated authority for reviewing and classifying positions should be revoked.

Cost Allocation

Because DIT's rates recover federal funds from some State agencies such as the Department of Social Services, Department of Transportation, and the Virginia Employment Commission, DIT is required to comply with federal cost allocation guidelines. DIT's current cost allocation plan has been approved by the federal Department of Health and Human Services.

DIT's cost allocation plan is prepared at a general level for federal purposes. However, in reviewing DIT's implementation of the plan, E&W and JLARC staff found instances where additional refinements were warranted. In order to appropriately attribute costs to corresponding service units wherever possible, DIT needs to adjust certain cost allocations. Specifically, IBM and Sperry computer support, rent, telecommunications, and personnel costs should be reallocated. E&W concludes that DIT's procedures for allocating other costs are generally acceptable but not well-documented.

IBM and Sperry Computing Costs. The costs of DIT's IBM and Sperry mainframe computer systems are aggregated and allocated to the computer services fund. The costs of these two different technologies are not separated, although the systems serve two different groups of computer users. In addition to direct hardware costs, technical support for computer operations, systems software support, database support, and maintenance could also be allocated directly to the separate IBM and Sperry systems.

During the month of November 1986, for example, IBM costs for hardware, software, and facilities were \$964,451. Sperry costs were \$777,891. Dividing total costs by various measures of processing capability, E&W found that the Sperry technology is more expensive per unit than IBM. For example, the IBM mainframes have a total rated capacity of 53 MIPS (million of instructions per second). The DIT cost per IBM MIPS is \$18,197. The Sperry mainframe has a capacity of 26 MIPS; the DIT cost per Sperry MIPS is \$29,919.

By disaggregating IBM and Sperry costs, and recovering the costs through a separate set of rates, DIT could establish a more precise charge for the actual amount of services that customers receive. Currently, IBM customers appear to be subsidizing Sperry customers.

Office Rent. Rent for the 7th Street building, which houses DIT's administrative offices and the data center, is approximately \$1.4 million annually. This entire amount is charged to the computer services fund, although only 90 percent of the direct and indirect rental expense should be charged to this fund. This practice has the effect of subsidizing telecommunications and systems development funds with computer services revenues. Similarly, allocation of other expenses related to the physical plant, such as electricity, insurance, and housekeeping, are not precise.

Telecommunications Services. The costs of using telecommunications services is not charged to the computer services fund or to the systems development fund. As a result, computer services and systems development costs are somewhat understated.

Personnel. In reviewing DIT's activities on a position-by-position basis, JLARC staff found that DIT could achieve greater segregation of personnel costs. For example:

Forty percent of all activities provided in the Technical Services Branch support DIT internal functions such as the development of automated systems for internal use. However, all 14 positions in this branch are charged to the computer services fund. Instead, 40 percent of these personnel (approximately six positions) should be charged as general agency overhead. The costs of these six positions should be allocated to all three internal service funds and DIT's general fund activities.

In the last chapter of this report, JLARC staff propose a reorganization for DIT. This proposal includes recommendations for segregating and allocating personnel costs by three categories: direct services for each fund, indirect services to all funds, and general agency overhead.

Reallocating Costs and Adjusting Rates. The effort that would be necessary to pinpoint all direct costs might favor general (but acceptable) indirect allocation methods. However, greater refinements still would be needed, particularly for major items such as IBM and Sperry system usage, personnel, rent, and telecommunications.

DIT uses complex billing algorithms to charge customers for its various services. For example, computer services rates are actually seven separate rates, which include CPU service, disk storage, lines of print, and others. In order to determine the rate impacts of allocating costs on a more direct basis where possible, DIT will need to recalculate the algorithms and propose revised rates for JLARC's approval.

Recommendation (46). DIT should review and revise its procedures for allocating costs. DIT should separately identify and allocate IBM and Sperry costs. DIT should also refine its methods for allocating office rent, telecommunications services, and personnel. DIT should submit a revised cost allocation plan for JLARC approval by October 1987. To facilitate JLARC's review of the cost allocation plan, DIT should submit a detailed list of allocation procedures for each expenditure category. DIT should prepare its rates for the 1988-1990 biennium accordingly and submit revisions to JLARC for approval no later than December 1987.

COMPUTER SERVICES FUND

DIT recovers costs for providing computer services through a seven-item rate structure: (1) seconds of use on the mainframe computers

(CPU service), (2) number of lines printed on DIT printers, (3) number of lines printed on agency printers, (4) number of tapes used for data storage, (5) seconds of tape use, (6) amount of disk storage, and (7) number of transactions (terminal input messages). DIT also charges a flat fee for use of the Sperrylink office automation system. During the last few years, DIT's computer services rates have more than recovered the costs of providing services. As a result, the fund has accumulated sizable surpluses (Table 16).

Table 16

COMPUTER SERVICES FUND BALANCE
(FY 1983-1987)

<u>Fiscal Year</u>	<u>Revenues</u>	<u>Expenses</u>	<u>Fund Balance*</u>
1983	\$18,163,341	\$18,166,490	\$ 93,780
1984	25,087,064	23,304,452	1,876,392
1985	24,746,186	25,730,649	891,929
1986	29,174,318	29,337,846	728,401
1987(projected)	33,420,412	32,025,323	2,123,490
1988(projected)	38,170,101	37,167,964	3,125,627**

*The fund balance is cumulative: it equals the balance from the previous year plus the surplus or deficit from the current year.

**DIT anticipates that rate reductions will be made during FY 1988 in order to reduce the surplus.

Source: DIT financial statements and projections.

The review of the computer services fund included an E&W comparison of DIT's rates and costs with those of other organizations. JLARC staff reviewed the resource forecasting methods DIT used in calculating rates. In addition, billing procedures were reviewed.

Cost and Rate Comparisons

In order to assess the reasonableness of DIT's costs and rates, JLARC staff requested E&W to compare DIT's costs and rates with other organizations in Virginia (all but one were in the Richmond area). In comparing costs of five comparably sized and configured data processing centers, E&W found that DIT's costs were generally higher than others. This cost comparison was intended to serve as a general indicator of DIT's costs in relation to other

data centers. Recommendations throughout this report identify specific opportunities for DIT to improve operational efficiency and effectiveness and reduce costs.

JLARC staff also requested E&W to evaluate DIT's 1985 rate survey. E&W found that some of DIT's survey methods and the analysis of results were inappropriately applied. Consequently, the survey results, which concluded that DIT rates were generally lower than comparable organizations, do not appear valid. Because of data limitations, E&W was unsuccessful in its efforts to conduct an independent rate comparison with eight other organizations providing computer services.

E&W Cost Comparison. E&W compared DIT's material costs with other organizations that maintained centralized data centers and a large mainframe computer system. E&W collected information on the costs of hardware, software, personnel, and facility resources. The E&W questionnaire was sent to nine organizations in Virginia, selected as the only ones comparable to DIT. These organizations operated IBM or Sperry mainframe computers. Five IBM users provided complete information for the analysis. E&W collected operational expenditure data for a full month, November 1986.

DIT's two-technology data center is larger than any of the other organizations' data centers. Consequently, DIT's total costs are higher than the others. In addition, DIT spends a proportionately greater amount on hardware than the other organizations. On the other hand, DIT spends a smaller portion on personnel (Table 17).

Table 17

PROPORTIONAL COST COMPARISON BY EXPENDITURE CATEGORY
(November 1986)

<u>DIT</u>	<u>Hardware</u>	<u>Software</u>	<u>Personnel</u>	<u>Facility</u>	<u>Total</u>
IBM	56%	8%	30%	6%	100%
Sperry	59%	4%	30%	7%	100%
Average	57%	6%	30%	7%	100%
<u>Other Companies</u>					
A	41%	11%	42%	6%	100%
B	46%	8%	37%	7%	100%
C	43%	8%	34%	15%	100%
D	38%	9%	41%	12%	100%
E	34%	11%	54%	2%	100%

Source: E&W Technical Supplement.

E&W also attempted to compare DIT's costs on a uniform per-unit basis. This comparison was designed to assess costs in relation to various measures of the data centers' processing capabilities. These measures included the rated capacity of the computers as measured in MIPS, jobs processed, terminals used, CPU minutes (processing times for the central processing unit), input transactions, and print output.

E&W found that as implemented by DIT, Sperry technology is relatively more expensive to operate on a per-unit basis than the IBM technology. Moreover, DIT's per-unit costs are generally higher than four of the five other organizations, except on the per-terminal measure (Table 18).

Table 18

COST COMPARISON BY RESOURCE UNIT
(November 1986)

DIT	Unit Measures (Dollars per unit)					
	<u>MIPS</u>	<u>Jobs</u>	<u>Terminals</u>	<u>Minutes</u>	<u>Transactions</u>	<u>Lines</u>
IBM	\$18,197	\$13	\$161	\$36	\$.10	\$.005
Sperry	<u>29,919</u>	<u>18</u>	<u>230</u>	<u>N/A</u>	<u>N/A</u>	<u>.11</u>
Weighted Average	\$22,055	\$15	\$186			\$.01
<u>Other Companies</u>						
A	\$ 8,105	\$ 6	\$224	\$ 5	\$.03	\$.002
B	14,304	8	237	14	.024	.002
C	14,819	5	556	17	N/P	.004
D	17,900	15	356	N/P	N/P	.004
E	22,237	21	796	19	.09	.01

N/A = Not applicable; no valid comparisons of the IBM and Sperry technologies can be made on these measures.

N/P = Not provided.

Source: E&W Technical Supplement.

Overall, E&W's analysis indicates that DIT's costs are higher than the other organizations examined. Recommendations throughout this report identify methods to provide services more effectively and efficiently. Implementation of these recommendations should result in current cost savings or future cost avoidances. As DIT's costs decline, DIT's rates should also decline.

DIT Rate Survey. In October 1985, DIT compared its rates with the rates of seven public and private organizations. These were the states of Georgia, Kansas, Montana, and New Mexico; Virginia Polytechnic Institute and State University (VPI); The Computer Company; and Litton Computer Services. As a result of the survey, DIT concluded that it was measurably less expensive as a provider of computer services than private sector firms. The study also concluded that DIT's rate structure was competitive with comparable agencies in other states. DIT concluded that because some costs of university computing centers are subsidized, a fair comparison between VPI and DIT was not possible.

Rather than simply comparing published rates, DIT attempted to calculate the amount and cost of resources used by model computer jobs. E&W noted errors in DIT's rate comparison methodology. For example,

- (1) DIT did not consistently use participants which offered teleprocessing capabilities comparable to DIT's TSO (time sharing option) service. For example, if DIT had compared New Mexico's TSO-equivalent service, New Mexico's price would have been 34 percent less than that computed by DIT. As a result, New Mexico's on-line transaction rates would be less, not greater, than DIT's rate for this service.
- (2) DIT did not adjust its comparison to reflect pricing incentives offered by other organizations. For example, New Mexico deliberately increased its rates to discourage customers from using more expensive tape service and two-ply paper for printed output. E&W subtracted these factors from the computations of DIT's and New Mexico's rates for a typical batch processing job. E&W found that New Mexico's bill would be 34.2 percent less expensive than DIT's bill, not 23 percent more expensive as reported by DIT.
- (3) DIT compared only IBM-related components with its rate structure. Kansas and Georgia also operate Sperry systems which could have been compared to the same system in DIT. Instead, DIT used its one summarized rate for Sperry and IBM workload measures. Consequently, DIT computations were based upon dissimilar systems.
- (4) DIT inappropriately interpreted some of the other organizations' billing algorithms. For example, DIT erroneously equated the hourly rate for the Kansas tape drive and disk controller usage with elapsed clock time. Typically, processing time is significantly less than clock time because actual processing does not occur during the entire duration of elapsed clock time. Consequently, the processing time and job cost for Kansas were overstated.

E&W Rate Comparison. In an effort to independently compare DIT's rates with other organizations providing computer services, E&W attempted to identify the computer resource requirements of four customer applications.

E&W contacted organizations that charge for computer services in this review. Of the eight companies contacted by E&W, five decided not to participate because they could not match their billing and rate schedules to the resource elements in DIT's system. E&W determined that the estimates provided by the remaining three were unreliable because the hardware or software environments were incompatible with DIT's environment, the billing algorithms recovered costs differently, or the estimates were subject to volume discounts.

E&W concluded, "an accurate rate comparison is not possible given the current DIT environment and usage accumulation procedures." Future attempts to compare DIT's rates with others will require more precise resource accounting at DIT and customer agencies. Currently, billing accounts do not necessarily match specific customer computer applications. As a result, neither agencies nor DIT are able to track the impacts of workload changes on bills. This also affects agencies' and DIT's abilities to project computer utilization, which will be discussed in this chapter. After resource utilization is documented, organizations with similarly defined resource elements need to be identified. Additional discussion of the E&W method is included in the technical supplement to this report.

Utilization Projections

An accurate estimate of computer usage is the most important factor in DIT's rate-setting process for computer services. DIT's rates are calculated by dividing total budgeted expenditures by projected utilization. If DIT's estimate is less than actual utilization, the unanticipated additional utilization will generate excess revenues. On the other hand, if DIT's estimate is greater than actual utilization, shortfalls in utilization will result in insufficient revenues to cover costs.

Customer Assistance. Section 2.1-563.18 of the *Code of Virginia* directs DIT to assist agencies in forecasting service needs. As the first step in assisting agencies, DIT provides recent historical information on computer usage. DIT requests agencies to use the information in order to provide utilization estimates based upon anticipated workload changes and revisions or additions in automated systems.

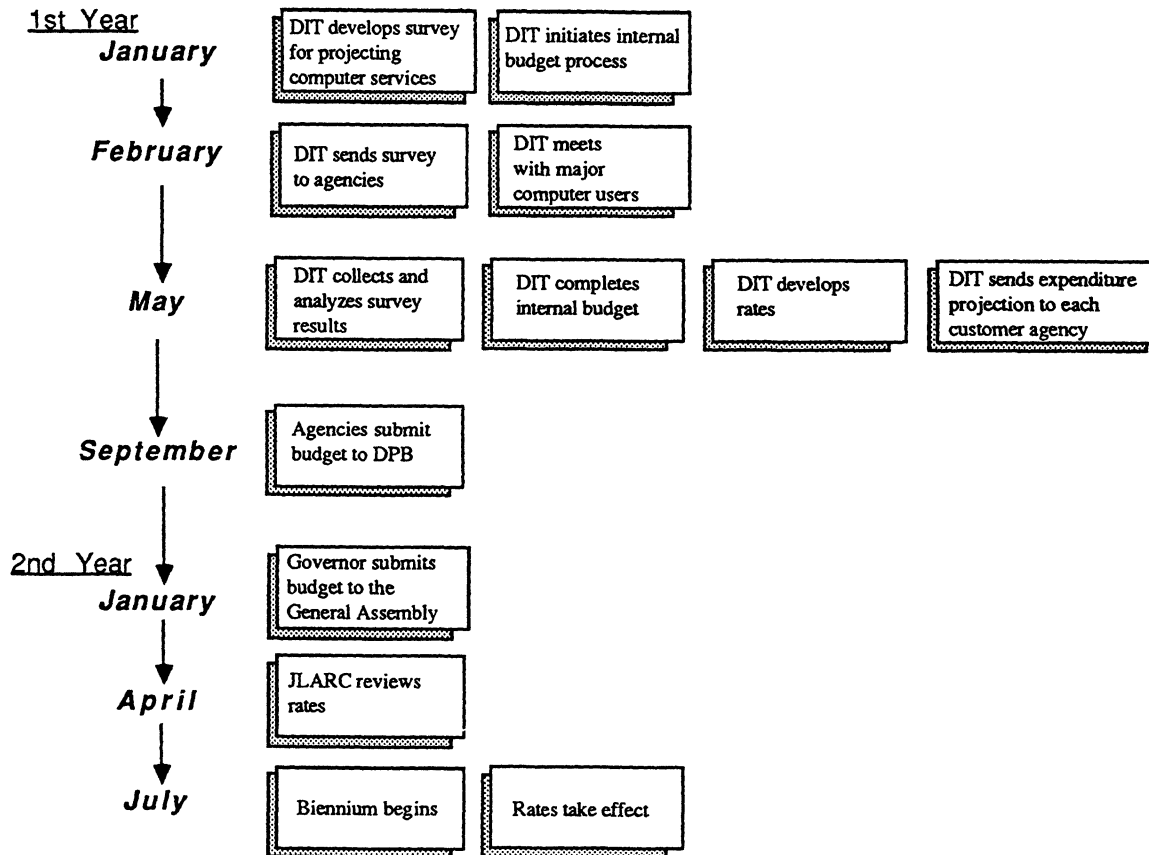
Simultaneously, DIT projects its costs. DIT divides its costs by agencies' aggregate estimates of resource utilization (CPU seconds, disk storage, and lines printed, for example). This calculation is used to set rates for each of the seven elements of the computer services billing algorithm. In turn, DIT calculates total anticipated expenditures for each agency by multiplying the rates by the projected utilization. DIT provides anticipated expenditure estimates to agencies for inclusion in their budgets.

This process begins a year and a half before the beginning of the biennium. Because of the State's typical budget development cycle, DIT and agencies must attempt to project computer utilization far in advance of the period in which the actual expenditures will occur (Figure 7).

Accuracy of Projections. DIT and agencies have historically under-projected computer services utilization. DIT under-projected computer

Figure 7

DIT Computer Services Rate Making Process



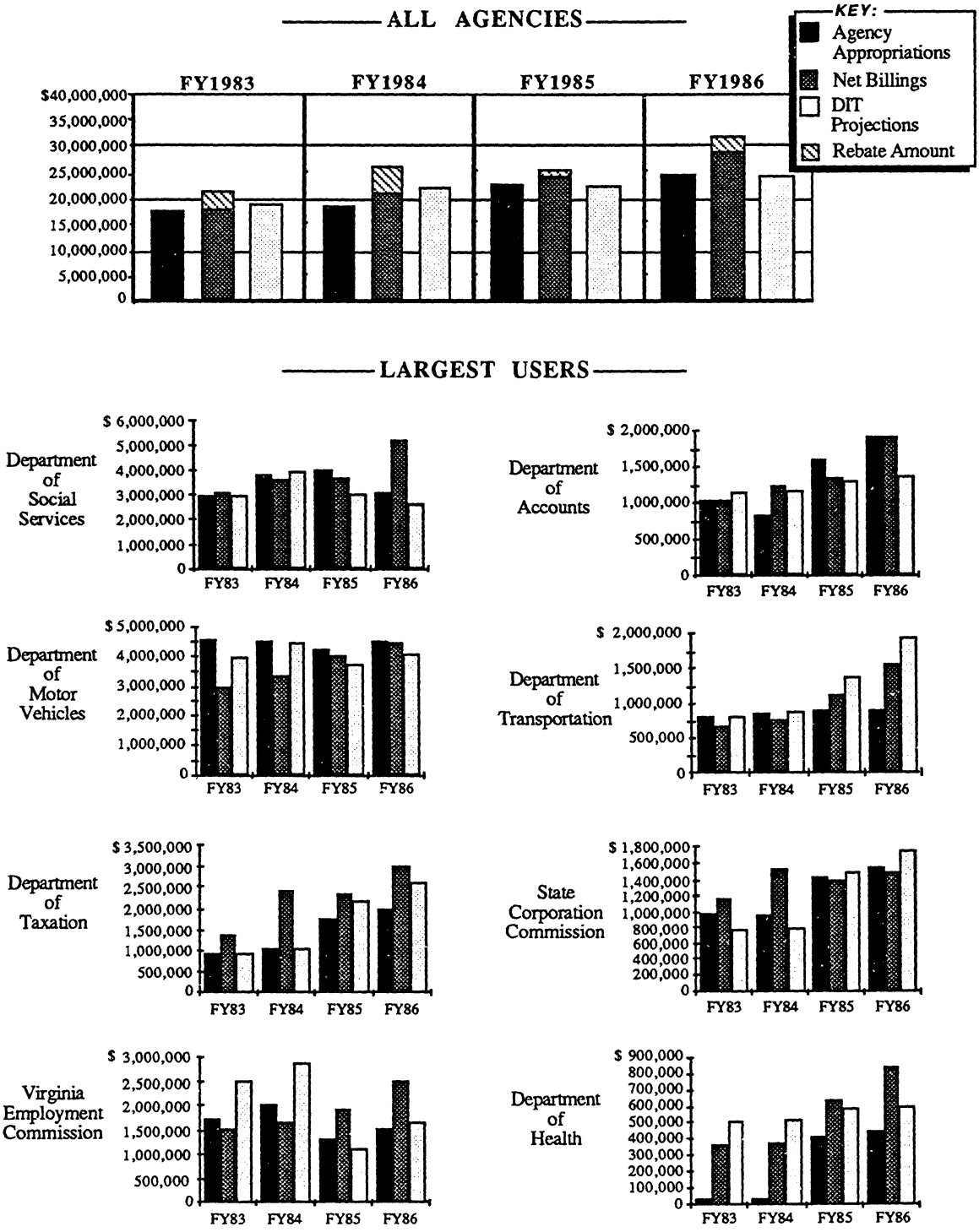
Source: JLARC representation of DIT procedures.

billings to agencies by 10.4 percent in FY 1985, and by 17.6 percent in FY 1986. These percentages would have been larger if rebates of \$489,878 in FY 1985 and \$3,298,785 in FY 1986 had not been given.

Agencies may, and often do, submit budget requests for amounts different from DIT's recommendations. The Governor and the General Assembly may also adjust budgeted amounts for computer services. As a result, appropriations usually vary from DIT's original projections.

Agency projections, as adjusted in the appropriations process, have been slightly more accurate than DIT's projections. In the last two years, appropriations have underestimated expenditures by 5.9 percent in FY 1985 and 17.4 percent in FY 1986. Agency spending is not restricted by appropriations at the sub-object budget code for computer services. This means that budgeted amounts can be transferred to other expenditure categories. Consequently, the amounts that an agency budgets and actually spends on computer services might not be equal (Figure 8).

Figure 8
Accuracy of Computer Services Projections



Source: DIT, Appropriations Act.

Among the largest users of DIT's computer services, budgets of the Department of Motor Vehicles (DMV) and the State Corporation Commission (SCC) have most closely approximated actual expenditures. In contrast, the Departments of Social Services (DSS) and Accounts (DOA) have substantially underestimated expenditures recently. These two agencies have added major computer systems, which have cost more to operate than the agencies originally projected.

Computer services costs for operating DSS's Child Support Enforcement Program increased the agency's computer services bill by approximately \$300,000 per month. DSS budgeted approximately \$3.1 million in FY 1986 for computer services. DIT projected \$2.6 million. Actual expenditures exceeded \$5.2 million for the year.

* * *

Operation of the Commonwealth's new automated accounting system, CARS II, costs DOA more than expected. DOA's original estimate for total computer services expenditures in FY 1987 was \$2.3 million. DIT estimated \$2.9 million. Updating its projections in 1987, DOA expected to spend approximately \$3.4 million by the end of FY 1987. DOA requested and received a supplemental appropriation in FY 1987 of \$1.2 million for a total of \$3.4 million for DIT computer services. Actual DIT billings in FY 1987 were \$2.9 million. Although DOA originally underprojected expenditures, it ultimately received \$512,818 in excess of actual expenditures.

Rebates and Rate Adjustments. When actual utilization exceeds projections, DIT's rates generate large surpluses in the computer services fund. However, prior to FY 1987, JLARC permitted DIT to return excess revenues to computer services customers. DIT returned excess revenues in the form of rebates -- as much as \$6 million in FY 1984 (Table 19).

Table 19

DIT BILLINGS AND REBATES
(FY 1983 - 1986)

<u>Fiscal Year</u>	<u>Gross Billings</u>	<u>Total Rebates</u>	<u>Net Billings</u>
1983	\$22,744,849	\$4,900,846	\$17,844,003
1984	\$28,821,528	\$6,039,006	\$22,782,521
1985	\$25,236,064	\$ 489,878	\$24,746,186
1986	\$32,697,794	\$3,298,785	\$29,398,999

Source: DIT financial statements.

From an agency's perspective, the rebate practice is disruptive. The rebate is provided on an agency's bill without prior notification. Usually the rebates are distributed during the second half of the fiscal year. In FY 1985, DIT issued rebates only in June. In FY 1986, DIT issued rebates from February through May. The practice can cause some agencies to completely change their spending plans.

In FY 1986, the Department of Accounts (DOA) implemented a very strict cost control program because of unexpectedly high computer bills. DOA curtailed planned expenditures in other areas, such as equipment purchases, in order to pay computer services bills. When DIT issued \$227,191 in rebates to DOA during the last part of the year, DOA had to reorder its spending plans. DOA had insufficient time to complete previously planned equipment procurements.

In an effort to avoid budget problems caused by rebates, JLARC recently approved two DIT rate adjustments within six months (July 1986 and January 1987). This action avoided approximately \$9.5 million in additional charges to agencies for the 1986-88 biennium. However, frequent rate adjustments also hinder agencies' multi-year planning and budgeting. Consequently, DIT and agencies need to improve utilization projection methods so that DIT's rates more accurately recover DIT's expenses.

Methods for Improving Projections. Although it is difficult to predict fluctuating computer services usage, DIT and agencies can take steps to improve projection methods. DIT cannot make accurate projections without accurate agency projections, and agencies cannot make accurate projections without useful resource consumption data from DIT. Consequently, DIT and agencies need to work together in order to accurately project future use. These efforts should result in more exact charges for computer services.

DIT uses complex algorithms for multiplying resource use data by rates. Although many of these rate calculations are necessary, agencies cannot adequately predict future use without actual usage data to serve as a baseline. DIT is attempting to modify its billing system, but additional simplification is necessary. Methods for simplifying the billing process are discussed in the next section.

Currently, the State has no standards for assigning billing account codes to computer applications. As a result, many agencies cannot establish a meaningful link between bills and operational activities. Increases or decreases in workload cannot be translated directly into corresponding changes in computer services use. The Virginia Employment Commission (VEC) and State Corporation Commission, on the other hand, have developed systems for associating internal departments and functions with computer account codes. This allows the agencies to maintain ongoing oversight of the computer resources used to perform each function. These account codes also provide a base for understanding what growth and expansion in the programs will mean to the computer budgets.

Agencies such as DMV, VEC, and SCC have developed methods for increasing the accuracy of their projections. Other agencies could benefit from some of these techniques. DIT, in cooperation with the largest users of computer services, should establish a task force for the specific purpose of identifying and adopting useful projection techniques.

DIT develops original utilization projections and bases its budget recommendations upon these projections. However, agencies or DPB may change these budget recommendations without notifying DIT. Because these changes affect DIT's projections and could alter DIT's spending plans, DIT should be notified. Conversely, DPB should participate in DIT's and agencies' original projections as a way to better understand computer services budgets.

Recommendation (47). DIT and the State's largest users of computer services should form a task force specifically for the purpose of developing methods for accurately projecting computer services use. Among other methods, the task force should develop standard account codes and an estimate of the financial impacts of implementing the codes.

The Department of Planning and Budget should continue in its efforts to participate with DIT and other agencies in developing original estimates of computer services for each biennial budget. DPB and other agencies should notify DIT of any adjustments in the estimates.

Customer Billings

DIT's customers reported on the JLARC staff survey that computer services bills were generally timely, but the complexity of the bills made it difficult to determine accuracy. E&W reviewed DIT's billing procedures for computer services and found that additional refinements in DIT's billing system are necessary in order to reduce complexity, improve accuracy, and increase agencies' capabilities to validate bills.

Factors Affecting Bill Amounts. In interviews with JLARC staff, agencies frequently expressed concerns that DIT's bills for services were increasing. It is important to note that three factors affect the size of an agency's bill and only one of these factors is within DIT's control. As discussed in this chapter, DIT is responsible for controlling its costs and setting rates that accurately recover costs. And in fact, in recent years, DIT rates have gone down, not up.

The other two factors are entirely within an agency's control. First, increased service usage drives up the amount of the bills. As discussed in the chapter on computer services, agencies do not fully anticipate or control service usage.

The second factor within agencies' control is use of software tools for computer applications programming. If an agency inappropriately uses the software, it will consume far more resources and cost a great deal more than anticipated. Fourth generation computer software, such as ADABAS and MAPPER, are particularly prone to exceptional resource consumption if used inappropriately. The Department of Accounts (DOA) and the Department of

Social Services (DSS) have incurred considerable ADABAS and MAPPER charges in the past, due in part to inefficient use of these software products. Efforts by DOA and DSS to improve use of these software products are in progress.

Agency Concerns. Accuracy rather than timeliness of bills is the greater concern among computer services customer agencies (Table 20). In the JLARC staff survey of customer agencies, the complexity of bills was frequently cited as a concern; 26 percent of DIT computer services customers reported that they did not know if bills were accurate. Five years ago, JLARC staff found that 16 percent of the computer services customers did not understand their bills. Thus, bill complexity remains a problem.

Table 20

CUSTOMER CONCERNS WITH DIT COMPUTER SERVICES BILLINGS

<u>Response</u>	<u>Timely</u>	<u>Accurate</u>	<u>Adequate Resolutions of Problems</u>
Yes	78%	57%	74%
No	6	17	15
Not Sure	<u>16</u>	<u>26</u>	<u>11</u>
TOTAL	100%	100%	100%

Source: JLARC survey of State agencies and institutions.

Larger agencies, with technical staff capable of analyzing computer services bills, found inaccuracies in their bills. The Virginia Employment Commission (VEC) and the Department of Motor Vehicles (DMV) were among 17 percent of the computer services customers who reported that inaccurate bills were sent to them by DIT:

VEC found errors in central processing unit factors and disk storage billings. VEC staff found the inaccuracies by conducting trend analyses, running benchmark programs, and auditing storage listings. Although DIT has corrected the bills, VEC reported that it took as long as a year to resolve some discrepancies.

* * *

DMV developed analytic procedures for replicating actual usage factors and formula weights used by DIT in generating computer services bills. Using these procedures, DMV found that DIT had undercharged \$90,000 on the December 1986 bill. DIT made the necessary adjustments to the DMV bill.

DIT's resolution of billing problems was cited as inadequate by 15 percent of the customer agencies.

Because of concerns raised by customer agencies, JLARC staff requested E&W to review DIT's computer services billing. E&W reviewed DIT's 24 major calculations for generating computer services bills and concluded that some minor adjustments could be made to ADABAS and MAPPER calculations. On the other hand, methods for deriving IBM and Sperry CPU usage and disk consumption warrant more significant adjustments and are unnecessarily complex. These complex calculations and the absence of standard nomenclature for account codes impede DIT's and agencies' abilities to trace and reconcile billing discrepancies.

Estimated ADABAS Usage. In an attempt to compensate for the lack of detailed CPU usage data for ADABAS, DIT uses an estimate of CPU time for each ADABAS command. The estimate was provided to DIT by the vendor of the ADABAS software. The number of CPU instructions actually used per ADABAS command can vary depending upon the type of operation, transaction volume, and the number of concurrent users. This procedure results in CPU usage charges which can vary for the same ADABAS command. This introduces uncertainty and inconsistency in the ADABAS charges, which have been a chief concern of ADABAS users. However, in January 1987 DIT made adjustments to its ADABAS billing method which compensate for the billing limitations. DIT now reconciles the usage data monthly before sending bills to customers.

Estimated MAPPER Usage. DIT also estimates MAPPER usage. As DIT noted in July 1986, the department was incorrectly using wall clock time as CPU time. This method resulted in MAPPER charges as much as five times more than actual usage. DIT developed a factor for estimating MAPPER usage, and confirmed the method with Sperry before implementing it. DIT began to use monthly reconciliations of MAPPER billing data in March 1987. This reconciliation procedure has been tested and implemented on bills to the Department of Social Services, the largest user of MAPPER. DIT intends to develop similar reconciliation procedures for other MAPPER users.

Complex IBM Equations. DIT's billing system attempts to equate different IBM machines, one of which DIT no longer uses. The current IBM 3090-400 mainframe, which was installed in January 1987, is equated to the IBM 370/158, which was installed in 1974 and has since been replaced. Similarly, the currently used IBM 3084 is also equated to the 370/158 in an effort to achieve a common usage denominator. Using the 370/158 as the common denominator, as opposed to the 3084, introduces an unnecessary level of complexity in calculating bills. E&W noted that IBM's publication, "MVS/Extended Architecture, Systems Programming Library, Initialization and Tuning," describes a method for more simply equating the 3090-400 and 3084 mainframes.

Unnecessary Sperry Bill Conversions. E&W found that DIT does not use the Sperry billing system which is built into the Sperry operating system. Instead, DIT uses the Sperry log file to equate Sperry usage to IBM usage. DIT then uses the job accounting system to produce bills. This action, while technically acceptable, requires additional efforts to equate two technologies

that are quite different. This action is not necessary, because Sperry usage can be measured without converting it to IBM terms. Separate bills for Sperry customers could be prepared from this data. The job accounting system on IBM could then be used only for IBM billing -- the purpose for which it was designed.

Disk Storage Charges. E&W found that DIT could more precisely charge agencies for disk usage. ADABAS users pay the same usage rate for permanent data sets as all other disk users, but ADABAS users are also assessed a surcharge for ADABAS work-space on the disks. Non-ADABAS users are not charged for work-space and temporary data sets. In addition, non-ADABAS users are only monitored and charged once per month for disk usage; ADABAS users are monitored and charged daily.

DIT's monthly calculation of disk space also fails to capture actual usage of Sperry disk storage. The Sperry technology operates differently than IBM. Disk management programs on the Sperry technology automatically offload files from disk to tape, or agencies can voluntarily offload files. If these offloads occur just prior to the day in the month that DIT records disk usage, DIT will not capture actual usage. In effect, a Sperry customer may have full use of the files for a month without paying for them. This difference in the Sperry and IBM technologies reinforces the need to bill the technologies separately and calculate disk usage daily.

Inadequate Naming Standards. Standard file names identify the agency but not the computer application. Computer job names also do not distinguish between production and test runs. Without consistent use of codes, some agencies cannot link billing account codes with the types of applications. As a result, it is difficult for DIT and agencies to detect billing problems and reconcile differences. The reconciliation of billing details sometimes takes weeks to resolve. DIT and agencies will need to cooperatively develop a meaningful account code system.

DIT's New Billing System. DIT is currently planning to revise its billing system for computer services. As a part of this effort, DIT is soliciting ideas from some of its major customers. However, DIT needs to recognize all of the current problems identified by E&W before attempting to implement a new system. E&W recommends that DIT should not proceed with a new system without written requirements and specifications for all of the system's capabilities.

Adjustments for Agency Errors. Not all billing errors that agencies might claim are caused by DIT billing procedures. In some instances, agencies have made computer programming errors and have requested DIT to provide credits on their bills. For example, during a six-month period (January through December 1986) DMV requested \$183,990 in credits for charges incurred when computer jobs did not finish processing correctly because of errors in the programs. DIT advised DMV to correct the errors and provided partial credits. Similarly, DIT has provided credits to other agencies for programming errors. However, DIT does not have a policy that defines under what circumstances bill adjustments will be made.

Recommendation (48). DIT should simplify its current billing system for computer services. At a minimum, Sperry and IBM usage should be billed separately. Also, when developing a standard measure of IBM processor time,

DIT should use IBM specifications to equate only the machines currently in use. Disk usage should be recorded daily and billed on that basis each month. In addition, billing information on resource usage should be linked to meaningful job identification codes as part of uniform nomenclature standards. DIT should include these billing enhancement procedures in the new billing system currently under consideration.

DIT should develop a policy that defines the circumstances, frequency, and amount of bill adjustments that DIT will make when agencies request adjustments for their programming errors.

TELECOMMUNICATIONS FUND

DIT's telecommunications fund is primarily comprised of telephone vendors' charges. DIT passes some of these charges directly on to customer agencies. DIT must divide and allocate other charges for the SCATS shared network, which account for approximately 45 percent of vendor charges. DIT also adds a ten percent surcharge to recover personnel expenses in the telecommunications division and a portion of agency overhead. E&W and JLARC staff reviewed DIT's telecommunications billing process and DIT's services that comprise the ten percent surcharge.

Customer Billings

Concerns with the timeliness of DIT's telecommunications bills were frequently cited by State agencies and institutions. Agencies reported on the JLARC staff survey that late bills also made it difficult to monitor usage and verify charges. However, multiple vendors and inaccuracies in vendors' bills appear to require DIT's involvement in bill preparation and validation.

Customer Concerns. Forty-two percent of the agencies and institutions receiving telecommunications bills from DIT reported that bills were not issued in a timely manner (Table 21). Typically, agencies receive

Table 21

CUSTOMER CONCERNS WITH DIT'S TELECOMMUNICATIONS BILLINGS

<u>Response</u>	<u>Timely</u>	<u>Accurate</u>	<u>Adequate Resolution of Problems</u>
Yes	56%	71%	73%
No	42	17	17
Not Sure	2	12	10
	<u>100%</u>	<u>100%</u>	<u>100%</u>

Source: JLARC survey of State agencies and institutions.

telecommunications bills from DIT 60 days after the month in which the charges were incurred. This practice hinders agencies' abilities to monitor telephone abuse and anticipate expenditures. Delayed bills also hinder agencies' abilities to reconcile monthly and year-end expenditures and budgets.

Seventeen percent of all agencies and institutions reported to JLARC staff that they found inaccuracies in telecommunications bills. Although bills are delayed, agencies nonetheless review their bills. Typically, errors were found by the largest users of the services, which have staff who monitor telecommunications billings, as illustrated by the following examples:

The College of William and Mary, the University of Virginia, Virginia Commonwealth University, and Old Dominion University were among the higher education institutions citing inaccuracies on their bills. The College of William and Mary listed numbers charged to the institution that did not belong to it, incorrect billings for telephone directories, incorrect toll charges, double billings for SCATS calls, no charges for SCATS calls, incorrect charges for data circuits, and charges for equipment the institution no longer possessed.

* * *

The Department of Mental Health and Mental Retardation (MHMR) cited incorrect charges and suspects others. MHMR reported that three-month billing delays have prevented monitoring the validity of vendor installation charges. MHMR is not sure in which month's bill those charges will appear.

JLARC staff found similar billing concerns in its 1982 report, Working Capital Funds in Virginia. At that time, 40 percent of the Department of Telecommunications' customers were dissatisfied with billing practices.

DIT's Billing Process. C&P and AT&T submit aggregate State bills to DIT on a monthly basis. These bills are submitted on computer tape. DIT uses its automated equipment inventory, developed with service order data, to verify the vendors' equipment charges. DIT then divides the aggregate bills into individual agency bills, applies the DIT surcharge, and sends the bills to agencies.

DIT's process adds approximately one month to the billing process, so agencies receive their bills approximately two months after the month in which the charges were incurred. To ensure that the vendors are promptly paid, DIT pays the bills after the equipment verification. DIT then collects agency payments via interagency transfers.

Impediments to Simplifying and Expediting the Process. Although direct billing from vendors to individual agencies would simplify and expedite the telecommunications billing process, DIT needs to be involved for two principal reasons. First, State agencies use some shared networks, and telephone vendors have no basis for determining how to allocate these charges

to individual agencies. DIT accumulates utilization data and uses this data for distributing charges. Moreover, approximately 20 different telephone companies are currently operating in Virginia as a result of the recently deregulated telecommunications market. DIT accumulates and consolidates these vendors' charges into a single bill for each agency.

Second, DIT uses service order information to check the accuracy of vendors' charges. Serving in this monitoring capacity, DIT has identified significant errors on vendors' bills. According to DIT, vendors have mistakenly charged the State for equipment that was not received or lines that were not connected or disconnected when requested. In August 1986, for example, DIT found \$291,171 in billing errors. More recently, DIT found \$176,868 in errors: \$131,546 in overcharges and \$45,321 in undercharges, for a net impact of \$86,225 in overcharges for November 1986 (Table 22).

Table 22

ACCURACY OF VENDOR'S BILLS
(November 1986)

<u>Vendor</u>	<u>Invoice Amount</u>	<u>Adjustments</u>
AT&T Information Systems	\$ 404,198.67	\$50,594.29
AT&T Communications	86,537.99	(45,321.36)
C&P	<u>2,109,712.33</u>	<u>80,952.20</u>
	<u>\$2,600,448.99</u>	<u>\$86,225.13</u>

Source: DIT analysis of November 1986 bills.

DIT's Overhead Surcharge

DIT's ten percent surcharge is intended to recover all of the administrative costs associated with providing telecommunications services. Most of these services benefit all State agencies and are appropriately included as an indirect service surcharge. However, telecommunications engineering studies are provided directly to specific agencies requesting this service. JLARC staff evaluated the impact of a direct charge for this service and concluded that a direct charge would discourage use of this valuable service. However, the appropriateness of DIT's rates might need to be re-evaluated after DPB's study of telecommunications is completed.

Indirect Services. DIT's Telecommunications Division provides a number of services that benefit all State agencies. DIT staff monitor the performance and maintain the statewide voice and data communications networks. Clearly this is a statewide service that cannot be attributed to specific agencies. Similarly, service order processing and directory assistance are generally used by all agencies. Because these services generally benefit all agencies, DIT appropriately recovers these costs through an indirect service

surcharge. The amount of the charge varies with the size of an agency's bill, but all agencies are charged the same rate.

Direct Services. DIT's Telecommunications Division also helps agencies redesign telecommunications systems. The equivalent of approximately ten positions in DIT are providing these services at a personnel cost of approximately \$357,400. As discussed in the telecommunications chapter of this report, this is a particularly important function. Agencies can potentially reduce telecommunications expenses by designing economical systems that take advantage of competitive products and services in the recently deregulated telecommunications market.

Although this service is available to all agencies, only those agencies which request the service receive its benefits. In effect, agencies that do not use this service are paying a portion of the service costs because it is included as part of the surcharge. The service costs could be directly attributed to the agencies using the service.

There is a principal disadvantage to an hourly direct charge for engineering studies, however. Agencies which would ordinarily use the service might not do so because of the costs. Efforts to develop more economical telecommunications systems might receive less emphasis. Overall, the costs of operating inefficient systems that could have been reduced with DIT's engineering assistance might outweigh the benefits of direct charges. In that case, although some individual agencies' bills might be less because of a smaller surcharge, the net effect could be higher total telecommunications costs.

Telecommunications Study Results. DPB, with consultant assistance, is currently studying opportunities for agencies to share statewide networks. The study is also focusing upon DIT's role as the central coordinator for telecommunications services. Results of this study, expected to be completed in October 1987, may indicate a need to revise DIT's cost allocation methods and rates for telecommunications.

Recommendation (49). Upon completion of DPB's study of telecommunications, DIT should assess the impacts of the study recommendations on the costs and rates of telecommunications services. If changes are expected, DIT should submit a revised cost allocation plan and recommended rates to JLARC for approval.

SYSTEMS DEVELOPMENT FUND

In recent years, the systems development fund balance has declined to a slight deficit at the end of FY 1986. A deficit of approximately \$150,000 is projected for the end of FY 1987. DIT projects an even greater deficit (28 percent) in FY 1988 (Table 23).

In order to avoid the immediate deficit projected at the end of FY 1988, DIT will need to revise its rate calculation methods. The longer-term fund impacts of changes in SDB's role, workload, and contracting methods will need to be closely monitored.

Table 23

SYSTEMS DEVELOPMENT FUND BALANCE

<u>Period Ending</u>	<u>Revenues</u>	<u>Fund Balance</u>	<u>Fund Balance as Percent of Revenues</u>
June 30, 1984	\$4,449,601	\$698,447	16 percent
June 30, 1985	4,045,637	301,853	7 percent
June 30, 1986	4,317,617	(43,246)	(1) percent
June 30, 1987*	3,569,972	(150,000)	(4) percent
June 30, 1988*	3,463,940	(955,980)	(28) percent

*DIT's projections.

Source: DIT financial statements and estimates.

Revise the Rate Calculation Methodology

Prior to FY 1987, SDB used different numbers of billable hours to calculate the hourly rates for higher-level and lower-level staff. SDB recognized that higher-level staff spend more time in administrative duties that cannot be charged to agencies as part of a specific project. Therefore, SDB used a lower number of billable hours in its rate calculation for higher-level staff.

During FY 1986, SDB actually billed more hours than the numbers used in the rate calculation. Consequently, SDB increased the numbers of billable hours used in the rate calculation but did not adjust for differences among staff. SDB used 1,550 hours as the base for all staff in order to avoid sizeable increases in hourly rates. This method needs to be revised in order to include a distinction in the type of non-billable activities in which higher- and lower-level staff are engaged. However, staffing levels should be adjusted before revising the methodology to ensure adequate staff productivity.

Targeted Versus Actual Hours. The Commonwealth compensates SDB staff for 2,080 hours -- the typical 40-hour work week, 52 weeks per year. But because of training hours, administrative requirements, agency staff meetings, and leave, the actual hours billed by SDB personnel are less. SDB used three target levels for actual hours during the 1984-88 biennium:

Information Technology Managers (ITMs)	--	900 annual hours
Systems Development Managers (SDMs)	--	1200 annual hours
All other staff	--	1460 annual hours

According to SDB personnel reports, during FY 1984 and FY 1985, approximately 60 percent of SDB staff billed more than their targeted hours. Table 24 shows that in FY 1986, the average billed hours exceeded targeted hours in every personnel category -- ITMs by an average of 34 percent

and SDMs by an average of ten percent. Overall, SDB staff billed 14 percent more than their targeted hours. Instead of billing 91,580 hours, SDB staff billed 103,948 hours.

Table 24

TARGETED HOURS VERSUS ACTUAL BILLED HOURS -- FY 1986

<u>Staff Position</u>	<u>Rate</u>	<u>Number of Staff</u>	<u>Targeted Hours</u>	<u>Av. Actual Hours</u>	<u>Percentage of Actual</u>
ITM	\$39	5	900	1,205	134%
SDM	\$36	2	1,200	1,318	110%
CSCE	\$36	2	1,460	1,561	107%
PSDS	\$32	10	1,460	1,559	107%
SA	\$32	11	1,460	1,569	107%
SSE	\$30	7	1,460	1,648	113%
SPA	\$27	16	1,460	1,712	117%
PA	\$27	6	1,460	1,791	123%
Programmer	\$22	6	1,460	1,607	110%
Totals		65	91,580	103,948	
Weighted Average				1,551	114%

Source: DIT's Management and Control System.

The effect of using inaccurately low targeted hours results in rates that are unnecessarily high. Actual billed hours should approximate the targeted hours used by SDB in its rate calculation.

Rate Calculations for the Current Biennium. For the 1986-1988 rate calculations, SDB raised the targeted hours to 1550 hours per staff member. This change produced an expected number of billable hours that more closely matched the actual hours billed during FY 1986. Although the average billable hours in each personnel category varied from 1,205 for ITMs to 1,791 for programmer analysts, DIT used a standard 1,550-hour base to avoid large increases in the hourly rates of higher-level staff. For example, if SDB had continued to use the 900-hour target for ITMs, SDB calculated that the hourly rate would increase from \$39 per hour to \$59 per hour. Instead, by using the 1,550-hour base, SDB set the rate for ITMs at \$48 per hour.

Adjustments to the Billable-Hour Base. SDB claims that its current deficit is due, in part, to the inability of higher-level staff to actually achieve the 1,550 targeted hours used in the rate calculation. Therefore, these staff are not recovering their salary expenses. Moreover, the General Assembly approved a 4.56 percent salary increase beginning in FY 1988, which was not included in SDB's original rate calculations.

There appears to be a need to make adjustments in the number of hours used in the rate calculations, particularly for higher-level staff. SDB's

projected \$955,980 deficit is based upon current rates and the assumption that total billable hours would be adjusted according to staff level: 1,000 hours for the highest-level staff (Information Technology Managers); 1,200 hours for the next highest-level staff (Computer Systems Chief Engineers); and 1,460 hours for all other staff.

Clearly, a deficit of nearly \$1 million is unacceptable. Some increases in the hourly rate and adjustments in the total billable hours that are used in the rate calculations appear warranted. However, the rates and billable-hour base SDB proposes to use for its staff should result in rates that are competitive with those of private vendors. Otherwise, State agencies would pay more for SDB's services than the rates that could be secured from other sources.

Match Positions to Anticipated Revenues. Rate increases should be used prudently as a method for ensuring adequate balances in the systems development fund. Longer-term trends in the demand for SDB services will require corresponding adjustments in the number of staff in the branch. If recent declines in project revenues continue, SDB will need to reduce staff.

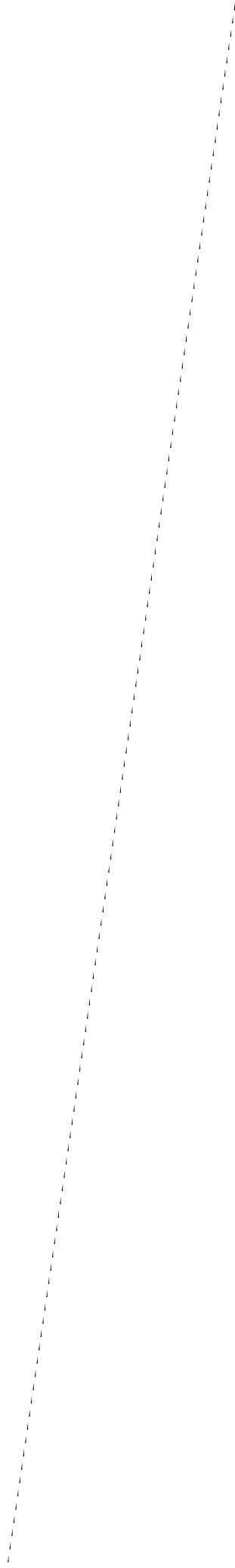
Recommendation (50). SDB should evaluate the number of billable hours used in its hourly rate calculation for systems development staff. SDB should propose a revised cost allocation plan and hourly rate schedule. The proposed plan, including the revised billable hours, and the rates should be submitted to JLARC for approval.

Fixed-Price Contracting

JLARC approved SDB's use of fixed-price contracting in July 1985. Beginning in FY 1987, SDB has been using fixed-price contracts for its project work. Approximately 40 percent of the current project work is contracted under a fixed-price arrangement. These contracts set firm cost figures that customers agree to pay. If the actual costs exceed the contracted price, SDB absorbs the cost overruns. When the situation is reversed, SDB retains the difference between the estimate and the actual lower cost.

This fixed-price contracting method requires SDB to accurately estimate costs. Otherwise, underestimates will result in revenue shortfalls, and overestimates will result in surpluses -- both contrary to the intent of internal service fund policies. As discussed in Chapter IV of this report, SDB estimated costs within plus or minus ten percent of actual project costs in 52 percent of the FY 1986 projects. This level of estimation accuracy does not warrant use of fixed-price contracting.

Recommendation (51). Until SDB demonstrates a higher level of accuracy in its estimates, the use of fixed-price contracts should be suspended. SDB should continue to maintain detailed, accurate records of the actual hourly costs of services provided to customer agencies.



VIII. STAFFING AND ORGANIZATION

The Department of Information Technology (DIT) was formed by merging the Departments of Computer Services (DCS), Management Analysis and Systems Development (MASD), and Telecommunications (DOT). This consolidation began immediately after DCS had centralized its separate computer centers. Merger of these three agencies provided the State with a central support agency capable of providing highly technical telecommunications and data processing expertise and services.

DIT consists of a director's office and seven divisions (Figure 9). The bulk of agency personnel are housed in three locations in Richmond. However, the Telecommunications Division has field offices in Norfolk, Fairfax, and Roanoke (three positions each).

The agency has a maximum employment level (MEL) of 480 positions. Currently, division size ranges from 11 positions in the Human Resources Division to 183 positions in the Computer Services Division. In addition, DIT utilizes the services of approximately 30 full-time and 15 temporary, wage employees on a regular basis. The Systems Development Branch of the Information Services Division also utilizes the services of contractors to supplement its development staff.

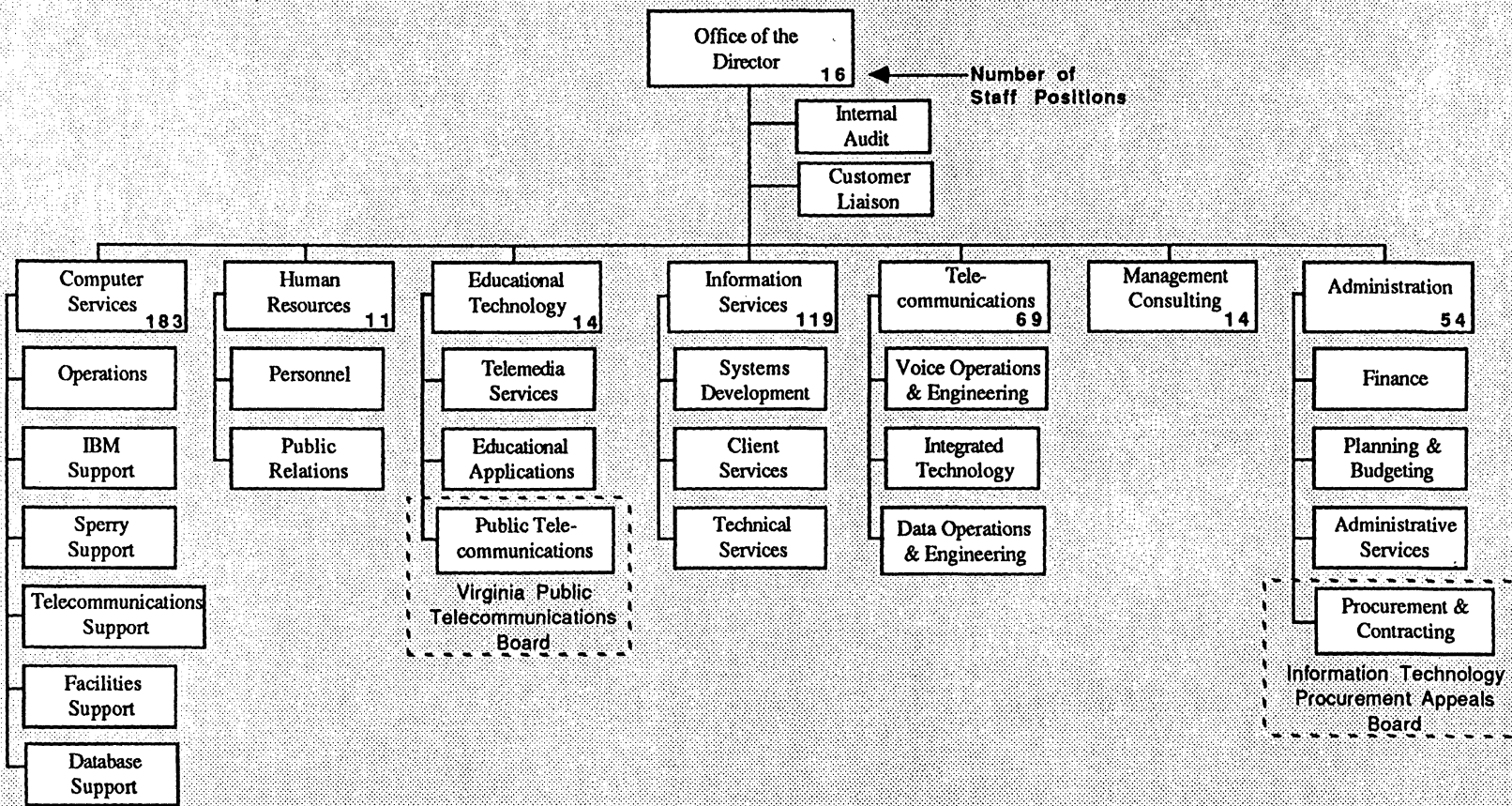
The provision of highly technical services to State agencies and institutions has resulted in the use of both agency-specific and technical classifications. Currently, 35 percent of DIT's 480 positions are allocated to technical classification series. Approximately 140 of these filled positions are allocated to the Computer Systems Engineering series.

The JLARC staff analysis of DIT's organization and staffing was broad-based and multi-faceted. After conducting personal interviews with all division and branch managers and collecting survey data from all full-time, permanent employees, JLARC staff found organizational, management, and position classification problems which resulted from agency consolidations and reorganizations.

Nearly one-fourth of DIT's positions may be misclassified, costing the State excessive personal services dollars. Much of this extra cost is passed on to customer agencies through internal service funds. While some of the staffing problems existing prior to co-location and merger have been remedied, full functional integration of DIT services has not yet occurred. The Administration Division and the Human Resources Division, however, do represent a merger of internal support functions and positions.

The Director of DIT recognizes many of these organizational concerns. The Director established an internal task force to review the organizational structure, and plans to use the JLARC staff report and the DIT task force findings to reorganize the agency. Upon completion of this reorganization, he reported to JLARC staff that he intends to conduct a comprehensive review of all position classifications.

Figure 9
Current Organization of DIT



Source: DIT's semi-monthly personnel report of March 1, 1987.

STAFFING AND COMPENSATION

DIT has emerged from two major agency consolidations in less than two years. Co-location was barely complete (and had not been fine tuned) when merger had to be implemented. Problems inherent in any large-scale reorganization were compounded by ineffective oversight by the Department of Personnel and Training (DPT). Co-location and merger had to be implemented in relatively short time frames.

Neither of the agency consolidations has yet produced the staffing efficiencies and savings predicted. Procedures and decisions implemented over the last several years have evolved into the staffing and organizational concerns found by the JLARC staff. DIT's own task force confirmed that DIT, as it exists today, provides duplicative services as a result of incomplete consolidation of the three merged agencies.

Co-location

Co-location of the five separate computer centers operated by the Department of Computer Services began in 1983 with the consolidation of the two Broad Street centers (1221 East Broad Street and 2300 West Broad Street). Centralizing DCS's separate computer operations locations was effected in an effort to provide State agencies and institutions with an opportunity to fully utilize all available technology and expertise. This consolidation effort was projected by DCS to result in significant hardware, software, and facility cost savings as well as personnel cost avoidances over a 20-year period.

Co-location was projected to result in personnel cost avoidances of \$16,049,647 over a 16-year period. These cost avoidances are not measurable in many cases. However, JLARC staff found that the consolidation of the State's separate computer centers cost the State \$142,091 in additional annual salary expenses. These costs were incurred through the upward migration of a large percentage of DCS staff within the State classification plan. In addition, possible staffing efficiencies identified by DCS in its co-location plans were not implemented.

According to the planning documents executed by the Department of Computer Services in September 1983, co-location represented a shift from operating five separate computer centers to providing one complete data center plus five service support areas (Database, IBM, UNIVAC, Telecommunications, and Technical). As noted by DCS, "Were co-location possible in one step, some 30 FTE positions could be immediately eliminated" by utilizing an organizational structure with these six major service areas.

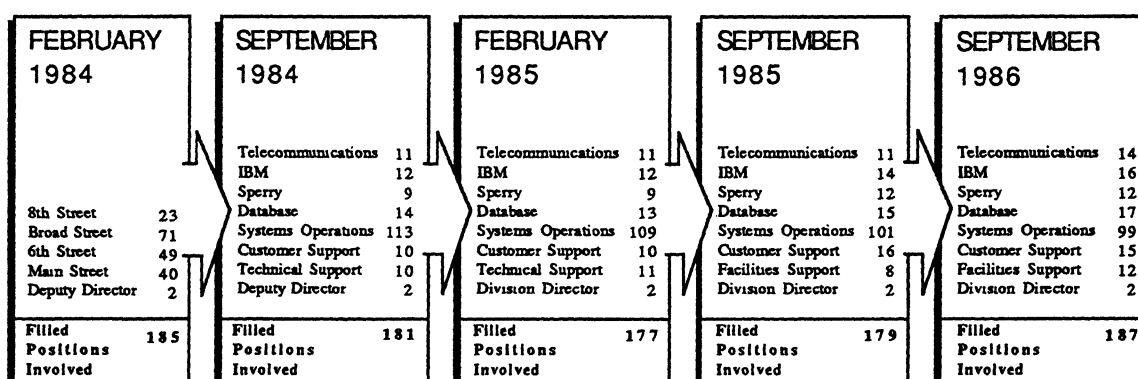
Development of a "Full-Service Image." DCS forecasted that customer demand for technical support services would increase, resulting in the need for an additional ten full-time positions (over a period of several years) to provide a "full-service image" to the customer community. This "full-service image" included providing services in customer support, the tape library, systems operation, database, and teleprocessing on all three shifts. In addition,

DCS stated that the level of services required by the customers would require the establishment of a technical support section to plan and coordinate the technical direction of DCS in a centralized environment. The full range of services encompassed eight service areas: customer service, systems support, systems operation, database support, IBM support, teleprocessing support, UNIVAC support, and technical support. The 30 FTEs that could have been eliminated at the time of co-location, as well as the projected increase of ten FTEs, were allocated among these areas. The technical support section was designed to be the capacity planning and performance monitoring group. This section was ineffective because its functions overlapped with the IBM, Sperry, and database support sections. This section was later dissolved, and the Facilities Support Branch was established in July 1985.

Resulting Personnel Changes. From a personnel standpoint, co-location efforts officially began on February 1, 1984, with the position reallocations of the Computer Center Administrators to Computer Services Technical Managers. On this date, there were 185 filled computer operations positions at the four centers. Figure 10 depicts the changes in the staffing levels of computer operations positions that originated from the separate centers. At the completion of co-location efforts (September 1984) the number of filled positions utilized in the eight computer operations support service areas had decreased by four. Two years after the completion of co-location, the number of filled computer services positions had increased by two positions.

Figure 10

Organizational Changes In Computer Services Related to Co-location



Source: DCS co-location planning documents; agency personnel records.

Co-location was implemented by placing 78 DCS employees in different positions (Table 25). Sixty-nine percent of these personnel changes were movements to positions with higher grade and compensation levels. During the seven-month co-location period, the average salary increase for personnel who changed positions and got increases was \$2,631, accompanying an average 1.7 grade level increase. Furthermore, these personnel changes caused an upward shift in the average grade level of DCS as a whole.

Table 25

CO-LOCATION GRADE LEVEL AND SALARY CHANGES

<u>Change in Grade Level</u>	<u>No. of Employees</u>	<u>Amount of Salary Change</u>
-1	1	\$ 0
0	23	0
+1	32	77,339
+2	10	24,645
+3	7	16,232
+4	4	18,774
+5	<u>1</u>	<u>5,101</u>
	78	\$142,091

Source: JLARC organization and staffing analysis.

The large number of personnel changes implemented during the short co-location period resulted in position classification problems. In order to appropriately classify positions within the State classification plan it is imperative that accurate position descriptions be written. The position descriptions should be compared with other positions within the agency, as well as with comparable positions in other agencies. DCS had inadequate time to implement all of the parts of the classification process or to strictly adhere to DPT's rule governing the allocation of positions resulting from agency reorganizations. There was inadequate time to formally determine the full staffing impact of the change in service provision which was instituted through co-location efforts.

Merger

Merger of the State's three agencies responsible for providing central support services in telecommunications and data processing was designed to eliminate service fragmentation as well as to respond to industry trends toward technological integration. This consolidation was expected to result in service enhancement as well as the elimination of redundant administrative support and its accompanying overhead costs. The Governor's report, An Assessment of the Secretarial System and Proposed Realignments of the Executive Branch, transmitted to the General Assembly on January 24, 1984 stated:

After the merger of [DCS, MASD, and DOT], it is anticipated that the agency could operate with at least 26 fewer authorized employees and an annual cost reduction of one million dollars.

JLARC staff research showed that these staffing efficiencies have not been realized. Furthermore, the maximum employment level (MEL) for DIT was initially 472, the sum of the MELs for the three separate agencies. The 1986 Appropriations Act set DIT's total MEL at 480 positions. In addition, DIT requested 62 additional positions for the 1986-88 biennium; however, the General Assembly denied this request. As in the case of co-location, merger also resulted in an upward migration of a large percentage of staff and the retention of some inappropriate position classifications.

Administrative Support Positions. For this analysis, JLARC staff defined administrative support positions as positions which were allocated to a formal administration section of any of the four agencies (DCS, MASD, DOT, or DIT) or positions which were utilized to support the total agency, such as personnel and internal audit. Table 26 shows a breakdown of these positions in DOT, DCS, and MASD prior to merger and in DIT as of September 1986 (two years after merger was implemented).

Table 26

COMPARISON OF ADMINISTRATIVE SUPPORT POSITIONS

<u>Agency</u>	<u>Administrative Positions</u>
Department of Computer Services	15
Management Analysis and Systems Development	12
Department of Telecommunications	13
Pre-Merger Totals	40
Department of Information Technology	55
Increase in Positions at DIT	+15

Source: DCS, MASD, and DOT organization charts.

Merger did mesh the administrative functions and positions of DCS, MASD, and DOT. However, instead of eliminating duplicate support positions found in the separate agencies, merger resulted in a 27 percent increase in the number of positions with administrative duties.

At least part of the increase in the number of administrative support positions can be attributed to the fact that there are more administrative services provided in DIT than were available or needed in the separate agencies. For example, prior to merger at least one of the separate agencies did not have a cost allocation plan, which is a violation of federal guidelines. None of the three agencies had positions responsible for maintaining the agencies' physical facilities. Furthermore, the number of positions in human resources and internal audit corresponded with agency size, resulting in a smaller number of these positions prior to merger.

Personnel Changes Resulting from Merger. As a part of the merger, 101 employees from the three agencies were allocated to different positions, representing 22 percent of the combined total personnel in the agencies (Table 27). Eighty-eight percent of these personnel changes resulted in movement into positions with higher grade and compensation levels. The average salary increase per personnel change was \$2,616, accompanying an average 1.8 increase in grade level.

At the time of merger, position descriptions were written primarily for newly-created classifications and/or positions, such as the Information Technology Management series. A few positions which previously existed in the three separate agencies were reviewed to determine if they were appropriately classified based upon the new DIT job duties.

Technological Change and Manpower Planning

Advances in less labor-intensive technology have resulted in a decrease in the number of positions needed to operate the DIT data center. It is likely that future technological advances, in addition to increased customer utilization of distributed data processing, will further reduce the number of personnel needed to run the data center. In fact, the manager of the Operations Branch projected that plans for new tape technologies and system enhancements will result in a reduction of 20 to 25 positions in the data center over the next three to five years.

Technological changes have also led to changes in the nature of customer demands. The shift in the focus of customer demands, resulting from the increase in the number of users, was first identified in co-location planning documents developed in 1983 by DCS. These plans stated that consolidation of the separate computer facilities presented "DCS with the opportunity to organize and direct its personnel and resources towards a full service image to its customers." Increasing customer requests for problem resolution and technical support during non-prime shifts were believed to indicate a need for such an agency image. As evidenced by the evolution of the help desk function in the Operations Branch, the shift in the nature of customer demands continues to gradually impact the nature of positions needed in DIT.

Table 27

GRADE LEVEL AND SALARY CHANGES RESULTING FROM MERGER

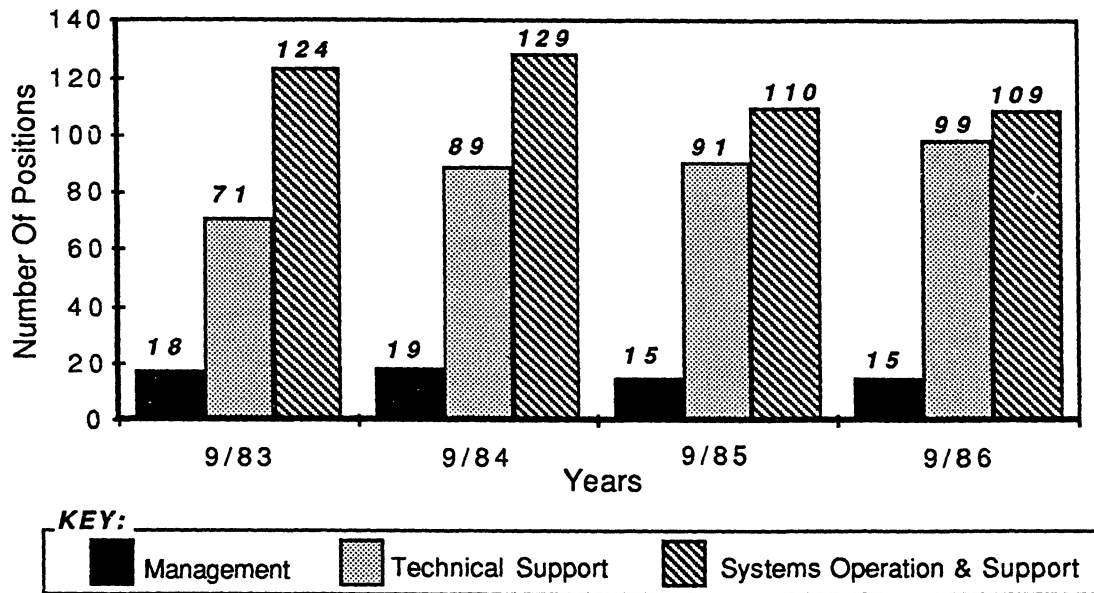
<u>Change in Grade level</u>	<u>Agency</u>	<u>Number of Employees</u>	<u>Amount of Salary Change</u>
-2	DCS	1	(\$ 2,474)
	DOT	1	0
-3	DCS	2	(4,775)
No Change	DCS	12	0
+1	DCS	11	29,117
	MASD	10	28,061
	DOT	14	36,243
+2	DCS	13	8,986
	MASD	20	73,913
	DOT	8	19,443
+3	DCS	2	3,163
	DOT	2	7,904
+4	DCS	1	2,525
	MASD	1	2,758
	DOT	1	1,575
+5	DOT	1	4,321
+6	DOT	<u>1</u>	<u>4,321</u>
		101	\$215,081

Source: JLARC organization and staffing analysis.

Customer Demands Translate Into Staffing Changes. A comparative analysis of the composition of computer services staff from September 1983 through September 1986 (Figure 11) clearly shows this expected shift in the focus of the services provided by DCS (and now DIT). Positions related directly to operations, such as computer operators and production control technicians, decreased 12 percent over this time period, while the number of management positions has remained fairly stable. On the other hand, technical support positions increased 28 percent. DCS originally anticipated that the personnel cost increase as a result of this change in service focus would cost \$471,183 less than if co-location did not occur. The JLARC staff analysis of the actual

personnel costs showed that the DCS cost avoidance was \$329,439, which was \$141,744 less than anticipated. As the number of technical positions has continued to increase and the number of operations positions has continued to decrease, salary costs have increased because technical positions are generally at higher grades than operations positions.

Figure 11
**Computer Operations Positions
1983-1986**



Source: DCS planning documents, DIT Human Resources Division.

Manpower Planning Needs. Effective manpower planning combines workload measurement and productivity standards (work measurement) to determine the number and type of staff needed to meet anticipated workload. Technological advances and changing customer demands make manpower planning very complex for an agency such as DIT. The costs of technology and a professional data processing staff make it imperative to accurately forecast needs and plan accordingly. With the exception of the operations branch of the Computer Services Division, DIT's manpower needs are handled more reactively than proactively. Even in the operations branch, staffing forecasts are basically estimates; and then attrition is utilized to eliminate unneeded positions.

Recommendation (52). DIT should establish a formal manpower planning function within its Human Resources Division. This function should be

charged with responsibility to develop valid forecasts of the agency's future manpower needs. DIT should develop measurable productivity criteria for all service-related and support positions, and this data should be used in conjunction with workload forecasts to project changes in the number and type of staff the agency will need.

Position Classification

As a result of co-location and merger, a number of position classification problems have been created for DIT. These problems have been compounded by inadequate planning for the impact of technological advances. In addition, DPT did not serve in a meaningful role during these agency reorganizations as indicated by the extent of inappropriate position classifications within DIT. An independent analysis conducted by JLARC staff found that as many as 24 percent of DIT's 480 positions may be inappropriately classified. These inappropriate classifications cost the State excessive annual salary expenses and fringe benefit costs. Savings ranging between \$500,000 to \$800,000 could possibly be realized.

Furthermore, approximately 35 percent of DIT's positions are allocated to technical classes in the Computer Systems Engineering, Telecommunication Services, and Communications Services series. The specifications for these series are written in vague language and lack clear distinctions among the classes. Consequently, a large percentage of these positions are currently allocated to questionable classifications.

DIT's Role. JLARC staff found five classification practices used by DIT which have resulted in the inappropriate classification of 114 positions. First, at the time of merger, current position descriptions were not written for all positions. For example, prior to merger, the top fiscal positions in the three agencies were classified as Fiscal Director A (DCS), Fiscal Officer (MASD), and Accounting Manager A (DOT). At the time of merger, none of these positions were utilized as the top fiscal position in DIT; however, all three positions are still classified based upon pre-merger job duties.

Second, personnel have been retained when their positions were no longer needed. The agency has placed at least 30 incumbents in new positions with new duties but retained the old position classifications. All of these positions are inappropriately classified. The following examples are illustrative:

There are at least three Computer Operations Supervisor positions in the Operations Branch which were responsible for supervising operations subordinates prior to co-location. After co-location, these positions were used as hardware analysts for the more complex data center operations. Supervisory duties were no longer a responsibility of these positions. Yet the positions have retained the classifications allocated prior to co-location, even though DPT states that a supervisor must have subordinates.

* * *

A Production Control Supervisor from the Operations Branch was moved to a new position in the security group. Primary responsibility in the new position consists of responsibility for the Computer Services Division's technical library. This position is also utilized to assist in determining what level of security is needed for which types of information and for supervising one employee, who is also not involved in production control. DPT questioned the allocation of this position in June 1986; however, the position classification has not been changed.

Third, DIT has used agency-specific and technical classes to allocate positions which are found in numerous other agencies. This practice is particularly evident in the Administration Division of DIT.

DIT, which is considered by DPT to be moderately complex based on the number of different funding sources involved, has classified its managerial position for the Finance Branch of the Administration Division as an Information Technology Manager (Grade 18), whereas comparable management positions in other moderately complex agencies, such as Social Services, Health, and General Services, are classified as Fiscal Directors A (Grade 16). Only in the most complex agencies, such as the Departments of Transportation and Mental Health and Mental Retardation, are the top fiscal management positions allocated at the grade level of 18. These positions are classified as Controllers. DIT's use of the Information Technology management series, rather than the fiscal series, appears to be unwarranted.

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In the Finance Branch of the Administration Division, there is a Computer Systems Engineer (Grade 14) position responsible for the billing function of the agency. In agencies of comparable complexity, such positions are classified as Accountants Senior (Grade 11) or Accountants (Grade 9), or the positions are charged with more than one accounting function and are classified as Accounting Managers B (Grade 14) or Accounting Managers A (Grade 12) based on staff size and the nature of the functions managed. Similarly, in the Planning and Budgeting Branch of Administration, the top fiscal management position is classified as a Computer Systems Chief Engineer (Grade 17), while similar positions in comparable agencies are classified as Budget Managers (Grade 14). Budget Directors (Grade 17) are only found in the largest, most complex agencies.

** * **

The entire Procurement and Contracting Branch of the Administration Division (excluding the clerical support staff) is an example of using agency-specific and technical classifications where such usage is questionable due to the high percentages of time spent performing non-technical duties. The top managerial position of this branch is classified as an Information Technology Manager (Grade 18), while the comparable managerial position in the Division of Purchase and Supply in the Department of General Services (DGS) is classified as an Assistant Director of Procurement (Grade 16).

JLARC staff recognize that effective procurement of data processing equipment requires a greater degree of technical expertise than does the procurement of supplies and equipment of a general nature. Moreover, the procurement process includes non-technical steps that do not require engineering expertise. The procurement section manager in DIT is classified as a Computer Systems Chief Engineer (Grade 17) while the telecommunications procurement section manager in DGS is classified as a Purchase and Stores Director B (Grade 13) and the comparable position in VDOT is allocated as a Purchasing Manager (Grade 14). The subordinates in the Procurement and Contracting Branch all are classified in the Computer Systems Engineering series ranging from Grade 15 to Grade 17. However, their counterparts in DGS and in VDOT are classified in the Buyer series (Grade 7 to Grade 11). Although some of DIT's procurement positions may warrant somewhat higher grade levels, DPT should re-examine the appropriateness of the large disparity between these DIT positions and other State procurement positions.

Fourth, DIT has broadly interpreted some class specifications, allocating specific positions at unnecessarily high levels. For example, DIT seems to have broadly interpreted geographic dispersion to mean three field offices each with three positions. As a result, many positions are classified at levels that are equivalent to comparable positions in agencies such as DMV, VDOT, and MHMR, which are definitely geographically dispersed throughout the State.

DIT has an Audit Director-Internal position (Grade 18), yet these positions are found in only the largest, most diverse, and complex agencies. According to DPT, Audit Manager Senior-Internal (Grade 17) is the classification that is designated for use in moderately complex agencies such as DIT. Audit Director-Internal is reserved for the State's largest and most complex agencies such as VDOT and MHMR.

* * *

DIT has an Employee Relations Director C (Grade 16). In other agencies where this classification is used, such as the Department of Social Services and the Department of Motor Vehicles, the staff are geographically dispersed in large numbers throughout the State. DIT's Employee Relations Director C position is not in charge of employee training and development even though the classification specifications for this class include responsibility for this function. Furthermore, the Employee Relations Directors C in other agencies have relatively large subordinate staffs compared to the staff of DIT's Human Resources Division. In May 1987, this position was downgraded to a grade 15 as a result of DPT's statewide personnel evaluation.

Lastly, there are numerous positions in DIT where reductions in staff or technological changes have led to a gradual change in the job duties. For example:

According to DPT, a lead operations position should be responsible for actually supervising a small number of subordinates (making work assignments, conducting performance evaluations, etc.), and such positions should be shown on the organization chart as having subordinates. Primarily because of a decrease in the number of operations positions, none of the 23 Computer Lead Operators or the 11 Production Control Lead Technicians currently meet these classification criteria. It should be noted that the management of the Operations Branch defines a lead position as one requiring more expertise and ability than an operator or a technician. However, there is also a classification for a Computer Center Operations Specialist which is the technical expert on a shift, making this definition of a lead somewhat redundant.

Recommendation (53). DIT should write new position descriptions for the 114 inappropriately classified positions identified through the JLARC staff analysis. In all instances, DIT should also comply with DPT's Policy No. 3.07 (for position reallocations) and Policy No. 3.08 (for position abolishment and establishment) in determining the type of personnel action needed to effect these classification changes. DIT should also use these DPT policies to determine the appropriate compensation actions required in changing the allocations of these 114 positions.

DIT should also write new position descriptions which accurately reflect position duties whenever an employee is moved from one position to another. This will ensure that the allocated classification is appropriate whenever a position becomes vacant, as required by DPT policies. DIT should also comply with DPT's Policy No. 3.07 and 3.08 whenever changes in an employee's duties result in classification and compensation changes.

DPT's Role. Classification problems at DIT have been compounded in two ways by the Department of Personnel and Training. While Section 2.1-114.3 of the *Code of Virginia* specifically charges DPT with responsibility for establishing and administering a "program of evaluation of the effectiveness of performance of the personnel activities of the agencies of the Commonwealth," DPT has served only in a consultative role in total agency reorganizations in the past. Without on-site audits, the effectiveness of DPT's oversight in agency personnel actions depends upon the accuracy and timeliness of classification changes initiated by an agency.

Under DPT's Rule 5.5, if restructuring cuts across classification lines, or results in changes in job duties for specific positions, the Director of DPT is to be furnished with a written description of the revised position duties so that proper allocation can be determined. This written notification is to be submitted at least 30 calendar days prior to the planned effective date of the change. However, "in the event it is not practicable to provide 30 days' written notice, the appointing authority [DIT in this case] shall notify the Director [of DPT] by the most direct and earliest means available." DCS and DIT did not initiate personnel actions, substantiated by the required written position descriptions, within a reasonable time after co-location and merger. JLARC staff found classification problems two years after these organizational changes were implemented.

Furthermore, a DPT compensation and classification analyst has stated that DPT has "pretty much bought off on the fact that DIT positions need data processing knowledge and experience." Consequently, when DIT has requested specific allocations, DPT has not routinely questioned the requested allocation. DPT's limited role in reorganizations and a belief that most DIT positions require data processing backgrounds have resulted in ineffective monitoring and control over personnel changes resulting from co-location and merger.

DIT has a memorandum of agreement with DPT granting it delegated authority to reallocate existing positions within classes and salary grades, and to allocate new positions. This authority enables DIT to classify jobs within the agency in 36 different class codes (excluding the top classification for each of the included codes). Under this system, DPT then reviews agency documentation of personnel actions on a monthly basis to determine compliance with the uniform State classification plan.

Under the current decentralized system, it is important that agency administrators ensure that all position descriptions submitted to DPT on a monthly basis are accurate and up-to-date. However, unless the agency with delegated authority voluntarily complies with DPT allocation and reallocation policies, and unless DPT follows up on its reviews, serious classification problems can still occur.

A Computer Operations Supervisor was moved from the Operations Branch to the Facilities Support Branch in 1986. The position description written in April of that year clearly indicates that this position is utilized as an interior decorator for DIT. DPT advised DIT in June 1986 that the State classification plan did not have a class

specifically suited to this type of work. DPT noted that this position could not be allocated to "a field of work so remote from computer operations." DPT did not conduct any follow-up of its assessment to determine if DIT made necessary adjustments to the classification. DIT recognized that the interior decorator position was misclassified but has taken no corrective action since DPT's review a year ago.

* * *

A Computer Systems Senior Engineer was moved from the Operations Branch to the Facilities Support Branch to supervise a carpenter, an assistant carpenter, and the interior decorator. The job duties of this position fit the classification specifications for a Building and Grounds Supervisor A, which is six grade levels lower than this position's current engineering classification. In June 1986, DPT advised DIT that the duties of this position were not appropriate for the computer systems engineering class and recommended that DIT take appropriate action. As of June 1987, this position is still classified as a Computer Systems Senior Engineer.

Recommendation (54). The Department of Personnel and Training should reassess its role in agency reorganizations to ensure that this role is consistent with DPT's statutory mission of implementing a State classification plan and of evaluating the personnel activities of all State agencies and institutions.

DPT should also assess its current policies and procedures used to monitor and evaluate personnel activities in agencies and institutions, and these policies and procedures should be redefined if needed in order to foster a more active role in reorganizations and in day-to-day personnel activities. DPT should revise Rule 5.5 for administration of the Virginia Personnel Act to include specific procedures to be utilized by agencies in position allocations that result from any type of reorganization. State agencies and institutions should be required by this rule to temporarily assign job duties to staff until such time as the position descriptions generated by reorganizations can be reviewed and allocations approved by the director of DPT.

Recommendation (55). DPT should revoke DIT's memorandum of agreement for delegated classification authority. DIT should be required to submit all position classification requests to DPT in writing and on an individual position basis, following the process outlined in Rule 5.5 for administration of the Virginia Personnel Act. DPT should routinely conduct on-site audits of DIT positions in each classification to ensure that position descriptions submitted accurately reflect position duties.

Use of Vague Technical Specifications. In addition to those positions clearly found to be inappropriately classified, 35 percent of DIT's 480 positions fall in the Computer Systems Engineering, Telecommunications Services, and Communications Services technical series. The classification specifications for

all classes in these series are written in vague language which could foster interpretations too broad to be accurate. JLARC staff questioned the appropriateness of DIT's use of these classifications for many of the agency's positions. However, because the classification descriptions often lack specificity, JLARC staff defined many of these position classifications as questionable. In interviews with JLARC staff, the DPT analyst assigned to DIT and the compensation and classification analyst at DIT also raised questions about the appropriateness of utilizing these classifications for some of DIT's positions.

Comparisons of job duties utilizing these specifications are complicated; consequently, these particular specifications present a potential for grade inflation. The specifications for the Computer Systems Engineering series are written in vague, general terms and lack clear-cut distinctions among the classes within the series, yet class codes from this series are assigned to 140 positions. The disparity in job duties for personnel in these classifications points to a need to rewrite the specifications, making clearer distinctions among the classes. For example, the Computer Systems Engineer title is assigned to positions with wide variance in the technical nature of the job duties performed as well as in the amounts of time spent in performing these technical duties.

A Systems Engineer in a technical support branch of the Computer Services Division is involved in software installation, maintenance and modification, and technical hands-on problem resolution. A Systems Engineer in the Client Services Branch is involved in simple problem diagnostics (a help desk function involving passing the problem on to someone else for resolution), software testing and documentation, systems monitoring, and assigning user ID's. A Systems Engineer in the Administration Division is responsible for using automated systems to carry out the fiscal function of generating accurate customer bills.

In addition, the Computer Center Lead Engineer classification should be restricted to large mainframe operations according to DPT; yet, 45 percent of DIT's 29 Lead Engineer positions are located outside of the Computer Services Division (the actual computer center).

A more precise definition of the type of degrees, previous work experiences and present job duties would provide a more meaningful distinction in the Computer Systems Engineering series. A college degree in computer science, mathematics, or engineering is listed in all of the specifications in this series as the required educational qualification. However, 69 percent of DIT's 140 incumbents in these positions either have unrelated degrees or no degrees. Many of these staff have prior experience which substitutes for the required degree. Because the class specifications are so vague, however, it is not clear what educational degrees or experience are really required to perform the duties assigned to these positions.

A supervisory requirement might also serve to better distinguish between higher and lower grades in this series. None of the specifications for

the Computer Systems Engineering series require management duties, yet JLARC staff found that 21 percent of DIT's 140 positions allocated to this series actually have full-time management duties. Sixty-five percent of the 40 Computer Systems Chief Engineers in DIT are full-time management personnel.

Another concern with DIT's technical classifications is the apparent overlap between the Computer Systems Engineering, Telecommunications Services, and Communications Services series. Prior to merger, Computer Systems Engineers were utilized in DCS and MASD, while Communications Engineers and Communications Engineer Managers were utilized in DOT. Now that these agencies have been merged and data processing and telecommunications technologies are being integrated, there is a need to have all of these specifications reworked to encompass an integrated definition of job duties.

In addition, specification language in both the Telecommunications Services and the Communications Services series has been outdated since the time of merger. For example, the classification specifications for a Communications Engineer Manager state that this position "reports to the Deputy Director, Government Communications," a position that no longer exists.

Recommendation (56). DPT should conduct on-site audits for all positions in DIT which are currently allocated in the Computer Systems Engineering, Telecommunications Services, and Communications Services series. The data gathered through these audits should be used to write these classification specifications from an integrated technology (and an integrated agency) perspective. The new specifications should incorporate clearer distinctions among the job duties, the expertise, and the training required for each of the new classes. In addition, DPT should include a requirement to perform full-time management duties in the new specifications for the Computer Systems Chief Engineer class.

Salary Levels and Turnover Rates

An examination of salary levels revealed that DIT salaries are competitive. In addition, an analysis of annual turnover rates for data processing and telecommunications positions in the Department of Information Technology showed that turnover currently is not a problem.

DPT Actions to Enhance Classification Competitiveness. In the early 1980s, turnover rates were excessively high for data processing classes throughout the State. The Departments of Computer Services and Management Analysis and Systems Development corresponded frequently with the DPT, urging actions which would make salaries for these classes more competitive with the private sector.

Between May 1981 and May 1984, DPT took three separate actions aimed at enhancing the competitiveness of the State's data processing classes and simultaneously reducing the turnover rates within these classifications. First, after completing a comprehensive study of all generic classes in the data processing group, new class concepts and salary ranges were implemented for

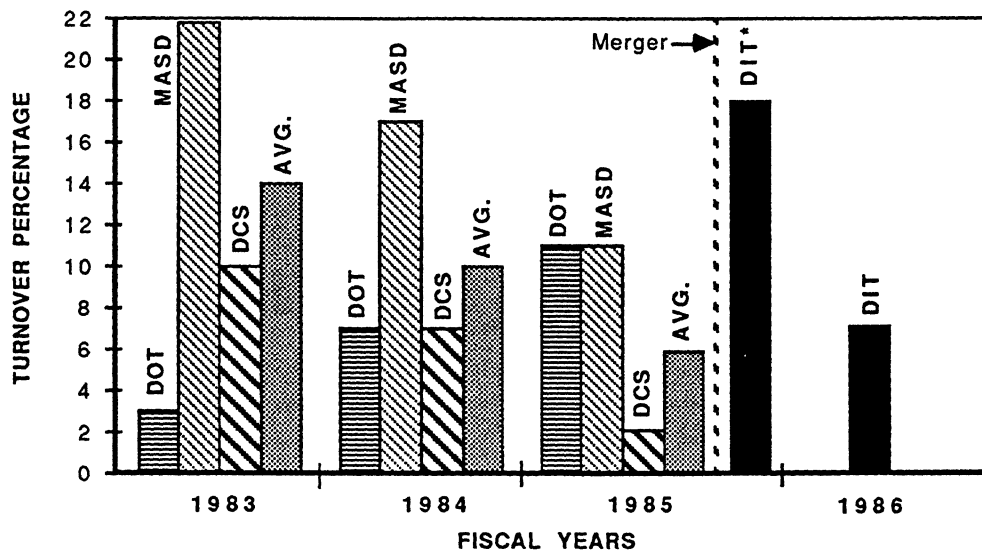
these classes on May 1, 1981. Second, an 8.5 percent salary differential was implemented for all data center personnel who worked second and third shifts. And finally, on May 1, 1984, DPT regraded a number of data processing classes, permitting agencies employing such personnel to grant salary increases ranging from 4.4 to 8.8 percent. DCS granted full 8.8 percent increases.

DPT completed a salary survey for data processing classes in 1986. Using A.S. Hansen's 1986 Data Processing Survey as its primary source, DPT concluded:

The data shows that data processing salaries are right where they should be. They trail the private market, as do all classes, but they are closer to the market than most classes.....Overall there is no problem of data processing salaries being either too high or too low. Therefore, no changes are indicated as necessary at the present time.

Analysis of Turnover Rates for Data Processing and Telecommunications Classifications. Figure 12 shows a comparison of turnover rates for FY 1983-1985 for the three separate agencies which merged to form the Department of Information Technology. Telecommunications positions for the Department of Telecommunications and for DIT were used in this analysis. Data processing positions from all the agencies were used to make turnover comparisons. In FY 1985, turnover is shown for both the separate agencies and for the DIT.

Figure 12
**Agency Turnover in
 Data Processing and Telecommunications**



* The turnover rates for DIT for FY 1985 encompass the period from September 1984 through June 1985. Source: DPT report, "Turnover Reports by Class Within Agency Classified", DIT's Human Resources Division.

Between FY 1983 and FY 1986, the turnover rate for data processing and telecommunications positions dropped from 14 percent to 7.4 percent, for a 6.6 percent reduction. DIT did experience a sharp increase in turnover for these classifications during the first quarter of FY 1985; however, this increase was probably a normal outgrowth of merger.

The national average annual rate of turnover in the areas of data processing and telecommunications has increased since 1984. A survey conducted by Edward Perlin Associates (New York City) and reported in the June 11, 1986, issue of Personnel Management showed that the average annual rate of data processing turnover was 18 percent. For FY 1986, DIT's turnover rate for its data processing and telecommunications professionals was significantly lower than the national average. DPT's 1986 annual salary survey concluded that "there is no evidence of significant turnover problems for any of the (data processing) classes or series at the present time."

ORGANIZATIONAL CONCERNS

DIT is a central support agency which provides highly technical services. This organization, considered by DPT to be moderately complex, is comprised of seven divisions and the Director's Office staff. These separate units are responsible for providing support to customer agencies and institutions, as well as for DIT's own operational needs.

An in-depth analysis of DIT revealed major organizational problems and underscored the fact that the many agency functions have not been merged. The services provided by the major divisions (Computer Services, Information Services, and Telecommunications) are largely copies of DCS, MASD, and DOT.

Several service areas were found to raise either mission consistency or staffing efficiency issues. Failure to consolidate service functions present in each of the three separate agencies has resulted in widespread fragmentation of services, as well as blurred distinctions between internal and external service support. JLARC staff also found that DIT's 480 MEL positions included one position which is not used as an agency position.

The size of DIT's seven divisions ranges from 11 to 183 positions. Comparably wide ranges were found to exist in the number of supervisory positions in the different divisions and in the number of subordinates assigned to specific managers. Based upon division size, JLARC staff found that six divisions have excessive layers of management positions. JLARC staff also identified a strong need for DIT to develop a well-defined management training and development program and to take steps to ensure that employee reimbursements for courses of study comply with DPT guidelines.

Mission Consistency and Staffing Efficiencies

JLARC staff found DIT to be providing several services that seemed to more closely match the missions of other State agencies. In addition, DIT's

procurement function and some of the activities of the Systems Development Branch were found to be outside of the realm of the agency's statutory mission. Utilization of positions for the provision of such services as clerical support pools, switchboard operations, facilities support, public relations, and legislative liaison were found to pose efficiency concerns. Furthermore, JLARC staff found one position that was used to provide clerical support to a secretariat.

Services Presenting Mission Consistency Concerns. DIT was found to be providing at least four services which fall outside of the agency's mission and which, consequently, should be provided by other agencies (or boards). As a holdover from DCS, the Technical Services Branch negotiates and administers for the Commonwealth a contract for educational materials. While the bulk of these contract offerings are data processing oriented at the present time, an instructional contract for training materials which benefit all agencies and institutions could be more effectively negotiated and administered by the Department of Personnel and Training.

The Public Telecommunications Branch of Educational Technology provides administrative support to the Virginia Public Telecommunications Board. This support involves negotiating contracts with public broadcasting stations and coordinating the program offerings that will be provided by these stations. This support is more directly related to educational purposes than to information technology.

The Virginia Public Telecommunications Board should be established as an independent board in the Education secretariat. Responsibility for providing administrative staff support should be assigned to the Department of Education (DOE), allowing the board to concentrate on its program responsibilities. Two positions from DIT should be transferred to DOE to provide technical and liaison support to the board. Other functions of the Educational Technology Division should be retained within DIT.

The Management Consulting Division has statutory authority to conduct both organization and management studies (which are general in nature and are aimed at assisting an agency in reviewing its organization and procedures) and special projects (which are more narrowly scoped and focused on one specific organizational problem in an agency). This authority does not extend to policy and program analyses, which come within the statutory responsibility of the Department of Planning and Budget. The nature of the services provided by this division does not blend with the information technology mission of DIT. This function should be placed in a separate agency in the Administration secretariat as recommended in JLARC's previous report, An Assessment of Structural Targets in the Executive Branch of Virginia.

The information management planning and technical staff support activities currently provided by the Systems Development Branch do not fit with DIT's mission and should be terminated. By the same token, the procurement function should be conducted independently of DIT's service orientation and should be placed in another agency as discussed in Chapter III.

Services Presenting Staff Utilization Concerns. Five service areas in DIT were found to exemplify less than efficient utilization of available staff: assignment of clerical support staff, physical plant maintenance, public relations, legislative liaison, and switchboard operations.

While JLARC staff agree that clerical support should be centralized within divisions and branches, several examples of inefficient utilization of existing clerical position assignments within DIT were found. First, while the director's office is assigned three clerical positions, neither the director nor the deputy director is assigned a personal secretary to provide for direct secretarial and clerical needs.

In addition, JLARC staff found two centralized clerical support pools which represent pre-merger utilization of support positions. The clerical support pool in the Voice Operations and Engineering Branch provides only support for this branch, not for the remainder of the Telecommunications Division.

The clerical support pool in the Information Services Division is actually a central word processing group for the agency. This clerical pool is located in the Monroe Building. JLARC staff found that many DIT management personnel in other buildings were unaware of the existence of this particular clerical support group; consequently, the available services have been inefficiently utilized.

Physical plant maintenance, public relations, and legislative liaison functions were created at the time of co-location and merger. The new positions created for these functions were found to present staffing efficiency concerns.

As of January 1987 the Administrative Services Branch contained four positions which were used for maintenance and interior design of DIT's facilities (particularly the Plaza Building). Two of these positions are used to provide minor remodeling construction and maintenance comparable to the services provided by the Bureau of Buildings and Grounds in DGS. JLARC staff found that, with the exception of the largest, most geographically dispersed agencies (VDOT, DMV, DOC), positions allocated to the carpenter series are only used in colleges, universities, and training and rehabilitation institutions.

In addition, the interior decorating services provided by a third position in this functional group fall outside of all of the occupational class specifications in the State classification plan. In other agencies, such services are either contracted for or handled by a management position on an "as needed" basis. The fourth position in this group was found to be used primarily to manage the general maintenance function.

There are only six agencies which have a legislative analyst position. With the exception of DIT, all of these have programs which require continuous legislative liaison, expertise, and tracking on the local, State, and federal levels. DIT's use of this classification cannot be attributed to a need for such continuous legislative activity. Furthermore, the agency director agrees that DIT's mission, programs, and services do not warrant such a position.

Prior to merger, DCS had an Administrative Staff Specialist position responsible for public relations for the agency. Since that time, the public relations function within DIT has been expanded to a three-position branch of the Human Resources Division. This branch was found to provide some services which overlap with the functions of the Personnel Branch of the Human Resources Division, such as publishing an employee newsletter and providing employee identification badges. The branch also duplicates efforts of the legislative analyst as well as the administrative staff specialist positions and Customer Liaison in the director's office because it handles press releases and serves as a point of initial contact for the general public as well as other agencies and institutions needing information on DIT services.

Furthermore, the functions managed by an Employee Relations Director should be confined to those which relate to the internal needs of an agency's employees. Inclusion of the Public Relations Branch in the Human Resources Division causes DIT's Employee Relations Director to be inappropriately classified.

The Telecommunications Division currently utilizes three shifts of switchboard operators to provide directory assistance, paging services, and emergency service connections 24 hours per day, seven days per week. In 1985, the Telecommunications Division received an unsolicited proposal from the C&P Telephone Company to provide State directory assistance services. The Department of Emergency Services (DES) approached this division in 1986 about taking over responsibility for the emergency service calls from the general public.

According to management personnel in Telecommunications, there was no question that the provision of these services would be more efficient and cost effective if turned over to C&P and DES, respectively. However, no effort was made to pursue alternative methods of service provision.

JLARC staff research also identified that one of the positions included in DIT's MEL is not actually a DIT position. This position, vacant since January 1987, is a clerical support position for the Secretary of Economic Development. When this position was filled, the secretary reimbursed DIT for the salary expenses of this position.

Functional Fragmentation

Using data gathered through employee surveys and personal interviews, JLARC staff identified 13 functions within DIT which were fragmented among more than one work unit. Some of the current functional diffusion was found to be beneficial. For example, the diffuse nature of security activities provides a system of checks and balances over computer users' access, thereby enhancing the effectiveness of overall security procedures.

Five of these diffuse functions, however, were viewed as incomplete functional alignment at the time of merger and represent fragmentation (Figure 13). This fragmentation results in: (1) an inability to streamline

Figure 13

Functional Fragmentation Within DIT

LOCATION OF SERVICE	FUNCTION				
	Procurement Activities	Systems Development, Maintenance, & Modification	Technical Assistance	Billing-Related Activities	Network Control & Management
Director's Office					
Customer Liaison	•		•		
Internal Audit					
Other Staff					
Management Consulting					
Human Resources					
Personnel					
Public Relations	•				
Educational Technology					
Ed. Applications	•		•		
Teleconferencing			•		•
Public Telecommunications	•		•		
Administration					
Finance		•		•	
Planning & Budget		•		•	
Administrative Services	•				
Procurement & Contract	•				
Computer Services					
IBM			•		
Sperry			•		
Database	•		•		
Telecommunications			•	•	•
Operations					•
Telecommunications					•
Voice	•		•	•	•
Data	•		•	•	•
Integrated Technology	•		•	•	
Information Services					
Client Services	•	•	•	•	
Technical Services	•	•	•		
Systems Development	•	•	•		

Source: JLARC interviews and DIT employee surveys.

staffing, (2) an inefficient utilization of available staff, (3) an inability to offer new services required by customers without the need for additional positions, and (4) a lack of cohesiveness among the staff due to the potential for "fighting" for customers in order to justify continued service provision.

Procurement Activities. Some aspect of the procurement process is being handled in almost every division and branch of DIT. This fragmentation is basically the result of retaining the procurement functions which were present in the three separate agencies prior to merger. The DIT task force reviewing the agency's organizational structure also noted that procurement was one of the areas in which insufficient collaboration and consolidation have taken place.

Technical Customer Assistance. Customer agencies and institutions often require technical assistance in the form of long-range planning, research, training, staff support, and consultations concerning feasibility studies and cost/benefit analyses. Prior to merger, each of the three separate agencies provided many of these technical services to agency-specific customers. Failure to consolidate these technical services in the merged organization has led to fragmentation as well as blurred distinctions between internal and external service support.

DIT offers two types of technical training to its customers, each provided by a different division. Both the Technical Services Branch and the Voice Operations and Engineering Branch provide coordination of vendor-provided technical training; the only distinction between the two training services is the focus of the training. Customer agencies' technical training needs could be more effectively coordinated if the function were consolidated.

The absence of clear-cut distinctions between internal and external technical support activities were found to result in fragmentation of technical services, organizational problems, and funding concerns. The Systems Development Branch is involved in long-range, information management planning for customers. Customer Liaison is involved in internal planning and in helping agencies identify other sources for information management planning. The Technical Services Branch provides long-range planning expertise for DIT's needs.

Research and technical consultative services are provided for both DIT and for customer agencies in all branches of the Telecommunications Division, the Educational Technology Division, all branches of the Computer Services Division (except Operations), and in the Client Services and the Technical Services Branches of the Information Services Division. The Systems Development Branch provides technical consultations only to DIT's customers. In addition, the IBM Support Branch and the Systems Development Branch provide on-site staff support to agencies needing to supplement technical staffs.

Billing-related Activities. All three of the separate agencies had staff assigned to billing activities prior to merger. The inadequate consolidation of these pre-merger activities has resulted in DIT's billing

function being fragmented among the Administration, Telecommunications, Computer Services, and Information Services Divisions.

Systems Development, Maintenance, and Modification Activities. The Systems Development Branch of the Information Services Division is responsible for wide ranging systems development needs of customer agencies and institutions. The Client Services Branch of the same division is currently responsible for all of DIT's internal systems development needs. In addition, the Finance and the Planning and Budgeting Branches of the Administration Division also play vital roles in maintaining and modifying DIT's internal decision support systems. The Technical Services Branch is also used to provide technical assistance to the Systems Development Branch and to all staff involved in the systems development, maintenance, and modification needs of DIT itself.

Network Control and Management Activities. Network control and management functions are currently divided between the Computer Services Division, the Telecommunications Division, and Educational Technology Division. These functional divisions are based on the distinction between DIT's data center network, the State's telecommunications network, and teleconferencing and educational programming needs. This division of responsibility requires a good deal of coordination and communication in order for both network units to perform effectively and efficiently. This delineation also precludes DIT from operating a "state of the art" customer assistance function because network-related problems need to be reported to different organizational units, depending upon the nature of the communications problem.

In addition, activities related to network management are fragmented within the Telecommunications Division. The current division of network design and management functions is based on the type of network service involved (SCATS, Centrex, or data). However, consolidation of these network functions would provide DIT with the vehicle needed to more effectively plan and monitor the State's integrated network, which will be used to provide all three types of services.

Effectiveness of Management Structure and Staff

As indicated by Table 28, DIT has wide ranges in the number of positions assigned to its specific divisions, the number of management positions per division, and the number of subordinates reporting to a single supervisory position. In addition, it is not readily evident from the agency organization chart or from interviews with staff which top management positions are charged with the responsibility of managing which divisions and functions. However, it is readily apparent that agency size and diversity preclude the director from directly overseeing the total agency effectively.

Supervisory Hierarchies. Approximately 25 percent of DIT's 480 positions carry full-time supervisory responsibility. Particularly in the smaller divisions, such as Educational Technology and Human Resources, JLARC staff found excessive numbers of management positions. In the Management Consulting Division, on the other hand, JLARC staff found a need for at least one additional full-time supervisory position.

Table 28

Utilization of Management Positions

ORGANIZATIONAL UNIT	Number of Management Positions	Total Number of Positions	Average No. of Subordinates Per Manager*	Number of Subordinates (Range)	Layers of Management
Customer Liaison	1	8	6	* *	1
Internal Audit	1	3	2	* *	1
Management Consulting	1	14	12	* *	1
Human Resources	5	11	2	1 - 3	3
Educational Technology	5	14	2	0 - 4	3
Administration	16	54	3	1 - 6	4
Computer Services	45	183	4	1-10	5
Telecommunications	22	69	3	2 - 5	5
Information Services	27	119	4	1-10	5

* Excludes clerical positions and filled hourly positions.

** Only one management position; consequently, no range given.

Source: DIT's semi-monthly personnel report of 3/1/87 and organization chart.

An analysis of the utilization of management positions revealed that neither division size nor the complexity of particular functional areas had a significant relationship to the number of supervisory positions assigned to specific work units. Consequently, the three major internal-service-funded divisions each have five layers of management, and the Administration Division currently has four managerial layers.

The number of subordinates reporting to a single supervisory position also varies greatly throughout the agency and does not appear to be predicated on task complexity. The Operations Branch has Computer Operations Supervisors with no subordinates, for example. Educational Technology, Human Resources, the Administration Division, and the Operations Branch each have supervisory positions with only one subordinate position. On the other hand, the Management Consulting director has direct responsibility for 14 positions, and the manager of Customer Liaison has seven positions to supervise.

Recommendation (57). DIT should reorganize to address the classification, mission consistency, fragmentation, organizational, and training problems identified by JLARC staff. DIT should write new position descriptions for every position once reorganization plans have been finalized. DIT should utilize DPT's revised classification specifications for technical classifications to determine if technical positions are warranted and appropriately classified in the new organization. DPT should be involved in

reviewing and approving all position descriptions prior to the implementation of DIT's restructuring, as required by DPT's Rule 5.5 for administering the Virginia Personnel Act. Upon completion of reorganization, DIT should submit a revised cost allocation plan to JLARC and the Department of Planning and Budget which includes a description of changes in the amount and allocation of personnel costs.

Management Training and Employee Educational Services. The need for managers and potential managers to avail themselves of management training and development opportunities is underscored in a highly technical organization such as DIT. However, the agency lacks a formal management development program. Furthermore, the educational services which are available to agency employees are coordinated through the Technical Services Branch, which specializes in technical training and services.

DIT does not have well-defined guidelines for the amount of professional development training that staff are expected or permitted to take. JLARC staff examined the number of courses and seminars, both technical and non-technical, that DIT employees attended during calendar year 1986. During that year, 37 percent of the DIT staff completed professional development courses, seminars, and workshops. Approximately one-half (58) of DIT's 125 managers and supervisors participated in training. This review also indicated that in some cases DIT does not monitor or control the amount of time allocated to an individual for professional development.

A Computer Systems Engineer attended 15 training courses and seminars which involved 43 days of attendance.

* * *

One member of the procurement staff attended 18 conferences and seminars. These were all job related but involved 35 days out of the office.

* * *

An engineer in the Telecommunications Division attended 12 training sessions and conferences as well as one college course. This employee was reimbursed \$4,150 for professional development expenses.

DIT's Policies for Employee Reimbursement for Development. In examining the number and the nature of the development courses taken by DIT employees during calendar year 1986, JLARC staff found that DIT broadly interprets DPT's policy governing reimbursement for courses of development. The DPT policy states that, "training provided under this authorization must be job related..... State financial aid may be made available only for study allied to the needs of the State service." According to a policy analyst at DPT, this would mean that a clerical employee in the accounting department of an agency and working on a degree would only be eligible for reimbursement for accounting-related courses.

DIT policies state that in order for reimbursement to be made for registration, laboratory, and tuition fees "the course must be job-related, provide reasonable preparation for advancement within DIT, be required for advancement within DIT, or be required to complete a job-related degree program."

The differences between DPT's and DIT's policies are the result of the general nature of the DPT policy. Because DIT and all other State agencies must establish specific policies to implement DPT's general requirements, the agency policies may include varying interpretations of appropriate reimbursements. Even among DPT personnel there appear to be differing views on the meaning of the reimbursement policy. As a result, some DIT staff were reimbursed for courses which were not job related.

For example, an executive secretary was reimbursed for completing a sociology course. In another instance, a senior programmer analyst in the Systems Development Branch was reimbursed for completing a swimming course. In a third case, the library assistant in the Telecommunications Division was reimbursed for completing courses in music appreciation, principles of reasoning, psychology, and biology. DIT reports that these courses were reimbursed as part of degree programs related to job duties or career advancement within DIT.

Recommendation (58). DPT should clarify its policy on educational reimbursements. The policy should state clearly that reimbursement is to be made only for courses related to the job duties of the employee. In addition, the policy should include specific criteria to help agencies determine the appropriateness of their reimbursement practices. DIT should develop well-defined guidelines and procedures for monitoring the number of professional development courses and seminars each employee may attend during a year. DIT should also revise its educational reimbursement policy to correspond to DPT's revised policy.

IX. ORGANIZATIONAL PROPOSAL FOR INFORMATION MANAGEMENT AND SERVICES

The merger of information technology service functions in DIT was a sound decision. Clearly, the integration of these services will provide for better coordinated and more efficient service delivery. Yet the inclusion of certain control and oversight functions in the agency has resulted in customer agencies raising serious questions about DIT's ability to properly fulfill either its service role or its oversight role. A service agency such as DIT cannot also serve as an oversight and control agency.

Thus, while DIT may have a genuine interest in promoting the most effective use of information technology, its customer agencies will continue to suspect that DIT's first priority is the maintenance and promotion of mainframe computer services. As its predecessors (the Division of Automated Data Processing and the Department of Computer Services) encountered in the past, DIT's efforts to develop a statewide plan or to establish information processing standards and policies would likely be resisted by agencies.

Moreover, DIT is the custodian and manager of the State's most expensive information technology resources. It cannot independently evaluate its own plans, acquisitions, and uses of those resources. Because DIT's primary mission must be to provide services to customer agencies, it is essential that control and oversight functions be established in some other agency. This chapter presents a blueprint for meeting this need. A Council on Information Management is proposed, and DIT should be reorganized to clearly focus its mission on information technology services and to address organizational concerns identified throughout this report.

THE COUNCIL ON INFORMATION MANAGEMENT

A Council on Information Management should serve as the focal point in a continuous planning cycle for information technology. As discussed in Chapter II of this report, successful implementation of a statewide plan will depend on effective linkages with State planning, budgeting, procurement, and evaluation processes. With advice from DIT, other agencies, and institutions of higher education, the oversight council would establish statewide plans, policies, and standards. Statewide policies and standards would guide agency planning; agency plans would be used to build the statewide plan.

The oversight council would also review budget requests for information technology. Requests would be prioritized according to statewide and agency information management plans, and recommendations would be provided to the Governor. By receiving agency and DIT budget projections, the council could also review the appropriateness of DIT's rates and provide rate recommendations for JLARC's approval.

The council would also review and approve major procurement requests in order to ensure that acquisitions support DIT's and agencies'

planning objectives. The council should be involved with other evaluation agencies in monitoring DIT's and agencies' success in implementing information management plans. Evaluation results should be used to adjust the statewide plans, policies, and standards when necessary (Figure 14). The following sections describe the structure of the oversight council, advisory committees, and staff support.

Statewide Oversight Council

State government in Virginia lacks a focal point for statewide information technology planning and policy development. DIT does not have statutory authority for statewide planning, nor should the centralized service agency be expected to establish statewide policies for itself and other agencies. Recognizing the need to provide for high-level planning and oversight for information technology, a number of states have recently created boards with responsibility for this function. The significance of the information technology issues confronting the State also suggests a need to establish an oversight council in Virginia.

Composition of the Council. In order to provide consistent and uniform leadership in statewide information planning, the council must have continuity of membership. Continuity can be achieved by selecting public members to serve staggered, four-year terms (as is the case for most other executive branch boards). The public members should not be affiliated with any manufacturer or vendor which sells information technology products or services to the State.

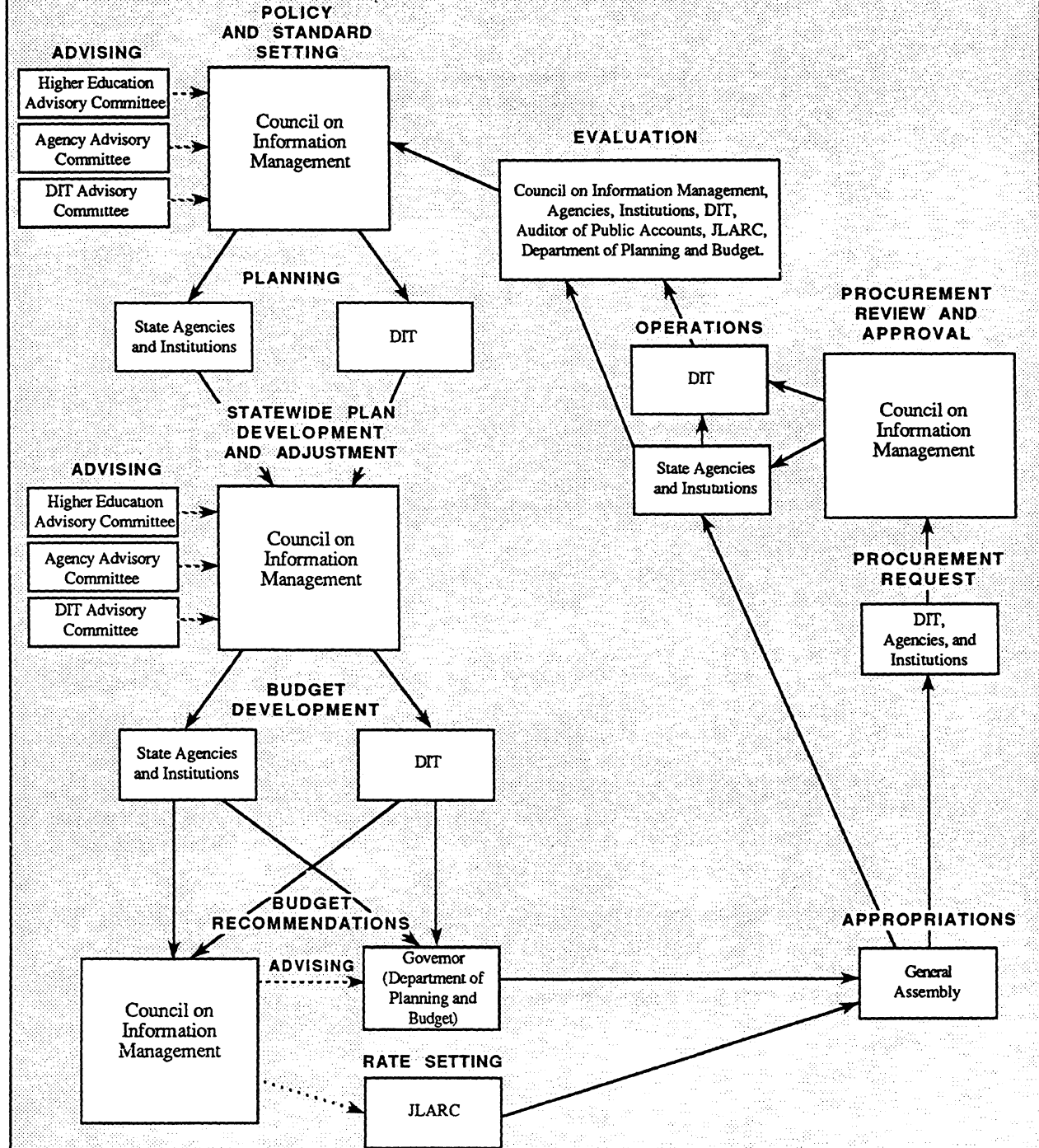
The council should also be linked with the State decision-making structure, but should remain independent of DIT. The link with the highest policy levels of State government can be forged by designating the Secretary of Finance and the Secretary of Administration as ex-officio, voting members. The finance secretary would be included to ensure that policy is linked to the commitment of the State's financial resources. The administration secretary would be included because this position oversees provision of centralized services to other State agencies. The council would report to the Governor, through the Secretary of Administration (Figure 15).

Because it would have statewide authority and not be affiliated with any one agency, the body would be labeled a "council." This is consistent with the statutory provisions regarding standard nomenclature (Section 2.1-1.2, *Code of Virginia*).

Responsibilities. To effectively serve as the body which sets the State's course for using information technology, the council would have authority to develop an information technology plan. The council should also have commensurate policy and regulatory responsibilities to ensure implementation. As part of its duties, the council would be expected to develop policies to address information technology issues confronting the Commonwealth. The council would also adopt standards, where necessary, to achieve networking and compatibility objectives. Council responsibilities would also include oversight of DIT and agency planning, identification of

Figure 14

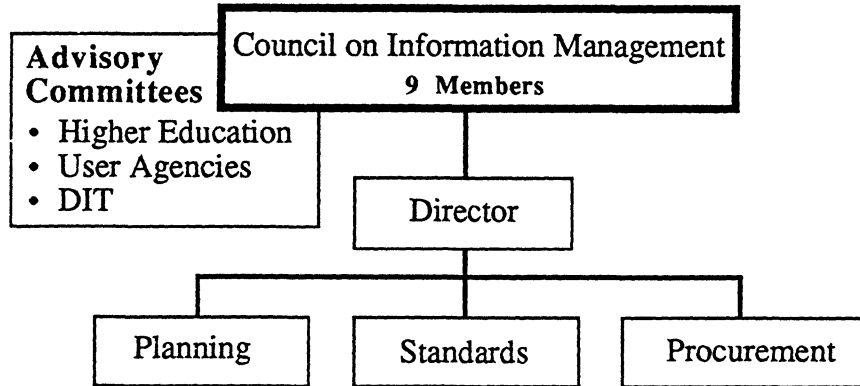
Proposed Information Technology Planning Cycle



Source: JLARC staff graphic.

Figure 15

Organization of the Proposed Council on Information Management



Source: JLARC staff graphic.

budget priorities, approval of information technology procurements, and evaluation of DIT's and agencies' performance.

Recommendation (59). The General Assembly may wish to amend Chapter 35.2 of the *Code of Virginia* to establish the Council on Information Management. The council should be comprised of seven public members and the Secretaries of Finance and Administration as ex-officio, voting members. The public members should be selected for their expertise in information technology matters, but they should not be affiliated directly or indirectly with any manufacturer or vendor of information processing or communications hardware, software, or services. They should be appointed by the Governor for staggered, four-year terms and confirmed by the General Assembly.

The council should be authorized to oversee statewide information technology planning. The council should develop a plan for managing the State's information resources and adopt policies, regulations, and standards for implementing the plan. Authority to establish budget priorities and approve procurements should also be included as methods for ensuring implementation. The council should also regularly evaluate implementation success. The council should meet at least six times per year, or more often if deemed necessary.

Advisory Committees

Although the proposed Council on Information Management should consider technology trends when developing a statewide plan, it must also

recognize the State's capacity for responding to those trends. The oversight council must rely on the advice of officials from higher education institutions, State agencies, and DIT. Moreover, the institutions and agencies are likely to share a greater commitment in pursuing statewide directions if they directly participate in the policy-making process.

Higher Education Advisory Committee. Many of the State's institutions of higher education maintain their own information processing and communication systems apart from DIT. Nonetheless, in order for the oversight council to develop a comprehensive statewide plan for information technology, the plans and resources of higher education institutions must be incorporated. The advice of officials from the institutions should assist the oversight council in shaping the State's direction for managing and sharing its information resources.

Agency Advisory Committee. State agencies must also participate in developing statewide policies for information technology by advising the oversight council of their concerns and sharing their insights. The agency advisory committee would be responsible for representing positions acceptable to all members and presenting these recommendations to the oversight council. This forum would help the council recognize the concerns of agencies which use DIT's services. Agencies from all branches of State government should be represented on this committee.

DIT Advisory Committee. Certainly, DIT should also have a strong voice in developing statewide plans and policies for information technology. DIT would be responsible for conveying to the oversight council concerns related to centralized information services.

Recommendation (60). The General Assembly may wish to amend Chapter 35.2 of the *Code of Virginia* to establish the Higher Education Advisory Committee on Information Management, the Agency Advisory Committee on Information Management, and the DIT Advisory Committee on Information Management. These three committees should advise and assist the Council on Information Management in developing statewide plans, standards, and policies for information technology.

The higher education advisory committee should be comprised of one permanent representative each from three large universities, one permanent representative from the Virginia Community College System, and one representative each from four of the remaining institutions of higher education, rotated annually.

The agency advisory committee should be comprised of one agency representative from each secretariat, designated by the Governor's secretaries. Agency representatives should be rotated annually. The agency committee should also include one representative each from the legislative branch, the judicial branch, and the independent agencies.

The DIT advisory committee should be comprised of the director and the deputy director. The director should also appoint three additional DIT staff to serve on the committee.

Staff Support

Part-time oversight council members who meet periodically throughout the year could not be expected to perform all of the administrative functions associated with statewide planning and policy development. Although the oversight council would formulate and approve State information technology plans and policies, the council would need staff support for compiling materials, drafting reports and standards, reviewing procurements, and monitoring implementation. This administrative support should be provided by an independent staff.

Independent Staff. By having independent support staff, the oversight council would be assured of exclusive organizational commitment to its planning and regulatory responsibilities. DIT should not provide the necessary staff support because of the conflict between DIT's service mission and the council's oversight mission. In fact, council staff would be required to review plans, approve procurements, and evaluate the performance of DIT.

Organization. Staff for the oversight council would be organized into units which support each major function of the council. A planning division would help the council prepare and update a statewide plan, develop planning guidelines for agencies, and prioritize budget requests for information technology according to planning objectives. A separate standards division would assist the council in developing technical standards, including performance and service level standards for the State's centralized computer center within DIT. Staff for the oversight council would be responsible for these functions at a statewide level; DIT should not duplicate these functions.

To ensure that acquisitions conform to plans and standards, a procurement division would review all procurements of information technology equipment or services which require formal solicitations (above \$10,000). All procurement functions currently performed by DIT would be transferred to the council.

An audit and evaluation unit for the council would be responsible for evaluating agencies' implementation of information management plans, compliance with standards and policies, and effective use of information technology. This unit would also perform internal audit functions, and report to the council directly.

With the exception of the audit and evaluation unit, the staff would be supervised by a staff director. An administrative unit composed of the usual clerical, fiscal, and personnel functions would report to the director. Total staff size would be approximately 36 positions.

Funding. The oversight council and its staff would be supported with general funds. Services would not be provided on a cost reimbursable basis to individual agencies. Rather, the council's planning and regulatory activities would guide and benefit all State agencies. JLARC staff estimate that the personnel cost of the council's staff would be approximately \$1.5 million annually. These costs would be more than offset by personnel cost reductions in DIT resulting from reclassification and reorganization recommendations in this chapter.

Recommendation (61). The General Assembly may wish to amend Chapter 35.2 of the *Code of Virginia* to authorize the Council on Information Management to appoint an executive director. The director should supervise a staff that will provide planning, standard-setting, procurement, and evaluation support to the council. The maximum employment level for the council's staff should not exceed 36 positions for the 1988-90 biennium.

PROPOSED REORGANIZATION OF DIT

The proposal for the reorganization of DIT is designed to address the concerns identified in this report. The recommended organization is built around six divisions, ranging in size from 52 to 84 positions (Figure 16). The total number of positions used in this proposal is 419, which is 13 percent fewer positions than the current maximum employment level of 480. The recommended allocation of positions is based upon DPT's current classification specifications and a comparison of the allocations used for similar positions in other agencies. This proposal could result in a reduction of approximately \$4.8 million in annual personnel expenses for DIT.

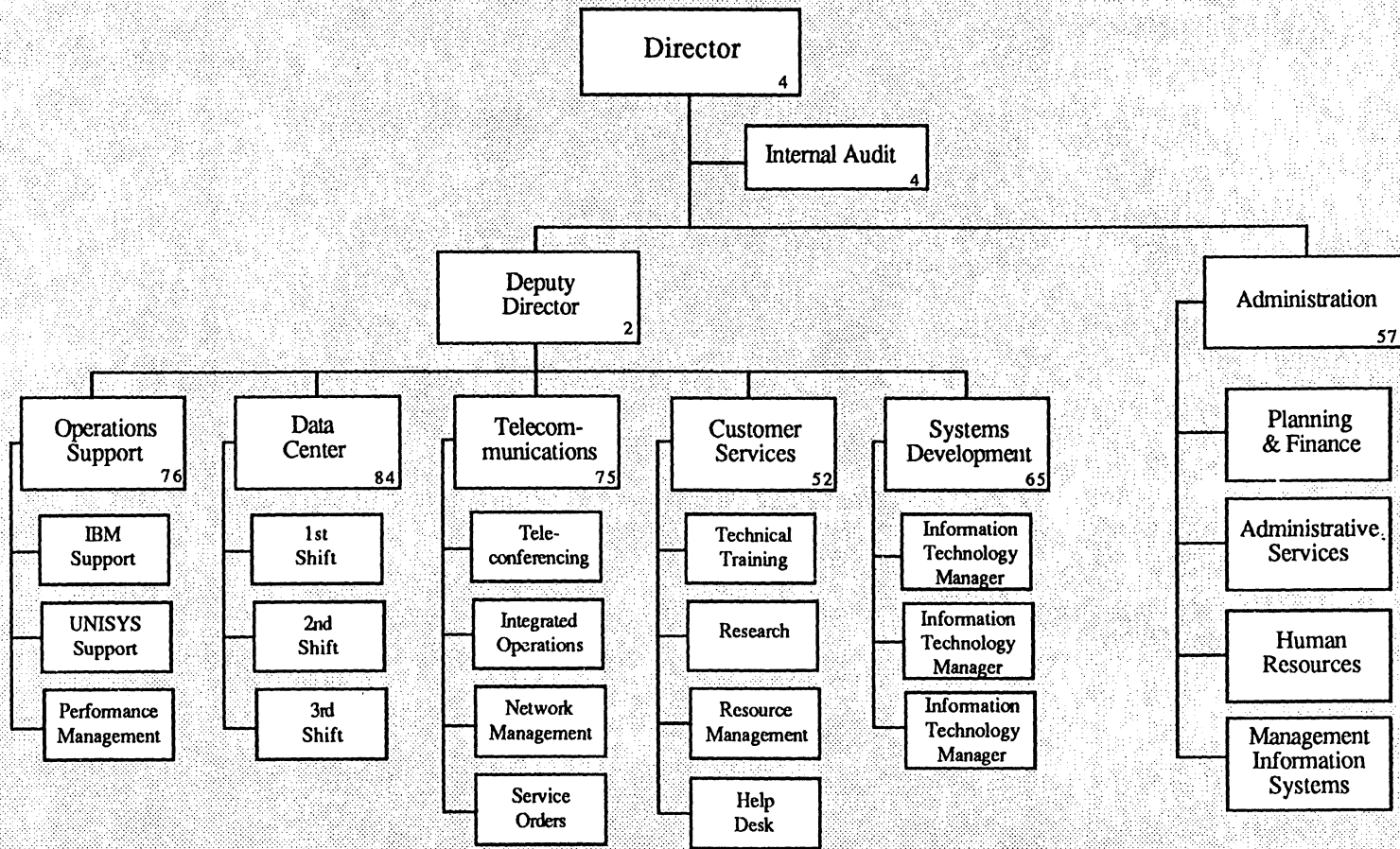
The proposal is based upon transferring five functions from DIT to other agencies. JLARC staff propose that Management Consulting be established as an independent agency. The Virginia Public Telecommunications Board should be an independent board with staff support from the Department of Education. Procurement and contracting and information management planning for other agencies and institutions are proposed functions for the Council on Information Management. Negotiation and administration of the State's multi-media instructional contract was not included as a DIT function. JLARC staff propose that this function be transferred to the Department of Personnel and Training.

Functional fragmentation resulting from an incomplete merger has been addressed primarily through the creation of a Customer Services Division. The Educational Technology Division is proposed for dissolution, with its remaining valuable services being provided through the new Customer Services Division and through the Telecommunications Division. Restructuring the Administration Division as solely internal support, with the addition of a Management Information Systems Branch, is proposed as an aid in functional consolidation. In addition, the proposed Systems Development Branch is to be staffed to provide only systems development, maintenance, and modification services which fit within DIT's statutory mission.

The JLARC staff proposal does not include switchboard operations, physical plant maintenance positions, a Public Relations Branch, or the current Information Services Division. In addition, the current Computer Services Division, which consists of five branches and contains 40 percent of DIT's total positions, has been divided into an Operations Support Division and a Data Center Division.

Figure 16

Proposed DIT Organization



(419 Positions)

Source: JLARC staff graphic.

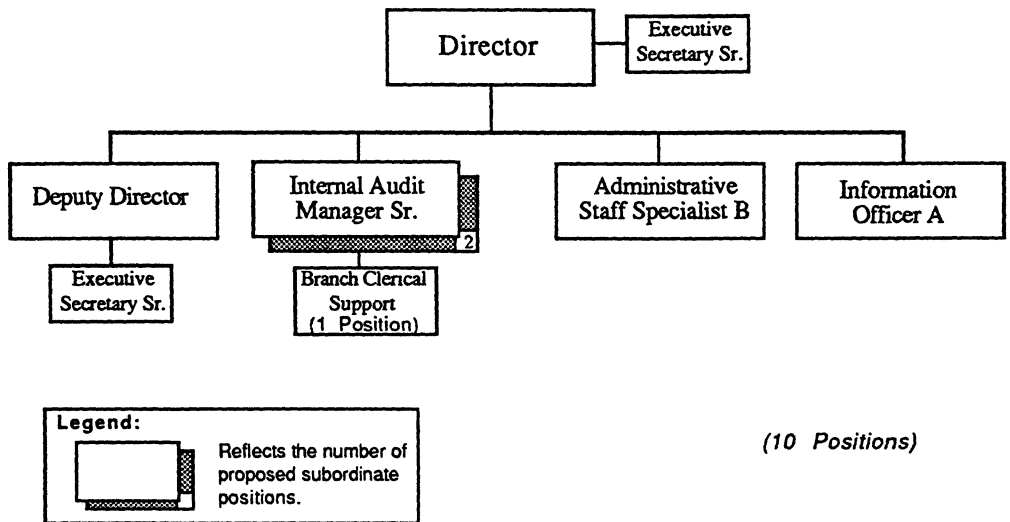
The proposal results in the need for fewer managerial positions, and duplicative positions have been eliminated. Divisional sizes, supervisory hierarchies, and managerial spans of control have been equalized throughout the agency.

Director's Office

The Director's Office (Figure 17) should consist of ten positions. The director and deputy director positions should each be assigned a secretarial support position. Two support positions should be utilized to provide legislative liaison and public relations activities.

Figure 17

Proposed Director's Office



Source: JLARC staff graphic.

Management Responsibilities. The director of DIT should directly manage all functional areas involved in supporting DIT as an agency. In the JLARC staff proposal, the director supervises the staff of the Director's Office and the Administration Division. The deputy director should directly manage all functional areas involved in the provision of services to customer agencies. Consequently, the deputy director should supervise the Data Center Division, the Operations Support Division, the Telecommunications Division, and the Customer Services Division. The director should be responsible for the ultimate effective coordination of all agency needs and programs; however, such coordination can be achieved and fostered through the direct reporting relationship between the deputy director and the director.

Internal Audit. The current three-position internal audit group should remain as a part of the Director's Office. However, the functional scope of this group needs to be expanded to include sole intra-agency responsibility for conducting internal organization and management studies at the request of the director. The positions in this internal function should be allocated to classifications consistent with similar positions in comparable agencies. In addition, this functional area should be assigned a secretarial support position.

Administration Division

The Administration Division should encompass all of the centralized support functions required to operate DIT effectively and efficiently. This group of 57 positions (Figure 18) should be organized into four branches: Planning and Finance, Administrative Services, Human Resources, and Management Information Systems.

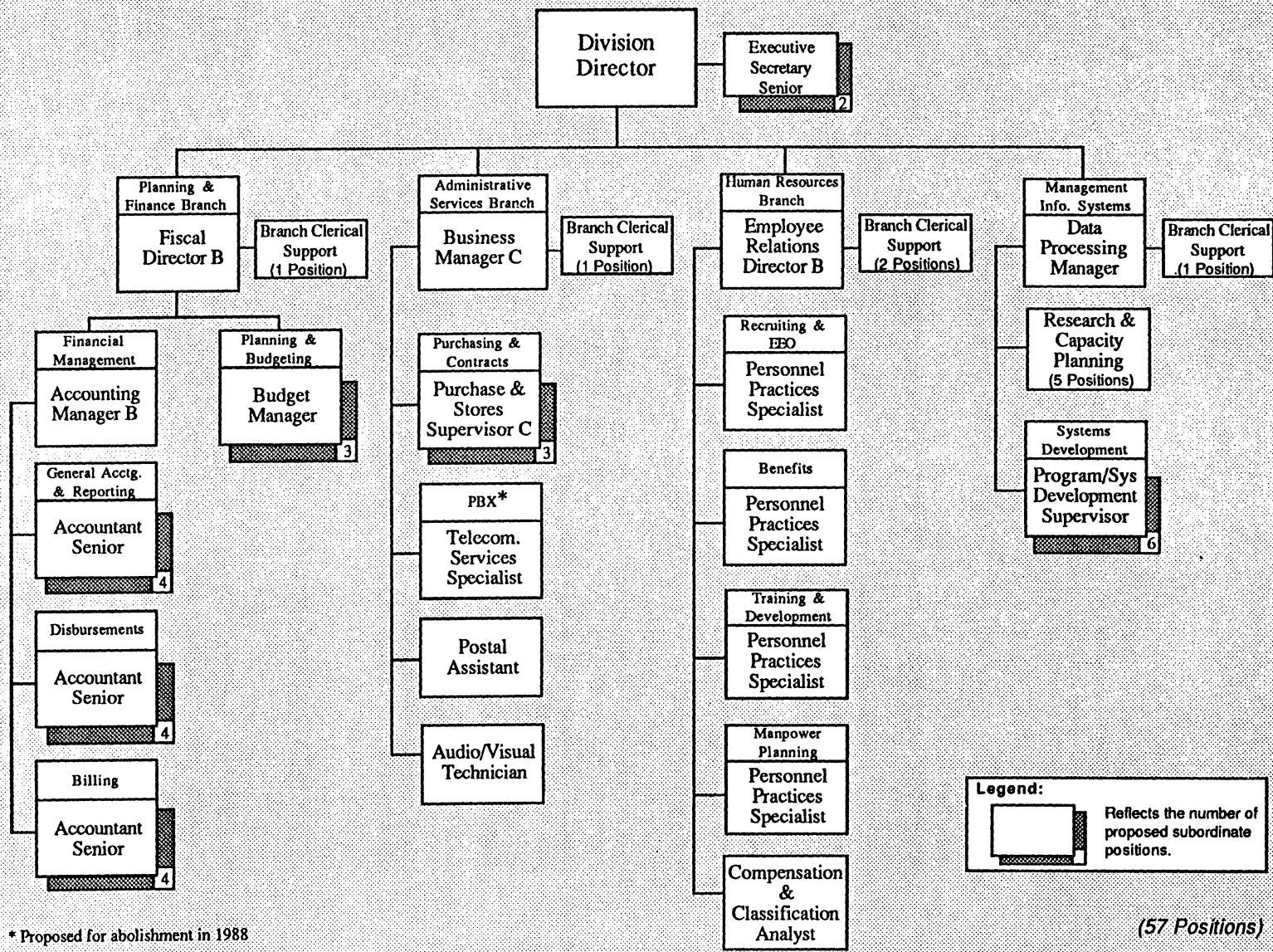
Planning and Finance Branch. Twenty-two positions should be assigned responsibility for DIT's fiscal, accounting, budgeting, and resource planning needs. The financial management activities should be broken into four sections: (1) financial reporting and general accounting, (2) disbursements, (3) billing, and (4) planning and budgeting. In effecting this reorganization, DIT should consolidate the voucher and disbursement activities and the fixed asset and lease tracking activities that are currently diffused throughout the Administration Division. All positions in the fiscal sections should be allocated to fiscal classifications.

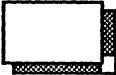
The planning and budgeting section should be responsible only for internal budgeting and cost allocation. The four positions in this section should be allocated to fiscal, not technical, classifications. The current activities conducted by this group which relate to resource planning and management for other agencies should be assigned to the recommended Resource Management Branch of the proposed Customer Services Division.

Administrative Services Branch. The Administrative Services Branch should encompass the functions of: (1) DIT internal purchases and contract administration, (2) agency mail service, (3) operation and maintenance of the digital telecommunications switch in the Plaza Building, (4) management of physical plant maintenance contracts, and (5) audio-visual services. The branch should consist of eight positions which are allocated to classes accurately reflecting the job duties.

The four positions currently used in this branch to provide maintenance services for DIT's facilities should be abolished, with the branch manager being assigned responsibility for ensuring that these needs are met through appropriate contractual services. Repair and maintenance needs of the Plaza Building's heating, air conditioning, and fire alarm systems (facilities maintenance) should continue to be coordinated with the appropriate vendors 24 hours per day. The on-call duties associated with such maintenance needs after regular working hours, which currently cost the State approximately \$1,350 in on-call pay per month, should be combined with the on-call duties of the employees in the proposed Data Center Division.

Figure 18
Proposed Administration Division



Legend:
 Reflects the number of proposed subordinate positions.

(57 Positions)

* Proposed for abolishment in 1988

Source: JLARC staff analysis.

Once the statewide network is operational (1988), the digital PBX switch in the Plaza Building will be redundant equipment, and the position currently assigned to service this switch should be abolished. Until abolished, this position should be classified as a telecommunications services specialist.

DIT's internal purchases and contract administration should be provided by a purchasing and contracts section of three positions. In addition, the mail service should be separated from the agency purchasing function. This mail service should be provided by a single postal assistant position reporting directly to the branch manager.

One of the two audio-visual support positions from the current Educational Technology Division should be placed in this branch, and this position should also be directly supervised by the branch manager. Furthermore, the production and preparation of computer-generated slides should be confined to meeting DIT's internal needs.

Human Resources Branch. The Human Resources Branch should consist of eight positions divided into five functional sections: (1) recruiting and equal employment opportunities, (2) benefit administration, (3) employee training and development, (4) manpower planning, and (5) compensation and classification.

The internal training activities of the current educational services section of the Technical Services Branch should be assigned to the proposed training and development position in this branch. This position should be responsible for developing a formal management development program for the agency as well as for ensuring that DPT policy is followed in DIT's reimbursements to employees for courses of study. This position should also have responsibility for new employee orientation, employee identification badges, and the agency newsletter (currently the responsibility of the Public Relations Branch).

A position dedicated to manpower research and planning should be assigned to this branch. This position should have the functional responsibility of developing productivity standards and work measurements for DIT's service-oriented and support positions. Also, this position should be responsible for working in conjunction with the management personnel of the agency's divisions to translate workload projections into staffing forecasts.

Management Information Systems Branch. The Management Information Systems Branch should be devoted to meeting DIT's needs in systems development/maintenance and modification, research, and long-range capacity planning. This new branch should consist of two sections: systems development (seven positions, including the systems analyst position currently in the Finance Branch), and research and capacity planning (five positions). The research and capacity planning section should be responsible for technical research and for developing DIT's long-range plans for technology and information management. These activities should incorporate *ad hoc* assistance and input from the line managers in the agency as well as the performance monitoring data provided by the recommended Operations Support Division and the Telecommunications Division.

Operations Support Division

The Operations Support Division (Figure 19) should encompass the functions currently provided by the IBM Support Branch, the Sperry Support Branch, the Database Support Branch, and the Telecommunications Support Branch of the Computer Services Division. The sole mission of this division should be to support the DIT data center. In addition, the customer service functions related to teleprocessing hardware and to internal security, which are currently provided through the Operations Branch, should be consolidated within this division. This division should consist of 76 positions.

IBM and UNISYS Support Branches. In order to facilitate the coordination of all support efforts for a single technology, this new division should contain two technical support branches, one for each technology. Each of these branches should encompass personnel involved in systems software and program products, database software, telecommunications software, and hardware. Eight of the current Operations Branch positions utilized to provide hardware support should be transferred to this division.

Such an organization will also facilitate separate billing algorithms for IBM and UNISYS (formerly Sperry) customers. In addition, it will improve the utilization of management positions by increasing the number of subordinates reporting to a single manager. This proposed structure will provide greater opportunities for cross-training of personnel within specific technologies, as well as providing a centralized pool of employees to handle the on-call duties involved in running the data center.

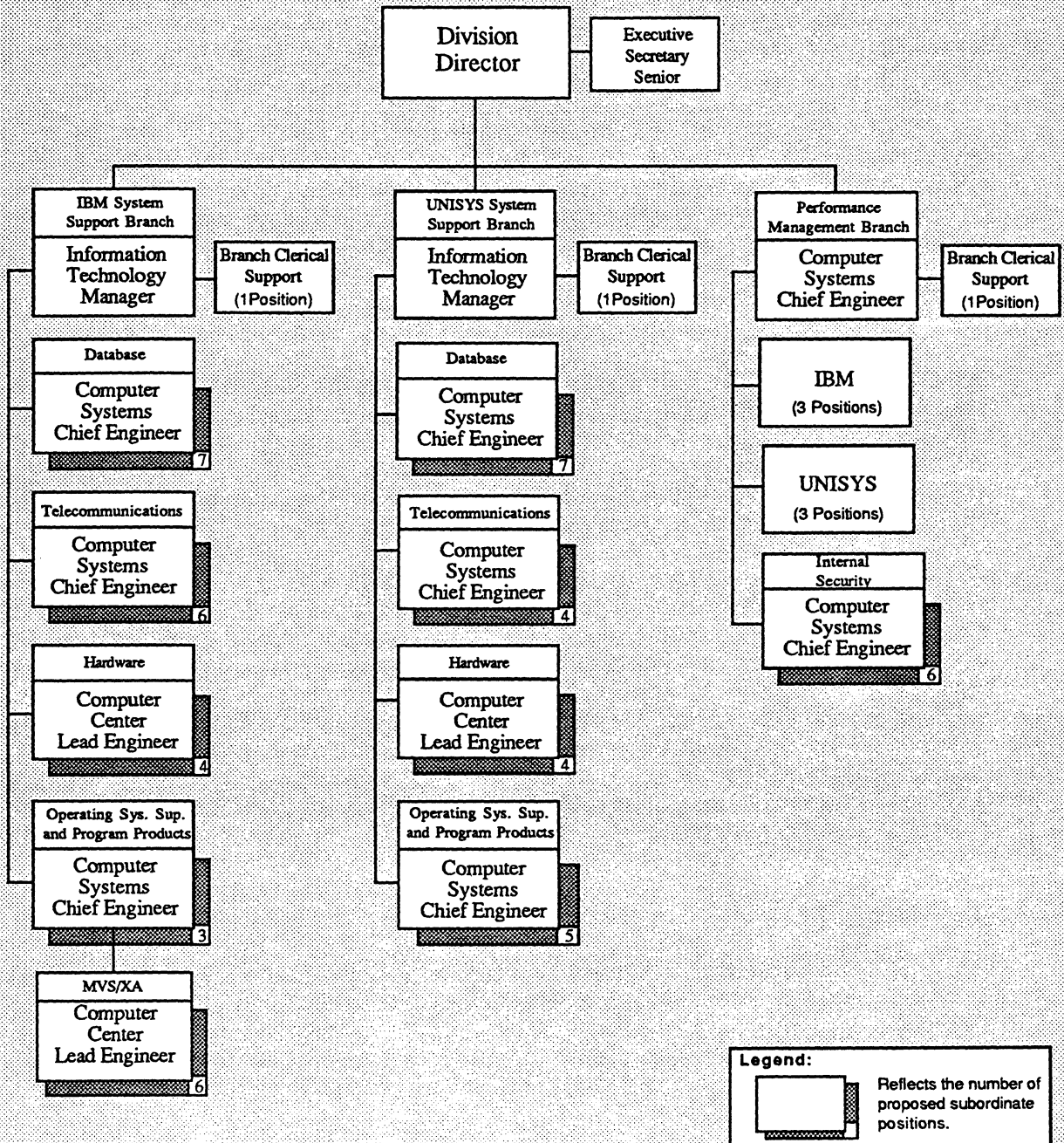
Performance Management Branch. The Performance Management Branch should be responsible for performance monitoring activities for both of the data processing technologies used in the DIT data center. The Performance Management Branch should consist of six engineering positions (three for each technological area). In addition, the seven positions currently in the security section of the Operations Branch should be assigned to this new branch. The new security group should be responsible for DIT's internal security function, consisting of physical security, computer, and information security in the data center, as well as the technical library utilized by the data center and technical support personnel.

Data Center Division

The bulk of the current Operations Branch of the Computer Services Division should be reorganized as the Data Center Division (Figure 20). The DIT data center should continue to operate 24 hours per day, seven days per week. As proposed, there should be 84 positions assigned to three shifts in this division. The primary function of this new division should be the actual operation of the data center.

The division should consist of three branches, each representing the staff assigned to the three shifts. Each shift should consist of three functional sections: (1) IBM, (2) UNISYS, and (3) print. Five of the current hourly positions assigned to these three shifts should be converted to full-time, permanent positions. Computer Lead Operators should be used in the IBM

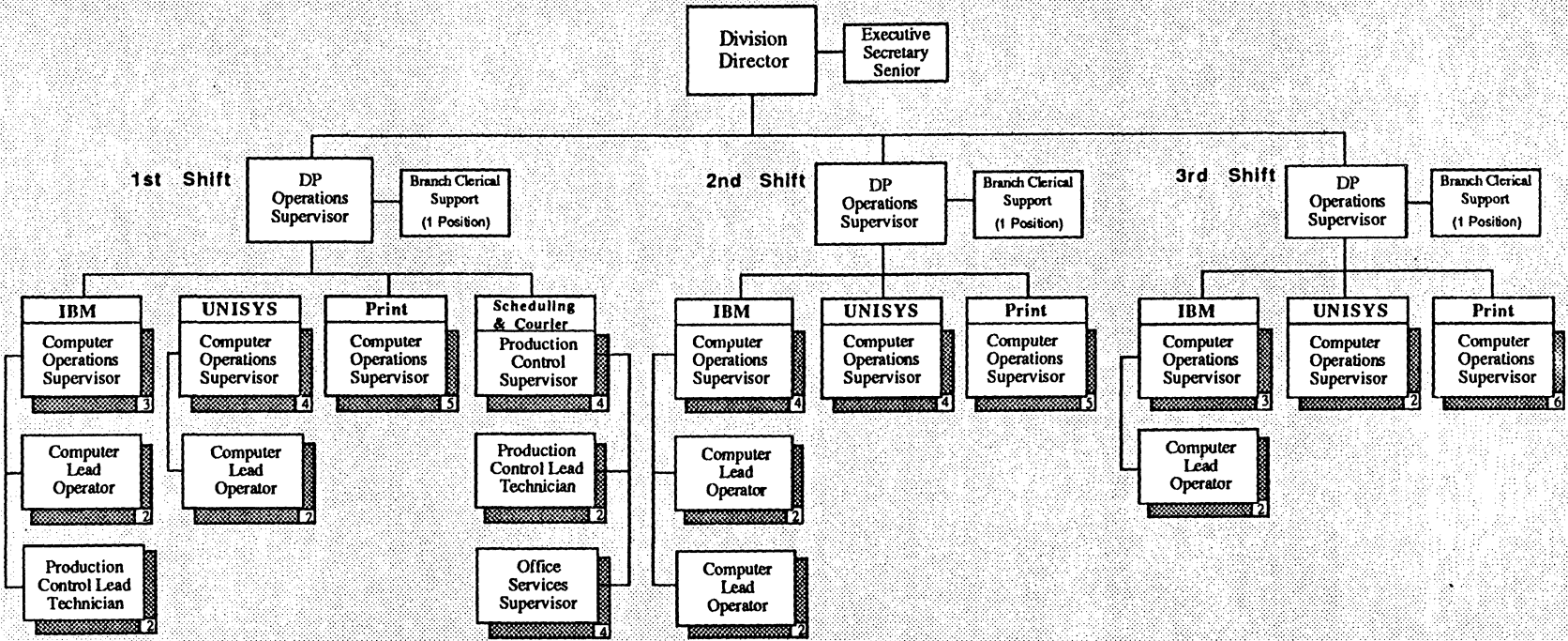
Figure 19
Proposed Operations Support Division



(76 positions)

Source: JLARC staff analysis.

Figure 20
Proposed Data Center Division



Legend:
 [] Reflects the number of proposed subordinate positions

(84 positions)

Source: JLARC staff analysis.

section for each shift and in the UNISYS section on first shift. These six lead positions should be formally assigned supervisory responsibility for two subordinates each. If the number of personnel involved in actual operations decreases over the next three to five years, as predicted by the current Operations Branch manager, there will be a need to abolish positions and to reallocate lead positions no longer used in the supervision of lower-level positions.

The staff assignments for the data center's first shift should also include a section responsible for scheduling and courier service. Production control activities on the second and third shifts should be directly supervised by the production control supervisor, while comparable activities on the first shift should be shared with one lead technician position responsible for two technicians. The courier service should be directly supervised by an office services supervisor position, and four hourly positions currently assigned to these activities should be replaced with full-time, permanent positions.

Telecommunications Division

The Telecommunications Division should be reorganized into four branches (Figure 21). The functional assignments of the branches should reflect the distinctions in the types of services provided by the division: (1) highly technical short-range planning, engineering and assistance in developing service orders, and directory listings, (2) teleconferencing services, (3) network management, and (4) service order processing. In addition, the implementation and maintenance of an integrated backbone network in the State makes it imperative that the Telecommunications Division begin to provide integrated services through its separate field offices and its network management function. This division should be assigned 75 positions.

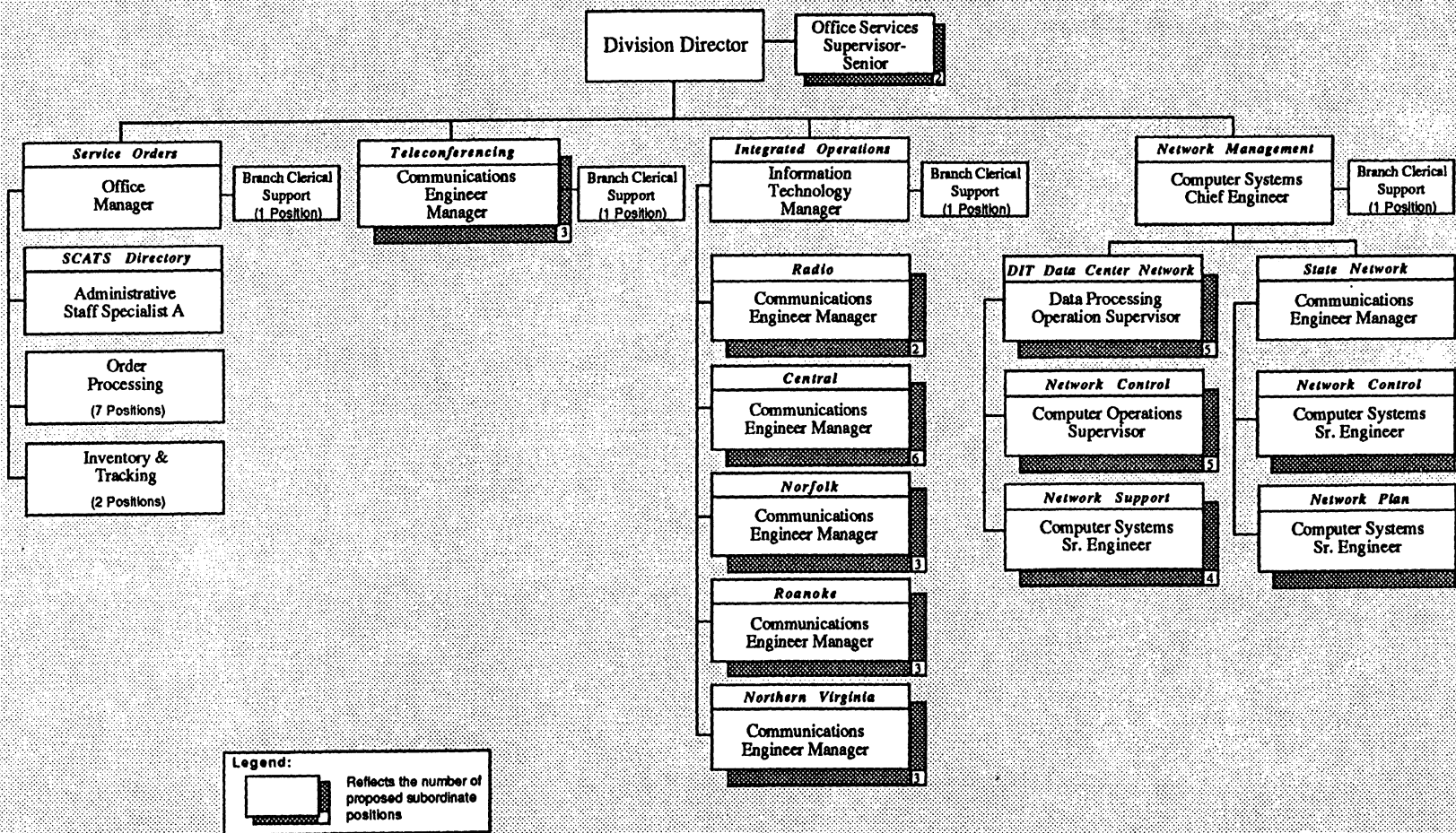
Teleconferencing Branch. The Teleconferencing Branch should be staffed by four positions and used to promote, schedule, and monitor all State teleconferences regardless of the type of application involved. The teleconferencing monitoring equipment located in Richmond should be operated in the available night-mode except during peak hours. This will eliminate the need to have personnel on duty for monitoring around the clock.

Integrated Operations Branch. The Integrated Operations Branch of the division should encompass short-range planning, engineering needs involved with an integrated network offering both voice and data capabilities, and technical assistance as required by agencies in the development of service orders. The activities of this branch should be divided into five sections: (1) radio and cellular telephone, (2) the central office, (3) the Norfolk field office, (4) the Roanoke field office, and (5) the Northern Virginia field office.

The central office and the three field offices should be responsible for designing the most effective and efficient utilization of the integrated network based upon the demands of customer agencies and institutions. A combination of voice and data engineers should be assigned to these separate locations. These personnel should provide customer agencies with assistance in developing non-routine service orders for telecommunications equipment and

Figure 21

Proposed Telecommunications Division



(75 positions)

Source: JLARC staff analysis.

services. The positions in all four of the telecommunications offices should be allocated to the same classes, depending upon job duties.

Network Management Branch. All network monitoring and capacity planning activities currently performed in the three branches of the Telecommunications Division and in the Operations Branch of the Computer Services Division should be consolidated into this proposed branch. The branch should consist of two sections: one devoted to network control activities for the DIT data center network, and the other devoted to performance monitoring and capacity planning of the State's integrated network and all resulting network services.

In order for network management to be effective and efficient, all engineering and design activities conducted by the Operations Support Division and the Integrated Operations Branch of the Telecommunications Division will need to be communicated to this branch. However, such coordination is currently required, and the consolidation of all network management functions should enhance the effectiveness of the overall processes involved in design, monitoring, and planning. In addition, DIT's overall effectiveness will be enhanced by this branch supplying the research and planning section of the proposed Management Information Systems Branch of the Administration Division with performance data to be used in capacity planning for DIT.

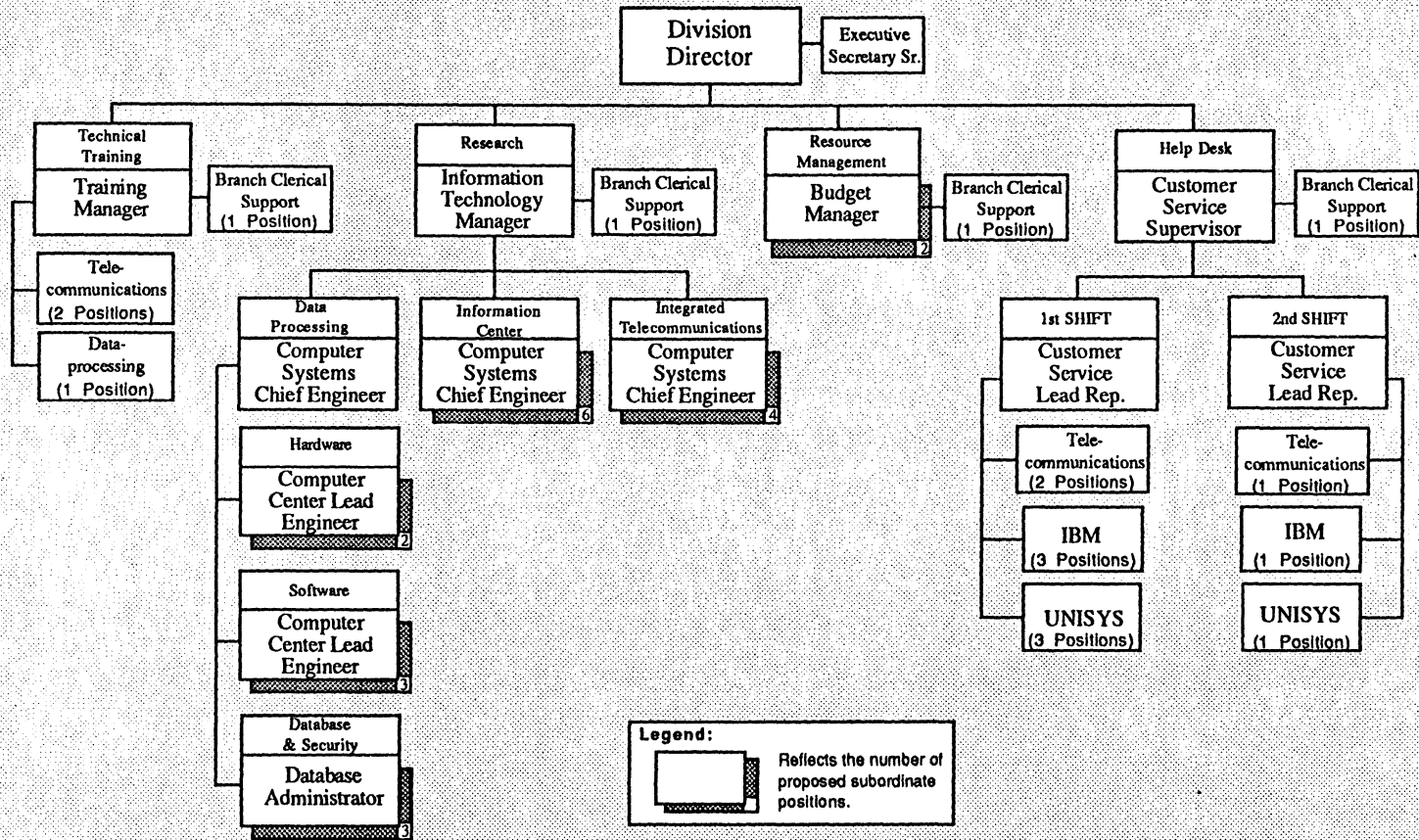
Service Order Branch. The Service Order Branch should be staffed by 12 positions. This branch should be responsible for processing all telecommunications service orders. In addition, the personnel in this branch should be responsible for working directly with customer agencies to write routine voice and data service orders. Two of these positions should be used for updating the databases required in the service order and inventory processes. In addition, the publication and distribution of the SCATS directory, as well as the compilation of local directory listings, should be provided by this branch.

Customer Services Division

The need for the creation of the Customer Services Division (Figure 22) is evidenced by: (1) the functional fragmentation of DIT's technical support services for customer agencies and institutions, and (2) the lack of resource management (and adequate budgeting measures) for data processing and telecommunications equipment and services in State agencies and institutions. Consequently, this division should consolidate needed technical support services, and provide resource and "state of the art" trouble report management to all agencies and institutions. The Customer Services Division should consist of 52 positions organized into four branches.

Technical Training Branch. Technical training, currently provided in both data processing and telecommunications, should be consolidated in the Technical Training Branch. The branch should have a two-fold mission: (1) reviewing and coordinating training offered by vendors, and (2) provision of on-going technical training.

Figure 22
Proposed Customer Services Division



(52 Positions)

Source: JLARC staff analysis.

Research Branch. The Research Branch should consist of three sections. Each section should provide technologically-focused consultations and research activities upon request from agencies and institutions. In addition, this branch should utilize the "experts" from the line divisions in order to ensure that research activities and proposed solutions to agency problems are compatible with the technology available within the State system.

The integrated telecommunications section should include positions to provide expertise in voice, data, teleconferencing, and educational applications. With the exception of stand-alone computing needs, the data processing section should be focused toward all hardware, software, database, and security applications utilized in data processing. The information center section should concentrate on assisting agencies and institutions to identify and implement appropriate applications of stand-alone and distributed data processing as well as fourth generation languages and office automation applications.

Resource Management Branch. The Resource Management Branch should be devoted to providing agencies and institutions with consultations, guidance, and problem resolution related to resource management, budgetary assistance, and assistance for data processing and telecommunications cost containment.

Help Desk Branch. The Help Desk Branch should consolidate the customer assistance help desk activities currently provided in the Operations Branch of the Computer Services Division and the trouble reporting function currently in the Integrated Technology Branch of the Telecommunications Division. Such a consolidation will provide for a state-of-the-art trouble report management function by fostering enhanced coordination between data processing and telecommunications. This proposed functional consolidation will also provide the needed expansion of the function in the telecommunications area.

The proposed branch should consist of two sections, each reflecting the staff required to operate the Help Desk two shifts per day, seven days per week. Each section should provide simple problem diagnostics and resolution referrals relating to IBM and UNISYS data processing and to telecommunications. Until such time in the future as computer and telecommunications utilization increases significantly during the third shift time period, any problems occurring during the third shift should be routed to the proposed Data Center Division's data processing operations supervisor assigned to the third shift. This supervisor should be responsible for logging the customer call into the problem management system and resolving the problem if possible.

The proposed structure of this branch will provide customer agencies and institutions with one telephone number to be utilized in resolving any information technology problem. The staff of this branch should use a "checklist approach" to diagnose the nature of reported problems and then refer the problem to the appropriate DIT organizational unit (or vendor) for resolution. According to Ernst & Whinney, this "checklist approach" could be used to resolve approximately 70 percent of the incoming trouble reports.

While the staff assigned to each of the two shifts of the Help Desk Branch will need to possess specialized expertise in either data processing or telecommunications, the primary function of these positions will be to provide customer assistance. DPT, working in conjunction with DIT, should develop a class series for these agency-specific positions.

DIT's internal audit section should be responsible for monitoring the effectiveness of the help desk function. The supervisory position of the proposed Help Desk Branch should be responsible for tracking and enhancing the use of DIT's resources to provide this service. Therefore, the current customer liaison section in the Operations Division is eliminated in the JLARC staff proposal.

Systems Development Division

The current Systems Development Branch (SDB) of the Information Services Division should be reorganized as a separate division of DIT (Figure 23). This division, comprised of 65 positions, should only be involved in systems development, maintenance, and modification activities. Other activities currently conducted by SDB, such as information management planning, should be conducted by staff for the Council on Information Management. On-site technical staff support for other agencies (currently three positions) should be discontinued.

The division should be organized in three branches, each of which will be responsible for systems development activities required by assigned secretarial areas. Each branch should be assigned a database analyst position to serve in a consultative capacity for the separate development project teams. In addition, current multiple management layers should be reduced in order to minimize overhead.

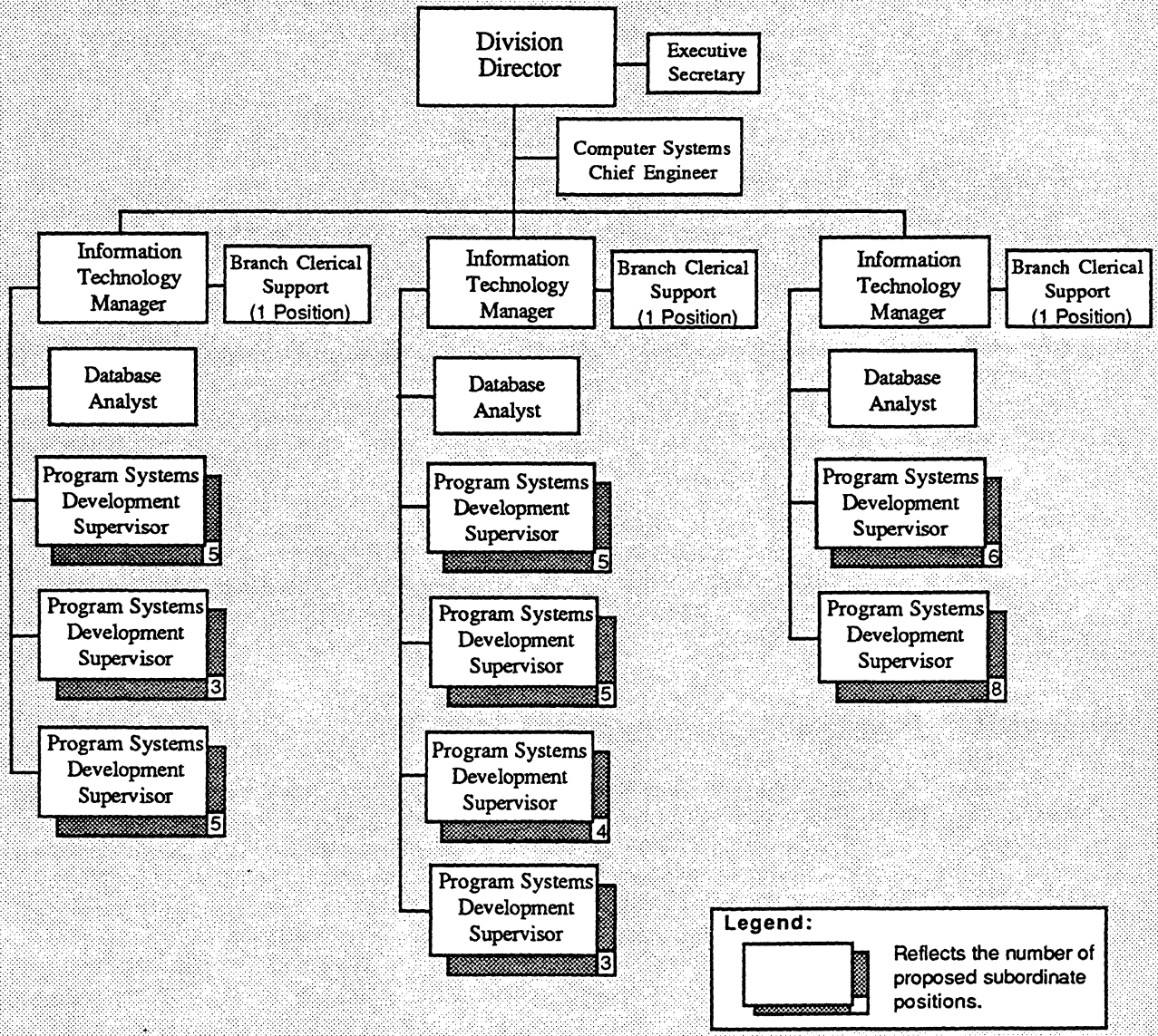
Funding of the Proposed Organization

The proposed DIT organization would require three internal service funds, one for computer services, one for telecommunications, and one for systems development. The computer services fund would be used to directly recover the costs involved in the Data Center and the Operations Support Divisions. The telecommunications fund would be used to directly recover the costs involved in the Telecommunications Division. The systems development fund would be used to directly recover the costs involved in the Systems Development Division. (The Council on Information Management would receive and disburse general funds for interagency projects according to statewide planning objectives and priorities.) The Administration Division's costs would be recovered indirectly as agency overhead.

Finally, the Customer Services Division would be funded indirectly through the three internal service funds. Such indirect recovery of service costs should be in proportion to the number of positions within this division which are assigned duties relating directly to computer services, telecommunications, or systems development.

Figure 23

Proposed Systems Development Division



(65Positions)

Source: JLARC staff analysis.

Recommendation (62). DIT should reorganize using this proposal as a guide. The agency should carefully consider the staff and functional assignments proposed by JLARC staff. DIT should use three internal services funds to recover the costs of the services provided: computer services, telecommunications, and systems development. DIT should recover the costs of the Administration Division through agency overhead. The costs of the Customer Services Division should be recovered indirectly through the three internal service funds. This recovery should be in proportion to the number of positions within the proposed division that are utilized for activities directly related to computer services, telecommunications, or systems development.

Summary of Impacts

JLARC staff's proposed organizational structure for DIT provides for between three and four branches per division. The agency's average number of subordinates per managerial position would remain at four; however, the range in the number of subordinates per manager is more equivalent among all divisions. The recommended number of managerial layers in any one division corresponds to divisional size, and all one-to-one reporting relationships have been eliminated (Table 29). The number of management positions used in the agency has decreased by 30 (from 123 to 93). All divisions and branches have been assigned clerical support positions.

Table 29
Utilization of Management Positions

ORGANIZATIONAL UNIT	<i>Number of Management Positions</i>	<i>Total Number of Positions</i>	<i>Average No. of Subordinates Per Manager*</i>	<i>Number of Subordinates (Range)</i>	<i>Layers of Management</i>
Internal Audit	1	4	3	-	1
Administration	13	57	4	2 - 6	4
Operations Support	14	76	5	3 - 7	4
Data Center Operations	22	84**	4	2 - 6	4
Telecommunications	17	75	4	2 - 10	4
Customer Services	13	52	4	2 - 8	4
Systems Development	13	65	5	3 - 8	3

** Excludes clerical positions.

** Includes 9 hourly positions which are recommended for conversion to full-time, permanent positions.

Source: JLARC interviews and DIT employee surveys.

The aggregate staffing and personnel cost effects of the JLARC staff proposal are illustrated in Table 30. The JLARC staff proposal provides for functional consolidation, separation of service and control functions, and the creation of new, needed functions such as State data administration and a management information systems branch for DIT.

Table 30

SUMMARY OF IMPACTS OF PROPOSED REORGANIZATION

<u>Current</u>	<u>Positions</u>	<u>Personnel Costs</u>
DIT's Maximum Employment Level	480	\$18,890,428
DIT's Additional Established Full- time, Permanent Positions	19	0
DIT's Hourly Positions	<u>44</u>	<u>524,145*</u>
Total	543	\$19,414,573
<u>Proposed</u>		
DIT's Maximum Employment Level	419	\$14,581,284
DIT's Hourly Positions	0**	0
Council on Information Management	36	1,472,313
Management Consulting	14	592,189
Public Telecommunications	<u>2</u>	<u>65,044</u>
Total	471	\$16,710,830
Proposed for Elimination	72	\$ 2,703,743

*Annualized salary costs of 44 hourly positions used by DIT on March 1, 1987.

**15 of the 44 current hourly positions were converted directly to full-time, permanent positions as part of the proposed staffing for DIT. JLARC staff's proposed functional consolidation resulted in eliminating the need for the specific services of the remaining 29 hourly positions.

Source: JLARC staff analysis.

The reduction in the number of positions proposed for DIT is the result of recommended internal changes and recommended transfer of some current functions to other organizations. The JLARC staff proposal would result in a net reduction of 72 established positions, or nine fewer than the March 1987 MEL of 480 for DIT. The net reduction in personnel costs should be \$2,703,743 annually. This net cost reduction is primarily the result of four factors: (1) internal DIT reorganization requiring fewer managerial positions at higher grade levels, (2) reclassification of currently misclassified positions, (3) staffing such functional work units as systems development with the lower-level staff needed to perform the required lower-level job duties, and (4) elimination of a few unnecessary functions such as switchboard operators, legislative liaison, and building maintenance. A position by position listing of recommended personnel changes is included in the Technical Appendix to this report.

Internal Impact. DIT currently has 499 full-time permanent positions established; however, the maximum number of filled positions permitted is 480. As of March 1, 1987, DIT also had 31 full-time and 13 part-time hourly positions (excluding two on-call secretarial hourly positions). The staffing analysis shown in Table 30 is based upon 543 positions. JLARC staff propose that all established full-time permanent positions not used in the recommended DIT organization should be abolished. In addition, the 419 proposed DIT positions include 15 full-time functions that are currently performed by 44 hourly personnel. The proposed reorganization is based on the number of full-time positions needed to carry out the proposed functions. Consequently no temporary, wage positions are included in the reorganization proposal.

JLARC staff propose that DIT should eliminate the current switchboard operations in the Telecommunications Division, the customer liaison and legislative liaison functions in the Director's Office, and the building maintenance and interior design functions in the Administration Division. In addition, DIT should dissolve the Educational Technology Division, the Information Services Division, and the current Public Relations Branch of the Human Resources Division. JLARC staff propose that DIT divide the Computer Services Division into an Operations Support Division and a Data Center Division. Furthermore, DIT should eliminate positions which will no longer be needed once functional alignment and enhanced management and clerical support utilization are implemented.

JLARC's proposed reorganization of DIT should be considered only after the Department of Personnel and Training has performed the on-site audits needed to rewrite the Computer Systems Engineering, Telecommunications Services, and Communications Services specifications. This will ensure that the recommended technical positions are appropriately classified.

Recommendation (63). DIT should eliminate a total of 80 full-time, established positions. Most of these positions are currently utilized in switchboard operations in the Telecommunications Division, customer liaison and legislative liaison in the Director's Office, building maintenance and interior design in the Administration Division, and centralized clerical support as presently assigned. In addition, DIT should eliminate positions which will no longer be needed once functional alignment and enhanced management utilization are implemented. DIT should discontinue its use of 44 hourly positions.

Recommendation (64). DIT should dissolve the Educational Technology Division, the Information Services Division, and the current Public Relations Branch of the Human Resources Division. The provision of all of these services should be assigned to various other divisions in the restructured DIT. Furthermore, DIT should divide the current Computer Services Division into an Operations Support Division and a Data Center Operations Division.

External Impact. The creation of the Council on Information Management would result in transferring all procurement and information management planning activities from DIT. DIT should transfer 36 of its currently established positions to this council.

The mission of the current Management Consulting Division does not fit with DIT's technically-oriented mission. Consistent with the findings of the 1984 JLARC report, An Assessment of Structural Targets in the Executive Branch of Virginia, the 14 Management Consulting positions should be transferred out of DIT and established as a separate agency in the Administration secretariat. This new agency would provide organizational and management assessment support to the Governor's secretaries as well as other State agencies.

The Virginia Public Telecommunications Board should be established as an independent board in the Education secretariat with staff support from the Department of Education (DOE). Two current DIT positions should be transferred to DOE to provide the technical support that is needed by the board.

Administration of the State's multi-media instructional contract should be made a responsibility of the Department of Personnel and Training.

Recommendation (65). DIT should transfer 52 positions to other State government organizational units. Management Consulting should be established as a separate agency in the Administration Secretariat. Two positions from the Public Telecommunications Branch of the Educational Technology Division should be transferred to DOE to support the Virginia Public Telecommunications Board in the Education Secretariat. The recommended Council on Information Management should be created using 36 positions that are currently allocated to DIT. DIT should not retain positions or functions proposed for the council. DIT should transfer responsibility for the State's multi-media educational contract to the Department of Personnel and Training.

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APPENDIX A:

TECHNICAL APPENDIX SUMMARY

JLARC policy and sound research practice require a technical explanation of research methodology. The full technical appendix for this report is available for inspection at JLARC, Suite 1100, General Assembly Building, Capitol Square, Richmond, Virginia 23219.

The technical appendix includes an explanation of the special methods and research employed in conducting the study. The following areas are covered:

1. Employee Questionnaire. Using a structured questionnaire, JLARC staff interviewed all full-time, permanent employees at DIT. The data collected were utilized in a position classification analysis, an analysis of management utilization, and an organizational functional analysis.

2. Position Classification Analysis. JLARC staff assessed the appropriateness of position classifications by comparing employee survey data with State Classification Plan class specifications for all classes utilized within DIT. Compensation/classification expertise from the Department of Personnel and Training and structured comparisons with other State agencies were also employed in evaluating DIT's classification allocations.

3. Review of Management Positions. The effectiveness of DIT's organizational structure was evaluated through a review of the number and placement of management positions, the number of subordinates assigned to each manager, and the employee survey data concerning the amount of time spent performing supervisory duties.

4. Functional Analysis. Employee survey data and structured interviews with DIT's management personnel were utilized by JLARC staff to evaluate functional diffusion and DIT's effectiveness and efficiency in carrying out its mission.

5. Reorganization Proposal. JLARC staff used the results of the position classification analysis, the review of management positions, and the functional analysis to draft its reorganization proposal.

6. Agency Consolidation Analyses. Planning documents, agency personnel records, and organization charts from 1983 through 1986 were used by JLARC staff to evaluate the staffing and organizational results of co-location and merger.

7. Analysis of Turnover Rates. DPT's annual turnover reports from FY 1983 through FY 1986 for DCS, MASD, DOT, and DIT were used to evaluate turnover rates for data processing and telecommunications positions in those agencies.

8. Review of SDB Time and Cost Estimates. JLARC staff reviewed information on DIT's Management and Control System (MACS) to determine the accuracy of the System Development Branch's cost and time estimates. Approximately 300 projects, spanning three fiscal years (FY 1984 through FY 1986) were used in this analysis.

9. Analysis of DIT Staff and Contractor. JLARC staff reviewed DIT's MACS data for FY 1986 to identify assignments of staff and contractors to project activities. This information was compared with the Department of Personnel and Training's class specifications to identify higher level of staff assigned to lower level project activities.

10. Budgeting Analysis for DIT Computer Services. This analysis included information from three sources -- the Probud system, DIT's billing records, and DIT's customer projections -- to determine the success of DIT's projection process. All customer information was reviewed and statistically compared using the mean squared error as a comparative measure. JLARC staff interviewed the largest users of DIT's mainframe services in order to develop an understanding of the agencies concerns, and DIT's processes for developing projections.

11. Procurement File Review. JLARC staff reviewed a sample of 225 agency procurement requests (APR) from calendar year 1985. The sample was stratified by type of APR: less than \$500, between \$500 and \$10,000, contract list purchase, delegated authority replenishment, sole source, RFP (request for proposals), and IFB (invitation for bids). APRs were reviewed to determine compliance with procurement procedures and DIT processing standards.

12. Procurement Workload Analysis. Using all automated procurement records for FY 1986, JLARC staff calculated the average processing time for each APR. This calculation was used to determine the amount of time that DIT spent in processing APRs which could have been delegated to agencies.

13. Customer Agency Survey. Using a structured questionnaire, JLARC staff surveyed all State agencies and institutions of higher education. The general purpose of the survey was to determine the level of customer satisfaction with DIT's services. The survey included questions on computer services, telecommunications, systems development, other DIT services, and statewide and agency planning.



APPENDIX B
AGENCY RESPONSES

As part of an extensive data validation process, each State agency involved in JLARC's assessment effort was given the opportunity to comment on an exposure draft of this report.

Appropriate technical corrections resulting from the written comments have been made in this version of the report. Page references in the agency responses relate to an earlier exposure draft and may not correspond to page numbers in this version of the report.

Included in this appendix are the following responses:

- Secretary of Administration
- Department of Information Technology
- Department of Motor Vehicles
- Alcoholic Beverage Control Board
- State Corporation Commission
- Department of Personnel and Training
- Department of Social Services
- Department of Accounts
- Department of Planning and Budget



COMMONWEALTH of VIRGINIA

Office of the Governor

Richmond 23219

Carolyn J. Moss
Secretary of Administration

July 8, 1987

Mr. Philip Leone, Director
Joint Legislative Audit and
Review Commission
General Assembly Building
Richmond, Virginia 23219

Dear Mr. Leone:

I have read, with interest, the exposure draft of the report entitled, "Review of Information Technology in Virginia," which has been prepared for the members of the Joint Legislative Audit and Review Commission. I appreciate your giving me, during the course of your study, the opportunity to share with you some of my concerns pertaining to both the Department of Information Technology (DIT) and important issues related to the management of information technology. I am pleased to offer the following comments on particular aspects of this study and to highlight some of the actions already underway which address your recommendations.

I concur with your general observation that effective management of information technology in Virginia demands renewed attention to facilitate coordinated planning both by central government and the user agencies and institutions whose current dependence upon information technology is unprecedented. The need for a cohesive strategy for developing and sharing this valuable resource among agencies is one which has long been recognized, but never adequately addressed, notwithstanding the multiple studies, recommendations, and agency reorganizations which have so frequently rearranged Virginia's management of information technology.

In its short history as the central agency responsible for implementing technology solutions, DIT has been keenly aware of the need for statewide standards to guide the acquisition of hardware and software systems and their attendant communications networks. To that end, we have recommended, as does your report, an oversight "council" to develop plans and strategies

Mr. Philip Leone
July 8, 1987
Page 2

from a Commonwealth perspective; a council which will balance the parochial interests of agencies and institutions against the statewide objectives of compatibility and sharing of automated information. You may be interested to know that during the last General Assembly Session we withheld proposed legislation and administrative implementation of such a measure until your analysis was completed.

While you were conducting your study, DIT recognized, and successfully addressed, many of the practices and procedures subsequently questioned in your report. In cooperation with the Department of General Services (DGS), a new Agency Procurement Manual was developed which consolidates and streamlines the rules for purchasing automated data processing and telecommunications goods and services. Many previously inconsistent procedures were harmonized, streamlined, and consolidated, and new flexibility in the competitive negotiation process now exists where it did not before. DIT and DGS are also developing a program to ensure compliance by agencies with delegated procurement authority, through mandatory training, certification, and continuing education of agency purchasing officials.

In addition, DIT has enhanced its evaluation of major procurements, and the acquisition of the IBM Model 400 upgrade in January, 1987, is a good example. Your report questioned the advanced planning of that sole source procurement, based largely on DIT's internal Agency Procurement Request (APR) dated December, 1986. However, well in advance of approving the APR in December, DIT evaluated the need for an upgrade and examined alternatives to the IBM purchase through its Computer Services Division, Technical Services Branch, and Procurement and Contracting Branch. For the first time, potential competitors were invited to present alternative processing solutions which were analyzed before the decision was made. Unlike previous mainframe upgrades, this one benefitted from unprecedented internal debate and justification before it was approved. Also in a departure from the past, DIT insisted on broader price protection in its contract, which resulted in a reduction in cost when IBM subsequently announced its less costly Model 400-E. While few endeavors of this complexity cannot be improved upon, this purchase definitely represents a significant improvement and change in the state's commitment to the objective evaluation of major data processing procurements.

Although not fully acknowledged in your report, DIT's minority vendor solicitation procedure is unrivaled by any other agency. In addition to advertising formal procurements in Virginia Business Opportunities, DIT publicizes those solicitations through Bid Net, a subsidiary of Dunn and

Mr. Philip Leone
July 8, 1987
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Bradstreet which advertises procurements nationally and reaches thousands of minority businesses across the country. Moreover, DIT directly solicits all registered minority vendors in service contract procurements, and is implementing the same procedure for hardware and software solicitations. In a marketplace where minority business participation has yet to achieve its full potential, DIT's efforts to increase the minority share of the state's business is extraordinary and worthy of emulation. As the previous Director of the Virginia Department of Minority Business Enterprise, and the initiator of voluntary compliance from agencies, I feel uniquely qualified to comment on these solicitation procedures. You can be assured that we will continue to improve our efforts in this area.

Contrary to some perceptions, during the last year DIT has demonstrated that its primary mission is not simply to provide "mainframe" computer services. Its recommendations to agencies seeking new technological solutions have resulted in office automation and micro-computer systems which do not rely on centralized processing facilities. DIT has procured, and is implementing, two of the state's largest distributed processing systems which will support the Department of Transportation and the Department of Corrections. This action clearly negates the suggestion that DIT's central processing operations compromise its objective analysis of alternative system solutions. That same objectivity is confirmed by its purchases for other agencies where only a small percentage of total procurements in the past year were in support of "mainframe" processors and peripheral equipment. While this may be viewed as an inherent conflict in its mission, in practice the record speaks otherwise.

Through setting new priorities for interagency systems development projects, DIT has substantially reduced its requirement for general fund support in this area during the past year. In accordance with a memorandum issued by my office on August 7, 1986, new projects must satisfy defined criteria and receive Cabinet-level support to qualify for funding. DIT's continued services in systems development will remain essential if the Commonwealth is to achieve compatibility and sharing of agency-developed systems. In this regard, the funding of those services must be carefully examined to ensure the viability of a centralized pool of expertise which can help coordinate the state's diverse software development efforts.

As your report observes, DIT is a complex agency, which is confirmed by reading the underlying study performed by Ernst and Whinney. A good example of this complexity can be found in DIT's financial management alone. DIT must deal with multiple

Mr. Philip Leone
July 8, 1987
Page 4

billing systems and take into account the projected demands of all users of computer services in its budget preparation. It must also provide information essential to the preparation of budgets of the customer agencies. When coupled with the requirement to maintain a federally approved cost allocation plan, the process rivals in difficulty and complexity that of any other agency in the Commonwealth.

I concur in your observation that the financial planning process is hindered by inadequate agency forecasts, and that DIT's task can and should be made easier through more careful and realistic agency estimates of their actual computer resource demands. However, significant improvements to the estimating process will require a new emphasis on information technology management at higher levels within the agencies, a factor which I am sure you will agree is essential to the state's overall success in managing this resource.

As you probably know, beginning January 1986, I expressed some concern regarding the organizational structure within DIT. While my immediate concerns have focused more on organizational structure, the issue of overall personnel classifications has been held in abeyance, pending the Director's recommendations for agency-wide reorganization. The Department of Personnel and Training (DPT) was asked in January 1986 to review all personnel classifications within DIT as soon as the reorganization was completed. In addition, DPT has been directed to assess and justify the disparity in position classifications which exists between DIT and DGS during its current study of statewide procurement classifications. Finally, a point that was not central to the recommendations made in your study, but one which disturbed me, was the discovery that DIT created an interior designer position in December 1985. I appreciate your alerting me to its existence, and you may be assured that the position has been abolished.

Perhaps the most significant achievement this year has been DIT's internal organizational study which was completed in May 1987, and which awaits your final report for further action. In this project, the Director charged a team of mid-level managers with the task of identifying and recommending solutions to many of the problems obvious to the agency and its customers. The team recognized that many of the difficulties apparent in service delivery, customer perceptions, and the balancing of control and service functions are in fact symptoms of the incomplete merger of DIT's predecessor agencies in 1985. The team recommended organizational and program changes which squarely address those concerns. The 1985 reorganization has

Mr. Philip Leone
July 8, 1987
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caused DIT the same kinds of problems inherent with other agency reorganizations, but due to DIT's central agency status, its problems became apparent more quickly.

I am pleased that the DIT internal report parallels, to a surprising extent, the recommendations in yours. It recognizes, and I concur, that service and control functions within the agency must be properly delineated, and are achievable with the assistance of an oversight planning body, and without representing an inherent conflict in mission. The report presents organizational alternatives to achieve this and other recommendations on which we largely agree.

In the coming months, I look forward to implementing changes in those areas where we agree, and to finding solutions in those areas where our opinions may differ.

Again, thank you for the opportunity to comment on your exposure draft report.

Sincerely,


Carolyn J. Moss

CJM:jfm



COMMONWEALTH of VIRGINIA

Department of Information Technology

110 SOUTH SEVENTH STREET
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(804) 344-5000

J. WESTWOOD SMITHERS, JR.
Director

July 9, 1987

Mr. Philip A. Leone
Director
Joint Legislative Audit and Review Commission
General Assembly Building, Suite 1100
Richmond, Virginia 23219

Dear Phil:

I am pleased to enclose the Department of Information Technology's response to the July 7, 1987, revised exposure draft of Review of Information Technology in Virginia State Government. I believe that our response offers a constructive, supplemental analysis which will complement the excellent work of your staff and be useful in JLARC's consideration of its proposed recommendations.

Please extend to the members of your staff who worked on this project my sincere appreciation for their professionalism, candor and, especially, their willingness to hear dissenting arguments. Our collective review and debate of the initial exposure draft was a truly productive effort. It established, in my opinion, an invaluable appreciation of our respective positions on areas of disagreement, most of which I am happy to know we have resolved.

I am confident that the spirit of understanding we established throughout this process will serve us well as the General Assembly and DIT begin implementing our shared objectives for improving the management of information technology in Virginia.

With kindest regards, I am

Sincerely,

A handwritten signature in dark ink, appearing to read "J. Westwood Smithers, Jr.", written over a horizontal line.

J. Westwood Smithers, Jr.

/j

cc: The Honorable Andrew B. Fogarty
The Honorable Carolyn J. Moss

**RESPONSE OF THE DEPARTMENT OF INFORMATION
TECHNOLOGY TO THE
JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION'S
REVIEW OF INFORMATION TECHNOLOGY IN VIRGINIA STATE
GOVERNMENT**

**JULY 9, 1987
(Technical Corrections July 20, 1987)**

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- II. Virginia Public Telecommunications Board**
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RESPONSE OF THE DEPARTMENT OF INFORMATION TECHNOLOGY TO THE JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION'S REVIEW OF INFORMATION TECHNOLOGY IN VIRGINIA STATE GOVERNMENT

I. INTRODUCTION

Overview

The Joint Legislative Audit and Review Commission Report, Review of Information Technology in Virginia State Government (herein the "Report"), finds that managing information technology is a difficult and demanding undertaking in any organization as large as Virginia's government. We certainly agree. Information technology is reshaping the environment, tools and, some have argued, even the directions of social and governmental action. Indeed, the transformation of information processing from a supporting role to a resource in itself may prove to be the most far-reaching influence on the environment of public management today. At the very least, information must be recognized as the foundation for every public program and service in Virginia, and an essential part of the many difficult decisions made by our public executives today.

The technological environment of information management in Virginia is complex, and it is dynamic. Data processing, once primarily computing, has evolved into comprehensive information processing as computing hardware, telecommunications and software technologies have merged. As those technologies grow more interdependent, coordinated management -- and sharing -- of the resource becomes more critical.

That message is clear in the JLARC analysis. Less clear, and perhaps deserving of more emphasis, is the recognition that DIT's primary mission is not simply to provide "mainframe" computer services. Our role is significantly more extensive, and reflects the maturing of information technology today. In the evolution of public information resource policy, it has been suggested, information is not so much owned (although supporting technology, data and delivery systems can be) as it is shared. Yet in Virginia today, as elsewhere, this evolution is incomplete. One sign of this, as the Report appropriately observes, is our short history. The Department of Information Technology is a young organization, and, as the Report confirms, we have had relatively little time to respond to the challenges of our recent merger. Nevertheless, we carry a substantial burden of responsibility for the efficient communication and management of the Commonwealth's information resources.

The Review Process: An Ongoing Challenge

As a young organization, DIT welcomes an open dialogue with JLARC. We look to the Report as an historic first step toward an appropriate legislative agenda for improving the Commonwealth's management of information technology. In this spirit, it was our wish that the review of DIT, as proposed by the Department of Planning and Budget to the House Appropriation and Senate Finance Committees, would be undertaken as a more collaborative effort between both legislative and executive bodies. The audit and review mission of JLARC does not, of course, permit its staff to perform a consultative analysis. As a result, we view the Report as a conscientious portrayal of the apparent deficiencies which an external auditor should challenge.

In this context, the Report is a valuable recognition of the State's history of problems in shepherding its information technology resources. We hope, and trust, that the recognition this Report commands will not soon be forgotten, as have so many previous studies and proposals on the subject, all well conceived. Given the most comprehensive analysis of the issue to date, we are encouraged that future recommendations will benefit from a more careful and continuing analysis than has historically been the case.

The Report notes, for example, that reductions in administrative positions and overhead costs were among the advantages noted in the 1983 Governor's report to the General Assembly for consolidating information technology services. Specifically, JLARC reports that

"...the merger of DOT, DCS, and MASD was expected to save \$2 million and eliminate the need for at least 26 full-time administrative and support positions during the FY 1984-86 biennium." (Report, page 3.) *

While this statement is of historical interest, it is not, we suggest, an appropriate standard for evaluating the success of the consolidated organization today. DIT's predecessors, who were participants in this reorganization, recognized that the assumed cost savings did not anticipate a dramatic growth in services which we have since then experienced, and that the expected reduction in staff simply reflected the number of vacant positions in the three agencies at that time.

* Note: all page numbers cited are to JLARC draft report of July 7, 1987

By recalling that assumption, the Report demonstrates the need for a continuing and open dialogue in finding solutions to the problems it identifies. Our history teaches us that such an interactive process is an essential sequel to this Report's analysis which, though an invaluable catalyst, should not be viewed as complete.

During this study, the JLARC staff necessarily limited its contact and in-depth interviews with key agency management, including the Director and several of the Division Heads (particularly in evaluating the Educational Technology and Management Consulting Divisions, and the Public Telecommunications Board). As a result, a wealth of senior policy and management experience was largely untapped, and valuable perspectives have yet to be considered. Many of those perspectives, and the reactions of management to the Report's findings, are reflected in this response. Fortunately, we are in agreement with the vast majority of its recommendations, and our differences lie, for the most part, in the supporting data or the manner in which the recommendations should be implemented.

The preliminary exchange of viewpoints with the JLARC and Ernst and Whinney staffs, in our collective review of the Exposure Draft, has been most productive. We are hopeful that a rekindled spirit of cooperative exchange of ideas will guide us as we now move through the remaining phases of the review process.

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II. STATEWIDE INFORMATION MANAGEMENT

Overview

Citing the supplemental analysis prepared by Ernst and Whinney, the Report concludes that the lack of a statewide information technology management plan is a "critical deficiency." We agree. The absence of a comprehensive executive structure for oversight of the State's information resources is a chronic problem. As we told JLARC over a year ago (and as DIT's own recent internal organizational analysis concludes), a coordinated statewide strategic planning process is the most important objective we must pursue.

This symptom is not unique to Virginia. In Florida, for example, a management task force of the legislature's Joint Select Committee recently found that strategic planning of its information resource needs had been subordinated to an inadequate management strategy which emphasized controlling the acquisition of technology rather than managing the resource. It concluded that a failure of planning led to serious deficiencies, including: (1) a general inability of state agencies to determine how information technology could best be used to support each agency's mission, (2) a poor understanding of the true costs of information technology and magnitude of the resource commitment, and (3) the inability to evaluate how effectively technology solutions delivered accessible and cost-efficient services.¹ JLARC concludes, as do we, that an effective information technology management plan

"... will require a commitment to planning at all levels within State Government: at the highest executive levels, at the centralized agency level (DIT), and at the administrative agency level." (Report, pages 17-18.)

The Report also finds that past attempts at instituting such a mechanism have not been successful. Unfortunately, this perception is accurate.

¹See State of Florida, Final Report of the Joint Select Committee on Electronic Data Processing (1983).

Strategic Information Planning

The Commonwealth does not have a fully integrated plan for the acquisition and use of information resources to support programmatic goals, nor is there an agency assigned this responsibility from a statewide perspective. Without a firmly established statewide strategic agenda and a structured, interactive planning process, continued investments in agency-specific technologies which prove redundant, incompatible or inefficient will be difficult to avoid. On this critical point, we are in complete agreement with JLARC's stated concern that

"without a statewide strategy for addressing these concerns, costly and uncontrolled use of information technology will continue." (Report, page 19.)

This conceptual agreement is encouraging, yet the appropriate kind and level of oversight authority must be thoughtfully examined. At this point, we support (as did our own organizational analysis) an oversight authority vested, either by statute or Executive Order, in an impartial Board which operates with the ongoing involvement of DIT. We do not believe that such an authority should be as divorced from DIT's participation as the Report suggests. To do so would unnecessarily duplicate, in another agency, the professional expertise already resident in this one.

The Report also recognizes the importance of statewide disaster recovery planning to protect agency investments in information technology. We agree. DIT is now actively working with client agencies to develop a comprehensive disaster recovery contingency plan, including "hot site" services, physical facility security and data privacy protection. Completion of the first phase of these plans, including a request for proposals for hot site services, is expected no later than August 1, 1987.

Centralized, Distributed and Decentralized Processing

In its review of Virginia's statewide information management environment, the Report implies that DIT's paramount interest is selling "mainframe" computer services. This is misleading, and suggests that DIT, because of "mainframe-oriented" computer service operations, is not concerned with supporting distributed or decentralized processing solutions.

We do recognize that alternative solutions can, and should, take advantage of technological advances in microcomputing. The Report should recognize that DIT's Information Services Division, through the Client Services Branch, is now

recommending and implementing office automation solutions which do not depend on mainframe processing. Additionally, the Systems Development Branch has assisted agencies with implementation of multiple systems written in the Hewlett-Packard, Wang and Prime micro-computing environments. It also overlooks our substantial commitment, particularly during the last eighteen months, to planning and implementing major distributed and decentralized processing systems, including those for the Department of Corrections and the Department of Transportation. Significantly, these systems have been among the largest competitive procurements conducted during this fiscal year.

DIT acknowledges that the question of balancing "centralized-distributed-decentralized" solutions continues to evolve, and that non-centralized processing will continue to grow. We agree with JLARC that a comprehensive strategy to govern centralized, distributed or decentralized applications, as well as system compatibility and communications linkages, is needed.

Compatibility Versus Competition

The relationship between compatibility and competition in the marketplace is an important issue which illustrates the complexity of today's procurement decisions. Proprietary agency requirements, a lack of statewide architectural and data administration standards, and a large number of competing vendors (each "pushing" proprietary technologies) contribute to problems of compatibility and quality assurance throughout the system. We agree that

"[A] computer or telecommunications product with the lowest price may not always be fully 'compatible' with other components of the system. Therefore, it is important that both performance and price be evaluated in the procurement of computer hardware, software, and telecommunications." (Report, pages 23-24.)

In this context JLARC concludes, as do we, that compatibility is the most critical requirement for achieving effective distributed processing within Virginia. It must be recognized, however, that optimum compatibility, achieved through restrictive standards and architectures, automatically restricts competition.

Exchange of Information

We also agree that the number of systems maintained by the State inhibits information exchange, and additional efforts to share information and identify redundant systems should be considered. Specifically, JLARC finds that the State can avoid redundancy of data and systems and save costs by sharing information in at least two important ways: (1) developing a statewide inventory of databases and contents, and (2) maintaining a statewide inventory of computer system applications.

As the Report notes, DIT has developed a statewide inventory of computer systems applications, and has maintained it for about six years. This inventory is routinely updated and is shared with central State agencies and any others who request information on specific types of applications. There is significant activity in this area throughout the State, and each submitting agency receives a computer printout of its own submission as a "turnaround" document. Moreover, the position of State Data Administrator, established in 1983, is a function which DIT's reorganization will address. Heretofore, the lack of statewide awareness of the value of such a position would have made its performance difficult, at best.

DIT's Dual Function

The Report questions the viability of DIT's "service" and "control" functions. The general concern, apparently based on user agency perceptions, is that DIT's interest in mainframe technology might hinder agencies' access to other technologies. We believe that in practice DIT's overall record is strong, with a significant and growing commitment to distributed and decentralized processing.

A subtle but important aspect of this question relates to JLARC's concern that "individual agencies may not have the perspective to appreciate statewide information processing needs." (Report, page 27.) We believe that the JLARC survey did not so much uncover agency concern with DIT's control role as it did a more general agency reluctance to "trade away" control or oversight responsibilities to any "outside" agency or institution, not just DIT.

The perceived tension between service and control functions can be minimized with organizational realignments and a commitment to statewide strategic planning. Specifically, the planning and control functions which DIT's incomplete merger left

within its separate divisions can (and will) be effectively merged as our organizational analysis has proposed. Ironically, many of the agencies interviewed in JLARC's study (ABC, DMV, DPT, DSS and VSRS) themselves assume the dual roles of service and control, which is more typical than not in administrative agencies.

Agency Planning

We are encouraged that the Report found that over half of our agencies and institutions maintain agency plans for using telecommunications and computer-related services. Prior to DIT's publication of Commonwealth of Virginia Guideline for Information Management Program Planning (DP Guideline 84-1) in 1984, little, if any, such planning had been undertaken. We concur that Virginia needs a more far-reaching statewide information management planning effort.

Information Management Strategies for the 80's, published by MASD in 1982 and updated through 1984, represented the first step in that direction. Coupled with the information management plans which DIT had received biennially from the agencies as part of the DPB Budget process (formerly Appendix J to the DPB Manual), it formed the basis of a much more formal and structured information management program planning process. The intent was to publish a Statewide Information Management Plan annually (or biennially). This would provide top-down strategic guidance, including general technology trends, a bottom-up overview of each agency's plans for major hardware/software changes, and an overview of the fiscal implications. (Unfortunately, this process was shelved after DIT's merger, a good example of the high price DIT has paid for its convulsive organizational history.) With the emphasis JLARC's Report will provide, this process should be made to work, not shelved for another three years.

DIT's "Strategic Technology Directions," developed in November, 1985, although not a true state plan, was intended to be a part of the top-down guidance when combined with an updated version of Information Management Strategies for the 80's. It was recognized as a meaningful foundation for a statewide plan, providing input for a "living" document--one which would chart the course for Virginia's technological future and retain the flexibility to adapt in response to changing requirements and interaction between DIT and its customer agencies.

We continue to believe in the integrity of that kind of "organic" approach to statewide planning, and we concur that the Report's recommendations for a statewide information management plan are appropriate, although the examples are more

limited than we would propose. (Report, page 30.) Through DIT's active involvement in the National Association for State Information Systems, and personal involvement of senior management on its Executive Committee, we can access comprehensive "comparative" data of the kind suggested by JLARC to help in the process.

Conclusion: The Need for a Permanent Planning Structure

In short, the clear message in this part of the Report is that statewide planning efforts are inadequate, hindered by a lack of continuity in organizational structure and leadership, and undermined by an ill-defined user agency commitment to the process. In our review of the significant planning needs identified in this chapter, we find much general conceptual agreement. Within this framework, we offer as a basis for legislative discussion our response to **State Information Planning Recommendations (1) through (7)**, as follows:

Recommendation (1). The General Assembly may wish to enact legislation to require development of a statewide plan for information technology management. At a minimum, the plan should identify methods for effectively integrating information processing networks; protecting information systems and data; ensuring competitive, timely, and compatible procurements; stimulating information exchanges; and sustaining a participative, continuous planning process. [pp. 29, 31]

DIT Response

WE AGREE, with modifications. A long-range statewide plan for the strategic management of information systems is clearly needed, and DIT's enabling legislation alone is insufficient to accomplish this. While DIT has ample authority to adopt broad policies, the authority to develop and maintain a truly statewide information technology management plan should be established, either through appropriate legislation or new Executive Branch initiatives. However, any such plan must: (1) conform to a clearly identified statewide strategic direction, and (2) be supported by adequate compliance authority. DIT recognizes, as did Ernst and Whinney, that the success of any statewide planning effort will depend upon the ability (and willingness) of agencies to participate in the plan, the definition of quantitative

milestones to measure its progress, and a commitment to its successful implementation, which will require the integration of planning, budgetary and service requirements.

The recommendation calls for "effectively integrating information processing networks," which we applaud. It does not, however, address the issue of multi-point, full-motion video processing (which cannot be done on an integrated telephone/data network, even with existing fiber technologies). This is dependent upon broadcasting facilities supported by the Virginia Public Telecommunications Board which the Report suggests should be segregated from DIT.

Recommendation (2). DIT should develop and implement a comprehensive management plan for the agency's operations. The comprehensive plan should include capital expansion plans for acquiring computer hardware. The plan should also identify how the performance of the computer and telecommunications systems will be monitored and improved. Plans for accommodating major changes in DIT's and agencies' computer applications should also be included. Disaster contingency plans should be completed. [pp. 34-35]

DIT Response

WE AGREE. Although much of the planning information which JLARC recommends already exists in various documents within DIT, there would be considerable value in assembling it into a comprehensive agency plan. Nevertheless, more timely and meaningful input from customer agencies and institutions will be necessary to define specific requirements. If DIT is to improve the accuracy of computer and telecommunications resource requirement projections, there must be a mandatory agency planning process, as described by JLARC in **Recommendation (3)**. A statutory mandate would be helpful to implement this recommendation.

Recommendation (3). State requirements for agency information management plans should be established. All executive agencies and institutions should be required to develop information technology plans in compliance with State requirements. These plans should be updated biennially and used to revise the statewide plan.

The director of each agency and president of each higher education institution should designate a senior staff member to serve as information resource manager. The information resource manager should be responsible for coordinating development of the agency information technology plan and overseeing its implementation. [p. 37]

DIT Response

WE AGREE. Agencies and institutions should submit information management plans to DIT, and the plans which were submitted in the past to MASD serve as good examples. They could serve multiple purposes, including: (1) verifying conformance to the recommended statewide information management plan, (2) providing necessary input to DIT's operating plan, and (3) defining the standards for evaluating budget requests and procurements of hardware, software and services. However, without clearly defined accountability, this process is unlikely to succeed. [This is probably a prerequisite for implementation of **Recommendations (1) and (2).**]

Recommendation (4). All executive agencies should reference budget requests for information processing or communications equipment, software, or services to the corresponding information technology plan. DIT's entire budget should be referenced to the agency and the statewide plan. Agencies' budget requests should be used to assess DIT's funding needs. [p. 38]

DIT Response

WE AGREE. Requiring greater accuracy in customer budgets through better planning would benefit DIT's budget and resource planning processes. JLARC may wish to consider expanding the scope of **Recommendation (4)** to include any organizational unit which receives state funding.

Recommendation (5). State policies for information technology

procurements should be revised. The policies should include a requirement that all procurement requests be justified on the basis of information management plan objectives. Central procurement staff responsible for reviewing information technology requests should ensure that procurements comply with statewide and agency plan objectives. [p. 40]

DIT Response

WE AGREE in part, and **DISAGREE** in part. Procurement can serve as a management control mechanism to ensure that agencies and institutions adhere to an information management plan in their acquisition of hardware and software systems. Purchasing, however, is the last step in implementing such plans, and as a control mechanism it cannot be effective (other than as a secondary safeguard). Agency procurements invariably occur after systems-dependent programs are planned and underway, after funds have been appropriated, and when "the money has to be spent this fiscal year." No regulatory organization can effectively win agency cooperation by exerting a "veto" power at this stage of the process.

A better approach might be to rely on annual budget approvals as the primary control. It would be more contemporaneous with any thoughtful planning process, and would serve as an incentive to conscientious advance planning. Subsequent oversight could be accomplished through approval of systems specifications as a **prerequisite** to purchasing, in accordance with standards set by an advisory or supervisory council such as recommended by DIT and JLARC.

More importantly, from an organizational perspective, a purchasing organization should not be cast in the dual (and potentially conflicting) roles of (1) adopting uniform technological architectures and standards (the essence of any effective statewide plan), and (2) conducting competitive procurements which should seek competition to "the maximum feasible degree" under Virginia law. Such a dual function might conveniently serve the State's planning interests. However, the vendor community (which is keenly competitive in this industry) would be justifiably critical if the organization which promulgates standards, inevitably excluding some vendors, also purports to ensure maximum competition in the marketplace. This, we believe, would present an inherent conflict in mission.

Recommendation (6). Agencies should annually report their progress in

achieving information technology objectives. The progress reports should be used by the State to monitor accomplishment of statewide and agency objectives and to revise policies and standards when necessary. [p. 41]

DIT Response

WE AGREE. Agencies should be required to submit their plans for coordination and approval and to report on their progress on a periodic basis. Such periodic reports would be an appropriate mechanism to evaluate an individual agency's effectiveness in meeting goals, and, more importantly, a means to determine each agency's impact on the interrelated activities of other agencies.

Recommendation (7). The General Assembly should consider creating a supervisory board to oversee statewide information management planning. The board should be independent of DIT. [p. 49]

DIT Response

WE AGREE in part, and **DISAGREE** in part. We recognize, as does JLARC, that a fully integrated plan for the acquisition and use of information resources is essential, and that DIT does not have the authority to implement that plan from a statewide perspective. We agree on the need for an external board (or council) which reviews existing systems and sets standards for future development. We are mindful, however, that no statutory mandate, however strong, will guarantee the cooperation of agencies which will be fundamental to the council's success.

The administration of government in Virginia finds discomfort in dictatorial authorities. For this reason, such a council should not attempt to regulate, in detail, the operational policy decisions of agencies and institutions, including every technology purchase. Its mission should be to adopt broad, uniform standards and architectures which allow reasonable agency flexibility in their implementation. Beyond that, we believe that its role should be advisory, taking into account the differing needs and recommendations of the committees proposed in Chapter IX of the Report.

DIT, which administers the largest single investment in information technology,

should be required to support the council with staff, but remain subject to its direction (as with the successfully functioning Information Technology Procurement Appeals Board). DIT can, as well, support the council through implementation of its statewide plans.

We also agree that the council must rely heavily on private sector membership to ensure its impartiality in evaluating agency perspectives. There is a wealth of information technology management expertise in Virginia's corporate citizenry, and our corporations deal with the same problems we now face. We expect that those experts would willingly share their experiences.

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III. PROCUREMENT

Overview

Most organizations, both inside and outside government, must address complex procurement decisions. For the Department of Information Technology, those decisions have never been more difficult. Realignment in the marketplace, and the economic realities of telecommunications deregulation, have clearly intensified competition. Evolving technologies, and changing relationships between vendors as well as between vendors and the Commonwealth, add to the dynamics of this process. Proprietary systems requirements, a lack of statewide architectural and data administration standards, and a growing variety of vendors with proprietary technologies all contribute to the challenge of ensuring fair competition for the State's investment in information technology.

Procurement Practices

Under these circumstances, the management of procurement decisions is particularly difficult. Moreover, its complexity will grow with more competition because there is no sure formula for properly balancing "competition" and "compatibility" in the technological marketplace. Nevertheless, we find some satisfaction in the Report's analysis of the soundness and efficiency of DIT's procurement practices. Obviously, we are encouraged by the threshold finding that

"In general, DIT has established sound procedures for reviewing agency compliance with the Public Procurement Act." (Report, page 51.)

We recognize, as does JLARC, that DIT has attempted to improve the timeliness of our processing. Given our small staff, this is a notable achievement; only 13 people, six of whom conduct some 1500 purchases a year (with a value of \$148 million last year), are available to this task. We add, however, that a more effective post-audit procedure is still needed to ensure compliance by agencies and institutions with delegated purchasing authority.

We are obviously concerned with the finding that some procurement staff do not consistently interpret or implement procedures for competitive bids, sole source determinations and minority vendor solicitations, and we have taken steps to ensure future uniformity. At the same time, these findings do not recognize that management

review is equally part of the process, and that differing interpretations of individuals (which are inevitable in any operation) do not flaw the outcome if they are adequately reviewed. We do acknowledge that more complete documentation of the subjective determinations of procurement staff would better support their decisions, especially from an audit perspective.

We do question the finding that since the creation of DIT procurement controls "have diminished." The former process of approval by MASD, and by MIS directors in the Cabinet, although facially a good procedure, was less effective than intended (former MASD employees now at DIT cannot recall a single procurement being denied by the MIS directors). In practice (though perhaps not in structure) we believe that DIT's internal controls have recently shown unprecedented muscle.

A prime example is the IBM 3090-400 CPU acquisition referenced in the Report. We agree with Ernst and Whinney that a thorough business plan based on an accurate assessment of customer needs would have better supported that purchase (a shortcoming which can be remedied only through a cooperative planning process). Yet, this procurement represented the most conscientious internal analysis of needs, and alternatives, in the history of DIT and its predecessors. For the first time, management challenged the Computer Services Division's request for an upgrade and required an analysis of alternatives (including no purchase) which two separate agency divisions were asked to critically review. Moreover, the only known potential competitors were invited to present alternative solutions before the procurement was approved by the Director. This was the first time, in our history of three CPU upgrades since 1984, that such scrutiny was mandated. It demonstrated that, notwithstanding the absence of desirable coordination of such a major decision with statewide plans, internal controls can and do work.

The Report's analysis of the purchase of the CADD system scanner for the Department of Transportation is somewhat incomplete. This procurement qualified as sole source, by even the most conservative standards, because there was only one machine known to be available at the time. The only issue was DOT's need to obtain the equipment immediately, having full knowledge that a better product could be had if it delayed the purchase. As the Report notes, DOT understood the caveats raised by DIT's engineers (and its own), but concluded that because of the value of a scanner in accelerating graphic design functions of its highway programs, purchasing the used equipment was worthwhile. DIT was not in a position to refuse the request on procurement grounds, nor on the basis of technical reservations, because of the agency's full knowledge of the risks.

We acknowledge that the example of the office automation software purchased in January, 1986, is justifiably critical. At the time of the procurement, the Procurement and Contracting Branch had, in the past, been automatically approving, without dissent, internal Agency Procurement Requests which had been first signed by the Director. This was a practice unknown to the new Director who had arrived three days earlier. The Director signed the APR with the understanding that it authorized the procurement to be conducted in due course, including the analysis of possible alternatives. This admitted misunderstanding was the result of previous management's "top down" approval process. That practice has been reversed, and dissenting opinions are now solicited (and received) from the "bottom-up" (as in the CPU procurement later in the same year).

Procurement Policies

DIT's procurement policies and procedures are approved by the Department of General Services pursuant to Sections 2.1-440 and 2.1-442 of the Code of Virginia. Although DIT has statutory authority to review and approve contracts, it has no procurement authority beyond that approved by DGS.

While there remains a need to improve the documentation and some of the controls in the procurement process, DIT and DGS have achieved, we believe, unprecedented cooperation during the past year. In cooperation with DGS, a new Agency Procurement Manual has been developed which consolidates and simplifies the rules for purchasing automated data processing and telecommunications goods and services. Many previously inconsistent procedures have been harmonized, and there is new flexibility in the competitive negotiation process which educational institutions requested. DIT and DGS are also planning to ensure compliance by agencies and institutions which have delegated purchasing authority. DIT has promised to participate with the Division of Purchases and Supply in a program of training, certification and continuing education for agency purchasing staff.

Sole Source Procurements

The Report cites the key reason why a greater portion of automated data processing items are likely to be sole source than other types of procurements -- often only one vendor may be able to offer the necessary product compatibility. We agree that this circumstance supports the observation that it is especially important to ensure

that controls over these procurements are firmly in place. We cannot disagree that better documentation is necessary to support the record. Yet, the frequent justification (quoted from the applicable statute) reflects the judgment of an experienced data processing procurement engineer familiar with the marketplace. It also reflects practical realities of the marketplace, including the fact that few competitive alternatives exist which are not well advertised and known to the routine purchaser. Unless each engineer should be required to discuss in writing all of the trade journals, catalogs and identities of manufacturers which were considered in the process, in many cases little more can be added by way of documented justification.

The primary factor which distinguishes data processing procurement, in a control sense, is the high level of competition in the industry. Every significant purchase, whether competitive or sole source, attracts attention in the marketplace. The key to success in this business is to establish an "installed base" with a purchaser, or to displace a competitor's foothold by offering better replacement products. While the resulting level of competition can result in some misleading sales practices, it does benefit the State by "policing" its procurement activities. In this environment, vendors are not hesitant to protest. During the past 18 months, DIT has received 20 vendor protests, only two of which challenged sole source determinations. The agency decided in favor of one, opening the process to the protestant.

Minority Procurements

We are pleased that the Report recognizes DIT's active program to encourage minority vendors to participate in information technology procurements. DIT's minority vendor solicitation procedures are, we believe, unequalled by any other agency in Virginia. In addition to broad advertisement of formal procurements, we directly solicit all registered minority vendors on service contracts, and the same procedure is being implemented in hardware and software solicitations. The Report finds that 50 percent of the APRs between \$500 and \$10,000 had no documentation that a minority vendor was contacted. DIT has addressed this issue and will ensure that, in the future, contacts are made and appropriate documentation is maintained. Our list of minority vendors includes more than are registered with the Department of Minority Business Enterprise. In a marketplace where minority business participation has yet to achieve its full potential, DIT's efforts to attract minority vendors are, we believe, exemplary.

The Report questions whether a large minority vendor should benefit from solicitation procedures for minority businesses. The present statute, which governs our activities, leaves DIT little choice. Unless it is changed, we will continue to actively solicit vendors who meet the current definition.

Conclusion

In our review of the JLARC procurement analysis, we find general agreement that the purchasing process is complex, with some disagreement regarding the proposed means to achieve procurement objectives. Within this framework, we offer as a basis for legislative discussion our response to **Procurement Recommendations (8) through (17)**, as follows:

Recommendation (8). State controls over information technology procurements should be strengthened. The first step in implementing stronger controls should be the separation of central procurement responsibilities from DIT. Agencies' and DIT's procurement requests should not be approved unless they support documented objectives in statewide or agency information management plans. [p. 57]

DIT Response

WE AGREE in part, and **DISAGREE** in part. We **AGREE** that controls over information technology procurements should be strengthened to ensure that purchases are justified by approved information management plans. DIT, as any other agency, should undergo the same review and approval. However, we **DO NOT AGREE** that separation of central procurement responsibilities from DIT is the solution. DIT can, and should be able to, strengthen its procurement program internally, and a mechanism for reviewing DIT's procurements should be considered. This recommendation would assume, in theory, that the Department of Personnel and Training cannot regulate its own positions, and that the Department of General Services cannot regulate its own procurements, which in fact they do, in addition to regulating every other agency's. Combining service and control functions in one agency is the rule, more than the exception, in State government, and it makes sense that the major provider of services should be an integral part of the control and decision-making process.

Stronger controls do not depend on creating yet another agency in State government. The substantive controls most needed (and now absent) will result from statewide strategic planning and standards adopted by the recommended council, on which DIT should participate with other agencies, but not control. Internal controls (over solicitation procedures, sole-source documentation, etc.) can be implemented through organizational and management initiatives, which will be appropriate during DIT's reorganization this year. Subsequently, if procedural errors occur, there is ample authority for external oversight and control by DGS, from which DIT derives its procurement authority and procedures.

Recommendation (9). In all informal competitive procurements, staff should solicit at least three bids from qualified vendors capable of providing the requested item. In all formal solicitations, procurement staff should document that awards were made to qualified vendors submitting the lowest bids or highest -scoring proposals. At a minimum, documentation should contain all bid amounts or proposal scores, and justifications used in determining which vendors were not responsive or responsible. Internal audits should be conducted annually to ensure that procurement staff comply with competitive procurement laws and procedures. [p. 62]

DIT Response

WE AGREE. Provided a sufficient vendor base exists to provide competition (i.e., where at least three qualified vendors exist), at least three bids should be obtained. We agree that more documentation is needed, but add that most of it is now provided. We also agree that periodic audits would be valuable.

Recommendation (10). The State's procedures for reviewing sole source procurements of information technology should be strengthened. As part of information plans, all State agencies should be required to develop a biennial procurement plan. Specific requirements for justifying sole source procurements should be developed, including cost analyses of alternatives and documentation of contacts with alternate vendors. Central procurement staff should periodically conduct market searches for items frequently procured as sole source. Agencies' and

institutions' use of sole source procurements, if conducted under delegated authority, should be reviewed as part of biennial procurement audits. [pp. 71-72]

DIT Response

WE AGREE, with clarification. Cost analyses of alternatives cannot, by definition, be accomplished on sole source procurements (if there are alternatives, then the procurement is not sole source). We do agree that the search for vendors should be better documented. We also support biennial procurement plans, but recognize that technology, today, undergoes significant changes too often (every six to twelve months) to plan specific purchases that far in advance.

Recommendation (11). The General Assembly may wish to amend Section 2.1-64.32 of the Code of Virginia to define disadvantaged minority vendors as socially and economically disadvantaged. Consideration should be given as to whether the intent of the statute is to define large minority-owned organizations as at a disadvantage, and if these organizations should benefit from special solicitation procedures. [p. 75]

DIT Response

WE AGREE that the General Assembly should decide this issue. If it is the intent or desire of the General Assembly to exclude large and/or successful minority-owned businesses, then we agree that the statutory definition needs revision.

Recommendation (12). DIT should continue in its efforts to increase participation by minority vendors. Procurement staff should routinely select and call one or more minority vendors from the registered vendors list for all informal solicitations. Similarly, procurement staff should establish and contact a minimum number of minority vendors for all formal solicitations. [p. 77]

DIT Response

WE AGREE, and reiterate that we have taken steps to ensure documentation of minority solicitation in informal procurements.

DIT is committed to an active program to solicit participation by minority vendors in its information technology procurements and, as the Report finds, we have developed special solicitation procedures for minority vendors in compliance with existing statutory requirements.

Recommendation (13). A formal training program should be established for all procurement staff. The training should include clearly defined procedures for conducting competitive procurements, sole source determinations, and minority vendor solicitations. Periodic supervisory reviews of procurements should also be conducted to ensure consistent interpretation and implementation of procedures. [p. 78]

DIT Response

WE AGREE. The Department of General Services and DIT have agreed with the Secretary of Administration to establish a program for training, certification and continuing education of procurement personnel. We concur that periodic supervisory reviews of procurements is appropriate, and there is a procedure in place to review every procurement prior to approval.

Recommendation (14). Procurement staff should establish and increase efforts to meet processing standards for procurement and contracting. As one method for monitoring performance, procurement staff should develop an automated system for tracking procurement requests. The system should be used to produce reports which identify all agency requests that exceed processing standards. Supervisory staff should routinely review the status reports and take necessary steps to ensure prompt completion of agency procurement requests. [pp. 83-84]

DIT Response

WE AGREE in concept. "Standards", which in reality are internal guidelines, have already been established. They are tight, based on assumptions that "ideal conditions" exist, and are intended to aid management in assigning workloads and identifying unwarranted delays.

An automated procurement tracking system is already in place. We fully agree that a better system needs to be developed.

Recommendation (15). DIT should increase its efforts to delegate procurements from the State master contract to agencies and higher education institutions. In delegating procurement authority to agencies, DPS should consider increasing the limit on individual purchases of data processing products to \$10,000. Authority to informally solicit items less than \$10,000, which are not on the contract list, should also be delegated to all agencies, as is currently the practice for higher education institutions. [p. 86]

DIT Response

WE AGREE, with some reservation. With adequate training and an effective compliance audit process (including authority to withdraw delegation for non-compliance), DIT favors procurement delegation, including purchasing from the master contract. A delegation procedure is already in place, but most agencies have elected not to take advantage of it. Most agencies are neither staffed nor trained to conduct written solicitations, which are required by the Division of Purchases and Supply for informal bidding in excess of \$1,200. Recognizing this experience, forced delegation may not yet be advisable.

Recommendation (16). In delegating procurement authority to agencies and institutions, procurement staff should establish procurement documentation requirements. A formal audit program should also be developed to monitor compliance with public procurement laws and procedures. Audits should be conducted within six months of the initial delegation and biennially thereafter. A periodic training schedule should also be developed. [p. 91]

DIT Response

WE AGREE. Procurement documentation requirements are already in place, as stated in the new Agency Procurement Manual. The audit programs in this recommendation will, nevertheless, require additional staffing.

As indicated earlier, DIT and DGS are planning to implement a program of training, certification and continuing education for agency procurement personnel.

Recommendation (17). A centralized method for monitoring vendor performance should be established. Agencies should inform the central procurement staff of all instances of unsatisfactory vendor performance on State contracts for information technology. This information should be available to agencies for use in making subsequent vendor selection decisions. [p. 92]

DIT Response

WE AGREE. In fact, in the 1986-88 biennial budget submission (DIT's first), a request for staff to perform contract administration functions was requested and subsequently rejected. DIT will again request staffing for this important statewide function.

IV. SYSTEMS DEVELOPMENT

Overview

In reviewing the Systems Development Branch (SDB), Ernst and Whinney noted weaknesses in project planning, differences between service requests and project results, inadequate project accounting and poor project documentation. We find in that criticism much constructive analysis, but we are concerned that it discounts the relatively high rate of satisfaction (over 72%) of our systems development customers. Also, the analysis could benefit from more emphasis on the responsibilities and accountabilities in short- and long-term development staffing, rate setting processes, and cause and effect analysis.

Quality of Service

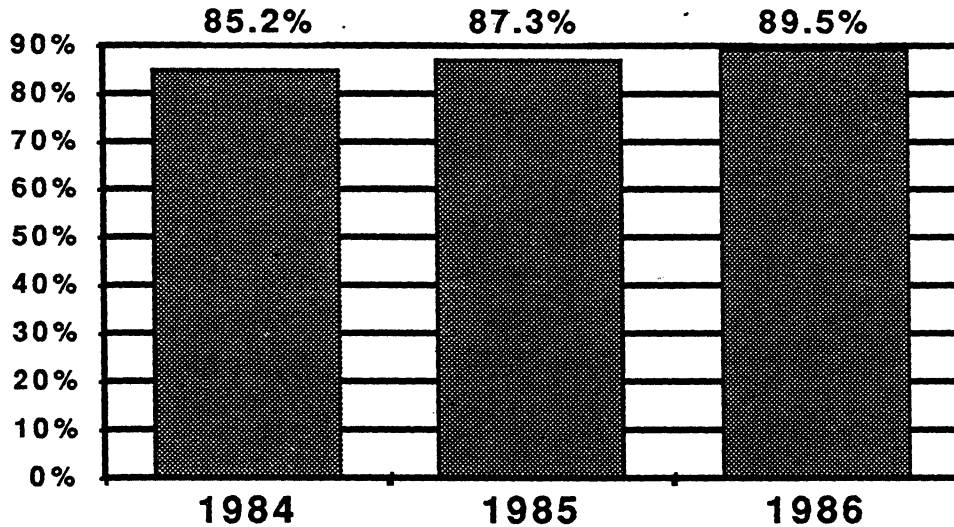
The assertion that the quality of SDB products is less than that of the private sector is contrary to the evidence available to DIT. Over 95% of the systems developed and implemented by SDB during the past five years have met or exceeded the system requirements that were contracted for. The vast majority of systems implemented are currently operating, and no major system changes have been required because of faulty design or development. Comments based on perceptions, versus specific documented system deficiencies, should be weighed very carefully before concluding otherwise. Every SDB customer has the opportunity to reject any product delivered by SDB, or terminate a contract at any point in its life cycle without penalty. Such action seldom occurs.

Figure 6, on page 117 of the Report, depicts the "Accuracy of SDB's Project Cost Estimates," showing that 52% of SDB projects were completed within 10% of estimates (up from 15% in 1981). This methodology, which includes under-budget projects in the same category as cost overruns, could be misleading because the text immediately following Figure 6 discusses "Cost overruns."

State agencies which contract with SDB are concerned with keeping project costs at or below estimates. The following table, using the same data as the Report, shows that 89.5% of SDB's projects are completed within estimates.

SDB PROJECT COST ESTIMATES

Percent of Projects Successfully Completed
Within Budget Limits



SOURCE: Page 19, JLARC DRAFT - Review of Information Technology in State Government, Technical Appendix, June 12, 1987.

Estimates for systems development activities will always reflect the judgment, knowledge and experience of the individuals who make them, and they are inherently imprecise because they represent the cost (primarily for personnel) to create something which does not already exist and is largely unknown. Studies of ADP application development estimating agree that no single method is adequate to estimate the time and cost associated with systems analysis and design work. We agree that this is an important area requiring additional attention; yet it should be recognized that marked improvement has been demonstrated over the last six years.

Some criticism of past uses of the Interagency Systems Development (IASD) fund may be appropriate. However, DIT, in cooperation with the Secretary of Administration and staff of the House Appropriations Committee, has imposed strict prerequisites for IASD fund projects during the past year. As a result, there has been a substantial reduction in the number of IASD projects, as reflected in a 77% reduction in general fund appropriations this year. The new criteria generally limit projects which enable shared systems use by general fund agencies.

Value of Products and Services

Ernst and Whinney's comparison of the product value (or cost) of SDB's services with that of the private sector is difficult to appreciate. As described by Ernst and Whinney, SDB's basic units of service are time (in hours) and its hourly rates are easily understood. Likewise, "[t]he allocation of captured cost within the Systems Development Branch is simple, clear and easily understood."

SDB's billing rates include direct salaries, fringe benefits, and related support costs. The majority of private vendors delivering similar services on a time and material basis charge by the hour at various rates depending on the position. Our comparison of DIT rate scales with comparable positions in commercial firms shows that SDB's rates are quite favorable, indicating that in most comparisons, DIT's rates are lower than the private sector.

	<u>RATE PER HOUR</u>	
	<u>SDB</u>	<u>Private Contractor</u>
Project Director/Information Technology Manager	\$48	\$60
Project Manager/Programming/ Systems Development Supervisor	\$43	\$50
Senior Systems Analyst	\$39	\$46
Programmer Analyst	\$30	\$35
Programmer	\$26	\$25

It should be noted that the cost of SDB personnel is the same as the cost of like classifications in other State agencies and institutions, which represent an additional 881 systems development personnel elsewhere in State government.

Service Demand

At the beginning of this fiscal year, 38 agencies, with a workload exceeding 800 man-months, have already indicated their intent to use SDB services this year. This equates to a minimum of 67 billable man-years of effort. Past experience indicates that SDB will receive an additional 8% of unanticipated project work (as noted in JLARC's 1983 report), which would result in approximately five more man-years of effort. The resulting demand is equivalent to a total of 78 to 93 positions.

The Report notes "Declining Requests for SDB Services," based on revenue figures in Tables 8, 9, and 10. A declining staff (by reduction in SDB's MEL) naturally results in declining revenues when that staff is the revenue producer.

Therefore, in comparing past revenues with today's, a common base should be used -- revenue producers. As shown below, the per capita revenue is not declining as alleged:

**REVENUES FOR SDB
(FY1984-87)**

<u>FISCAL YEAR</u>	<u>AVERAGE FTE</u>	<u>GROSS REVENUE</u>	<u>PER CAPITA REVENUE</u>
84	110	4,449,601	40,450
85	108	4,045,637	37,460
86	85	4,317,617	50,795
87	75	3,760,000*	50,130

*DIT Projection 6/16/87

NOTE: It is also important to note that these revenues were attained with a reduction of \$1.5 million in IASD appropriations which were made up through the "free market."

At one time during 1986, there were as many as 25 contract personnel supplementing SDB personnel work, and, as in prior years, almost 50% of SDB revenue was from IASD (general) funds. Therefore, data relative to 1986 or prior years' revenue or hourly rates are inappropriate to present circumstances, under which rates are based on fewer staff, with more costs recovered from customers than ever before.

In spite of the drastic cut in IASD funds and the severe "hobbling" of SDB by the \$50,000 contract ceiling, in the eyes of many agencies this staff still provides the best services at the lowest price. We agree, therefore, that SDB should "adjust" staff to match the workload. The change in staff numbers should occur when the actual circumstances dictate such an adjustment in staff.

The key factor in controlling SDB's success is its rate structure, which requires every employee, regardless of position, to bill 1550 hours per year against agency projects, and at hourly rates which are unreasonably low. Moreover, the \$50,000 project limit makes it impossible to undertake most significant systems development efforts.

The Free Market versus the \$50,000 Ceiling

In 1976 the General Assembly authorized SDB to exercise a "right of first refusal" on all state systems development projects. In 1984 it reversed this posture and, as pointed out by JLARC,

"The Appropriations Act requires agencies to competitively procure any project in excess of \$50,000." (Report, page 104.)

The apparent intent of the previous legislation (1976) was to use State resources if they could meet the need, and was based on the various State studies reflected in the Ernst and Whinney supplement. In reaction to the 1984 Appropriations Act, the Director of MASD, in a June 19, 1984, memorandum, requested that JLARC grant approval for fixed-price contracts:

"A fixed-priced contract would establish a total price for the entire project. Overruns would be absorbed by MASD; underruns would still result in agencies being billed for the full contract price. Billings for the fixed-priced contracts would be according to an agreed-upon schedule of payments, usually tied to the delivery of certain products."

In response, JLARC staff stated in a memorandum dated July 5, 1984:

"Justification. Because the Appropriations Act requires a competitive bidding process, it appears that the SDD must be given the authority to engage in fixed-price contracts."

Additionally, JLARC spelled out specific rules under which SDB would have to operate.

"1. That the Systems Development Division continue to maintain detailed, accurate records of the actual costs of services provided for the purpose of audits; and

2. That MASD continue to provide expert advice to State agencies in the development of RFP's for systems development services but to ensure that SDD can bid without conflict, such technical advice should not be provided by SDB."

The current Report now says that SDB should not compete for projects and the use of fixed-price contracts should be suspended. The Report concedes, however, that the \$50,000 limit is "... rendering SDB- provided development services an infeasible alternative for agencies considering larger projects." (Report, Page 106.) If agencies want to use SDB services for larger projects (DPT, DOSS, VHDA, SBE), they should be allowed to through modification of the restrictive legislation.

It should be noted that less than 40 agencies and institutions have their own in-house systems development staffs. The rest must rely on contracting for their systems development needs. SDB has worked with over 60 State agencies and institutions during the past several years and knows that, in addition to the uncertain quality of private vendors' work, contracting for outside services simply costs more. This is due, in part, to a vendor's minimum "up-front costs" (often \$10,000 or more) for the time and effort involved in developing competitive proposals (APRs, RFIs/RFPs). In some cases, the intrinsic costs of the competitive procurement process can equal or exceed the cost of the project effort.

The Report does not fully reflect: (1) the cost of staffing all State agencies without DP staffs, (2) the comparative costs of other agency staffs and their results with the central pool, (3) the total cost of current private sector use, including sole source contracts, (4) the satisfaction of agencies with work performed by the private sector, and (5) the satisfaction of agencies with work performed by their internal staffs.

There would be a major loss in statewide systems knowledge without SDB's continuity of experience. Decentralization of DP staffs promotes duplication of systems and data with little coordination and sharing. Nevertheless, from 1982 to 1987, agency development staff has grown by 45%, while SDB's staff has decreased by 33%.

Utilization of SDB Staff

The Report finds that, in some instances, higher-level SDB staff were assigned to tasks usually assigned lower-level staff. The use of senior staff for lower-level functions can, generally, increase costs to customer agencies and should be avoided. Nevertheless, assignments made to higher-level and more skilled personnel often require less time, supervision and administration, and produce a higher quality product; in some instances, the costs are actually reduced.

The Report, in its Table 11, confirms that 92.5% of lower-level tasks were performed by appropriate personnel: systems analysts/programmers. (For example, tasks of high-level testing, test data generation, and test validation are upper-level tasks, with the coding and unit testing at the lower range.)

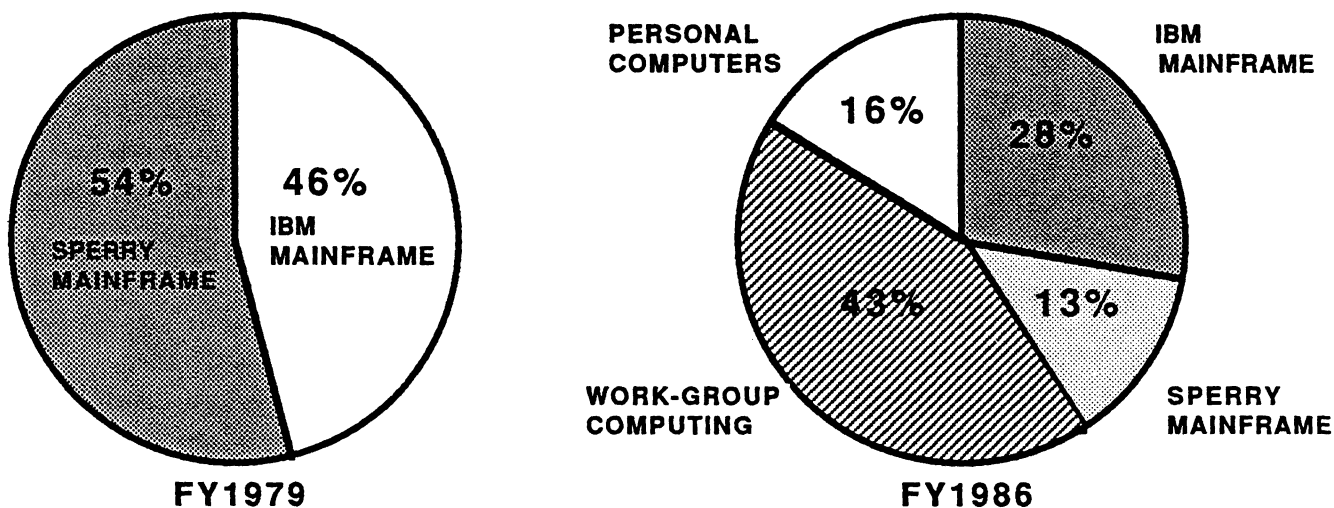
Operations Methodology

Ernst and Whinney found SDB lacking in project planning, contract development, and staff assignments. It is difficult to address these areas without considering the total SDB environment. Our experience suggests that the amount of project planning and time spent on contract development must be relative to the specific task.

The project planning and monitoring methodology issues addressed in the Report are complex and recognized by DIT. We must also recognize the business reality that 70% of all SDB contracts are less than \$10,000 each, and 56% are less than \$5,000 each. Dealing with a series of \$5,000 contracts does not, quite frankly, allow much time to be devoted to elaborate project documentation at the expense of systems development and documentation.

The Report rates several key environmental influences on SDB's operations, including the reduction in IASD contracts and the adverse effect of the \$50,000 contract ceiling. At least two others are discussed: a declining maximum employment level (MEL), and a rapidly changing technological environment. During the period 1984 to the present, the SDB MEL has been reduced from 110 to 75. Concurrent with staff reduction, SDB has employed additional modern analytical and systems development methodologies to improve services to clients and to shorten the time required to develop and implement systems. This includes the use of information architecture and business systems planning techniques in developing information management plans, as well as the use of multiple fourth generation languages.

Not only have the number of languages drastically increased, the technologies have also changed as is apparent from an examination of the SDB Development Environment Distribution charts below:



**SDB
DEVELOPMENT ENVIRONMENTS
DISTRIBUTION**

Conclusion

In our review of JLARC's analysis of the Systems Development Branch, we find that the majority of recommendations suggest appropriate directions for improving service delivery. The general intent of most of those recommendations has been been

recognized even prior to the review, and many have been implemented. There is, of course, always room for improvement. Within this framework, we offer as a basis for legislative discussion our response to **Systems Development Recommendations (18) through (24)**, as follows:

Recommendation (18). Interagency systems development projects should be justified and prioritized according to objectives in a statewide plan. Consideration should be given to awarding these types of project contracts on a competitive basis. [p. 104]

DIT Response

WE AGREE with modifications. As observed by JLARC, no "statewide plan" currently exists which offers objectives against which priorities can be set and projects justified. However, approval by the Governor's Secretaries is required for interagency systems development projects. The following procedures were established in mid-1986:

- SDB develops an Interagency Systems Development (IASD) Program for each Cabinet Secretary;
- Cabinet Secretaries review, approve and put projects in priority;
- Agency sponsors are nominated as system proponents;
- Agency sponsors in conjunction with Secretaries develop biennium budgets for IASD projects;
- Cabinet Secretaries appoint IASD Board for each approved and budgeted project; and
- IASD Board oversees project and reports to Cabinet Secretaries.

Competitive contracting should be considered if it is to the advantage of the State. A recent organization study of SDB by the Management Consulting Division identified nine states which have organizations similar to SDB. None require competitive

contracting as a prerequisite to using their own agency services. Additionally, the study found that five of the states require an evaluation of using their central systems development staff before contracting with private vendors because the use of central staff was believed more cost-effective.

Recommendation (19). The General Assembly may wish to amend Section 4-5.06(b) of the Appropriations Act to require that the total anticipated costs of systems development, enhancement, or modification should be included in the purchase estimate. Total anticipated costs should include the costs of requirements specification, general design, detailed design, implementation, and evaluation. State agencies should competitively bid all projects for which total anticipated costs exceed \$50,000. When requested, SDB should assist agencies in reviewing automation needs, writing requests for proposals, and select private vendors to develop systems. [p. 107]

DIT Response

WE AGREE in part, and **DISAGREE** in part. We are concerned that the requirement to include "total anticipated costs" for the entire life of a system is not practical. One cannot estimate the cost of the detailed design, implementation and evaluation of a system without first knowing the magnitude of the effort, or, as SDB prefers to say, how "big is the box." Analysts will not know how big the "box" is until they complete the general design phase of the systems development life cycle. The requirements analysis and general design phases generally indicate whether the system should be developed, purchased, or obtained from another agency. If the analysis phase recommends procurement, the procurement action may result in a new hardware/software environment with a fourth generation development language. This scenario has been the normal environment for the state and SDB for the past five years.

JLARC finds that the \$50,000 limit is "... rendering SDB- provided development services an infeasible alternative for agencies considering larger projects." We recommend that the General Assembly consider allowing agencies to use SDB services for larger projects if they wish, by amending the restrictive legislation. As

noted by JLARC, "... 72% of the agencies who use SDB were satisfied with the services." This shows a definite increase (over 20%) in client satisfaction since JLARC's last review.

Two major impacts are involved in minimizing central systems development services: (1) a need to increase agency staffs to provide the necessary services (either by DP personnel or contract administrators), and (2) a major loss in statewide system knowledge for coordination and development. Optimization of decentralized agency staffs to handle workload peaks and valleys would be severely restricted. Duplication of systems and data would be widespread with little coordination and sharing.

The following statistics and information were recently developed at the request of the Governor's Commission on Efficiency in State Government to show the growth in State DP staffs:

SYSTEMS DEVELOPMENT STAFFS

	<u>1982</u>	<u>1986/7</u>	<u>Increase (Decrease)</u>	<u>%</u>
Agency Development Staffs	607	881	274	+45%
Central Development Staffs (SDB)	112	72	(37)	(33%)

These numbers depict substantial growth in decentralized systems development resources. This is contrary to the earlier Hopkins Commission's recommendation regarding the need for central staff, and it has proliferated the use of outside contractors whose failures, in particular, are not unknown.

The need for central oversight is obvious. Systems development projects have been undertaken by individual agencies without adequate coordination. Some of those systems do not work as expected, and many were designed and implemented without adequate cost-benefit analyses. For example, on-line systems have been implemented without first planning for and estimating the costs of data communications networks. The cost of private consulting services should be impartially compared to the cost of central agency consulting staff.

Recommendation (20). Because it is an organizational unit with a service mission, SDB should make every effort to maintain sound business relationships with customer agencies. SDB should ensure that the quality of its products and services is high. Moreover training courses emphasizing "customer relations" skills should be developed and made mandatory for all project staff. [p. 110]

DIT Response

WE AGREE. We recognize that a sound relationship with customer agencies is the key to our service mission, and SDB has strived to meet the needs of its clients. However, the \$50,000 contract ceiling imposed on clients who want to do business with SDB is too restrictive.

SDB must try to meet its client's stated needs. At the same time, SDB is faced with doing "what's best" for the State. For example, if a client wants to develop an agency system that duplicates another State system, SDB can choose to satisfy the client, or choose to subordinate the client's demands and risk customer dissatisfaction.

Recommendation (21). Consistent with Section 2.1-563.19, SDB should continue to focus its mission on designing, developing and testing systems. Additional emphasis should be placed on providing technical assistance to agencies in evaluating systems needs and temporarily maintaining and periodically modifying automated systems. SDB and all State agencies should comply with the project size restriction established in the Appropriations Act. [p. 115]

DIT Response

WE AGREE. SDB's major efforts are focused on providing those services related to systems development, modification, and maintenance as appropriately set forth in the State's Systems Development Standard (DP Standard 82-1). All services reflected in the MASD memorandum of March 2, 1982, to JLARC will be provided to agencies who request them. These include:

- Feasibility studies and analysis of information processing systems (manual/automated).
- Development of manual/automated systems.
- Modification of enhancement of manual/automated systems.
- Maintenance of automated systems.
- Operation of automated systems.
- Data processing support activities:
 - Provide project leader
 - Provide project team (analysts and/or programmers)
 - Develop Request for Information (RFI), Request for Proposal (RFP) documents
 - Procurement assistance
 - Hardware installation assistance
 - Documentation review/critique
- Management Information Systems (MIS) planning assistance.
- Data processing applicant screening.
- Data processing training.

The Appropriations Act currently establishes a \$50,000 value limit above which agencies must competitively procure services. As indicated earlier, this limit should be removed in favor of allowing agencies to use SDB's less costly services if they wish to.

Recommendation (22). SDB should develop detailed project plans, using full customer agency participation in the planning process. Specific work tasks should be identified in the plans. Changes in the scope of the projects should be discussed with the customer agencies and the results of these discussions should be documented and maintained in the project files. [p. 118]

DIT Response

WE AGREE. In the majority of cases, SDB does develop detailed project plans with client participation. Specific work tasks are identified in project plans. Changes in project scope are discussed with clients, and contracts modified to reflect adjustments of cost, time and dates.

Recommendation (23). SDB should review its personnel structure to determine the appropriate number and classifications of staff needed to complete project tasks. SDB should develop and use project plans for matching staff skills with project tasks. SDB should improve its planning methodologies to ensure that contractors are used only when special skills are required on projects. A formal training program should be developed to keep staff aware of changing technologies. [p. 122]

DIT Response

WE AGREE. SDB continually reviews its personnel structure and classifications, as demonstrated by the many personnel adjustments since the establishment of DIT. Adjustments are made to meet the current and anticipated workload based on contractual commitments and SDB's restrictive MEL.

SDB does attempt to match skills of staff with project tasks. We recognize that on some occasions higher-level skills have been assigned to lower-level tasks due to scheduling problems. This is never the best way to do business but, as in any organization, at times it is unavoidable.

As a normal business practice, SDB uses contractors to augment its staff based primarily on client demands (calendar timing and lack of adequate SDB staff), and in some instances on skills. However, in the past four years SDB has not had to use contractors because it did not have the skill in-house. SDB used contractors because it lacked a sufficient number of in-house staff.

Recommendation (24). SDB should revise its project accounting procedures to identify and record all contracts included within projects. All project changes should be documented and added to the automated tracking system. SDB should develop and comply with documentation standards for all projects. [p. 124]

DIT Response

WE DISAGREE in part. We agree that such records should be maintained, but do not believe that significant revision of project accounting procedures is necessary. Project documentation standards already exist, and SDB has accounting procedures for identifying and recording contracts included within projects. Project changes are documented and added to the system. This Recommendation appears to be based primarily on the Ernst and Whinney finding that "... time and expenses are charged against project account numbers which may relate to one or more systems development contracts."

We believe that the Ernst and Whinney analysis may not have fully recognized the contracting and recording process in SDB. Projects are initiated and recorded in the Management and Control System (MACS) under a single MACS number. Changes to the project subsequent to the signing of the contract require a Project Modification Request. The MACS project plan data is adjusted to reflect the changes -- cost, time, activity--without losing the initial/original contract data. Project contracts are filed. System modification request contracts contain the same MACS number as the system that is targeted for modification/enhancement together with a special activity number to identify the specific contract. This latter procedure makes it easier to analyze each system's performance. System modification contracts are filed.

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V. COMPUTER SERVICES

Overview

We are pleased that JLARC has recognized that DIT does a good job in operating and maintaining the State's computer systems. This conclusion is supported by the high (87%) customer satisfaction rate, and JLARC's finding that in providing the many technical services needed by customer agencies, DIT's success in maintaining system operation (as measured by the average time for problem resolution) was as good as other computer installations of comparable size. This is an important finding, and one in which we take understandable satisfaction.

JLARC finds that expenditures for computer services have almost doubled within five years, from \$18 million in FY 1983 to an expected \$33 million in FY 1987. However, and as the Report points out, our workload has more than doubled in the same time-frame: for example, the number of supported terminals has increased from less than 3,000 to over 10,000; transaction volumes, as reported by JLARC, have increased from 265,000 per day to over 1,500,000 per day; and batch processing has increased from 10,000 steps to over 16,000 steps per day. Using a conservative 5% compounded inflation rate, DIT expenditures would have grown to approximately \$23 million dollars with no increase in workload.

The Report notes that DIT needs to help customer agencies make the best use of the mainframe computers, and cannot continue to provide services, on a demand basis, at unquestioned levels. DIT does provide various services to facilitate agency use of mainframe computers. However, as the Report itself finds, the individual agencies need better planning and control of their own computer use. This is an important recognition of the limitations of the DIT-user agency "control" relationship, and we agree with the finding that agencies should exercise greater controls over computer use and place additional emphasis upon planning computer needs.

DIT Operations

The Report describes DIT's computer center as a complex configuration, and we agree. But, as we have stated before, DIT does much more than operate a mainframe computer. By focusing on mainframe computer operations, it is possible to overlook other substantial activities, including the approval, acquisition and implementation of distributed processing systems during the past year. In short, DIT's

operational role is significantly more extensive than providing mainframe computer services, and that fact may be critical as we look at DIT's role in the evolution of distributed systems, discussed later in this chapter. Indeed, Exhibit 4, which provides a good general overview, is not an all-inclusive summary of the myriad responsibilities which are handled by the Computer Services Division.

Capacity Planning

The Report recognizes, as do we, that capacity planning and accurate projections of utilization are difficult tasks. Variances in the process can be expected. We believe we do a credible job in this difficult area, but acknowledge that additional efforts to improve our control of capacity planning should be considered.

Ernst and Whinney reported that DIT could improve upgrade planning methods, finding that forecasting methods underestimate computer service needs, and that our computer usage could be better regulated and acquisition decisions could be strengthened. They also find that capacity planning in DIT is treated as a "special" rather than a permanent process. Although we do not agree that capacity planning is not a part of our routine management activities, we concur with the need for improved capacity planning, and have taken a number of important steps in this critical area.

DIT does use a capacity planning methodology in arriving at critical decisions regarding the modification or replacement of its computer hardware and software systems. This methodology is considered a permanent, not special, part of an on-going management process. However, the methodology is not prepared as a single, formal document. We believe that it can be, and, after reviewing the JLARC findings in this area, agree that it should be.

We impress upon our client agencies the importance of a realistic prediction of resource consumption for budgeting purposes. Admittedly this is a difficult responsibility, and subject to significant error. JLARC recognizes this effort. In too many cases, however, utilization is underestimated by our customer agencies. As a result, we cannot plan as well as we should for resource demands, either in personnel or hardware. By working with DIT, client agencies can, we suggest, improve their control and utilization of central computer resources.

Performance Monitoring

The Report finds that DIT places "a great deal" of emphasis upon monitoring the performance of its mainframe system. We do, and we should. Ernst and Whinney finds that DIT does not have a consistent methodology for interpreting performance data, although it concludes that DIT produces a range of analyses and reports on performance (but no consolidated interpretation) and uses these monitoring tools appropriately.

DIT has a formal methodology for monitoring the performance of its mainframe systems, but we agree that better documentation of the process is needed. DIT uses 28 different software and hardware products to monitor various systems and telecommunication components. The use of multiple performance monitoring packages can help management's ability to use performance data effectively. In fact, a single source of data is not always the most appropriate performance tool. DIT has a complex computer center, and the use of "different" monitoring products provides a necessary "checks and balances" approach, and, as the Report suggests, it can help DIT managers effectively use the data. In short, and as JLARC observes, we believe our emphasis upon monitoring the performance of our mainframe systems is sound management, which results in a high level of agency satisfaction.

The Report finds that DIT does not have a formal method for monitoring or managing changes in computer hardware, systems software, or applications software. Although DIT does not have a similar method in application software, we do have a formal method for monitoring and managing changes in computer hardware and other software. The Exec-8 level 39 operating system is presented in the Report as an example of how changes in DIT's systems have "adversely affected" agency operations. Using this example to illustrate a purported need for change management in DIT is inappropriate. The availability of the Exec operating system averages above 99% (year-to-date). The industry standard is 98.5%. The Report should also note that virtually all the proposed improvements in change management procedures have been implemented: committees exist to evaluate change requests; evidence of pretesting is available for software and hardware through contacts with centers which have installed these same products; "BACK OUT" procedures are always part of our installation plans and are discussed in change management meetings; change control committees evaluate change requests; and customers are alerted when changes are to occur by several different means, both hard copy and on-line.

Dual Technologies

JLARC concludes that the need for the State to maintain two major mainframe technologies needs to be evaluated, citing the relatively higher costs of one of those systems. We agree, but caution that the evaluation, not to mention any conversion itself, will require a major dedication of resources and effort.

The Report finds that DIT is one of 12 states that simultaneously operates two major mainframe computer systems, noting that special applications must be used to provide users access to both technologies. Compatible access to dual technologies is the key to successful dual technology operation, and we are pleased that the Ernst and Whinney analysts were "particularly impressed" with DIT's staff expertise in using software products to give our customers compatible access to both technologies.

In concluding its analysis of dual technology operation, the Report observes that the cost differences and compatibility concerns associated with operating two systems suggest that migration to one mainframe technology should be considered.

Migration to a single technology is a major policy issue, with implications far beyond simple "technical advantages," particularly in the areas of conversion costs, multiple vendor competition, fiscal and budgetary constraints, and others. Any such decision must be made with great care.

"Outdated" Products

JLARC reports that when agencies do not upgrade systems, DIT must maintain some outdated products. For example, DIT maintains both the early and the recent releases of some software products. In several cases, only one or two agencies use a particular product, such as TCAM and TOTAL. As a service agency, DIT has made the general commitment to provide the tools wanted by its customers, including updates of "older" products. We find that agencies are reluctant to migrate to new "untested" processes or products. They recognize, as do we, that migration to different software is not without cost. DIT does not have the authority to "force" agencies to migrate to specific software products. This is a function of statewide planning, discussed elsewhere in our response.

Product Requirements

DIT, like most complex information technology organizations, operates in a multi-technology, multi-vendor environment. In this environment, Ernst and Whinney found that DIT does not have computer hardware or technical environment plans that specify DIT's expectations for product performance and compatibility. We find these suggestions helpful, but note that we do, in fact, have an equipment plan which is documented in the agency budget, and is stated in capacity requirements.

Agency Support and Production Control

We are, of course, pleased that JLARC has recognized that customer agencies are generally satisfied with DIT's computer services. We would expect, as JLARC indeed finds, that agencies desire even greater assistance in areas such as problem resolution, product research and training. However, practical factors limit our ability to accommodate those desires. As JLARC itself concludes, although DIT can help agencies use computer services efficiently, we cannot control agencies' use. Agency production runs, data storage, and data base management are within the users control, and DIT has no authority to so regulate its customers. As the Report also notes, agencies' costs for computer services "are driven more by their own use than by any operational inefficiencies within DIT."

Ernst and Whinney estimate that DIT operates at approximately 65% of capacity during prime shift. Our analysis shows that figure to be low: routinely, during peak processing periods, DIT operates at over 90% of capacity. The use of jobsteps is not an accurate workload measure. (Our analysis indicates that batch processing consumes 37% of batch resources on prime shift, and 63% on non-prime.)

JLARC finds that DIT could take additional measures to ensure efficient utilization of data storage and slow accelerating data storage costs. We are committed to improving that process. We agree that there exists a need for continued review of reasonable alternatives to meet customer resource needs and promote efficient use of DASD and other resources.

Customer Service, Problem Resolution, and Training

The JLARC staff survey of all DIT customer agencies reports an average of 87% of our customers are satisfied with the range of computer services we provide. Of equal note, a third of our customers

"...reported that the overall quality of services has improved since DIT was consolidated in January 1985." (Report, page 146.)

We find satisfaction in these efforts, and believe they reflect significant innovation in our operations.

In 1986, for example, we established a "help desk" to provide more timely solutions to customers' operational problems, including computer output problems, JCL problems, system problems and other technical issues. The Help Desk is only a start. We are currently analyzing other ways to improve customer services, including an "Account Representative" function to serve the customer in a more comprehensive way, leaving the help desk function to satisfy expediting technical and operational problems. "One-stop-service" ideas (such as the Computer Store concept) and support services such as needs analysis, systems configurations, hardware/software support, maintenance and training) can provide an array of added value in support of our customers.

Agency Utilization and Planning

JLARC recognizes, as do we, that agencies must share responsibility for the effective and efficient use of information technology services provided by DIT. JLARC finds that the existing linkage between agency systems, functions and policy is inadequate. We agree. Improved strategic planning, as discussed earlier, is the fundamental foundation process for the required improvements.

Centralization Versus Decentralization

In Virginia, as elsewhere, interest in distributed or decentralized computing solutions is growing. As JLARC notes,

"One of the principal information technology issues confronting Virginia is: the State continue in its attempt to centralize computer services, or should agencies be permitted to purchase and operate their own computer systems?" (Report, page 159.)

This question, at least on a statewide strategic basis, remains open. Even if agreement were reached on the advantages of distributed or decentralized data processing, important policy questions remain. How does the Commonwealth plan for distributed or decentralized information technology so that strategy, structure and information systems all match? JLARC concludes, as do we, that a responsible answer to this fundamental question will require comprehensive statewide policy direction.

Conclusion

We believe, as does JLARC, that DIT is doing a good job of delivering computer services in Virginia today. In our review of the JLARC analysis of computer services, we find general agreement with many of the ideas presented. Some disagreement remains regarding specific reforms proposed by JLARC to achieve services and operational objectives. Within this framework, we offer as a basis for legislative discussion our response to **Computer Services Recommendations (25)** through **(40)**, as follows:

Recommendation (25). DIT should develop a formal capacity planning methodology for use in critical decisions regarding the modification or replacement of its computer hardware and software systems. DIT rate-development staff and the data center managers should jointly participate in projecting customer utilization and the capacity of DIT computers to accommodate expected service use. DIT should identify additional opportunities for including customer agencies, particularly the largest users of computer services, in projecting utilization. [pp. 129-130]

DIT Response

WE AGREE. DIT now uses a formal capacity planning methodology, with DIT rate-making staff jointly participating in projecting customer utilization. DIT includes customers in projecting utilization, especially with the largest customers. A comprehensive statewide information resources planning effort would be beneficial in this process, and could serve to provide additional opportunities for including customer agencies in the projection process. Greater checks and balances are needed to ensure that DIT identifies and verifies the need for hardware and software enhancements.

Recommendation (26). DIT should develop an information management plan in order to direct staff use of its computers. DIT should establish accounting and reporting procedures for recording internal computer use. This information should be distributed to DIT managers and used by them to monitor and restrict use to essential and economical applications. [pp. 130-131]

DIT Response

WE AGREE. Recognizing that Ernst and Whinney reported that DIT uses a significant part of its own computer capacity, we agree that enhanced procedures to monitor internal computer use would be an effective management tool. We do not, however, suggest that by establishing such tools, we would concede either insufficient or excessive internal use of the system.

Recommendation (27). DIT should develop a multi-year hardware and software acquisition plan. DIT's acquisition plan should contain procedures for ensuring that non-upgrade solutions have been attempted first and are no longer adequate to meet needs for additional data processing capacity. [p. 132]

DIT Response

WE AGREE, with clarification. Multi-year hardware and software acquisition plans are appropriate management tools. In fact, DIT's budget, which is prepared several years in advance, identifies all planned hardware and software purchases by individual item.

WE AGREE that stronger planning procedures would better ensure that non-upgrade solutions receive maximum consideration. We caution, however, that any multi-year plan can limit the ability to use "newer" technologies as they emerge in a rapidly changing marketplace.

Recommendation (28). DIT should develop a formal methodology for monitoring the performance of its mainframe computer systems. Consolidated results of performance evaluations should be used by DIT's data center managers to establish specific criteria for initiating system adjustments and upgrades. DIT should evaluate the usefulness of its 28 different performance monitoring products in order to reconcile conflicting performance indicators. [pp. 133-134]

DIT Response

WE AGREE, with clarification. A formal methodology for monitoring the performance of mainframe computer systems exists. DIT has such a program today, using multiple software and hardware products to monitor various system and telecommunications components. We concur that DIT should improve documentation of its methodology for monitoring mainframe performance.

Use of multiple products provides different and sometimes conflicting information. However, we do not agree with the implication that current procedures undercut our ability to use the data effectively: in fact, "different" data provide useful "checks and balances." We recognize that in a complex computer operation "single source" performance data may not be best.

Recommendation (29). DIT should improve its methods for testing and monitoring changes to the State mainframe systems. DIT should notify all agencies which could be affected by the changes and seek customer assistance in monitoring the impacts of the changes. [p. 134]

DIT Response

WE AGREE, with clarification. DIT has a "change management" process which is in place. It seems to be working better than the industry standard, as evidenced by DIT's high availability statistics. DIT has a formal method for monitoring or managing changes in computer hardware and software. DIT does not have a formal method for monitoring or managing changes in application software, a responsibility which currently lies with user agencies.

DIT has extensive formal change management procedures. Committees exist to evaluate change requests. Documentation of pretesting is available for software and hardware through contacts with centers which have installed these same products. "BACK OUT" procedures are part of our installation plans and are discussed in change management meetings. Change control committees evaluate change requests. Customers are alerted when changes are to occur, and are generally involved with testing major products.

Recommendation (30). As part of a State plan for data processing, the benefits and costs of maintaining multiple mainframe technologies and outdated or redundant software products should be evaluated. DIT should specifically review the feasibility of converting to a single mainframe computer technology. Results of these evaluations should be used to establish compatibility and uniformity policies. In particular, policies that require agencies to move from costly, outdated technologies to newer technologies should be established.

DIT should develop hardware and technology environment plans. These plans should document necessary levels of performance and compatibility for vendors' computer-related products. Vendor performance information should be recorded and used to guide subsequent acquisition decisions. [pp. 138-139]

DIT Response

WE AGREE. The question of maintaining dual mainframe technologies is an important one. DIT can review the feasibility of converting to a single mainframe computer technology. However, this effort will require a very significant investment in manpower. Before such a major study is initiated, a commitment must be made by all parties that, if the evaluation proves the case for migration to a single technology, the conversion should be pursued. This is not as simple as it would appear. A study, and conversion, of this magnitude will likely span at least two administrations; there must be assurances that the project, once begun, will not be abandoned.

WE AGREE that hardware and technology environment plans, including vendor performance and compatibility information, can be useful management tools.

Recommendation (31). To achieve more evenly distributed mainframe data processing, DIT should be given greater authority to manage batch processing for customer agencies. DIT should help agencies identify major batch production runs which could be scheduled during non-peak hours. Standards which govern the appropriate scheduling of batch processing should be developed, and DIT should be given specific authority to enforce those standards. [p. 141]

DIT Response

WE AGREE. Batch processing standards and controls can help to evenly distribute mainframe data processing which are run 24 hours a day. However, DIT's customers expect to use the services for which they are paying, and we do work with them in scheduling their runs. Therefore, we must be careful in assuming how much work an agency can shift to non-peak hours.

The ultimate consumers of services in Virginia are its citizens. Citizens expect, and sometimes demand, access to many services during the day. While some work may be moved to "off-prime" shift, most of the work performed during the day requires "real time" access as part of the communication between agency and citizen. The methodology of moving non-essential production work to back shifts is sound; however, the assumption that because it is batch it can be moved to off-prime shift is not valid without assessing the impact on citizen services. It should be noted that DIT has recognized the value of back shift work, and already provides a 25% discount for non-prime shift production.

Recommendation (32). DIT should help customer agencies to better manage data storage files. DIT should identify storage files which are infrequently accessed and decide with agencies how to most efficiently store the data. DIT should also consider using software products that will free additional disk storage space without adversely affecting agencies' access to files.

DIT should develop a two-tiered tape charge. A tape mount surcharge should be established as a method to discourage use of tape for frequently accessed data and production runs. A discount for use of tape in archiving data should be developed. The rate adjustment should be submitted to JLARC for approval. [pp. 142-143]

DIT Response

WE AGREE in part, and **DISAGREE** in part. Improvements in agency data storage management can be achieved. We are conscious of the continuing growth and cost of disk storage and DIT has been pursuing various solutions. We have recently begun to examine software solutions to the problem. From a hardware standpoint, we have in recent years initiated a series of tasks intended to reduce the overall cost as well as channel requirements for DASD space. While our total megabyte capacity has increased dramatically over the last few years, the number of logical volumes and channels required to access that additional data has not.

DIT has undertaken a comprehensive project over the past six years, specifically targeting conversion of files and data bases from 3330 to 3350 to 3380 and up to 3380E. Currently, the conversion of 3330's is finished, with the conversion of 3350 data sets about two thirds completed. In 1986, the 3380 model E's were installed, and that conversion process began. The model E conversion had to be done carefully and selectively due to the amount of data and the related performance considerations on devices of this type.

DIT has attempted to move with the industry in finding disk storage solutions. We find that the majority of large shops manage disk data sets at the volume level, identical to what we do at DIT. Although virtually all large scale processors are concerned with growth in disk storage, approximately 60% of such installations have not implemented software to help manage disk data sets.

DIT is in the process of analyzing and evaluating whether the potential benefits of implementing disk space management software will be offset by the additional manpower, software cost, and CPU cycles in our environment. While software products of this nature have been on the market for some time, they are just now beginning to mature, with new features that may make them useful and economical tools.

DIT also has under development an IBM DASD report mechanism to enable both DIT and its customers to monitor and make more efficient use of their DASD space, including information on under-utilized or fragmented datasets and unreferenced data sets.

WE FURTHER AGREE that migration from tape to disk is emerging as an efficient and cost-effective storage solution, and a surcharge incentive mechanism to encourage this migration may be appropriate in Virginia. However, the two-tier approach may not be a cost-effective solution because of the requirement to modify the operating system and increased system overhead.

Recommendation (33). DIT staff should provide agencies with greater assistance in establishing efficiently constructed databases. DIT should also assist agencies in identifying opportunities for sharing information. Database management guidelines which include uniform labeling standards for common information should be established. As part of its planning and policy responsibilities, the Council on Information Management should identify needed database interfaces and require uniform labeling standards when applicable. [p. 144]

DIT Response

WE AGREE in part, and **DISAGREE** in part. Efficiently constructed databases are, we recognize, important. To implement this recommendation, sufficient staff and financial resources must be committed. Customer agencies will also need resources to implement applications and file re-writes.

A commitment to comprehensive data administration must be made on a statewide basis. This function must exist and be supported across agencies, and at the Cabinet level. **WE AGREE** that DIT as a single agency cannot possibly exercise the full control necessary to perform this function, and an enhanced statewide

planning process is necessary to develop database management guidelines. That commitment will substantiate our recognition that the Commonwealth has a significant investment and interest in the security and integrity of its data assets.

Recommendation (34). The cost-containment function should be expanded within DIT. DIT should place additional emphasis on helping agencies understand DIT's billing algorithms and in identifying more economical data processing procedures. [p. 145]

DIT Response

WE AGREE. DIT supports an effective cost-containment process. In fact, we have operated a program identical to this for many years, but this service operates on a voluntary basis. Many agencies, especially those which complain the most about their bills, have declined to implement cost savings techniques proposed by DIT.

Recommendation (35). In order to record and successfully track all requests for assistance, DIT staff should direct agencies to first contact the help desk. DIT should maintain data on all requests and responses, and build a problem management database. This database should be used to develop specific management and technical strategies for addressing recurrent problems. [p. 147]

DIT Response

WE AGREE in part. Considerable discussion has been given to the "help desk" function. It is important to note that this is not a new concept, and one that is not easily implemented. DIT has taken steps to improve the problem resolution process. The first step was our Help Desk, developed as a training ground not only for DIT, but also for agency customers. The next step was the Customer Support Center which was implemented on June 1, 1987, and DIT has instructed all of its computer services customers to call the Center for assistance. This process is new and has not reached its full potential; it will take time, and patience, from both DIT and our customers.

We are also reviewing another structural approach to this issue. Program support to our clients is not always problem-related. Consulting and technical support services should be coordinated, and a problem management database developed by an identified group of technical staff, working with the agencies on a daily basis, which would allow the Help Desk to serve as a control and reporting element. This group of consulting and support staff could also include a section responsible for maintaining a close working relationship with each of the client agencies in an effort to assist in planning and coordinating all support-related requirements.

Recommendation (36). DIT should develop a planned approach for conducting technology research. Statewide and agency information management plans should provide the focus for DIT's research. With assistance from agencies, DIT should identify, test, and evaluate new computer products with likely applications in agencies. When agencies plan to evaluate new technologies, DIT should be included in order to assess the impacts on DIT's operations. Information regarding new products and their test results should be summarized and distributed to all agencies. DIT should also establish a formal, continuous training program, after identifying the most crucial needs within agencies. [p. 149]

DIT Response

WE AGREE. A planned approach for conducting technology research must be undertaken on a statewide basis, with the significant involvement of DIT in identification, evaluation, and training activities. DIT currently conducts much of its research within the Technical Services Branch where such activities assist planning and support issues.

This concept was addressed in the DIT organizational analysis, in which subcommittee reports provided alternative approaches. However, the most important issue recognized is the need for a legislative mandate to encourage agency compliance. Without that key element, attempts to structure research efforts would be limited. Many of the research efforts within TSB are in support of multiple areas and are sources of information for procurement and planning for agencies. (One recent

example is the research and evaluation effort conducted in support of the Department of General Services, Division of Purchases and Supply ZIP+4 project. The results of this project alone will save the Commonwealth substantial postage costs.)

Recommendation (37). DIT should establish and promote agencies' use of computer information groups and establish additional groups focused on the common technologies. Agencies should actively participate in these groups. [p. 150]

DIT Response

WE AGREE. The promotion of agency use of computer information groups is appropriate. This process is already in place, with specific "Users Groups" recognized as the focal points for product introductions and vendor presentations. The need or interest in a product is normally generated out of these many groups.

Agencies represented in these groups include: Department of Motor Vehicles, Department of Taxation, Virginia Supplemental Retirement System, Department of Accounts, Virginia Employment Commission, Department of Social Services, Department of Corrections, Health Department, Department of Transportation, State Education Assistance Authority, Office of the Attorney General, State Compensation Board, Industrial Commission of Virginia, Department of Commerce, State Board of Elections, Department of Health Regulatory Boards, Department of Planning and Budget, Department of State Police, State Corporation Commission, Department of Personnel and Training, Department of the Treasury, Department of General Services, and others.

Recommendation (38). In order to identify necessary, economical, and uniform service levels, uniform performance standards for DIT's data center should be established. [p. 151]

DIT Response

WE AGREE. DIT has a diversified customer base. As a result, we cannot implement standards that will satisfy all customers. Acceptable performance levels for

some agencies, as JLARC notes, may be unacceptable for others. Service level agreements are, at least in concept, an admirable goal. However, implementation will require staff experience and time, and recognition of practical limitations.

Recommendation (39). Agencies should develop information management plans and exert greater controls over computer services use. The State should develop uniform standards to ensure that systems are adequately documented to facilitate maintenance and modification. Planned schedules for evaluating software and hardware capabilities should be developed, and plans for replacing outdated, inefficient equipment should be developed and reviewed by central planning staff. Agencies should be governed in their use of various programming languages when designing computer applications by standards and statewide planning objectives. As part of statewide planning efforts, opportunities for using minicomputer and microcomputer applications should also be explored. [p. 158]

DIT Response

WE AGREE. These agency utilization proposals are all sound in concept. Until we fully recognize "information as an asset" throughout the State, and without comprehensive planning, support and statewide control, even the best agency controls will not be effective. Plans are needed for replacing outdated or insufficient equipment and for eliminating redundant and inefficient program products.

Recommendation (40). The State should evaluate agency information technology plans and computer needs for the purpose of identifying opportunities for distributed processing networks. The State should develop standards that ensure compatible information processing and communications systems. The State needs to adopt policies that specify under what conditions agencies should be permitted to develop their own computer systems. Criteria for determining interface requirements with other systems should also be established. [pp. 163-164]

DIT Response

WE AGREE. There are numerous valid opportunities for distributing processing systems in the Commonwealth. Compatibility standards for processing and communications systems, as well as interface requirements, are needed.

Evaluation of opportunities for distributed processing alone is not sufficient. Distributing processing, if that is indeed the appropriate policy direction, cannot succeed in the Commonwealth without a commitment to a statewide information technology plan.

VI. TELECOMMUNICATIONS

Overview

If the management of computer technology is in a state of evolution today, it is probably fair to say that telecommunications is in a state of revolution. The merger of voice and data communications technologies, and the promise of a truly integrated network, are especially challenging in today's deregulated environment. Indeed, the breakup of AT&T has dramatically ended a relatively simple era when "telecommunications" meant little more to managers than "paying the telephone bill." This is a heritage clearly understood by JLARC's staff, which notes that

"Prior to industry deregulation, the State relied on C & P Telephone Company of Virginia for most services." (Report, page 165.)

Virginia has taken an important first step toward integrating telecommunications and computer technologies by establishing DIT as a consolidated agency. Additional actions are necessary, and we expect further changes as a result of the pending Department of Planning and Budget study of statewide telecommunications needs, which should be completed in October, 1987. In keeping with the Report, DIT will defer any detailed analysis in this area. We do, however, acknowledge that Virginia can achieve substantial cost savings by sharing communications networks among agencies and by transmitting multiple types of information through integrated networks.

We also know that substantial savings can be achieved immediately, regardless of future planning and study conclusions. DIT has taken advantage of the deregulated environment by competitively procuring, for the first time, the State's long distance telephone service. We have also solicited competition for elements of our "backbone" network serving voice and data communications, and the purchase (rather than lease) of over 900 modems serving our data networks. New contracts for these goods and services will begin saving, in the aggregate, over \$100,000 per month this fiscal year.

DIT Support Services

We are encouraged that JLARC's customer agency survey found that agencies and institutions are generally satisfied with DIT's support services, with an average of

84 percent reporting satisfaction with our telecommunications services. In addition, 81 percent of the agencies are satisfied with DIT's technical consulting and systems design services.

The Report, on the other hand, identifies service areas which need improvement, and we find many of these suggestions to be helpful and appropriate. We recognize, as does JLARC, that further coordination in the area of network maintenance, performance monitoring and capacity planning can, and should, improve the availability and quality of voice and data transmission in Virginia. Continuing change in this area will require all users to focus their attention on new technologies. We expect, and welcome, the upcoming DPB study, and we would be surprised if that study does not call for planning for system optimization at the statewide level.

Network Management and Service Order Processing

The Report concludes that voice and data communication information is inadequate for "acceptable" maintenance and capacity planning purposes, citing the lack of a comprehensive strategy or supporting technical tools to monitor system performance. We agree. Further development of system monitoring capabilities could help DIT anticipate telecommunications needs and augment existing line monitors to identify transmission difficulties.

Service Orders

The Report notes the somewhat tedious process of tracking and preparing service orders, but acknowledges that DIT, at present, must stay involved (although improved management of the function is warranted). Service orders are a very important management tool. We use them for billing verification and to realign and optimize the networks. Moreover, while more direct involvement between agencies and telecommunications vendors might simplify order processing, we believe it would result in a proliferation of equipment and redundant networks.

Through bill verification alone, DIT has identified substantial vendor overcharges for telecommunications services. Credits have exceeded \$750,000 in voice operations within the past 15 months, and \$233,000 (one time) and \$21,000 (recurring monthly) in data operations within the last 12 months.

Procurements

The Report finds that the absence of clear-cut guidelines concerning DIT's Telecommunications procurement responsibility has complicated the procurement process. We agree, but believe that recent efforts will significantly reduce confusion in this area. Procurement authority has been clarified with the new Agency Procurement Manual and the recent Procurement Forum in Williamsburg, presented with DIT assistance, was well-received by participating State agencies.

JLARC finds that approximately 75 percent of the requests for data communications services and equipment are routine. Nevertheless, even routine service orders for an agency's single line telephone can depend on multiple vendors, and agencies generally do not know who the vendors are. On a case by case basis, DIT does delegate the processing of some routine service orders, but not those which impact shared network resources. Because divestiture and deregulation have created multiple vendors in the marketplace, a simple service order may involve service from several companies, which in turn involves complicated billing issues. This will continue to require centralized control through active DIT involvement.

The Report also notes that agencies and institutions could become more involved with vendors to secure needed telecommunications equipment. If implemented, we fear that the practice could result in a proliferation of equipment, a consequence inconsistent with the Report's positive recommendations for centralized planning.

Conclusion

We agree that the full potential of shared telecommunications network, and greater opportunities, will be recognized in the course of developing statewide plans and supporting policies following the DPB study. Within this framework, we offer as a basis for legislative discussion our response to **Telecommunications Recommendations (41) through (44)**, as follows:

Recommendation (41). DIT should develop and implement a formal capacity planning methodology for the statewide telecommunication system. DIT should collect additional performance data on voice and data communications by upgrading software and hardware used to monitor the system. DIT should also coordinate data collection efforts split between the telecommunications division, the computer services

division, and State agencies which operate telecommunications networks linked to the statewide network. DIT should expand its current trouble reporting service to encompass all voice and data communications. All problems should be centrally recorded and tracked to ensure expedient resolution. [p. 172]

DIT Response

WE AGREE. Formal capacity planning for the statewide telecommunications system is just as critical as (and really a part of) data processing plans. We are currently upgrading software and hardware monitoring equipment (matrix switch/performance monitor). We now coordinate the data collection effort between the different divisions of DIT and State agencies, and will continue to do so with the new upgrades. We have already expanded our trouble reporting service (formerly under contract with C&P) to include voice and data communications.

Full-motion video technology should also be acknowledged in this recommendation, and its relationship should be addressed in the statewide telecommunications system planning process.

Recommendation (42). DIT should designate specific staff to provide technical consulting and engineering studies of agencies' telecommunications systems. DIT's field offices should be staffed by data communications engineers in addition to voice communications engineers. [p. 174]

DIT Response

WE AGREE. The designation of specific telecommunications resources will, however, require staffing changes and probably staff reclassifications.

Recommendation (43). DIT should clarify its internal procedures for reviewing and writing telecommunications service orders. Engineering staff should not be involved in processing routine orders. In order to

expedite order processing, DIT should facilitate direct purchases by attempting to expand the number of telecommunications items on the hardware contract list. [p. 177]

DIT Response

WE AGREE, with the caveat that service order processing is, for the present, an essential network control and billing verification function which cannot yet be dispersed.

Recommendation (44). The General Assembly may wish to authorize the development of plans and policies that require agencies to share telecommunications networks wherever feasible. The results of the DPB study of telecommunications should be considered when developing statewide policies and plans. The State should adopt uniform communications standards and require review of procurements in order to ensure compatibility of systems and compliance with standards. [p. 183]

DIT Response

WE AGREE. Mandated sharing of telecommunications networks is the only realistic way of developing the necessary support of shared networks. We are making progress, but there needs to be greater incentive for agencies to consider statewide needs as opposed to agency-specific network solutions.

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VII. FINANCIAL MANAGEMENT

Overview

JLARC and Ernst and Whinney correctly observe that DIT is responsible for many complex accounting and financial systems. Our Division of Administration has accomplished the difficult task of integrating dissimilar systems that provide a complex array of financial information which is essential to our internal service fund operations. DIT gathers and reports financial information (on the accrual basis and cash basis of accounting) by program, by fund, by cost center, and by billing element, and must keep all of these systems "in sync." In addition, DIT maintains three separate billing systems which are necessitated by our separate internal service funds.

The Report suggests additional refinements which would allow DIT to associate work units with resources. Implementation of this recommendation would put DIT's financial management on a par with major corporations in this country. In the long run, a more sophisticated and highly integrated cost accounting and financial accounting system will provide additional data to allow increased efficiencies in DIT's operations. Obviously, operating sophisticated systems and effectively utilizing the data generated by them requires a highly technical staff in the agency's financial management operations.

DIT has also effectively merged the financial management of the Departments of Computer Services, Management Analysis and Systems Development, and Telecommunications. The recommended movement to a more fully integrated cost accounting and financial management system is natural in the evolution of an organization less than three years old.

Areas of Particular Concern

The Report states that DIT's "cost allocation plan met general federal requirements, but needed additional refinements." It is important to note that DIT's approved cost allocation plan meets all federal requirements, and apparently all State requirements, because it was approved in writing by both the federal government and JLARC.

We acknowledge that the equipment leases discussed in the Report were uneconomic at their inception, and most of the excessive costs under those leases were incurred prior to the creation of DIT. They clearly represent inappropriate financial management decisions made between 1982 and 1984. Nevertheless, those leases do not currently represent a "control" problem. DIT does not lease equipment in this manner today, and is attempting to buy out these uneconomic leases. Although non-cancellable, DIT expects to negotiate a reduction of over \$400,000 in lease obligations as well as the transfer of ownership of the leased assets to the Commonwealth.

The Report notes that DIT projects customer usage, upon which our rates are developed. JLARC and Ernst and Whinney acknowledge, however, that this is definitely not a unilateral process. Only the user agencies can reasonably be expected to know what their new systems and major modifications will use in terms of computer resources. DIT assists the agencies, but cannot predict their systems' utilization two and one half years in advance without better agency participation. We agree, therefore, with the recognized need for more conscientious agency participation.

The Report states that DIT's rates for computer services are higher than necessary to recover costs. However, it must be recognized that DIT's rates are adjusted at least annually and were adjusted twice last fiscal year. Agencies receive the benefit of these rate adjustments through rebates and, more recently, a rate reduction. It is important to note that inaccurate agency usage projections are the primary reason for DIT's rates being higher than necessary to recover costs.

JLARC further states that "in comparing costs of like-sized and configured data processing centers, Ernst and Whinney found that DIT's costs were generally higher than others." Ernst and Whinney acknowledged, however, that it did not review other data processing shops utilizing both UNISYS and IBM technologies, nor did its comparison review other governmental units. Additionally, there is not enough comparative data available to determine whether the companies used in the study provided the same on-line response times, batch turn-around times, support services or software products required by DIT's customers. Finally, it is unlikely that the budgets of other DP operations support the breadth of consultative services which DIT provides to other agencies.

Because the data required to do a comparative rate study is also necessary to completely understand and analyze costs, it is difficult to determine meaningful action in response to this conclusion.

Conclusion: Management Towards an Improved DIT/Agency Partnership

We agree that there is much room for improvement in the rate setting process, and that it will become a far more comfortable and predictable exercise when agencies more carefully, and candidly, estimate their resource consumption and budget requirements. We concur that a closer "partnership" between DIT and user agencies will achieve that objective. Within this framework, we offer as a basis for legislative discussion our response to **Financial Management Recommendations (45) through (51)**, as follows:

Recommendation (45). DIT should establish operational objectives for the agency and develop specific plans to achieve those objectives. In particular, these plans should include methods for projecting and controlling personnel, contractual, and equipment-related expenditures. In order to better anticipate and monitor expenditures, DIT should link spending plans with operational objectives. [p. 189]

DIT Response

WE AGREE. DIT's operational objectives, to be truly worthwhile and effective, must be a logical outgrowth of a statewide information management plan.

For a number of years, both the Departments of Computer Services and Management Analysis and Systems Development utilized a well defined management by objectives (MBO) program. However, neither agency was as effective as it could have been because agency objectives could not be tied to non-existent statewide plans and objectives. DIT has continued to use the MBO process and recognizes fully that there needs to be solid linkage to a statewide information management plan to guide its direction and resultant spending plans, as well as those of the agencies.

Recommendation (46). *DIT should review and revise its procedures for allocating costs. DIT should separately identify and allocate IBM and Sperry costs. DIT should also refine its methods for allocating office rent, telecommunications services, and personnel. DIT should submit a revised cost allocation plan for JLARC approval by October 1987. To facilitate JLARC's review of the cost allocation plan, DIT should submit a detailed list of allocation procedures for each expenditure category. DIT should prepare its rates for the 1988-90 biennium accordingly and submit revisions to JLARC for approval no later than December 1987. [p. 193]*

DIT Response

WE AGREE in part, and **DISAGREE** in part. DIT will estimate the costs of separating IBM and UNISYS technologies. After an impact analysis, DIT will present its findings to DPB and JLARC for their consideration.

WE DISAGREE that a new cost allocation plan should be written according to the timeframe specified in the JLARC report. In light of the DPB telecommunications study's likely impact on cost allocation, and the budget impact of any DIT reorganization, DIT suggests that revisions to the cost allocation plan (CAP) by October, 1987, would be disruptive, and could lead to rejection by the federal reviewing agencies. To avoid this, DIT recommends that revisions to the cost allocation plan be submitted to JLARC no later than December 31, 1987. Upon JLARC's approval, the CAP will be submitted to the appropriate federal agency for review and approval. All rate revisions will be forwarded to JLARC no later than March 31, 1988, for the 1988-90 biennium.

Recommendation (47). *DIT and the State's largest users of computer services should form a task force, specifically for the purpose of developing methods for accurately projecting computer services use. Among other methods, the task force should develop standard account codes and an estimate of the financial impacts of implementing the codes.*

The Department of Planning and Budget should continue in its efforts to participate with DIT and other agencies in developing original estimates of computer services for each biennial budget. DPB and other agencies should notify DIT of any adjustments in the estimates. [p. 208]

DIT Response

WE AGREE. DIT supports JLARC's Recommendation and will actively pursue higher levels of interaction throughout the customer community in developing methods for projecting computer services use, use of account codes, and variance/financial analysis which will allow for the preparation of more sound financial and operational plans for DIT and the agencies. DIT and DPB have already initiated changes in communicating budgetary information. Both agencies will be meeting to establish the kinds of information to be exchanged, appropriate timeframes, and report formats.

Recommendation (48). DIT should simplify its current billing system for computer services. At a minimum, Sperry and IBM usage should be billed separately. Also, when developing a standard measure of IBM processor time, DIT should use IBM specifications to equate only the machines currently in use. Disk usage should be recorded daily and billed on that basis each month. In addition, billing information on resource usage should be linked to meaningful job identification codes as part of uniform nomenclature standards. DIT should include these billing enhancement procedures in the new billing system currently under consideration.

DIT should develop a policy that defines the circumstances, frequency, and amount of bill adjustments that DIT will make when agencies request adjustments for their programming errors. [p. 215]

DIT Response

WE AGREE that DIT should simplify its billing system for computer services, and that Sperry and IBM technologies should be examined to see if they should be charged separately. DIT will actively pursue methods to improve understandability of charges through the account code and job naming processes. In addition, beginning

in FY 1986-87, DIT eliminated its policy of rebates. The new DIT computer services chargeback software can address all of the issues raised by Ernst and Whinney and JLARC, and was recommended by a team of five evaluators including representatives from DMV and VEC. DIT also agrees to document its bill adjustment policies.

Recommendation (49). Upon completion of DPB's study of telecommunications, DIT should assess the impacts of the study recommendations on the costs and rates of telecommunications services. If changes are expected, DIT should submit a revised cost allocation plan and recommended rates to JLARC for approval. [p. 221]

DIT Response

WE AGREE. DIT will assess the impacts of the telecommunications study. If changes to the cost allocation plan are necessary, DIT will submit a revised plan and recommended rates to JLARC for approval.

Recommendation (50). SDB should evaluate the number of billable hours used in its hourly rate calculation for systems development staff. SDB should propose a revised cost allocation plan and hourly rate schedule. The proposed plan, including the revised billable hours, and the rates should be submitted to JLARC for approval. [p. 226]

DIT Response

WE AGREE.

Recommendation (51). Until SDB demonstrates a higher level of accuracy in its estimates, the use of fixed-price contracts should be suspended. SDB should continue to maintain detailed, accurate records of its actual hourly costs of services provided to customer agencies. [p. 227]

DIT Response

WE AGREE. However, we do not agree that SDB's estimating process is as seriously flawed as indicated by JLARC or Ernst and Whinney. Clarification of SDB estimating accuracy is graphically depicted in our response to Chapter IV.

Before this recommendation is adopted, two areas should be explored: (1) the desires of the client agencies, and (2) the ability of SDB to compete in response to an RFP which dictates a fixed price bid. In the case of the latter, this was specifically approved by JLARC when it was presented several years ago. JLARC staff, at that time, recognized the need for fixed-price contracts, as discussed in our response to Chapter IV.

As of January 1, 1987 there were eleven fixed-price contracts, and on July 1, 1987 there were only seven fixed-price contracts active out of a total of 320 uncompleted contracts.

Instead of alluding to the overall SDB project estimating statistics as the basis for recommending suspension of fixed-price contracts, the services sought under actual fixed-price contracts that clients requested should be examined.

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VIII. STAFFING AND ORGANIZATION

Overview

On May 6, 1987, DIT completed a detailed examination of its organization. Publication of the Director's Organizational Project, Phase II Report (See Appendix I) culminated an intensive task force effort which began in late March. As a result of that effort, we are now reviewing a series of alternative realignment proposals for the agency. DIT's internal analysis was prompted by most of the concerns highlighted in the Report, and it shares many of JLARC's conclusions. The organizational alternatives, however, are significantly different from the single structure proposed in the Report. We recognize that problems in structure and personnel classification exist in our agency, including some fragmentation and overlapping, which are not surprising consequences of the incomplete merger of DIT's predecessors. We are confident that the merger can be completed on the basis of our organizational project and JLARC's findings.

DIT's analysis acknowledges that, as a practical matter, it is unlikely that a "one and only" organizational structure for the Department exists. Even if it did, that structure would certainly be qualified by the legitimate needs and prerogatives of top management, fiscal and budgetary constraints, personnel realities and other implementing limitations inherent in the management of a public agency. Of course, reasonable people can, and do, disagree as to the "best" structure for most organizations. As our internal analysis illustrates, the Department of Information Technology is no exception. We therefore suggest, as a more constructive approach, that DIT's internal analysis of alternative realignments, with the cooperation of the Department of Personnel and Training, can and should form the basis for organizational reform. We believe that this is a sound approach, and most consistent with the philosophy adopted in our internal analysis -- that the most successful organizational change and development activity is not, as our task group pointed out, "something done to an organization," but a process of people in the organization working together to improve its effectiveness in reaching shared objectives. We have taken that first step, and we are now prepared to move forward. To assist in that process, we have included key findings from the Director's Organizational Project Phase II Report in our Appendix I.

Educational Technology and Management Consulting

The proposals to disband the Educational Technology Division and create a separate Management Consulting agency each require more analysis than the summary conclusions provided in the Report. Recognizing that the Virginia Public Telecommunications Board has a critical interest in the analysis, we have included as Appendix II the Board's stated opposition to the recommendation to remove the Board to the Secretariat of Education and to reallocate staff support from the Educational Technology Division to the Department of Education.

Conclusion

The merger of DIT's predecessor agencies to form a consolidated information technology organization was a difficult undertaking. The fact that it is incomplete, we acknowledge, has contributed to recognized organization and classification challenges. In our review of the staffing, organizational and classification needs identified in this chapter of the Report, we find some agreement with the proposed reforms. Within this framework, we offer as a basis for discussion our response to **Staffing and Organization Recommendations (52) through (58)** as follows:

Recommendation (52). DIT should establish a formal manpower planning function within its Human Resources Division. This function should be charged with responsibility to develop valid forecasts of the agency's future manpower needs. DIT should develop measurable productivity criteria for all service-related and support positions, and this data should be used in conjunction with workload forecasts to project changes in the number and type of staff the agency will need. [p. 243]

DIT Response

WE AGREE with the intent of the recommendation. However, manpower planning should be accomplished in conjunction with overall agency planning and should not be solely a function of the Human Resources Division.

The Report notes that "Effective manpower planning combines workload measurement and productivity standards (work measurement) to determine the number and type of staff needed to meet anticipated workload." We suggest, for consideration, that the ability to plan for manpower needs is seriously hampered by:

- The continued inaccuracy of workload projections by our computer services customers.
- Changes in legislative requirements.
- Economic conditions outside of DIT's control.
- Technology developments which impact the amount and kind of manpower necessary to provide technical support.
- Organizational stability that allows for the ability to assess staffing levels and functions so corrective actions can be planned and implemented.

Recommendation (53). DIT should write new position descriptions for the 114 inappropriately classified positions identified through the JLARC staff analysis. In all instances, DIT should also comply with DPT's Policy No. 3.07 (for position reallocations) and Policy No. 3.08 (for position abolishment and establishment) in determining the type of personnel action needed to effect these classification changes. DIT should also use these DPT policies to determine the appropriate compensation actions required in changing the allocations of these 114 positions.

DIT should also write new position descriptions which accurately reflect position duties whenever an employee is moved from one position to another. This will ensure that the allocated classification is appropriate whenever a position becomes vacant, as required by DPT policies. DIT should also comply with DPT's Policy No. 3.07 and 3.08 whenever changes in an employee's duties result in classification and compensation changes. [p. 248]

DIT Response

WE AGREE that new position descriptions should be written for any jobs that may be misclassified. We cannot, however, agree with the reported classification study without examining each such position, which the timing of this response does not permit.

Nevertheless, the planned agency reorganization, soon to follow, will present an appropriate opportunity to reassess our employee classifications. As promised, DIT will work closely with DPT and examine all agency positions in conjunction with the Report's findings and pending organization realignments.

Recommendation (54). The Department of Personnel and Training should reassess its role in agency reorganizations to ensure that this role is consistent with DPT's statutory mission of implementing a state classification plan and of evaluating the personnel activities of all State agencies and institutions.

DPT should also assess its current policies and procedures used to monitor and evaluate personnel activities in agencies and institutions, and these policies and procedures should be redefined if needed in order to foster a more active role in reorganizations and in day-to-day personnel activities. DPT should revise Rule 5.5 for administration of the Virginia Personnel Act to include specific procedures to be utilized by agencies in position allocations that result from any type of reorganization. State agencies and institutions should be required by this rule to temporarily assign job duties to staff until such time as the position descriptions generated by reorganizations can be reviewed and allocations approved by the director of DPT. [p. 251]

DIT Response

WE AGREE that DPT should be a full participant in agency reorganizations. In our forthcoming realignment, DPT has agreed to actively participate in a review of all affected positions.

Recommendation (55). DPT should revoke DIT's memorandum of agreement for delegated classification authority. DIT should be required to submit all position classification requests to DPT in writing and on an individual position basis, following the process outlined in Rule 5.5 for administration of the Virginia Personnel Act. DPT should routinely conduct on-site audits of DIT positions in each classification to ensure that position descriptions submitted accurately reflect position duties. [pp. 251-252]

DIT Response

WE DISAGREE. DIT's memorandum of agreement for delegated classification authority is, overall, working well, and each year DPT has increased the agency's job classes included under this agreement (in fact, the most recent increase in authority was granted this past month). DPT reviews all classification requests on a monthly basis.

We acknowledge that a handful of positions are patently misclassified, and each is the result of the agency's incomplete consolidation of its predecessors. Rather than single out those positions, ad hoc, followed by a general reorganization, we have determined that a single reorganization/reclassification process is far more appropriate -- both for the State and its employees.

Recommendation (56). DPT should conduct on-site audits for all positions in DIT which are currently allocated in the Computer Systems Engineering, Telecommunications Services, and Communications Services series. The data gathered through these audits should be used to write these classification specifications from an integrated technology (and an integrated agency) perspective. The new specifications should incorporate clearer distinctions among the job duties, the expertise, and the training required for each of the new classes. In addition, DPT should include a requirement to perform full-time management duties in the new specifications for the Computer Systems Chief Engineer class. [pp. 254-255]

DIT Response

WE AGREE in part, and DISAGREE in part. WE AGREE that on-site audits are appropriate and should be conducted to resolve any conflicts. WE DISAGREE that, as the Report states: "None of the specifications for the Computer Systems Engineering series specify management duties...." The Computer Systems Chief Engineer referred to has supervisory duties defined. The 21 percent of 140 positions which the Report found allocated to this series, and having full-time management duties, is almost exactly the same number as the 65 percent of the 40 Computer Systems Chief Engineers in DIT which have full-time management duties. These duties are appropriate according to the letter and spirit of the job specifications.

This concept could also be expanded, as suggested in the Director's Organizational Project Phase II Report, to include other functional areas within DIT, and should be one of the initial steps in any reorganizational effort. If the results of such audits reveal that these position descriptions do not reflect the actual duties performed within the Engineering series, suitable alternative position descriptions and associated classifications will be established.

It should also be noted that DPT is currently rewriting statewide class specifications, including those currently allocated to Computer Systems Engineering, Telecommunications Services, and Communications Services.

Recommendation (57). DIT should reorganize to address the classification, mission consistency, fragmentation, organizational, and training problems identified by JLARC staff. DIT should write new position descriptions for every position once reorganization plans have been finalized. DIT should utilize DPT's revised classification specifications for technical classifications to determine if technical positions are warranted and appropriately classified in the new organization. DPT should be involved in reviewing and approving all position descriptions prior to the implementation of DIT's restructuring, as required by DPT's Rule 5.5 for administering the Virginia Personnel Act. Upon completion of reorganization, DIT should submit a revised cost allocation plan to JLARC and the Department of Planning and Budget which includes a description of changes in the amount and allocation of personnel costs. [p. 271]

DIT Response

WE AGREE with the need to reorganize, although we differ on the recommended organizational structure discussed under Chapter IX.

As a result of DIT's organizational task force, we are reviewing a series of realignment proposals which differ from the single structure in the Report, yet address a number of its concerns. It is our intent to combine that review with this one, and to then implement changes which address our requirements.

DIT will work closely with DPT, as well as JLARC's staff, throughout the restructuring of our agency, and will ensure that suitable classification actions are executed. A revised cost allocation plan will be submitted to DPB and JLARC after reorganization of the agency.

Recommendation (58). DPT should clarify its policy on educational reimbursements. The policy should state clearly that reimbursement is to be made only for courses related to the job duties of the employee. In addition, the policy should include specific criteria to help agencies determine the appropriateness of their reimbursement practices. DIT should develop well-defined guidelines and procedures for monitoring the number of professional development courses and seminars each employee may attend during a year. DIT should also revise its educational reimbursement policy to correspond to DPT's revised policy. [p. 274]

DIT Response

WE AGREE. DIT is in the process of developing appropriate guidelines and monitoring procedures will be instituted. DIT's educational reimbursement policy will be revised to correspond to any clarification in DPT's policy.

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IX. ORGANIZATION PROPOSAL FOR INFORMATION MANAGEMENT AND SERVICES

Overview

The Report concludes that the decision to merge information technology functions into one agency was a sound one, but that DIT cannot perform both "service" and "control/oversight" functions. Although we agree that greater management control is necessary (within DIT and customer agencies), we do not agree that these "dual" responsibilities are wholly incompatible in one agency. The Department of General Services is a good example of how both roles can be accommodated in a proper organizational structure, something DIT has never seen.

The merger of DIT's three predecessor agencies was a difficult undertaking, and its purpose and expectations should not be criticized. The fact that the task was not finished is lamentable, and we are confident from our organizational analysis that this has contributed, more than any other factor, to our significant organizational and classification problems. Before deciding to solve these problems by creating yet another State agency, we recommend that the General Assembly carefully evaluate what can be done within the existing organization, as suggested by our internal analysis.

We agree that an oversight council must be formed, yet we believe that its objectives can be fulfilled more appropriately with less disintegration (and duplication) of information technology personnel resources. We suggest that, in an efficiency-oriented analysis such as this one, creation of a new agency should be the least favored alternative because of the attendant problems of organization, staffing, funding and, inevitably, growth.

Balancing Service and Control

The solution to DIT's inappropriately classified positions is readily apparent, and we welcome DPT's analysis of those positions as we reorganize. Less apparent is how to reconcile service and control functions within the agency, a consistent theme to which the Report attributes our major difficulties. DIT's recent merger tells us why.

Prior to merger, DCS, MASD and DOT each performed service and control functions within their own organizations. Although MASD was the State's primary control agency for information technology, it did not effectively regulate the technological directions pursued by other agencies. In addition to providing systems development services, MASD had the authority (now in DIT's enabling legislation) to formulate policies, standards and specifications, and to regulate procurements. However, DCS, the central data processing agency, plotted its own course, including its own capacity planning. MASD did not effectively participate in its long-range strategies, which made it difficult to control (through procurement or otherwise) major CPU expansions to support the dynamic growth DCS was experiencing.

DOT, prior to 1984, was basically a service organization, because telecommunications was, for the most part, a regulated industry. Both DOT and MASD had statutory authority to implement policies for statewide coordination of data communications networks, but effective implementation was lacking, resulting in over 15,000 miles of dedicated data communications lines in Virginia. This was largely the product of uncoordinated user agency initiatives which were allowed to develop unchecked.

Consolidation of the three agencies should have coordinated the planning and control functions of DCS, DOT and MASD, and should have broadened that control to temper the growth in parochial agency-specific data processing and telecommunications solutions we are experiencing today. It did not.

The merger left DCS essentially intact, as DIT's Division of Computer Services. It remains staffed, in part, to perform capacity planning analysis. Its correctly perceived mission is to support centralized processing demand, as well as links to distributed processing systems with compatible technologies. Both of these it does very well. It also advocates, but cannot externally implement, hardware, software and communications standards which we know are necessary to avoid more redundancy and incompatibility of technologies.

DOT became the Division of Telecommunications, also intact except for its public telecommunications activities (public broadcasting and teleconferencing) which were assigned to the Educational Technology Division. The Telecommunications Division still plans and implements voice and data communications, as did DOT. It has been augmented with staff expertise to plan integrated (voice and data) technology solutions, and to contend with today's deregulated product and service industry. Its

data communications and integrated technology expertise is, nevertheless, organizationally separate from the Computer Services Division. Likewise, audio teleconferencing (a voice communications function) is in a separate division.

MASD did not survive as a division within DIT, but was fragmented among the Division of Administration (Procurement and Contracting), the Information Services Division (Systems Development and Client Services), the Management Consulting Division, and the Director's Office (Customer Liaison/Information Management). Hence, any internal or external "control" function which MASD might have brought to the new agency was effectively neutered. The better approach would have been to consolidate, rather than disperse, planning and control elements of the former agencies into a stronger division of DIT, segregated from its data processing and telecommunications service functions. This is reflected in DIT's organizational analysis.

The significant organizational improvement accomplished by merger was creation of the new Division of Administration, which coordinates the former agencies' complex finances and customer billing systems. Nevertheless, the Divisions of Computer Services, Telecommunications, and Information Services are still unnecessarily involved in billing functions "held over" from their predecessors. Fortunately, MASD's Procurement and Contracting function, a Branch of this division, is organizationally (and physically) separate from the agency's operating divisions.

It is no wonder that our major customers, whose daily business is with the Computer Services Division, perceive DIT as a "mainframe" organization, notwithstanding the fact that most of our personnel are not in that business. It is also not surprising that DIT's CPU upgrades have been questioned, because capacity planning remains largely within that Division. Likewise, advice to customers must be perceived as inconsistent when multiple divisions consult with agencies on the same subject.

This is why our own analysis recommends consolidating planning and "outreach" functions in a single division, segregating the service "providers" from service planning and regulation, and concentrating customer communications through defined channels. Such a realignment will complete the long overdue organization of this agency and address the same concerns voiced by JLARC.

Will DIT's reorganization cure all the deficiencies which the Report and our own analysis have identified? No. There is every reason to believe that reorganization will afford the needed effectiveness and credibility which major planning and procurement activities demand. It will not, however, eliminate the existing divergency of agency-specific programs (including DIT's) which have endured all past curative efforts. Recognizing that no "line agency" in the Executive Branch can effectively dictate to its counterparts, we agree that an oversight council is the appropriate remedy. We also agree that such a council should evaluate and approve DIT's major internal strategic initiatives.

We do not, however, believe that the council should attempt, as the Report recommends, to employ all the expertise required to regulate every agency's detailed strategy for data processing and telecommunications. Nor do we believe that such a planning body, whose adopted standards and architectures will deliberately restrict hardware and software solutions, can attempt to conduct procurement transactions, in which Virginia law expects competition to the "maximum feasible degree."

The majority of Virginia's problems in coordinating data processing and telecommunications solutions can be resolved by adopting (1) broad standards and architectures for hardware, software and data communications, and (2) mandatory policies for agencies to follow in data administration, systems development, evaluating distributed and decentralized processing solutions, and sharing communications networks and facilities. Promulgation of a strategic plan expressing those standards and policies, if adopted with the advisory input of agencies and institutions, would accomplish the objective which JLARC and DIT share. Proof of adherence to those standards, a relatively objective process, could be accomplished through DIT's reorganized planning division without the costs of supporting a separate agency and its staff.

The council's oversight can (and should) control procurement through promulgation of its hardware, software and telecommunications standards as uniform specifications for each major category of agency purchases. State purchasing officials well know that the specifications in a competitive solicitation control, more than any other factor, the breadth of potential competition. Also, in DIT's experience, it is the specifications which vendors most frequently challenge, because of alleged "proprietary" requirements which exclude a vendor, or because they "point" to a specific product brand.

DIT has found such protests the most difficult to defend, because they require a fundamental justification of (1) the purchaser's generic equipment/software needs, and (2) an explanation of why a solution "slightly different" from the specifications cannot serve those needs as well. The difficulty is compounded when the specifications reflect a desired standard architecture, and there is no statewide plan to support it.

Today, DIT's procurement branch must debate (with agencies and vendors) the issue of specifications vs. agency needs vs. compatible standards in almost every major procurement action. We would be most relieved if the proposed council decided, for all agencies, the fundamental standards for the State's technology solutions. This would (1) afford credibility to the specification of standards (because they would emanate from a "disinterested" party, not the purchasing agency or our procurement staff), and (2) enable DIT staff to more objectively perform its mission of seeking maximum competition within the approved specifications.

The implementation of statewide information technology plans and standards should not, we believe, be subject to the council's prescription in every detail. If so, its workload would demand a growing staff, duplicating agency resources, and would cause the council to be viewed as "dictatorial", jeopardizing its effectiveness and credibility. The agencies (including DIT), in implementing common standards and architectures, must continue to have the flexibility which their day-to-day operations require. Nevertheless, we would expect the council to review, in particular detail, DIT's major procurement decisions.

Finally, with respect to costs, the Report suggests that the transfer of positions from DIT, together with the cost savings to be achieved through reorganization and classification of positions, will provide ample funding for a separate agency. DIT's organizational initiative shares the objective of reducing positions and expenditures, but the resulting savings cannot, for the most part, be transferred elsewhere from DIT's budget. With the exception of minimal general fund programs, the preponderance of DIT's budget is derived from internal service fund charges. Approximately 50% of telecommunications revenues and 35% of computer services revenues are from non-general fund sources. A substantial portion of each represents federal funding to customer agencies for their service costs. We learned when DIT "rebated" almost \$3 million in computer service charges in 1986 that even the general fund portion of these charges cannot be easily "retrieved" for other uses. Moreover, federal funding for identified agency data processing and communications services cannot, we believe, be legally diverted to fund a separate governmental agency.

Management Consulting and Educational Technology

The Report recommends isolating the Management Consulting Division as a separate agency and disintegrating the Educational Technology Division. As indicated in our response to those recommendations below, we do not believe that the Report states sufficient reasons why those functions do not work properly where they are (or, more importantly, why they would better perform their missions elsewhere). Accordingly, we suggest that these proposals be given more thought.

Conclusion

DIT intends, as recommended, to proceed with its reorganization, using the Report's recommendation as a guide in consultation with JLARC's staff. In our review of the comprehensive staffing, organizational and classification needs identified in this chapter of the Report, we find general agreement on the issues, with the qualifications noted above. Within this framework, we offer as a basis for legislative discussion our response to **Organizational Proposal for Information Management and Services Recommendations (59) through (66)** as follows:

Recommendation (59). The General Assembly may wish to amend Chapter 35.2 of the Code of Virginia to establish the Council on Information Management. The council should be comprised of seven public members and the Secretaries of Finance and Administration as ex-officio, voting members. The public members should be selected for their expertise in information technology matters, but they should not be affiliated directly or indirectly with any manufacturer or vendor of information processing or communications hardware, software, or services. They should be appointed by the Governor for staggered, four-year terms and confirmed by the General Assembly.

The council should be authorized to oversee statewide information technology planning. The council should develop a plan for managing the State's information resources and adopt policies, regulations, and standards for implementing the plan. Authority to establish budget priorities and approve procurements should also be included as methods for ensuring implementation. The council should also regularly evaluate implementation success. The council should meet at least six times per year, or more often if deemed necessary. [pp. 280-281]

DIT Response

WE AGREE with the intent of the Recommendation and the need for statewide information technology planning. However, **WE DISAGREE** that the Council should be so totally independent of DIT.

DIT should provide most (if not all) of the staff support and implementation oversight necessary to ensure compliance with the Council's direction. Although DIT cannot, alone, ensure structured, comprehensive information resource planning by all agencies, it can, through a reorganized planning division, provide staff support to an independent board or council with that responsibility. Moreover, DIT is appropriately funded to provide that assistance, whereas a separate agency would probably require general fund support.

This approach would appear more in keeping with the appropriate role of boards and commissions in Virginia. By limiting control to necessary broad standards, supplemented with such detailed guidelines as it may wish, the Council would be assured greater agency cooperation. This supervisory/advisory approach would accomplish what is badly needed: a clear indication of legislative intent that information resource direction and planning shall be a coordinated function in Virginia State Government.

There are many ways to oversee information management, and our sister states have tried a variety of solutions. To assist in deliberating this issue, we have included, as Appendix III, a representative sample of "Information Management in Other States."

See also companion **Recommendation (7)** following Chapter II, Statewide Information Management.

Recommendation (60). The General Assembly may wish to amend Chapter 35.2 of the Code of Virginia to establish the Higher Education Advisory Committee on Information Management, the Agency Advisory Committee on Information Management, and the DIT Advisory Committee on Information Management. These three committees should advise and assist the Council on Information Management in developing statewide plans, standards, and policies for information technology.

The higher education advisory committee should be comprised of one permanent representative each from three large universities, one permanent representative from the Virginia Community College System, and one representative each from four of the remaining institutions of higher education, rotated annually.

The agency advisory committee should be comprised of one agency representative from each secretariat, designated by the Governor's secretaries. Agency representatives should be rotated annually. The agency committee should also include one representative each from the legislative branch, the judicial branch, and the independent agencies.

The DIT advisory committee should be comprised of the director and the deputy director. The director should also appoint three additional DIT staff to serve on the committee. [pp. 282-283]

DIT Response

WE AGREE with the intent of the Recommendation, recognizing that the Council would be faced with adjudicating the often opposing positions of each committee (and some of their members). DIT's representation would depend upon the Council's ultimate mission and staff support, discussed at the beginning of our response to this chapter.

Recommendation (61). The General Assembly may wish to amend Chapter 35.2 of the Code of Virginia to authorize the Council on Information Management to appoint an executive director. The director should supervise a staff that will provide planning, standard-setting, procurement, and evaluation support to the council. The maximum employment level for the council's staff should not exceed 40 positions for the 1988-90 biennium. [p. 285]

DIT Response

WE AGREE with intent of the Recommendation. However, **WE DISAGREE** that a Council with a separate staff of 40 is necessary, desirable, or an efficient expenditure of funds.

Recommendation (62). DPT should work in conjunction with DIT in writing classification specifications for the agency-specific customer service positions proposed for staffing the Help Desk Branch. [p. 307]

DIT Response

WE AGREE. We have already agreed to work closely with DPT in reviewing this new function, and appropriate class specifications will be prepared.

Recommendation (63). DIT should reorganize using this proposal as a guide. The agency should carefully consider the staff and functional assignments proposed by JLARC staff.

DIT should use three internal services funds to recover the costs of the services provided: computer services, telecommunications, and systems development. DIT should recover the costs of the Administration Division through agency overhead. The costs of the Customer Services Division should be recovered indirectly through the three internal service funds. This recovery should be in proportion to the number of positions within the proposed division that are utilized for activities directly related to computer services, telecommunications, or systems development. [p. 310]

DIT Response

WE AGREE with the statement on reorganization, and **WE AGREE** with the use of internal services funds for major parts of DIT. DIT allocates cost (and always has) by a formula of direct cost, indirect cost, and allocated overhead. Allocating indirect costs can be achieved in a number of different ways, all of which are acceptable under G.A.A.P.

The impact of the Recommendation on the customer base will be analyzed, and if the results appear appropriate, this portion of the Recommendation will be implemented.

However, **WE DISAGREE** that all of DIT should necessarily be funded from the three internal service funds. This will depend, nevertheless, on the final product of our agency reorganization. We believe that many of DIT's services (such as consulting assistance in office automation) should remain "free" to agencies requesting them, but should not be added to internal service fund charges. They may be more appropriately considered general fund programs. For example, at JLARC's recommendation, Telemedia Services funding was converted from internal service to general fund appropriation, effective July 1, 1986.

Recommendation (64). DIT should eliminate 93 full-time, permanent positions. Most of these positions are currently utilized in switchboard operations in the Telecommunications Division, customer liaison and legislative liaison in the Director's Office, building maintenance and interior design in the Administration Division, and centralized clerical support as presently assigned. In addition, DIT should eliminate positions which will no longer be needed once functional alignment and enhanced management utilization are implemented. DIT should discontinue its use of 44 hourly positions and establish 15 full-time permanent positions to be utilized for the full-time functions currently provided by some of the agency's hourly employees. [p. 314]

DIT Response

WE AGREE in concept that DIT should eliminate positions no longer needed to perform its assigned mission; the demand for services should dictate staffing levels. Staffing requirements will be closely examined in DIT's final organizational alignment, and positions will be eliminated where warranted. The use of hourly positions will be examined in concert with DIT's organizational realignment and full-time staff needs.

Recommendation (65). DIT should dissolve the Educational Technology Division, the Information Services Division, and the current Public Relations Branch of the Human Resources Division. The provision of all of these services should be assigned to various other divisions in the restructured DIT. Furthermore, DIT should divide the current Computer Services Division into an Operations Support Division and a Data Center Operations Division. [pp. 314-315]

DIT Response

WE DISAGREE with dissolution of the Educational Technology Division, and with moving two positions to the Department of Education to support the Virginia Public Telecommunications Board, which would become a separate entity under the Secretary of Education. This recommendation is not supported by any detailed analysis of how the Board or the division's staff could better serve elsewhere. With the Commonwealth's current video needs, and the expectations of video communications use in the next five to ten years, a viable means of delivering this medium to agencies should not be removed from the State's central technology agency.

Video technology is generally acknowledged to be an integral part of the information age, and it must be shared, the same as voice and data communications. The only practical means of disseminating full-motion video today, where the need is point-to-multi-point delivery, is through the public broadcasting network (microwave/ITFS, open broadcast and satellite). Newer technologies such as fiber optics have the capacity for video transmission, but primarily point-to-point delivery. Even then, the distance of delivery is a limiting factor because of the electronics necessary to duplicate the video signal over a long distance.

The public broadcasting community, the Board, and the Educational Technology staff are responsible for other services and programs beyond educational services. For example, the radio reading service for the visually handicapped, cable issues, community service programming (such as coverage of the Virginia General Assembly), editorial integrity issues, administrative teleconferencing, FCC licensing, media services and media equipment for agencies and institutions.

It is important that the staff supporting these functions provide services to all State agencies and institutions. Otherwise, duplication of services and networks will occur (one network for elementary-secondary, one network for post-secondary or higher education, and another network for administrative agencies). These capacities are too expensive to allow duplication and fragmentation, and they require the central coordination which the Board and staff can provide. The Board also strenuously objects to this Recommendation, and has submitted a separate response included herein as Appendix II.

Recommendation (66). DIT should transfer 52 positions to other State government organizational units. Management Consulting should be established as a separate agency in the Administration Secretariat.

Two positions from the Public Telecommunications Branch of the Educational Technology Division should be transferred to DOE to support the Virginia Public Telecommunications Board in the Education Secretariat. The recommended Council on Information Management should be created using 36 positions that are currently allocated to DIT. DIT should transfer responsibility for the State's multi-media educational contract to the Department of Personnel and Training. [pp. 315-316]

DIT Response

WE DISAGREE. Although reorganization can be expected to identify unnecessary positions, proposed transfer of 52 positions to other State Government organizational units requires further analysis in the context of DIT's response to the Report. Caveats regarding the creation and funding of a new agency should be evaluated in comparison to what can be achieved internally through reorganization. Recommendations such as Educational Technology should be more thoughtfully considered before concluding how many (and which) positions should be relocated (or abolished).

We do not agree that Management Consulting should be established as a separate agency. Management Consulting provides services which do blend with DIT's complex mission, although it is given, within the agency, the independence it needs to ethically and objectively serve its clients. MCD performs analysis to determine whether automation (a key management tool) is appropriate to solve an agency's problems. It also does "post-automation reviews" to enhance the effectiveness of information systems and staff. To do this job, MCD must remain technologically current, and can, by remaining associated with the State's principal technology agency. As a separate agency, the relevant knowledge and skills of MCD analysts would likely diminish, and would have to be supplemented by other staff.

An objective assessment of MCD's actual performance in the DIT environment would have been much more meaningful. By not fully assessing Management Consulting's current operations, this important link in DIT's integrated approach to accomplishing its complex mission was largely overlooked.

MCD's mission is to assist state agencies in effecting cost reductions, improving efficiency, and increasing operational effectiveness -- a mission which complements

DIT in its providing technological support to agencies so they can more effectively and efficiently accomplish their missions. Significantly, the Hopkins Commission stated that this basic function of management analysis is management oriented, and that the use of data processing had become so prevalent -- even in 1975 -- that the separation of data processing systems analysis, design, and development from the management analysis function was no longer appropriate. Indeed, improvements in the integration of service delivery functions, a need cited in the Report, would logically include management consulting:

"...DIT has a unique opportunity to assist State agencies in exploring and using sophisticated inter-related technologies for communicating and processing information. Using these technologies, all agencies can achieve program objectives more effectively." (Report, page 1.)

As someone once reportedly said, we all may be "drowning in data and starving for information." MCD--in partnership with DIT -- can and should assist in better managing and more effectively delivering information services to the citizens of Virginia.

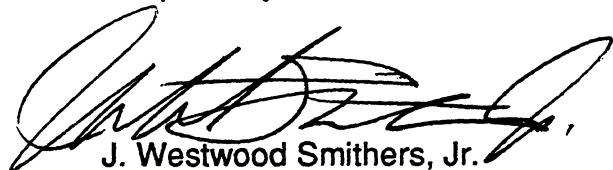
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X. CONCLUSION

Through this Report, and the Department of Information Technology's collective efforts in responding to its many constructive suggestions, the Commonwealth is provided the opportunity, momentum, and strategic directions for change. In the short history of information technology in Virginia Government, we are hopeful that the Report will be welcomed today, and hereafter remembered, as the beginning of the Commonwealth's strategic management of a valuable, dynamic resource.

At DIT, we believe we have both the commitment and flexibility to enhance the management of information technology in Virginia, now and for the future. We recognize, as does JLARC, the need for many improvements, and we happily share the fundamental approaches to achieving them. We have tried, in our response, to design the foundation for an expanded partnership with the General Assembly, whose active interest and continued participation are essential to our success. We are hopeful that our heightened awareness of the issues, and our mutual commitment to addressing them, will persuade the General Assembly to play a strategic role in managing this resource through the appropriations process, the best "control" mechanism in government today.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "J. Westwood Smithers, Jr.", written in a cursive style.

J. Westwood Smithers, Jr.

Director

APPENDIX I

Director's Organizational Project Excerpts



COMMONWEALTH of VIRGINIA

Department of Information Technology

110 SOUTH SEVENTH STREET
RICHMOND, VIRGINIA 23219
(804) 344-5000

WESTWOOD SMITHERS, JR.
Director

May 6, 1987

Mr. J. Westwood Smithers, Jr.
Director
Department of Information Technology
110 South Seventh Street
Richmond, Virginia 23219

Dear Mr. Smithers:

I am pleased to submit the Phase II Report of the Director's Organizational Project.

This report provides three alternative functional realignments for the Department of Information Technology. This "options approach" is a healthy, and not unexpected, recognition of the organization's complexity. As a practical matter, it is unlikely that a "one and only" organizational structure for the Department exists. Even if it did, that structure would certainly be qualified by the legitimate needs and prerogatives of top management, fiscal and budgetary constraints, personnel realities, and other implementing limitations, particularly in the management of a public agency. (I think it helpful to consider that the organizational resources which are viewed as "enabling" in the private sector -- structure, personnel and budget -- are often viewed as "constraining" in the public sector.)

Moreover, reasonable people can, and do, disagree in good faith as to the "best" structure for most organizations. As our work illustrates, the Department of Information Technology is no exception. In addition to the three options presented, other alternatives and variations were in fact explored. At the outset, the Project Group accepted the likelihood that multiple "design

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Mr. J. Westwood Smithers, Jr.

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solutions" would emerge. In fact, the Phase II working structure of independent subgroups encouraged that kind of diversity of thought. That structure was tempered, however, with a commitment to identify (where possible) a practical consensus and to reserve (where necessary) the privilege of independent thought and minority dissent. As a result, both the Phase II Report, and the organizational and environmental analysis upon which it is based, reflect, it seems to me, a credible balance between consensus (within the working subgroups and, even more significantly, across the working groups) and independent thought.

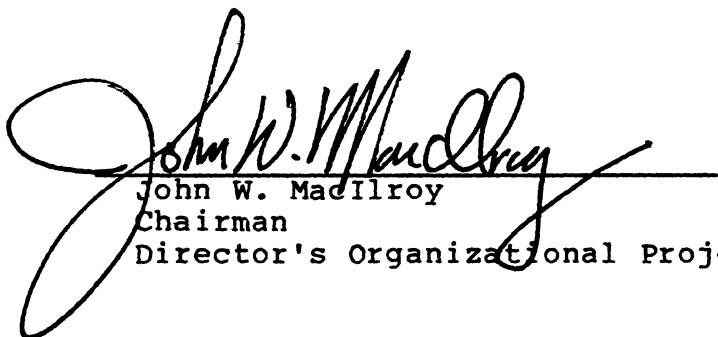
Three alternative organizational realignment "models" were developed by two independent working subgroups and submitted to the Chairman. Each alternative is included in the Phase II Report, with supporting rationale, in its entirety as submitted. Organizational assumptions, analysis of the strengths and weaknesses of each proposal, and a "cross-check" based on the criteria and objectives detailed in your charge to the Group are specifically addressed. In addition, a very preliminary analysis of funding alternatives is included. However, a truly comprehensive discussion of that important issue is outside the scope of this Project.

This commitment to process, as I reported to you in the Phase I report, is an important part of any organizational development activity. It is not "something done" to an organization, but a process of people working together to improve mutual effectiveness in achieving shared organizational objectives. I advised you earlier that the initial work of the Project Group reflected a commitment to that kind of authenticity. I am again pleased to report that a high level of energy, dedication and commitment was successfully carried over to the difficult work of Phase II of the Project. In forming the Project Group, you advised each member that a comprehensive review of the Department's organization would be essential in order to position DIT to meet its long-term challenges as well as to establish a proactive and constructive framework for the exchange of ideas with JLARC and the Governor's Commission on Efficiency in Government. I believe we have met that challenge.

Mr. J. Westwood Smithers, Jr.
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Although the realignment alternatives presented in the Phase II Report address important internal organizational issues, it is clear that the future success of DIT will depend in no small way on a continuing assessment and management of the external environment. This is particularly apparent in the area of strategic planning, with the clearly identified need for some form of structured and comprehensive executive "oversight" of Virginia's information resources.

In presenting this Report, I acknowledge the complexity of the findings, and close with both a recommendation and request that a formal presentation be made to Division Management, concurrently with distribution of the Report.



John W. MacIlroy
Chairman
Director's Organizational Project

FOREWORD: PHASE II

Organizational development intervention, a process described in the Phase I Report as structuring, and ultimately managing, activities to bring about long-term improvements in any organization, can be a complex and difficult task under any circumstance. The work of the Director's Organizational Project Group was no exception.

The essence of the process, however, is quite simple and has provided the framework for both phases of the Project. In its initial collective working sessions, the Project Group adopted a systems view of the organization, including its culture, technologies, structure and environment. Proposed changes in the Department's organizational structure and design have resulted from the Project's intervention efforts. These changes reflect the systems perspective. However, the question of organizational design, or what the organization should be like in some "ideal" sense, was not addressed until the second phase of the intervention, and is included in the Phase II Report in the form of three alternative organizational realignments.

These functional realignment proposals are the "meat" of the Director's Organizational Project. As in most structured

organizational development efforts, the greatest value of the analysis may rest in its innovative approach to challenges both old and new, and the fresh perspective and exchange of ideas within the working resource group.

The toughest work of all, however, may lie ahead. Although the work of the Project provides a strong foundation for constructive dialogue and change, management must ultimately move the organization from "what it is" to "what it can be." In support of that effort, the realignment alternatives proposed focus on concepts, not labels; relationships, not titles; and organizational needs, not personal agendas.

INTRODUCTION TO PHASE II: METHODOLOGY

To develop a comprehensive and creative process for evaluating functional alignment alternatives, while maintaining a manageable working group size during Phase II, the Project Group was restructured into two independent working teams. They were identified as "Subgroup 2/4" and "Subgroup 1/3." The complete report of each group is reproduced in Appendix I and Appendix II.

This subgroup approach was adopted for several reasons. Subgrouping structured the opportunity for--and in fact increased the likelihood of--the development and discussion of multiple alignment options. By combining smaller Phase I teams, an acceptable, if incomplete, functional representation and balance was achieved, while limiting the working groups to a manageable size. Finally, subgrouping opened a pathway for debate and "cross-fertilization" of ideas in the later stages of the Phase II analysis.

This methodology contributed to certain important process characteristics. Legitimate differences of opinion emerged at each level of analysis, although usually "at the margin" of debate. In most cases, they were the result of honest disagreement, and provided a healthy and constructive dialogue. On a few issues, however, some differences probably reflect incomplete functional representation in subgroup composition. These were tempered by the cross-fertilization of multiple options.

EXECUTIVE SUMMARY

The three alternative realignment models, presented and discussed in full in Appendix I and Appendix II, represent distinctive organizational "solutions" to challenges facing the Department of Information Technology today, and likely to face the Department in the future. The realignment alternatives exhibit a high degree of general conceptual agreement, particularly at the highest levels of the organization. However, differences do emerge as the analysis moves more deeply into each proposed alternative structure, and are selectively highlighted in a matrix representation. See Table I, Page 8.

REALIGNMENT HIGHLIGHTS.

The Executive Summary adopts the Project Group Task 3 "Objectives" as a framework for a brief discussion of the realignment highlights, as follows:

Delivery of Services.

Each realignment alternative recognizes and supports the fundamental concept that DIT is primarily a service delivery organization. With some variations, each alternative supports a greater consolidation of service delivery functions. Each

specifically identifies an "account management" or "service coordination" structure. This concept recognizes the importance of an increased emphasis on integrated client outreach, the value of "one-voice" agency service, and the need for a high level of client satisfaction.

Consolidation of Functions.

Each of the realignment alternatives identifies client service delivery functions, central planning and regulatory ("control") functions, and administrative support functions as separate and consolidated units. This structural consistency is apparent at the highest levels of the various proposals. However, significant variations do emerge in the lower levels of each realignment model. For example, the grouping of telecommunications functions varies considerably among the three realignment models.

Funding.

The analysis of billable and non-billable functions, which is included in each realignment proposal, must be considered as very preliminary at best. It is intended to stimulate a more disciplined and comprehensive analysis at a later date. That kind of detailed analysis would be most productive in conjunction with an identified realignment decision and implementation process.

Checks and Balances.

Each of the realignment models incorporates a separation of identified "service" and "control" activities as the preferred direction to improve "checks and balances" in the DIT structure. Even within the "service" component, considerable attention has been paid to this concept. For example, although voice and data have been consolidated in each of the various telecommunications alternatives, operations has been separated from engineering for the specific purpose of providing enhanced checks and balances. Moreover, the establishment of a structured information technology strategic planning process (some type of "Information Resources Board") has been advanced in each proposal as a key element in the "statewide" checks and balances process. This was seen as an internal check on research, development, and acquisition efforts, as well as a structure to balance the needs of other state agencies and institutions.

Communications with Agency Managers

The "account management" or "service coordination" structure in each of the proposed realignment models is specifically intended to improve the Department's communications with senior agency managers and agency operating managers in client agencies. This approach is intended to facilitate a formal exchange of expectations and perspectives throughout the Commonwealth.

Internal Administrative Support.

Increased integration of internal administrative functions, in the realignment alternatives proposed, is intended to eliminate duplicative activities currently spread out among existing DIT branches. This is an area with some degree of conceptual consensus, although there are several different proposals to meet this need. Administrative support activities are recognized as those which traditionally involve significant Agency Head discretion, particularly in the reporting relationships of human relations and personnel functions. It is significant to note, however, that none of the proposed realignment models has modified the unique organizational relationship of Internal Audit, and each has recognized that DIT may be the only agency of its size in the Commonwealth without an internal data processing manager.

Information Resource Planning.

The establishment of structured strategic planning functions, as well as some type of "central government" planning or regulatory function, is common to each of the realignment alternatives. It is the direction proposed to strengthen information resource planning and management functions both within the Department and across state agencies. These structures acknowledge the importance of the Department assuming a more aggressive role in information planning in the Commonwealth.

Policies-Standards-Guidelines.

The strategic planning and regulatory control structures identified in each of the alignments should strengthen the Commonwealth's "Policies-Standards-Guidelines" program. Several suggestions and ideas are presented which tie the development of Policies-Standards-Guidelines to internal and external programs, as well as the planning function.

CONCLUSION

The Director's Organizational Project, like most similar organizational development activities, has looked closely at weaknesses in the existing structure of the Department of Information Technology. After all, the ultimate objective is to improve the organization as a whole and to increase the ability of the organization to achieve shared objectives consistently and routinely.

The realignment alternatives proposed in the Phase II Report should provide a credible foundation for the constructive exchange of ideas with interests outside the Department. They can, as well, establish a practical agenda for the internal evaluation of how best to structure the Department for the challenges ahead.

Of course, building a commitment and motivation for change, moving the Department through legitimate change and transition processes, and ultimately "refreezing" the organization in some improved state are difficult managerial challenges. The work of the Project Group in its diagnostic, analytical and feedback activities has only set the stage for the next series of management tasks. As noted in the Phase I Report, the center of any organization is its managerial subsystem. Here, the tough decisions on how to pull the pieces of the organization together must be made.

SELECTIVE COMPARISONS

TABLE I

CURRENT ORGANIZATION	APPENDIX I	APPENDIX II (A)	APPENDIX II (B)
Educational Technology	Rename-Telemedia Division	Disperses functions	Disperses functions
Telecommunications	<p>Merges Voice & Data</p> <p>Maintains separate Operations & Engineering Branches</p> <p>Field Offices-> System Connectivity Consulting (Services Directorate)</p> <p>Strategic Planning-> Strategic Planning Branch (Planning & Regulatory Directorate)</p> <p>Network Control Center & Front End Processor Support - from Computer Services Division</p>	<p>Merges Voice & Data</p> <p>Maintains separate Operations, Engineering, Services Branches</p> <p>Field Offices -> Integrated Services Branch</p> <p>Planning in Telecommunications Services (Client Services)</p>	<p>Merges Voice & Data</p> <p>Maintains separate Operations and Engineering Branches</p> <p>Disperses Support Services Functions (Including Network Planning)</p> <p>Field Offices -> Integrated Services Branch</p> <p>Planning in Information Resources Management (Central Government Services)</p>
Management Consulting Division	Essentially unchanged, except placed under Business and Information Consulting Division (Services Directorate)	Essentially unchanged, except placed under Central Government Services	<p>Split Roles:</p> <p>White Hat - Integrated Services (Client Services)</p> <p>Black Hat - Central Government Services</p>
Computer Services Division	<p>Security -> Planning & Regulatory Directorate</p> <p>Capacity Planning Coordination-> Administration</p> <p>Computer Operations Division:</p> <ul style="list-style-type: none"> • Operations Support Branch • Software Engineering Branch <p>Network Control Center & Front End Processor Support -> Telecommunications</p>	<p>Security -> Information Resources Management (Central Government Services)</p> <p>Computer Operations & Systems Software are separate Divisions (Client Services)</p>	<p>Security -> Information Resources Management (Central Government Services)</p> <p>Computer Operations & Systems Software are separate Divisions (Client Services)</p>

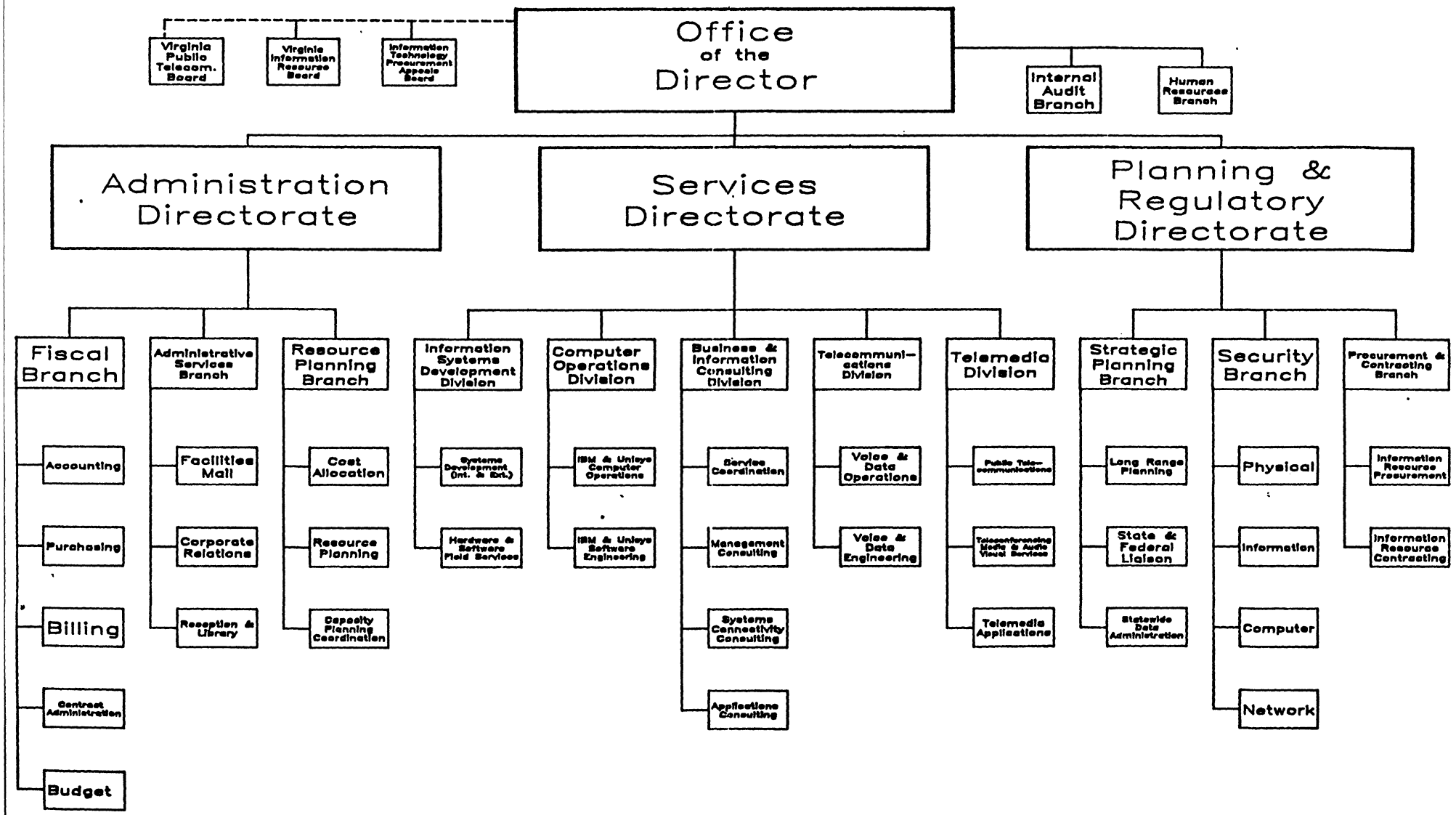
SELECTIVE COMPARISONS (cont.)

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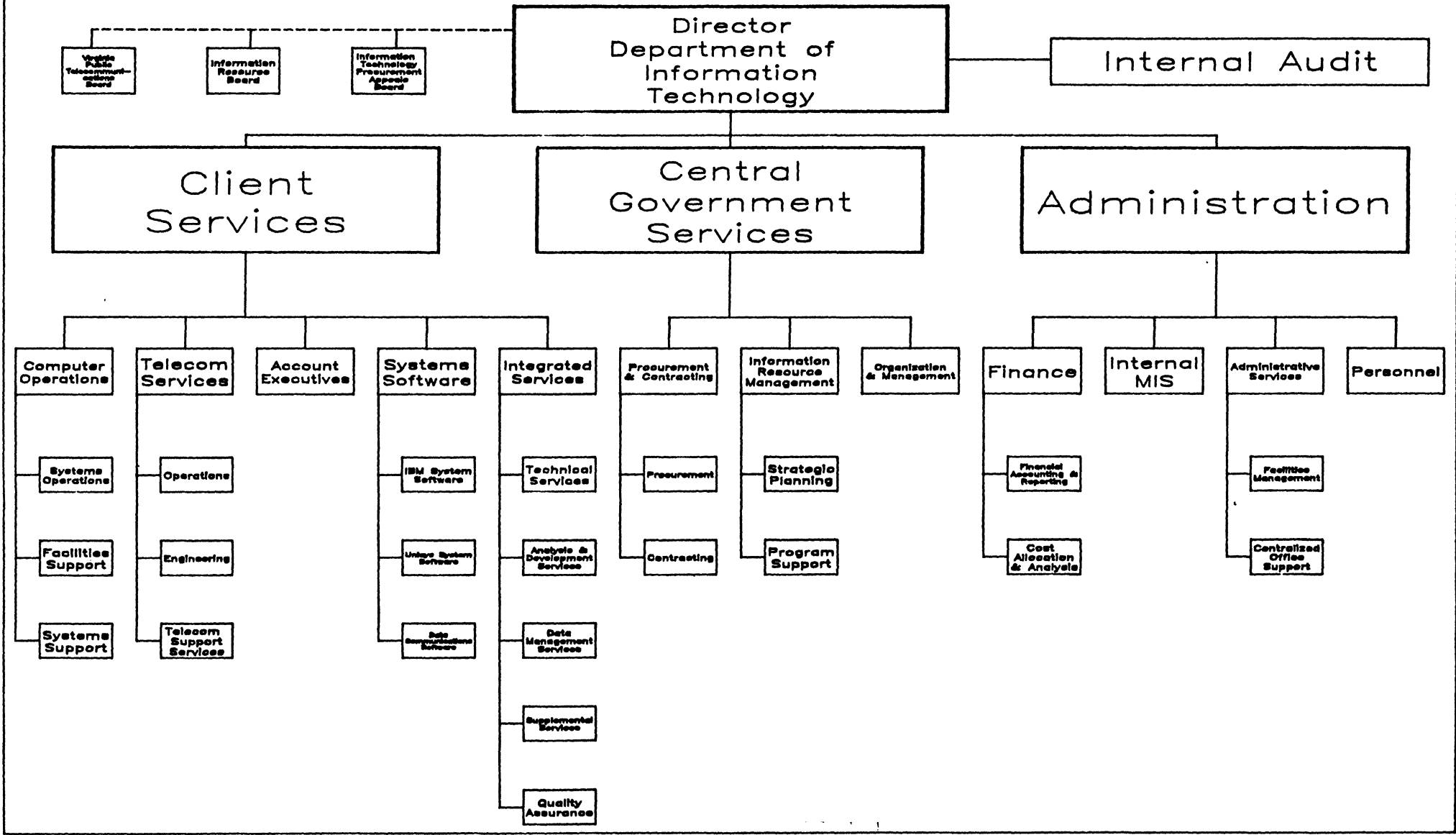
CURRENT ORGANIZATION	APPENDIX I	APPENDIX II (A)	APPENDIX II (B)
Customer Liaison / Information Management	<p>Customer Liaison -> Services Coordination Branch in Business & Information Consulting (Services Directorate)</p> <p>Information Management -> Strategic Planning Branch (Planning & Regulatory Directorate)</p>	<p>Customer Liaison -> Account Executives (Client Services)</p> <p>Information Management -> Information Resources Management (Central Government Services)</p>	<p>Customer Liaison -> Account Executives (Client Services)</p> <p>Information Management -> Information Resources Management (Central Government Services)</p>
Information Services Division	<p>Functionally realigned within Services Directorate:</p> <ul style="list-style-type: none"> • Information Systems Development Division • Business & Information Consulting Division <p>Combines internal & external Systems Development</p>	<p>Functionally realigned within Integrated Services (Client Services)</p> <p>Establishes internal MIS function within Administration</p>	<p>Functionally realigned within Integrated Services (Client Services)</p> <p>Establishes internal MIS function within Administration</p>
Administration	<p>Procurement & Contracting -> Planning & Regulatory Directorate</p> <p>Maintains Separate Fiscal & Resource Planning Branches</p> <p>Budget merged with Fiscal</p>	<p>Procurement & Contracting -> Central Government Services</p> <p>Combines all financial matters under one Manager</p>	<p>Procurement & Contracting -> Central Government Services</p> <p>Combines all financial matters under one Manager</p>
Human Resources	<p>Public Relations - Functions Dispersed</p> <p>Personnel - Reports to Director</p>	<p>Public Relations - Functions Dispersed</p> <p>Personnel - Reports to Administration</p>	<p>Public Relations - Functions Dispersed</p> <p>Personnel - Reports to Administration</p>

Department of Information Technology

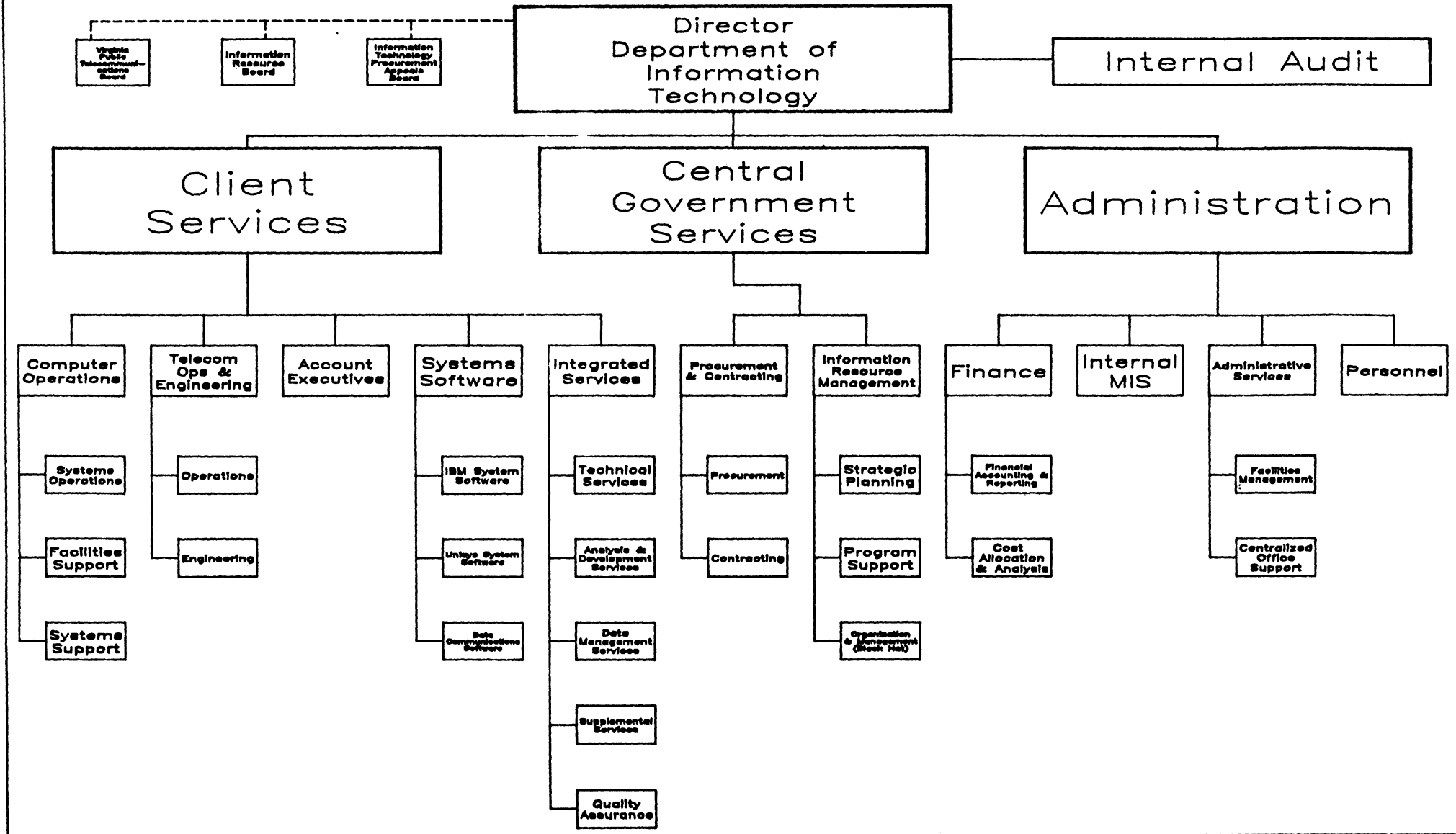
Subgroup 2/4



Department of Information Technology



Department of Information Technology



APPENDIX II

Virginia Public Telecommunications Board

EMORY & HENRY COLLEGE

EMORY, VIRGINIA 24327 (703) 944-3121

OFFICE OF THE PRESIDENT

June 26, 1987

Mr. Philip A. Leone
Director, JLARC
Suite 1100, General Assembly Building
Richmond, Virginia 23219

Dear Mr. Leone,

As Chairman of the Virginia Public Telecommunications Board, I am writing to respond, at the direction of the Board, and on their behalf, to the recommendations affecting the Board as contained in the exposure draft of the JLARC study of the Department of Information Technology.

The Virginia Public Telecommunications Board met in executive session during its regularly scheduled quarterly meeting to discuss the JLARC recommendations and to receive a briefing from the Director of DIT on the JLARC study. After devoting more than an hour of consideration to the JLARC recommendations in Executive Session, the Board authorized me by resolution to respond directly to you as follows.

You should know that this response reflects a consensus unanimous in the Board.

Based on the information contained in the materials available to the members at this time, the Virginia Public Telecommunications Board does not concur with the recommendations in the JLARC study to move the Board to the Secretariat of Education and to reallocate staff from the Educational Technology Division to the Department of Education as support for the Board.

Further, with respect to any questions on the appropriate performance of its general mission and specific responsibilities, the Board would direct your attention to those paragraphs in the statute creating the Board. The members feel

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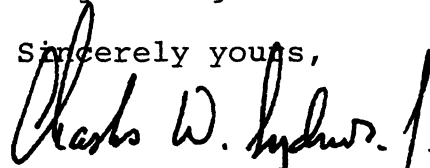
Mr. Phillip A. Leone
Page 2
June 26, 1987

the original legislation, detailing the authority of the Board, and placing it as a separate entity from DIT and its predecessor agencies, still enables the Board to serve the needs of education through public television and radio, teleconferencing, and other appropriate areas of public telecommunications.

Until there is greater evidence, appropriate documentation, persuasive analysis, and compelling argumentation for changing the current working arrangements, the Virginia Public Telecommunications Board does not believe there is any reason to do so.

I would welcome the opportunity to have you discuss this with the Board at our next meeting in August.

Sincerely yours,



Charles W. Sydnor, Jr.
Chairman, Virginia Public
Telecommunications Board

CWS:ja

cc: Mr. J. Westwood Smithers
Dr. J. C. Phillips
Ms. Suzanne Piland
Members of VPTB

APPENDIX III

Information Management In Other States

INFORMATION MANAGEMENT IN OTHER STATES

STATE	TITLE	TYPE	COMPOSITION	ROLES
NC	NORTH CAROLINA COMPUTER COMMISSION	POLICY	<p>GOV, LT. GOV, AND VARIOUS CABINET & AGENCY HEADS</p> <p>STAFF SUPPORT: DEPT OF ADMINISTRATION</p>	<ul style="list-style-type: none"> •DEVELOP 5-YR PLAN •APPROVE STATEWIDE POLICIES & PROCEDURES •REVIEW PROPOSALS OF DEPT OF ADMIN. •ARBITRATE DISPUTES •DEVELOP MEANS OF FINANCING & COST ALLOCATION
TN	INFORMATION SYSTEMS COUNCIL	POLICY	<p>COMMISSIONER OF FINANCE AND ADMINISTRATION COMMISSIONER OF GENERAL SERVICES COMPTROLLER OF THE TREASURY</p> <p>STAFF SUPPORT: OIR IN DEPT. OF ADMIN.</p>	<ul style="list-style-type: none"> •DEVELOP LONG-TERM DIRECTIONS •DEVELOP 5-YR IMPLEMENTATION PLAN •DEVELOP POLICIES, STDS, & GUIDELINES •SET/REVIEW PRIORITIES •HEAR USER-AGENCY APPEALS
FL	INFORMATION RESOURCES COMMISSION	POLICY/SUPERVISORY	<p>GOVERNOR & CABINET</p> <p>STAFF SUPPORT: EXECUTIVE ADMINISTRATOR</p>	<ul style="list-style-type: none"> •DEVELOP POLICIES, PROCEDURES, STDS •ENSURE COMPLIANCE •REVIEW/APPROVE DEPT PLANS •PROVIDE PLANNING ASSISTANCE •REVIEW/APPROVE "IT" RESOURCE ACQUISITIONS •ASSESS OPPORTUNITY FOR MULTI-AGENCY USE OF "IT" RESOURCES
	EXCLUDES TELECOMMUNICATIONS			

INFORMATION MANAGEMENT IN OTHER STATES

STATE	TITLE	TYPE	COMPOSITION	ROLES
KY	KENTUCKY INFORMATION SYSTEMS COMMISSION	POLICY	8-REPRESENTATIVES OF CABINET/AGENCY HEADS 1-SUPREME COURT 1-AUDITOR OF PUBLIC ACCTS 1-KY ASSOC OF COUNTIES 1-KY MUNICIPAL LEAGUE 1-PRESS 3-CITIZENS STAFF SUPPORT: PERMANENT STAFF	<ul style="list-style-type: none"> •FORMULATE LONG-RANGE STATEWIDE EDP PLAN •COORDINATE STRATEGIC PLANNING BY AGENCIES •RECOMMEND PROCEDURES & LEGISLATION RE: -PUBLIC RECORDS -INDIVIDUAL PRIVACY
MN	INFORMATION POLICY COUNCIL	POLICY	1 REPRESENTATIVE FROM EACH AGENCY STAFF SUPPORT: DEPT. OF ADMIN	<ul style="list-style-type: none"> •ASSIST COMM OF ADMIN IN DEVELOPMENT OF INFORMATION MGMT. DIRECTION •REVIEW/APPROVAL OF R&D ACTIVITIES •ASSIST AGENCIES TO IDENTIFY INFO REQ'TS & PRIORITIES
ID	DATA PROCESSING TASK FORCE	POLICY	DIR, DEPT OF: ADMINISTRATION TRANSPORTATION HEALTH & WELFARE EMPLOYMENT MEMBER, STATE AUDITOR'S OFFICE MEMBER, STATE BD OF EDUC.	<ul style="list-style-type: none"> •FORMULATE STATE DP MASTER PLAN •REVIEW & APPROVAL OF PROCUREMENT OF DP SVCS •REVIEW & APPROVAL OF AGENCY DP PLANS

INFORMATION MANAGEMENT IN OTHER STATES

STATE	TITLE	TYPE	COMPOSITION	ROLES
OR	JOINT LEGIS COMMITTEE ON DATA PROCESSING	POLICY	4 HOUSE MEMBERS 3 SENATE MEMBERS	<ul style="list-style-type: none"> •ESTABLISH STATE-WIDE DP GOALS & POLICY •MAKE RECOMMENDATIONS ON PROPOSED DP PROGRAMS & ACQUISITIONS •CONDUCT STUDIES OF DP EFFICIENCY & SECURITY
	GOVERNOR'S COMMITTEE ON INFOR SYS	ADVISORY	DIRECTORS: DEPT OF GEN SVCS EXEC DEPT STATE CT ADMINISTRATOR ADMINISTRATOR - LEGIS ADMIN COMM 5 OTHER AGENCY HEADS 2 PUBLIC MEMBERS (NON-VENDOR)	<ul style="list-style-type: none"> •REVIEW & RECOMMEND STATEWIDE POLICIES, GOALS, STRATEGIES & PRIORITIES •REVIEW STATE GOV'T PLANS •ADVISE GOV ON NEW DEVELOPMENTS IN "IT"
MS	CENTRAL DATA PROCESSING AUTHORITY	POLICY/ OPERATIONAL	4 PRIVATE SECTOR MEMBERS 2 LEGISLATIVE ADVISORS EXECUTIVE DIRECTOR	<ul style="list-style-type: none"> •LAY BOARD ESTABLISHES "IT" POLICIES •EXEC DIRECTOR OPERATES "IT" PROGRAM TO INCL COMPUTER CENTER, PROCUREMENT, TELECOM NETWORK, MUCH LIKE DIT

INFORMATION MANAGEMENT IN OTHER STATES

STATE	TITLE	TYPE	COMPOSITION	ROLES
PA	SPECIAL COMMITTEE ON ELECTRONIC DATA PROCESSING	ADVISORY	CABINET COMMISSIONER OF STATE POLICE 1 FROM PRIVATE SECTOR 2 FROM SENATE 2 FROM HOUSE STAFF SPT: SEC'Y OF BUDGET & ADMIN	<ul style="list-style-type: none"> •ADVISE ON EFFICIENT USE OF EDP RESOURCES •MAKE RECOMMENDATIONS ON GROWTH AND MGMT OF DP •ADVISE ON APPLICATION OF EDP TECHNOLOGY •ADVISE ON EDP BUDGETS
CT	STATE AGENCY INFOR & TECH ADVISORY COMMITTEE	ADVISORY	DESIGNEES OF STATE AGENCIES	<ul style="list-style-type: none"> •ADVISE DIRECTOR OF INFOR & TECH ON DP/ TELECOM REQ'TS
	PRIVATE SECTOR INFOR & TECH ADVISORY COMMITTEE	ADVISORY	REPRESENTATIVES OF ENTITIES WITH LARGE INFO SYS FUNCTION	<ul style="list-style-type: none"> •ADVISE DIRECTOR ON: - ORG & FUNCTIONS - DEVELOPMENT OF STRATEGIC PLAN
KS	STATE COMPUTER ADVISORY COMMITTEE	ADVISORY	MIS DIRECTORS FROM 8 CORPORATIONS	<ul style="list-style-type: none"> •DEVELOP & MAINTAIN LONG-RANGE PLANS •MAINTAIN LONG-RANGE VISION OF "IT" ACTIVITIES •INFORM STATE GOV'T OF OPPORTUNITIES •PURSUE DATA ADMIN PHILOSOPHY



COMMONWEALTH of VIRGINIA
Department of Motor Vehicles
2300 West Broad Street

DONALD E. WILLIAMS
COMMISSIONER

MAIL ADDRESS
P. O. BOX 27412
RICHMOND, VIRGINIA 23269

June 16, 1987

Mr. Philip A. Leone
Director
Joint Legislative Audit and
Review Commission
General Assembly Building
Capitol Square
Richmond, Virginia 23219

Dear Mr. Leone:

DMV is pleased to respond to the exposure draft of your report on a Review of Information Technology in Virginia State Government. We understand that DMV received only selected parts of the draft report, and therefore, we must qualify our comments to refer only to the material contained therein. As you know, DMV strongly endorses the need for a Statewide policy making body, which includes representation from major users, to help formulate information technology policy in the Commonwealth. We note on page 126 of the draft a reference to a "Council on Information Technology" which, we hope, indicates that such a policy body will be a recommendation of the JLARC.

DMV generally concurs with the analysis and recommendations you make in your report. We note, in particular, on page 122 that your analysis found DIT's FY 1986 revenues from mainframe computer operations were 17.6% greater than actual costs. For DMV, which was billed \$5,011,448 for DIT computer services in FY 1986, this overbilling amounted to \$882,000. Even with the rebates granted by DIT in the second half of FY 1986, DMV over paid for services during the fiscal year by at least \$352,000. Clearly, DIT must improve its methodology for (1) establishing its own costs, (2) allocating those costs to user agencies, and (3) reporting on its financial condition to the JLARC and other appropriate oversight bodies of State government.

DMV endorses Recommendation 29, specifically the need for additional price incentives for non-peak processing.

June 16, 1986
Mr. Philip A. Leone
Page Two

DMV does not disagree with your observation about the benefits of standardized labelling conventions. This is a very complex issue, however, which can involve not only data sharing with other State agencies but also with other states, the federal government, local governments and the private sector. DMV, for example, shares driver and vehicle information with numerous regulatory and law enforcement agencies outside of Virginia. Recommendation 31, if implemented, would require great care and coordination among all users.

DMV cannot agree with Recommendation 33 as written. In our experience, the personal contacts developed through daily interaction with DIT are the most efficient means of coordinating requests for assistance. A "help desk" is a valuable resource, but having DIT require that all requests pass through this desk will create unnecessary bottlenecks.

We believe that Recommendation 34 could be counter-productive if construed to require that DIT perform all product testing and evaluation for the Commonwealth. We agree that DIT should be included in agency evaluations of new products and technologies, providing that this inclusion does not unduly delay or complicate the evaluation process.

Recommendation 36 fails to specify who should establish the uniform performance standards to which you refer. Given that these service level standards cut to the heart of an agency's legal and program responsibilities, we believe the setting of such standards must remain with the agency management. DIT could provide consultation and assistance in evaluating those standards, as appropriate.

On page 151 you note that lack of planning can delay upgrading technologies to achieve greater operational efficiency. However, the major factor is budgetary limitations which can delay upgrading long after the need for improvement is recognized. For example, DMV is acutely aware of the limitations of its current telecommunications software, but updating this component of our system needs to be done in conjunction with our ongoing citizen services system redesign, which will take approximately four years and \$5-\$7 million in agency expenditures.

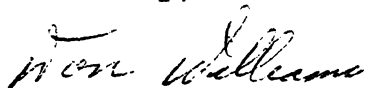
June 16, 1987
Mr. Philip A. Leone
Page Three

Recommendation 37 states that "agencies should be governed" (emphasis added) in their use of various programming languages. DMV believes that the information-sharing recommendations made earlier are adequate to promote proper use of technologies by State agencies. The State would not benefit from centralized control over the details of selecting appropriate technologies for systems development and, given the range and complexity of State systems, implementation of such a control is probably not possible as a practical matter.

Recommendation 38 also does not specify who within the State should perform the proposed oversight function you describe. This is a recommendation with far-reaching implications, and we are concerned that a lack of user involvement in developing the necessary policies would result in even more centralization for Virginia's information technology management.

Again, I want to express my appreciation for the opportunity to comment on your draft report. I hope DMV's comments are helpful, and my staff or I would be happy to discuss our views in more detail with you should you desire.

Sincerely,



Donald E. Williams
Commissioner

DEW/dmm

COMMONWEALTH OF VIRGINIA

JUN 17 1987

MEMBERS
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J. YOUNGER COGGIN
LAURIE NAISMITH

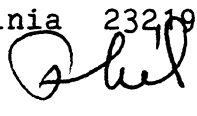
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June 17, 1987

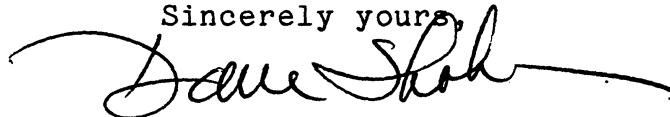
Mr. Phillip A. Leone, Director
Joint Legislative Audit and Review Commission
Suite 1100, General Assembly Building
Capitol Square
Richmond, Virginia 23219

Dear Mr. Leone: 

Thank you for sharing those portions of the exposure draft Review of Information Technology in Virginia State Government that are of interest to this Department. As a result of our detailed review of the draft, we do not believe that a meeting is required. However, we have identified three items that need to be changed. (Attachment 1). Items 1 and 3 are submitted for your information. Item 2 requires minor changes in supporting exhibits. A comparison of the narratives contained in the exposure draft and our initial submissions indicates a difference in semantics. As required, we would be happy to discuss the contents of the attached.

I would like to receive two copies of the final report when it is ready for distribution. Again, thank you for your consideration in permitting us to review the draft prior to its finalization.

Sincerely yours,



J. David Shobe, Jr.
Chairman

JDSJr./mrp

cc: Mr. J. Y. Coggin
Ms. Laurie Naismith

ATTACHMENT

ITEM 1 Ref: pg. 148

"The CIPPS System also. . .

ABC was one of the forerunners in implementing a fully automated personnel leave accounting system. Our leave accounting system was implemented in 1976. Migrating to the central system would require the Department to complete and submit additional required paperwork. There would also be a corresponding increase in the time required to validate and correct the input data.

ITEM 2 Ref: pg 150/Table 13; pg 5-77/Exhibit 5-11; and pg 5-71/Attributes

After reviewing the supporting narratives contained in the draft document, it was discovered that we responded inaccurately. The error was one of semantics.

- In the area of DATA DIRECTORY, ABC has been utilizing the features of the automated DATA DICTIONARY for all application systems since 1981. In the DATA DICTIONARY, all data elements are defined, how and where they are used, and who is the primary owner. A sample is provided for your review. It is therefore recommended that the figures adjacent to the DATA DICTIONARY be changed from 0 to 100.
- In the area of SCREEN FORMATS, ABC has just recently moved into the development of on-line applications. Our response was based upon the percentage of on-line applications in relation to our total number of applications that use CRT screen formats. The supporting narrative in the draft document reveals that our response should have included all data inputs and interfaces. A review of our batch applications reveals that each transaction is documented with the data formats, edits and associated controls. It is therefore recommended that the figures adjacent to the SCREEN FORMATS be changed from 17 to 100.

ITEM 3 Ref: pg. 149 Functionally Redundant Systems

The primary reason that ABC maintains its own automated general ledger system is that we are on an accrual based accounting cycle in addition to being an enterprise fund. Our review of CARS II indicates that the system is not capable of adequately handling the volume of data needed to provide detailed financial information within the time constraints required by this Department.

COMMONWEALTH OF VIRGINIA

JUN 17 1987

ELIZABETH B. LACY
CHAIRMAN

PRESTON C. SHANNON
COMMISSIONER

THOMAS P. HARWOOD, JR.
COMMISSIONER

GEORGE W. BRYANT, JR.
CLERK OF THE COMMISSION
BOX 1197
RICHMOND, VIRGINIA 23209



STATE CORPORATION COMMISSION

June 17, 1987

Mr. Philip Leone, Director
Joint Legislative Audit and Review Commission
Suite 1100
General Assembly Building
Richmond, Virginia 23219

Dear Phil:

I have conducted a review of the JLARC exposure draft of the Department of Information Technology Study and appreciate an opportunity to respond to the findings relative to the State Corporation Commission. We certainly applaud your efforts to conduct an extensive study of the technologies available to the Commonwealth of Virginia through the Department of Information Technology. Our response will not be a line-by-line enumeration of the report, but we have some general observations.

First, we would like to clarify that the new Corporate Information System in our Corporate Operations Division is not the only system that the SCC operates on the Sperry Mainframe. We have over 16 major systems operating on the DIT Mainframe and consume nearly 50% of the Sperry resources. Moreover, we spend upwards of \$1.5 million annually to operate these systems. As you know, we are moving to rebuild the particular system mentioned on our own in-house mini computer. We feel that this technological direction is far more cost beneficial to have distributed processing technologies within our agencies. Your report confirms this belief.


Moreover, we certainly agree that the Commonwealth should move to one technology. This current split technology between IBM and Sperry has proved to be very inefficient for our needs as well as for us to be in a position to share data with other state agencies. In that regard, we would strongly suggest that DIT work to develop a higher level user group to review DIT plans, costing strategy, activity levels and acquisition efforts rather than having management decisions and long range plans reviewed from afar by another third party. In other words, there needs to be an even closer, harmonious working relationship between the management at DIT and the management of the agencies. This would certainly prove to be beneficial in developing methodologies

Memorandum
Mr. Philip Leone, Director
Joint Legislative Audit and Review Commission
June 17, 1987
Page 2

instituting changes both in the hardware configurations and software of the systems. Additionally, the cost for converting to a single technology may be expensive in the short term; however, we feel that it would be most beneficial over the long term. The application systems of the SCC are approximately eight years old, and many of them are close to ten years old. Major studies are planned over the next two to five years for evaluation of the needs to rebuild these systems. It is abundantly clear that to move to a single technology requires a planned methodology and approach to rebuilding our systems which incorporates all of the necessary systems development and budget planning necessary to implement such a strategy. We feel that the DIT staff should be brought into the planning process as an advisory role to support and assist the agencies and work as the liaison between DIT and the agencies. As you know, the perception of DIT is not always of supportive role. With the move towards decentralized processing, we must all work towards a common plan that is beneficial both to the agencies as well as DIT which in turn will best serve the needs of the Commonwealth.

Again, I certainly appreciate the opportunity to comment on the chapter of the study referencing the State Corporation Commission. If we can be of further assistance in your efforts, please feel free to call.

Sincerely,


Elizabeth B. Lacy
Chairman



JUN 21 1987

COMMONWEALTH of VIRGINIA
Department of Personnel and Training

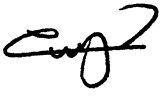
CHONG M. PAK
DIRECTOR

JAMES MONROE BUILDING
101 N. 14th STREET
RICHMOND, VIRGINIA 23219
(804) 225-2131

June 19, 1987

MEMORANDUM

TO: Mr. Philip A. Leone, Director
Joint Legislative Audit and Review Commission
910 Capitol Street, Suite 1100

FROM: Chong M. Pak 

SUBJECT: JLARC Exposure Draft Report
on Department of Information Technology

Enclosed is the Department of Personnel and Training's response to the JLARC report. We appreciate the opportunity to comment on your findings.

If I may provide any further information, please call on me.

CMP/cea
Enclosure

DIT - JLARC Evaluation

On page 147 and 148, the JLARC report quotes an "Ernst and Whinney" statement in support of the data processing planning needs of the State. The E&W statement was essentially inaccurate. I quote, "DPT informs us that the M&D personnel system (component of CIPPS) does not fit their needs, that their needs are adequately satisfied by DPT's current PMIS system, and that DPT was not involved in the decision to acquire the M&D personnel system."

DPT personnel were involved in the very early stages of DOA's efforts to develop a payroll system that could be effectively integrated with the State's personnel system. It was determined, however, that the most cost effective development approach involved the acquisition of a commercially developed payroll system.

According to DOA, all of the commercial systems that met their minimum requirements, also included a number of "personnel" applications. Although each of the two "finalists" systems offered some applications not provided by DPT, DPT systems far exceeded their basic capabilities. Since each had "integration" capabilities there was no business reason for DPT to convert to the M&D software which was eventually purchased.

In addition, I believe the second paragraph of this section of the report also contains statements about the availability of time and attendance and leave accounting applications, which should be reviewed by DOA personnel. These statements appear to be inaccurate and could materially affect the credibility of the proposed recommendation.

DPT RESPONSE TO JLARC REPORT ON DIT

The Department of Personnel and Training welcomes the opportunity to comment on that portion of the JLARC "exposure draft" report on the Department of Information Technology that has been shared with us. We look forward to participating in the effort to improve those deficiencies and faulty practices cited in the report, where such citations can be validated. We are aware that JLARC has spent well over a year on this study and that the services of a private consulting firm have been engaged. Moreover, that portion of the report to which we have been made privy covers a period of almost three years, perhaps longer. Given the magnitude of the study, the amount of time and resources expended in the process, and the multitude of personnel transactions taken and available for scrutiny by the JLARC team, we trust that it will be understood that DPT has faced a daunting challenge in responding within a few days to all the assertions and recommendations growing out of the study.

The segment of the report to which we are asked to respond is Section VIII, Staffing and Organization. We begin under the heading of "Position Classification," on page 246. Certainly a number of problems in position classification have arisen since the Department of Information Technology was established as an agency on September 1, 1984. This agency has been aware of many of those problems, and we recognize that many of them persist. However, before addressing ourselves to the specific problems detailed in the report, we think it appropriate to offer some general and relevant observations.

The Department of Personnel and Training is today an organization of 80 positions, considerably smaller than it was only a few years ago. We must

accomplish our mission, in large measure, through providing policy guidance, training, and delegation of certain authority to the agencies. There are presently five senior classification and compensation analysts and three journey level classification and compensation analysts performing all statewide classification work under the direction of the State Classification Manager. Each senior analyst manages all the classification actions for one or more cabinet secretariats. Among the five of them, they are responsible for providing oversight and assistance to some 168 agencies employing more than 70,000 classified employees. The distribution of this work load, together with all eight analysts' continuing commitment to special classification studies and projects, renders it impossible for the Department of Personnel and Training to monitor every personnel transaction and enforce the application of state policy and rules in every instance where a decision is made.

It is for this very practical reason that we have worked to build a partnership with all state agencies whose employees are subject to the Virginia Personnel Act. Our aim is to promulgate and interpret policies, and to decentralize as much decision-making authority to the agencies as is feasible. Our plan for decentralization does not cede to other agencies that authority and those functions that must be retained by the Department of Personnel and Training. Nor does it abrogate those responsibilities assigned to this department by law. At the same time, as we continue to shift more authority to other agencies, we recognize that there will be ample opportunity for those agencies to make mistakes and for the Department of Personnel and Training to allow some mistakes to go undetected. Even so, we believe that only through the full participation of the agencies in the process of human resource management will the Commonwealth as an employer be successful in maintaining a competent,

motivated, well-trained, and well-informed work force. It is, after all, the hiring agency that is closest to the employee and all the problems attendant on making him a productive and satisfied worker. . Agencies will learn to avoid mistakes only if they are given the opportunity to make decisions affecting all areas of human resource management. We in the Department of Personnel and Training accept the responsibility and the opportunity to provide the guidance, service, and oversight necessary to ensure that the human resource program promotes effective management and supports the attainment of the goals and objectives of all participating agencies. It is in this spirit that our response to the JLARC report is offered.

We turn now to the problems and recommendations discussed in the JLARC report. It was noted (pp. 246-247) that "the limited role" of DPT in the merger process had resulted in 114 inappropriate position classifications within DIT. The characterization of DPT involvement as limited is inaccurate. Before and after the merger of the three affected agencies, the DPT senior analyst assigned to the project had numerous meetings with the staffs of those agencies and attended briefings given by the planning task force. The Director of DPT, the Director of the Office of Compensation and Classification Management Services, and the senior analyst met with and briefed the Secretary of Administration (then Andrew Fogarty) on the salaries of DIT managerial classes. This briefing took place on October 23, 1984, just prior to the approval of the new DIT agency-unique classes. A partial list of these meetings is given in Appendix 1. In addition to these meetings and briefings, DPT's files contain copies of numerous items of correspondence between DPT and DIT touching on classification issues examined during the periods prior to and following the establishment of DIT. There were also DPT intra-agency memoranda and memoranda

addressed to the Secretary of Administration on classification and salary matters affecting DIT. A list of this correspondence is given in Appendix 2. In addition to these documented contacts, there were countless unrecorded telephone conversations and other discussions regarding the merger, establishment of DIT, and subsequent actions. We think these contacts and DPT's participation in the process amply demonstrate that DPT's role was not limited, as stated in the JLARC report.

We cannot accept without challenge the validity of JLARC's finding that 114 positions in DIT are inappropriately classified. While Section VIII does not provide a detailed description of the methodology used in arriving at these conclusions regarding classification, the language of the report and Appendix C ("Inappropriately Classified DIT Positions") strongly suggests that they were reached by comparing employee survey responses with class specifications. Certainly class specifications must be a major reference point in the classification process. However, it appears that JLARC has relied solely on class specifications, to the exclusion of the working environment and comparison with positions in other agencies. Such an approach does not yield reliable results, and it is one that DPT does not accept in its own analysts, nor those of other agencies requesting position classification actions.

If there are inappropriately classified positions in DIT, then DPT is eager to take corrective action as soon as possible. We would like to have the opportunity to review the positions in question with JLARC and DIT. However, it is our understanding that DIT plans to begin a major reorganization immediately. Doubtless, a number of the positions in question will be affected by the reorganization. We propose, therefore, to review all positions affected by the

reorganization, as well as any of the 114 identified positions which are not affected. We will be glad to work with JLARC during the review or, alternatively, to provide a report of our review to JLARC.

We agree that the merger of three agencies to form a single new agency presented many difficult situations which contributed to some of the classification problems. "Agency Realignment Guidelines," published by the Secretary of Administration and Finance in April, 1984, provided that all positions, whether filled or vacant, would be transferred without reallocation. The directive provided further that the document effecting the transfer should indicate whether any positions were expected to undergo significant changes in the new organization. Preparation of new position descriptions for changed positions was to begin, but their completion was not required prior to effecting the realignment/merger. The guidelines were silent as to the timetable for completion of new position descriptions, but we have assumed in such cases that the intent was that the newly formed agency should pursue this requirement as soon as practicable. In the case of DIT, the transfer document submitted by the "lead agency official" (R. W. Miller, Director of the Department of Management Analysis and Systems Development) stated that some of the positions would have significant changes and would be submitted to DPT on the appropriate forms "as soon as feasible." The subsequent document transferring positions from the Department of Telecommunications to DIT, effective January 1, 1985, made no reference to significant changes in any positions. Our records indicate that in fact a number of position classification actions were submitted by DIT between September 1, 1984, and April 30, 1985. However, our staff resources did not permit us to ascertain that all necessary changes and classification

actions had been accomplished. Then, as now, we relied on the agency to initiate those actions on the basis of its own internal review.

The JLARC report observed (p. 247) that approximately 35 percent of DIT's positions were allocated to technical classes, and that the class specifications were written in vague language, lacking clear distinctions among the classes. These class specifications were written in the early 1980's, a time when the Director of Personnel directed that specifications be very brief and general, in order to accommodate a variety of jobs in one class and thereby reduce the number of classes. While we still attempt to limit the number of job classes, we have more recently recognized the value of having much more descriptive and definitive class specifications. For almost a year, DPT has been publishing specifications in a new format, which includes the class concept, statements reflecting the degree of all seven classification factors, and a qualifications guide. We have also recently launched a statewide class specification update project, in which many agencies are participating. Classes in the data processing group are now under study and class specifications will be re-written. This project will involve consultation with subject-matter experts where necessary, so that the final products will be specifications that clearly delineate among the classes.

In describing DIT's role (pp. 247-251), the report described five classification practices used by DIT which had resulted in the inappropriate classification of 114 positions. The first practice mentioned was the failure to write current position descriptions for all positions. We agree that updating position descriptions is essential in any reorganization. The report referred to three fiscal and accounting positions which, prior to merger, had been the top fiscal

positions for their respective agencies. Our records identify these positions as IT861 (Fiscal Director A), formerly of the Department of Computer Services and vacant since February, 1987; IT850 (Fiscal Officer), formerly of the Department of Management Analysis and System Development; and IT852 (Accounting Manager A), formerly of the Department of Telecommunications. All three of these positions were reallocated to their present classes on September 1, 1984, on the basis of a statewide fiscal and accounting study performed by DPT. However, these reallocations were based upon the duties and responsibilities assigned to the positions while they were still in their old agencies. DIT has not initiated any classification action on any of these three positions since the merger. During December, 1985, we received a new position description for IT850, in connection with the conversion to the new position description forms to be used in the new pay for performance system. However, owing to the volume of position descriptions received from all state agencies over a period of several months, we reviewed them on a sampling basis. All new position descriptions accompanied by a Form P-5 requesting classification action were reviewed and acted upon. Positions in the class Accounting Manager A need not be the top fiscal positions in agencies. On the other hand, JLARC correctly observes that the Fiscal Director A and the Fiscal Officer should be limited to the top fiscal position in an agency. Since the Fiscal Director A position in DIT is now vacant, we will ensure that it is re-evaluated before another appointment is made. We also intend to evaluate the other two positions mentioned.

The second practice noted was that of retaining personnel when their positions were no longer needed. It is the responsibility of each agency head to determine whether he needs a position. This practice is, of course, controlled somewhat by the budget process and the fact that every agency is

limited by a maximum employment level. The JLARC statement that "the agency has placed at least 30 incumbents in new positions with new duties but retained the old classifications," suggests that all of these positions are now misclassified. While that might be true of many of them, it does not necessarily follow that the assignment of new duties requires reallocation to a new class.

The report cited as examples three Computer Operations Supervisor positions and a Production Control Supervisor which, in the former case, had no supervisory responsibilities and, in the latter case, was assigned duties not involving production control. We agree that the classification of these positions raises questions, and we intend to evaluate them. In connection with this point, it should be noted that the agency's 7th Street facility is recognized as one of the major computer operations centers on the East Coast. Even though some other state agencies and institutions use most of the same generic data processing classes as does DIT, none of them has a facility approaching the complexity and magnitude of the DIT mainframe. Therefore, in some instances, we have applied a broad interpretation of class concepts in allocating DIT positions. In doing so, however, we have never intentionally allocated a position to a class in a grade higher or lower than that we thought appropriate to the work involved.

At this point in the report (p. 248), JLARC digressed to observe that "a compensation and classification analyst at DPT pointed out that DIT has many people who are no longer appropriately classified." During the JLARC study, a DPT senior analyst, and perhaps other members of the staff, talked a number of times with a JLARC team member and provided as much requested information as was available. We have always cooperated fully with any state agency

engaged in an inquiry or study. In this case, the analyst concerned attempted to be forthright in answering questions and providing information. We have no written record as to any of his comments, but we believe that any such statements should be taken in the context of his intent to acknowledge that DIT, as a complex and newly formed agency, doubtless was still experiencing some organizational and classification problems.

The third practice commented on was that of using agency-specific and technical classes to allocate positions similar to those which are found in numerous other agencies. As though to reinforce the point, JLARC continued: "In fact, according to a high-level manager in the Human Resources Division, 'prior to December 1984, if the Director felt strongly enough about having a position classified a particular way, all he did was go to the Director of DPT and he was accommodated.'" Although the individual who was Director of DPT at that time has since departed, there is nothing in the record nor in the recollection of those intimately involved to sustain that notion. Any such accommodation resulting in a classification action would necessarily have been communicated to the senior analyst assigned to DIT. At no time has a DPT Director, past or present, directed any DIT position allocation not previously recommended by the senior analyst. It is true, however, that the Director of DIT (Lemuel C. Stewart, Jr.) met several times with the Director of DPT during and after the merger. He also had numerous telephone conversations with the DPT senior analyst.

JLARC illustrated the practice of using agency-specific classes by referring to several positions in the Division of Administration and comparing them to positions in generic classes in other agencies. We allocated these positions on

the basis of information provided by the Director of DIT and members of his staff. At the time, we believed the allocations to be appropriate, even though we recognized that the classes were in some cases at higher grades than those of positions doing related working in other agencies.

The first reference in this area was to an Information Technology Manager (grade 18) acting as chief of the Finance Branch. The reference is to position IT748. The latest position description submitted by DIT is dated October, 1985, and is obviously inaccurate. (As a related matter, JLARC compared this position with the class Controller, which JLARC thought to be at grade 17 at the time this portion of the JLARC report was written. The Controller class was regarded to grade 18 on June 1, 1985.) In fact, the records on file now do not fully and accurately account for all the positions assigned to the Finance and Planning and Budgeting Branches. We intend to pursue this matter with DIT and to ask for a thorough update on the changes that have taken place and the current organization of the branch.

A second reference was made to a Computer Systems Engineer position in the Finance Branch responsible for the billing function, and to a Computer Systems Chief Engineer responsible for budgeting. The first position referred to is IT540, for which we do not hold a current position description. The assignment of this position will be included among the items we intend to ask DIT to update. We must also obtain an updated position description on position IT658, the Computer Systems Chief Engineer assigned budgeting responsibilities.

The third and final reference under this topic was made to the Procurement and Contracting Branch of the Division of Administration, which is headed by an Information Technology Manager. JLARC criticized the fact that all professional subordinate positions were classified in the Computer Systems Engineer series, while positions seen as performing comparable work in other agencies were allocated to lower level classes. Because we have had similar questions about the classification of the DIT procurement positions, we have pressed DIT in the past for supporting information. We think the information presented justifies the use of technical classes in the Procurement and Contracting Branch, but we also recognize that this will continue to be a contentious issue. As recently as December, 1986, we addressed to the Secretary of Administration a memorandum setting forth the reasons for the disparity in salaries between procurement positions in the Department of General Services and those in DIT. We pointed out, among other things, that as early as 1968 the Governor had directed that all automated data processing acquisitions be approved by the then Division of ADP. Subsequently, legislation enacted by the General Assembly broadened the procurement powers of the Division of ADP and its successor agencies. In summary, we have agreed with DIT's position that the economic acquisition of data processing equipment and related services requires highly specialized and technical analysis by individuals well grounded in knowledge of data processing technology. For this reason, we have concurred in the allocation of DIT's procurement positions to the Computer Systems Engineer series.

The fourth DIT practice cited by JLARC was that of broadly interpreting some class specifications, especially in the area of geographic dispersion of field

facilities or units. The report focused on two examples: the Audit Director-Internal (grade 18) and Employee Relations Director C (grade 16).

The audit position was not allocated to its class on the basis of geographic dispersion, but rather on the complexity and pervasive nature of the information systems operated by DIT. For example, just one system, Personnel Management Information System, drives the payroll for employees throughout state service. Another system embraces information essential for administering the state's tax laws. Yet another maintains retirement information affecting state and local employees. Still other systems track central procurement and contracting activities. In summary, these and many other automated systems operated by DIT present potential vulnerabilities to dishonesty, fraud, and compromise of security and confidentiality. We consulted with the State Internal Auditor on this position, and he concurred that it represented the highest level of auditing responsibility in single agencies.

Again, the Employee Relations Director C position was not allocated to this class because of geographic dispersion. In fact, the absence of that factor was noted, but was considered to be offset somewhat by the high level of shift work and the fact that the agency operates 365 days per year. Moreover, this position also has the unusual responsibility of managing the public relations staff. Even so, if DPT's initial allocation of the position was somewhat liberal, that error has been corrected by the recently completed statewide study of the Personnel group, which resulted in the downward reallocation of the position to a class in grade 15, Human Resource Manager Senior.

The fifth DIT practice pointed out was that of failure to initiate classification changes when reductions in staff or technological changes had led to gradual changes in job duties. As mentioned earlier in this response, DPT has in some cases agreed to a broad interpretation of some of the operations class specifications, but we share some skepticism about the number of Computer Lead Operators and Production Control Lead Technicians without any lead responsibilities. We intend to pursue this question with DIT and will take whatever classification action is indicated.

Recommendation (54) (p. 252).--"DIT should write new position descriptions for the 114 inappropriately classified positions identified through the JLARC analysis." There was a further recommendation that DIT should comply with DPT policy on reallocation, abolishment, and establishment of positions. We concur wholeheartedly that such compliance would tend to reduce the type of problems highlighted in the JLARC study.

Under this recommendation, JLARC commented on DPT's statutory responsibility for establishing and administering a program to evaluate agencies' effectiveness in performing personnel activities. That this responsibility has not been discharged fully in recent years is a direct result of staff reductions alluded to near the beginning of this response. We now have plans, however, to establish the positions necessary to carry out our evaluation program.

JLARC continued, under recommendation (54), that "DPT has served only in a consultative role in total agency reorganizations in the past. The policies and procedures DPT has implemented in order to carry out its statutory mission has limited its involvement and oversight powers in agency reorganization

proposals to concerns with position allocations." We should point out, first, that DPT has no power to intervene in the process of an agency reorganization, except to control the classification and compensation of positions. Each agency head is responsible to organize in the manner that best supports the accomplishment of the agency's mission. In the Executive Branch, it has been the practice that all major reorganization plans have been reviewed and approved by the cognizant cabinet secretary before implementation. In spite of the limitation of DPT's general authority in this area, it is very common for agency heads to consult with the assigned DPT senior analyst and other staff specialists when planning reorganizations. This was true in the case of planning for the establishment of DIT. The nature of advice offered in such situations often goes to organizational issues beyond the classification of positions.

A recurring theme throughout the segment of the JLARC report to which we are responding is that DPT has taken a "stand off" approach to the merger establishing DIT, and to subsequent activities. For example, also under recommendation (54) (p. 253), JLARC quoted a DPT analyst as saying that DPT has "pretty much bought off on the fact that DIT positions need data processing knowledge and experience." We do not believe that any DPT analyst made such a statement applicable to all DIT positions. In view of this statement, JLARC went on to conclude that "when DIT has requested specific allocations, DPT has not routinely questioned the requested allocation." We strongly disagree with this assertion and will offer, in subsequent paragraphs, some references to correspondence that demonstrates DPT's active and critical role in the establishment and allocation of DIT positions.

JLARC commented (p. 253) on the decentralized classification program. It is true that we review decentralized classification actions on a monthly basis. We do so in order to identify trends and problems areas. However, every decentralized action is also reviewed by a DPT analyst immediately after the action is entered in PMIS. We do not consider this practice to result in a less meticulous review, and in fact have questioned and revoked some actions on the basis of post-audits. If, as alleged, "a high-level Human Resources Division manager stated that decentralized authority does not work at DIT," that assessment has never been communicated by DIT to DPT. In fact, we would question DIT's continued interest in retaining decentralized authority if that were the case.

Another example of inappropriate classification described by JLARC (p. 254) was that of a Computer Operations Supervisor, who in April, 1986, was assigned duties as an interior decorator. The report stated: "Yet DPT accepted the agency classification of Computer Operations Supervisor for this position." Not only do we think that such a classification is ridiculous, but would also question the need for devoting a position to such a function. DPT did not accept this classification. During the period mentioned in the JLARC report (spring, 1986), the assigned DPT senior analyst attended a DIT briefing on its proposed reorganization of the Facilities Support Branch of the Computer Services Division. The analyst was presented a preliminary package describing the proposal. On June 4, 1986, the analyst addressed a letter to the DIT Director of Human Resources, outlining a series of problems associated with the proposal. Among them was the allocation of position IT357, the Computer Operations Supervisor referred to in the JLARC report. Comments from the analyst's letter are quoted here: "This position is to plan office space and

furnishings. Since most agencies accomplish interior design and decoration on a special-project basis, we do not have a class specification suited to the work you described. I am inclined to allocate the position to Purchase and Stores Supervisor A (grade 6). Again, we cannot reallocate position IT357 to a field of work so remote from computer operations, so it would be necessary to establish a new position." DIT remained silent on this issue for a number of weeks following the analyst's letter. Subsequently, however, the Director of DIT called the analyst, acknowledged his agreement with DPT's assessment of the reorganization package, and indicated that he and his staff were going to re-think the entire proposal. That was the last communication between DIT and DPT on this matter. In retrospect, we see now that DPT should have taken the initiative in following up and clarifying DIT's intentions with respect to the reorganization of the Facilities Support Branch.

JLARC made a similar criticism related to a Computer Systems Senior Engineer assigned to the Facilities Support Branch. Similarly, this position, IT591, was discussed in the same letter, in which it was pointed out that corrective classification action should be taken. Ten positions were discussed in the letter, which we will make available for examination if that becomes necessary.

JLARC commented (pp. 254-255) on the classification of two DIT training positions. These positions were evaluated during the Personnel study and have been reallocated as follows: IT916 to Personnel Development Manager (grade 14), and IT917 to Personnel Development Specialist (grade 11). The class specifications for these new classes do not require that incumbents actually conduct training. Positions in both classes may be involved in a wide range of

managerial, planning, and administrative duties connected with development programs. We will be glad to discuss the basis of these reallocations with JLARC, if that is requested.

Recommendation (55) (p. 255).--"The Department of Personnel and Training should reassess its role in agency reorganization . . ." We intend to examine our role in such cases in order to determine whether there are additional steps we might take to facilitate the process and to ensure the effective maintenance of the State Classification Plan.

"DPT should also assess its current policies and procedures used to monitor and evaluate personnel activities . . ." DPT has recently distributed new decentralization guidelines and standards for the state's human resource management program.

Recommendation (56) (p. 255).--"DPT should revoke DIT's memorandum of agreement for delegated classification authority. . . ." Though we agree that significant errors have been committed, we would like first to cooperate with DIT in a thoroughgoing review of all classification issues raised in the JLARC report. If, upon completion of such a review, it appears that DIT is not capable of meeting all terms of the agreement, we will either suspend or revoke the memorandum of agreement now in effect and will continue to work with DIT in their effort to overcome deficiencies.

The JLARC report continued (pp. 256-258) with another critique of class specifications. In general, we agree with JLARC's criticism of the vagueness of the language, their lack of specificity, and their failure to provide clear-cut

distinctions among classes in the same series, and we have responded to this critique in an earlier paragraph. However, we are obliged to comment on what we think is JLARC's misinterpretation of the state's use of class specifications. To illustrate, we quote in part from pages 257-258: "A college degree in computer science, mathematics, or engineering is listed in all of the specifications in this series as the required educational qualification. However, 69 percent of DIT's 140 incumbents in these positions either have unrelated degrees or no degrees. Many of these staff have prior experience which substitutes for the required degree."

We would point out that the qualifications guide provided in a class specification is in fact just that. The specific qualifications required must always be related directly to a particular position, not to a class in general. This approach accords with the federal "Guidelines on Employee Selection Procedures" and laws and policy governing employment practices. One of the policies followed by the state, and demonstrated by our qualifications guide, is that, in the absence of specific legislation requiring a degree or certification, provision is always made for the substitution of an equivalent combination of training and experience for educational qualifications outlined in class specifications.

Recommendation (57) (p. 258).--"DPT should conduct on-site audits for all positions in DIT which are currently allocated in the Computer Systems Engineering, Telecommunications Services, and Communications Services series. . . ." We intend to pursue this recommendation using the staff resources of DIT and the DPT-led study team reviewing all data processing classes.

APPENDIX 1

Meetings and Briefings*

1984

- March 16 - With Donnivan L. Massey, member of DIT planning task force
- April 10 - With Personnel Officer of Department of Computer Services (DCS)
- April 13 - With Personnel Officer of Department of Management Analysis and Systems Development (DMASD)
- April 30 - With DIT planning task force
- May 3 - Toured DCS/DIT operations spaces
- June 26 - With Donnivan L. Massey, member of DIT planning task force
- July 12 - At DMASD
- August 24 - At DCS
- September 12 - At DIT
- September 18 - With Personnel Officer of DIT
- October 1 - At DIT
- October 11 - With Personnel Officer of DIT
- October 23 - Director of DPT, Director of Office of Compensation and Classification Management Services, and DPT Senior Analyst briefed Secretary of Administration (Andrew Fogarty) on salaries of DIT managerial classes.
- November 15 - With Personnel Officer of DIT

1985

- February 26 - With Personnel Officer of DIT on decentralization of classification authority
- March 21 - At DIT for briefing on financial management

*DPT representative was Classification and Compensation Senior Analyst unless otherwise noted.

APPENDIX 2

Correspondence

1984

- June 27 - Letter to Employee Relations Director of Department of Computer Services (DCS), returning requests to reallocate an Information Officer A and to establish an Audio-Visual Technician, pending further action on the part of DCS.
- July 12 - Letter to Director of DCS, denying request to establish Information Officer B.

1985

- January 3 - Letter to DIT Personnel Practices Supervisor, returning without action a request to establish position IT128 as Information Technology Manager. Also discussed problems related to establishing four positions in the Administrative Staff Specialist A class and the reallocation of Information Technology Executive Assistant, position IT010, to Administrative Staff Specialist C.
- January 23 - Letter to DIT Employee Relations Director, explaining DPT's position on the six positions discussed in January 3 letter.
- March 4 - Letter to DIT Personnel Practices Supervisor, disapproving request to reallocate two positions from Clerk-Typist C to Clerk D.
- March 8 - Letter from Director of DPT to Director of DIT, again explaining DPT's conclusions with respect to positions IT010, IT011, IT012, IT013, and IT014. Letter also discussed DIT's request for decentralized classification authority.
- October 9 - Letter to DIT Personnel Practices Supervisor, disapproving establishment of position IT853 as Accounting Manager C, but approving its establishment as Accounting Manager B.
- November 26 - Letter from Director of DPT to Director of DIT, explaining DPT's revocation of the reallocation of six Switchboard Operator A positions. DIT took this action under the Memorandum of Agreement relating to decentralized classification authority.
- December 16 - Letter from DIT Deputy Director to DPT Senior Analyst, expressing appreciation for the latter's audit of a newly established Administrative Staff Specialist A position.

1986

- January 29 - Memorandum from Director of DPT to Secretary of Administration, summarizing information related to salaries of DIT classes.
- June 4 - Letter to DIT Director of Human Resources, discussing a number of problems related to proposed classification of ten positions in the Facilities Support Branch, Computer Services Division.
- October 21 - Letter to DIT Personnel Practices Supervisor, describing the findings of a DPT audit of position IT683, which was reallocated from Program Support Technician to Library Assistant.
- December 5 - Memorandum from Director of DPT to Secretary of Administration, explaining the disparity in salaries between procurement positions in the Department of General Services and those in DIT.

1987

- January 28 - Letter to Director of DIT, providing information on the employment of a temporary Executive Assistant and requesting DIT's cooperation in assessing the effect of this action on other key positions in DIT.
- May 18 - Letter to DIT Director of Human Resources, explaining DPT's conclusion based on review of position IT044, Executive Secretary.



COMMONWEALTH of VIRGINIA
DEPARTMENT OF SOCIAL SERVICES

June 22, 1987

Mr. Philip A. Leone
Director
Joint Legislative Audit and Review Committee
Suite 1100, General Assembly Building
Capitol Square
Richmond, Virginia 23219

Dear Mr. Leone:

The following comments are provided regarding the technical content of the DIT JLARC Exposure Draft that effect the Department of Social Services (DSS). Comments are referenced to the appropriate section of the Exposure Draft.

Cost-Containment Reviews - Page 139

The \$88,000 cost savings opportunities identified by DIT may not have taken into account the unique attributes associated with each job execution required for the DSS batch operations.

Some of the key factors required for the scheduling of the batch operations are:

- Cut-off schedules that ensure the systems will be available to on-line users the following morning.
- Production batch runs that sometimes must be started prior to the 6:00 p.m. rate change in order that user and technical staff can validate the output in the evenings prior to hardcopy distribution and on-line availability of the systems the next morning.

Mr. Philip A. Leone
June 22, 1987
Page 2

Application System Documentation - Tables on Pages 150 and 5-77

The source of the percentages presented in these tables is not clear. The level of documentation for a simple system such as Labels does not compare to that required for a complex system such as VACIS. If this is not taken into consideration, the aggregate percentages could be misleading.

Applications Prototyping - Page 152 & DSS Analysis - Page 5-95

The report states on page 152 that DSS uses MAPPER-based code for four major systems. On page 5-95, the report identifies four systems written in MAPPER:

- Caseload Standards/Cost Allocation
- Refugee Management Information System
- VACIS-Social Services
- VACIS-ADC

The Caseload Standards/Cost Allocation system was developed using COBOL prior to the introduction of MAPPER. It was later enhanced using MAPPER for some functions such as data entry.

The Refugee Management Information System was initially developed in MAPPER as a small user system. However, user requirements have increased and the system is currently being redesigned using a combination of COBOL and MAPPER.

The reference to VACIS-Social Services and VACIS-ADC being written in MAPPER is an error in fact. VACIS was developed prior to the introduction of MAPPER and was developed using DMS-1100 and COBOL.

Automated Systems Overview - Exhibit 5-7, Page 5-51

The information regarding the number of programs, jobs/runs and types of reports in this exhibit do not appear to be correct. As an example, the VACIS ADC area has 158 programs, 113 reports and 142 jobs/runs. The VACIS Social Services area has 156 programs, 61 reports and 121 jobs/runs. It is possible the information provided to E & W on the survey forms was not complete or there was a misunderstanding of the specific information requested.

If needed, we will be happy to provide the information required to correct the report.

Mr. Philip A. Leone
June 22, 1987
Page 3

Comments on th ACSES System - Page 5-93

DSS refers to the Child Support Enforcement MAPPER system as ACSES, not ACCESS.

The report states that all child support payments are entered into a suspense file. This is a mistake in fact. Only unidentified payments are entered into the suspense file.

If additional information is needed, please let me know.

Very truly yours,

A handwritten signature in black ink, appearing to read "William L. Lukhard". The signature is fluid and cursive, with a large, sweeping flourish at the end.

William L. Lukhard
Commissioner

cc: The Honorable Eva S. Teig



COMMONWEALTH of VIRGINIA

Office of the Comptroller

EDWARD J. MAZUR, C.P.A.
COMPTROLLER

P.O. BOX 6-N
RICHMOND, VIRGINIA 23215

June 24, 1987

Mr. Philip A. Leone, Director
Joint Legislative Audit and
Review Commission
Suite 1100, General Assembly Building
Capitol Square
Richmond, Virginia 23219

Dear Phil:

Thank you very much for the opportunity to review a draft copy of the JLARC study of the Department of Information Technology, together with sections of the supporting report by Ernst & Whinney. As I understand it, our task in reviewing this material is to help you ensure that the observations and conclusions, as stated, are accurate and supportable.

The study involved very complicated issues and required the consideration of a great number of situations and perspectives. Perhaps it is for that reason that there were a number of observations and conclusions directly related to the Department of Accounts that were not accurate, and which should be corrected prior to the issuance of the final report. Since I was not briefed on the exact methodology used in conducting the study, I am unable to express any conclusions as to why these inaccuracies occurred. It may be that there was an inadequate representation among those individuals who were contacted, relating to a particular subject. It may also be that supporting documentation, including workpapers and related correspondence, were not reviewed in sufficient detail to more tightly anchor observations and conclusions. Nevertheless, that is why you have a review process and why we so much appreciate having an opportunity to clarify the facts.

I have enclosed the Department of Accounts' comments regarding the JLARC report. A table of contents is included, which is arranged by subject matter that refers to each of our comments. Each comment appears on a separate page, which is structured to include the following:

- o Original Comment Included in Draft Report (with page reference).

Mr. Philip A. Leone
June 24, 1987
Page 2

- o DOA's Comment on the Observation or Conclusion.
- o DOA's Proposed Approach for Correcting the Observation or Conclusion.
- o DOA's Recommendation On Potential Contact Persons Who Can Aid in the Clarification.

I have intentionally avoided shipping to you copies of documentation and other materials that would assist you and the consultants in modifying the report. However, these materials are available, and we would be most pleased to share them with your staff and with the Ernst & Whinney consultants, at your request. Again, I appreciate the opportunity to comment on the draft report and work with you to ensure its accuracy.

Sincerely yours,



Edward J. Mazur

/vpl

Attachment

cc: The Honorable Stuart W. Connock, Secretary of Finance
Ms. Karen F. Washabau, Deputy Secretary of Finance

DEPARTMENT OF ACCOUNTS
COMMENTS REGARDING MAY 22, 1987, DRAFT JLARC REPORT,
ENTITLED "REVIEW OF INFORMATION TECHNOLOGY
IN VIRGINIA STATE GOVERNMENT"

JUNE 24, 1987

DEPARTMENT OF ACCOUNTS
 COMMENTS REGARDING MAY 22, 1987, DRAFT JLARC REPORT,
 ENTITLED "REVIEW OF INFORMATION TECHNOLOGY
 IN VIRGINIA STATE GOVERNMENT"

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DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

When agencies fail to adequately plan for major applications systems, the expected benefits of the systems may not be realized. Planning is especially important when systems are to serve integrated, statewide functions. And the lack of adequate planning for such systems can be more serious and costly. E&W found, for example, that the Commonwealth Integrated Payroll and Personnel System (CIPPS) developed for the Department of Accounts may not be able to serve as an integrated system as originally thought.

According to E&W:

The Department of Personnel and Training (DPT) is responsible for the government's "official" personnel system. DPT informs us that the M&D personnel system (component of CIPPS) does not fit their needs, that their needs are adequately satisfied by DPT's current PMIS System and that DPT was not involved in the decision to acquire the M&D personnel system. Under these conditions, only DOA would benefit from the purchase of the M&D personnel system, which is a duplication of the personnel application software and potentially an inefficient use of funds.

(reference pages of draft)
 JLARC study: page 147-148
 E&W study: page 5-84

DOA's Comment on the Observation or Conclusion

Throughout the CIPPS effort, planning has been a central concern. From the initiation of the project, both DPT and DIT were afforded the opportunity to, and did actively participate in, the software review and package selection. The software of McCormack and Dodge provides a strongly integrated payroll/personnel system that would provide an excellent foundation for future integration of the two systems in the Commonwealth. Extensive files on the cooperative development effort are available for review within DOA.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

The referenced text should be replaced with the restated text shown below.

When agencies fail...integrated, statewide functions. When the functions to be integrated reside in separate secretarial areas, the integration effort must be carefully negotiated to best serve the Commonwealth. E&W found, for example...

According to E&W:

The Department of Accounts (DOA) is responsible for the government's "official" payroll system. In 1984, in concert with then-Governor Robb's direction to use automated technology to best serve the Commonwealth, DOA began a search for new software to replace the aging Central Payroll System. During this search, both the Department of Personnel and Training (DPT) and DIT participated in all aspects of the requirements definition, general design and package selection for CIPPS. Mr. William S. Girling of DPT was a voting member of the package selection committee. As such, he participated in all analytical activities and approved the decision to acquire a personnel system as well as the selection of the McCormack & Dodge software which is the basis of CIPPS.

During the software review, personnel system needs were reviewed to ensure their inclusion in the software to be acquired. Based upon this analysis, the M&D software capabilities exceed the current capabilities of PMIS and include certain functionality, such as benefits accounting, which, within the Commonwealth, is considered a payroll responsibility. Thus, the M&D personnel system needed to be purchased to discharge DOA's legal responsibilities.

DOA's Proposed Approach for Correcting the Observation or Conclusion cont.:

The personnel capabilities of M&D were also acquired to provide an integrated payroll/personnel system for those agencies (legislative and judicial) which do not use PMIS and have manual personnel systems. In addition, the system provides a foundation should the Commonwealth decide to move to a fully integrated payroll/personnel system in the future.

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Charles H. Taylor, Jr.
Assistant Comptroller
225-2116

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

The CIPPS system also does not provide all of the functionality needed by the user agencies. We noted that CIPPS does not currently perform project accounting, or labor distribution, and does not capture time and attendance data. Because of this condition, some user agencies have developed their own systems to account for time and attendance, and personnel leave. Of the other six agencies participating in the study, ABC, DMV and DSS had their own in-house payroll systems, and personnel leave accounting systems.

(reference pages of draft)

JLARC study: page 148 and 151 (Table 14)

E&W study: page 5-84 and 5-103

DOA's Comment on the Observation or Conclusion

The report's text commingles facts about several systems and time periods. CIPPS currently provides the capability to account for time/attendance and leave data and to perform labor distribution and project accounting. Prior to the implementation of CIPPS, certain agencies developed their own time/attendance and leave accounting systems as these functions were not addressed by Central Payroll. Subsequent to these systems implementations and before the implementation of CIPPS, DOA developed the Statewide Leave Accounting System (SLAS) which works in conjunction with the Central Payroll System to address the leave accounting needs of classified State employees. An additional clarification of fact is necessary in that ABC, DMV, and DSS do not have internal systems which calculate payrolls for their employees. Also, DSS utilizes SLAS, which is provided by DOA, not an in-house leave system.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

The referenced text should be replaced with the restated text shown below.

CIPPS currently provides significantly greater functionality than provided by the Central Payroll System and will allow DOA to discontinue the following systems:

Central Payroll
Mirror-Image Payroll
Statewide Leave Accounting
U. S Savings Bonds

CIPPS captures time and attendance data for seven pilot agencies and also provides the capability to maintain leave data and to perform both project accounting and labor distribution. In addition, representatives of the Commonwealth's colleges and universities are currently working with DOA to further enhance the system to meet their unique requirements. Prior to the implementation of CIPPS, some agencies developed time/attendance and leave systems to meet internal needs not then fulfilled by the Central Payroll System. (Delete: ... and DSS... in-house payroll systems, and...)

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Charles H. Taylor, Jr.
Assistant Comptroller
225-2116

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

CIPPS is the payroll system preferred by DOA. It was scheduled for full implementation during 1987, but has been put on hold due to an unexpected funding problem. DOA plans to resume full implementation when the required funds become available. There are seven pilot agencies currently using CIPPS, which represent 2000 of over 100,000 state employees.

(reference pages of draft)
E&W study: page 5-83

DOA's Comment on the Observation or Conclusion

The implementation of CIPPS was planned as a phased effort to allow a high level of staff support to agencies, ensuring that the conversion effort would be successful and well-managed. This was understood by senior persons within the Administration and was clearly understood by everyone who was involved with the design and development.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

The referenced text should be replaced with the restated text below.

... preferred by DOA. It was scheduled for partial implementation... DOA plans to resume a phased implementation schedule on October 1, 1987. There are...

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Charles H. Taylor, Jr.
Assistant Comptroller
225-2116

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Functionality – CIPPS does not provide the personnel system functionality required by DPT, and currently available in PMIS.

(reference pages of draft)
E&W study: page 5-91

DOA's Comment on the Observation or Conclusion

CIPPS provides many aspects of personnel functionality, such as applicant tracking, not provided by PMIS. In addition, CIPPS provides the functionality to tailor its applications to specific user needs. Certain nonexecutive branch agencies have expressed an interest in potentially utilizing the CIPPS personnel functions as their personnel system and as a means of eliminating current systems and procedures that they rely upon for personnel information.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

The text should be rewritten to reflect that the functionality of CIPPS satisfies, and in some cases, enhances that provided by PMIS.

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Charles H. Taylor, Jr.
Assistant Comptroller
225-2116

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

We agree with DPT that if the current PMIS System meets the requirements of DPT, and if PMIS is an effective user of the technology, then there is no business reason to switch systems. We believe that use of the current PMIS system will increase if DIT can establish access to the Sperry system and PMIS for the IBM users. There are separate human resource systems maintained by DOA, ABC, DMV, and DSS which are potentially redundant. In term of efficiency, it is less costly to build and maintain one complete personnel system, then five separate systems. (Reference page 5-91, Ernst & Whinney Study)

DOA's Comment on the Observation or Conclusion

This comment does not reflect an understanding of the circumstances involving the development of CIPPS nor, perhaps, the circumstance surrounding the development of PMIS. PMIS, while it is an on-line system, is one of the Commonwealth's older systems, going back to 1978. It was essentially developed in-house. Based on various reviews carried out during the development of CIPPS, there is every reason to suspect that there may be significant occurrences wherein the PMIS system is not necessarily the most efficient system. The PMIS system does not contain all of the personnel management features currently being requested by some of the more sophisticated agencies. It does not contain information or have ready access to information maintained within the payroll system, in order to respond to information needs by senior management of the Commonwealth. It is, in short, a home-grown system with certain deficiencies.

The fact that the Department of Personnel and Training has, as it has alleged by the comment, expressed satisfaction with the PMIS system, may not be an adequate basis for determining whether or not PMIS is the system Personnel and Training should continue to rely on. It is a relatively common understanding that personnel and payroll systems, in the environment of today's available technology, are generally designed to work as integrated systems. This is because there is usually a significant duplication of data that is required by both systems. It also reflects the fact that, in many instances, as is true for many agencies and institutions within the Commonwealth, personnel staff are also the same individuals who handle payroll.

Consider the case from the agency's perspective where an individual has to sit at a PMIS terminal to do personnel transactions and then switch over to a different terminal to do payroll transactions, at times entering the same data. This is redundancy. The fact that there has not been a thorough assessment of the ability of CIPPS to be the personnel system for DPT is the comment that should be made here, rather than suggesting that the Department of Accounts and other agencies and institutions have established redundant systems.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

We recommend that the comment be rewritten to give consideration to the above observations. Beyond those mentioned, it may be well that the comments should be rewritten to reflect that there is a major opportunity for the Commonwealth to encourage the migration to a single mainframe environment if PMIS is replaced by the personnel functions within CIPPS. Accordingly, the comment should reflect that there may be considerable business reasons for replacing PMIS.

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Charles H. Taylor (225-2116)

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Control - DPT does not want to surrender control of personnel processing to DOA's system. If DPT lost PMIS, the authority over pay levels would probably revert to the agencies. Instead, PMIS interfaces with CIPPS daily. The daily transactions are passed to CIPPS at night, so that the payroll data can be matched to the personnel records.

(reference page of draft)
E&W study: page 5-91

DOA's Comment on the Observation or Conclusion

CIPPS security measures could enable a user, other than DOA, full control over selected aspects of the system. This could include control over all defined "personnel" functions. This capability is currently used to segregate control over certain functions between DOA and the user agencies as well as between individuals within user agencies.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

The text should be rewritten to reflect that the control features within CIPPS would allow DPT to control personnel data.

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Charles H. Taylor, Jr.
Assistant Comptroller
225-2116

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

We agree with DPT that if the current PMIS System meets the requirements of DPT, and if PMIS is an effective user of the technology, then there is no business reason to switch systems. We believe that use of the current PMIS system will increase if DIT can establish access to the Sperry system and PMIS for the IBM users. There are separate human resource systems maintained by DOA, ABC, DMV, and DSS which are potentially redundant. In term of efficiency, it is less costly to build and maintain one complete personnel system, then five separate systems.

(reference pages of draft)
E&W study: page 5-91

DOA's Comment on the Observation or Conclusion

As PMIS does not currently meet all agencies' needs, the M&D human resources/personnel system was acquired, in part, to provide a personnel system for those agencies (legislative and judicial) that do not currently use PMIS and have manual personnel functions. As pointed out in the Computer Services portion of the JLARC study, IBM processing costs (CIPPS) are lower than those for Sperry (PMIS) and there are significant technical difficulties preventing IBM users from accessing Sperry systems. As costs are a prime motivator of business decisions, so should they be a factor in business actions.

As regards the issue of human resource systems operated by DOA, DOA maintains the M&D system for use by agencies. DOA maintains certain payroll-related personnel items for employees in M&D that are required by the software to perform payroll functions. This does not infer that DOA is operating a redundant system.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

The text should be rewritten to reflect the above considerations.

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Charles H. Taylor, Jr.
Assistant Comptroller
225-2116

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Similarly there is no automated interface between IBM users' personnel-related systems and DPT's central personnel system on Sperry. DOA, ABC, DMV, and DSS all maintain their own personnel-related systems (Table 14). Additional opportunities for developing unified central applications should be explored.

(reference pages of draft)

JLARC study: page 149 and page 151
(Table 14)

E&W study: page 5-103 and 5-104

DOA's Comment on the Observation or Conclusion

DOA and DPT conducted, and documented through correspondence, extensive discussions on the feasibility of integrating CIPPS and PMIS before arriving at the decision to maintain functionally separate systems. DOA maintained, and continues to maintain, that the duplicate entry of more than several data elements could be eliminated through a closer integration than that permitted by the ultimate negotiated agreement with DPT. The CIPPS personnel module allows agencies, particularly those not on PMIS, to effectively integrate personnel and pay data on one system. As the CIPPS personnel module will ultimately be made available, under joint agreements between DOA and DPT, to all State agencies using the system's payroll capabilities, it is not a system maintained by DOA for its own use.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

The referenced text should be augmented for clarity as shown in the restated text shown below.

... own personnel-related system (Table 14). The personnel system maintained by DOA, however, is an integral part of CIPPS and is primarily utilized at present by those agencies whose needs are not fulfilled by PMIS. DPT participated in and approved the acquisition of the CIPPS personnel module. Additional...

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Charles H. Taylor, Jr.
Assistant Comptroller
225-2116

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original of Comment Included in Draft Report:

In reviewing these agencies' computer applications, E&W found that only one agency, DMV, has a comprehensive information management plan to guide computer use and systems development with respect to the agency's program objectives (Reference page 146, JLARC Draft). . . . As discussed throughout this report, information management plans are a crucial starting point for ensuring effective use of automation to meet agencies' policies and program objectives. E&W found that one of the agencies formally linked the systems functions to agency policy. (Reference page 148, JLARC Draft)

DOA's Comment on the Observation or Conclusion

In indicating that only DMV "has a comprehensive information management plan," this comment is not accurate. The Department of Accounts has had, since late in 1980, an approach to planning and developing systems that has been very visible and fully integrated into all aspects of the management and operations of the Department of Accounts. The Department of Accounts, when developing policy directives for itself or for agencies, has always made it clear when new systems would be required to support those policy initiatives (especially as it relates to development of improved GAAP reporting).

DOA has regularly maintained what it calls a "Project Task Force Listing" which has listed every single opportunity to create new systems or to amend and enhance existing systems. This listing, which is reviewed monthly by the Comptroller, Assistant Comptrollers and Managers, is designed to ensure that no creative thought as it relates to improving a system is ever lost, that efforts are applied, given scarce resources, on a priority basis, and that all changes, enhancements, or new systems are developed in conformance with the systems life cycle standards.

This project task force effort is further backed up by a formal systems modification approval document, that fully controls all changes. All of the Department's budget planning and financial proposals together with Executive Agreements with the Governor, or other documents relating to the plans and objectives of the Department have always very thoroughly addressed systems development initiatives. Again, within the Department of Accounts the planning for systems is, of necessity, totally integrated within all aspects of the management and operation of the agency, and represent a major portion of our efforts. To the latter point, aspects of the management of systems development efforts are also reported monthly to the Comptroller and documented in the Comptroller's Monthly Management Review Report.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

It is recommended that the comment be modified to clearly state that the Department of Accounts also had a comprehensive management planning approach and that that approach has resulted in the successful, on-time, on-budget implementation of the following systems:

- Fixed Assets Accounting Control System (FAACS)
- Electronic Fund Transfer System - for transferring monies to localities
- Direct Deposit of Retirees Annuities Systems
- Sick Pay Recovery System
- Statewide Leave Accounting System (SLAS)
- Automated Accounts Payable - as part of CARS II
- Automated Lease Accounting System
- Commonwealth Integrated Payroll System (CIPPS)
- On-line Automated Savings Bond Accounting System,

together with a significant number of other enhancements to other systems and procedures.

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Edward J. Mazur (225-2109)
W. Hoyt Robinson (225-2114)

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Agencies often may recognize that technologies need upgrading in order to achieve greater operational efficiencies. However, they do not have strategic or acquisition plans to guide system improvements. Decisions are made as a reaction to problems rather than anticipating and endorsing periodic evaluations of and enhancements to systems (Reference page 151, JLARC Draft). . . . Planned schedules for evaluating software and hardware capabilities should be developed, and plans for replacing outdated, inefficient equipment should be developed and reviewed by central planning staff. (Reference page 153, JLARC Draft)

DOA's Comment on the Observation or Conclusion

As it relates to the Department of Accounts, this statement is not accurate. Because of the tremendous effort that the Department of Accounts has made over the past several years in enhancing systems and developing new system and supporting technologies, it would be a significant omission if the exception represented by the Department of Accounts was not mentioned at this point in the report.

As more completely noted elsewhere, the Department made strenuous efforts between 1980 and 1983 to replace aged equipment that was no longer being maintained by the vendor. It put forward repeated and extraordinarily well documented arguments to replace the equipment with modern computer technology that would be totally compatible with both our software and existing DIT mainframe computers. The decisions by DIT's predecessor, DCS, even after appeal, required the Department of Accounts to select secondary equipment that was not as fully compatible and that was not as powerful as that recommended by DOA. This has led to a number of problems.

The Department of Accounts has been thorough in its planning for hardware and in its planning for software, and this should be mentioned.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

The comment should be modified to make it very clear that its conclusion does not apply to all agencies, including the Department of Accounts. Further, the comment should clearly note that the Department of Information Technology, in exercising its procurement function, has had a negative affect on the timely and appropriate procurement of computing technologies by agencies and institutions.

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Edward J. Mazur (225-2109)
W. Hoyt Robinson (225-2114)

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Included in Draft Report:

Exhibit 5-11

Customer Agency Application Systems

Summary of Documentation Attributes

APPLICATION ATTRIBUTES DOA

Software Function/ Aging Policy	0
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(Reference page 5-77, Ernst & Whinney Study)

DOA's Comment on the Observation or Conclusion

The title "Software Function/Aging Policy" should be "Software Function/Agency Policy Relation," in order to be consistent with the other charts that precede the exhibit.

Exhibit 5-11 indicates that DOA does not relate its software functions to its policies. This is inaccurate. All of the Comptroller's policy directives, that have an implication relative to systems and procedures, make that implication clear. The policies initiatives that the Department has taken, especially those relating to the preparation of financial statements in conformance with generally accepted accounting principles, have been the foundation stones upon which many of our system initiatives have been built. For example, it was the decision to conform to the GAAP requirement to report fixed assets that led to the development of the FAACS system which, incidentally, is now an important aspect in instituting the Higher Education Equipment Trust Fund. Another example is our effort to develop a lease accounting system that followed our decision to conform with the lease accounting requirements of GAAP. There are other similar examples.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

We request that the zero be changed to 100% in DOA's column along side of Software Function/Agency Policy Relation.

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Edward J. Mazur (225-2109)
W. Hoyt Robinson (225-2114)

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Page 5-79- Department of Accounts (DOA)

.... The most significant systems run by DOA include:

...

- o Expenditures - The State Expenditures System prints

(reference pages 5-79, 5-80 E&W of draft)

DOA's Comment on the Observation or Conclusion

The draft states that there are a number of automated systems run by DOA and then it lists the systems. All systems listed are, in fact, separate systems except the "expenditures" system. The payment process, or expenditure process, and generation of checks is a subsystem of the Commonwealth Accounting and Reporting System (CARS). Although CARS is described as a general ledger system, it actually does much more and has features that make it more than a general ledger system.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

Delete the reference to an expenditures system and expand the description of CARS to read:

"CARS II - The Commonwealth Accounting and Reporting System is the general ledger for the State and has many features that make it useful for statewide and agency specific financial management. It also generates all payments to vendors and others to satisfy the State's financial obligations. It has features to monitor compliance with the Prompt Payment Act and others to ensure that payments are not made before they are due."

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Eddie N. Moore (52115), Assistant Comptroller

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Page 5-81 - CARS II has an ad-hoc reporting capability but it has not yet been made available to user. As a result, there are 70 agencies that receive tapes from CARS II to process their own reports.

(reference page 5-81 E&W of draft)

DOA's Comment on the Observation or Conclusion

The second sentence of this paragraph is untrue. All agencies receive their CARS II reports from DOA. There are 70 agencies who receive CARS data on tape in a prescribed format for use by agencies in reconciling agency information to CARS information and in preparing agency specific reports.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

CARS II has an ad-hoc reporting capability that has not been released for use by agencies, but will be available in the Fall of 1987. However, more than 70 agencies receive specified agency data from the CARS II system for use in agency based systems to aid in reconciling agency records with CARS and in creating special reports for boards, in meeting federal reporting requirements, and in meeting other state requirements outside the formal accounting systems needs. These 70 agencies also received this data from the CARS I system, which preceded CARS II.

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

W. H. Robinson, DOA - 804-225-2114

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Customer Agencies E&W page 5-81

The draft states, "We learned from DOA that the purpose of CARS II was to organize a central set of books and curtail individual agency accounting systems. DOA states that it is working on a standardized chart of accounts

(reference page 5-81 E&W of draft)

DOA's Comment on the Observation or Conclusion

The objectives for making improvements to CARS as stated in the general design document included nine items. Some of the highest priority items were to improve timeliness of information, distribute the data entry function, consolidate multiple payments to a single vendor, ensure compliance with the Prompt Payment Act, improve grant and contract accounting, and eliminate the need for agency-based general accounting systems. DOA currently has and publishes a standardized chart of accounts, and is not now working on one.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

We recommend adopting the following wording:

"We learned from DOA that the purposes of making changes to CARS were to address accounting needs expressed by user agencies, take advantage of improvements in data processing technology, meet the legal requirements mandated by the legislature, and generally improve financial reporting capabilities. As an example of improvements in technology, the enhanced system provides user agencies with the ability to key information directly into the system. This allows for the making of rush payments, rush adjustments to agency accounts, and full editing so errors will not occur after entry of the data. It also provides agencies with on-line status information regarding vendor payments and account balance information. Before the modification to CARS, agencies were limited to preparing hardcopy information and forwarding it to DOA for processing. Agencies with their own systems could (and still can) generate magnetic tapes and send them to DOA. All processing and error correction occurred at DOA, however, and some agencies that had their own system performed both hardcopy and automated data entry functions because of limitations of their own agency-based system."

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Eddie N. Moore, CPA (52115) Assistant Comptroller

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

The draft states, "Of the six agencies other than DOA who participated in this study, VSRS and ABC have their own general ledger systems. VSRS uses the accrual basis of accounting ...(and) the agencies manually reconcile their general ledgers to the CARS II system."

(reference page 5-81 of draft)

DOA's Comment on the Observation or Conclusion

In fact, all non-higher education agencies use CARS as their general ledger system but may supplement it with other in-house systems because of unique requirements of a particular agency. For instance, CARS does not have a complex billing subsystem, or cost accounting system. As a note, VSRS has recently compared CARS features to other systems available for purchase and decided to continue to use CARS for their administrative accounting. Of course, they do have other systems to support their annuitant accounting responsibilities.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

We recommend adopting the following:

"Although almost all non-higher education agencies use CARS as their primary accounting system, some agencies supplement CARS to meet unique needs. These needs include complex cost accounting, accrual accounting, and billing/receivable capabilities not offered through CARS. Agencies that do not rely primarily on CARS for general accounting purposes had their own systems prior to implementing CARS II in July of 1986. CARS II is essentially the same system as CARS with the addition of numerous improvements instituted to meet requests of agencies for more timely and useful information, to ensure compliance with the Prompt Payment Act, to provide improved cash management capabilities, to establish vendor identification capabilities, and to take advantage of new data processing on-line capabilities. Agencies that maintain their own systems may, in fact, duplicate some of the capabilities of CARS, and some have to manually reconcile their own system information to CARS information on a regular basis."

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Eddie N. Moore, CPA (52115) Assistant Comptroller

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Page 5-81 - CARS II - Analysis

This paragraph states that, "It uses the Commonwealth's chart of accounts, which often times is different from the various agencies' chart of accounts. Each agency is required to use CARS II as a vehicle for financial reporting to DOA."

(reference page 5-81 of draft)DOA's Comment on the Observation or Conclusion

To our knowledge, all agencies use the chart of accounts prescribed jointly by the Department of Accounts and the Department of Planning and Budget. Higher education institutions use a unique chart of accounts approved by DOA, but the information is converted for statewide usage prior to forwarding information to DOA. This information is needed not specifically for DOA, but for all users needing financial information about the Commonwealth.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

We recommend adopting the following:

"CARS analysis. CARS is the 'official' general ledger of Virginia government and supports statewide financial management information needs. It meets and records all financial obligations of the Commonwealth and promotes prompt payment of obligations and sound cash management policies. Every state agency and institution is required to use CARS as a vehicle for gathering and reporting statewide financial management information. It is maintained by the Department of Accounts and was significantly modified in 1986 to incorporate features considered necessary for sound and timely financial management."

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Eddie N. Moore, CPA (52115) Assistant Comptroller

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

The draft states that "Customer agencies ... complained that CARS II does not provide the individual reporting and certain accounting features needed by agencies ... According to DOA, the agencies main objection to the use of ad hoc reporting is DIT's 'high' charges ..."

(reference page 5-82 of draft)

DOA's Comment on the Observation or Conclusion

The cost of providing the on-line features of CARS has not been confirmed. The processing costs borne by DOA were very high initially, but have been significantly reduced by improving the methods of using the DP system. DOA decided to use ADABAS because it was recognized as a very good method of achieving the objectives we were trying to achieve, and DIT confirmed and supported the use of ADABAS after participating in evaluations of alternatives.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

Replace with, "Customer agencies who participated in the study complained that CARS II does not provide the individual reporting and certain accounting features needed by the agencies. We confirmed that CARS II does not have a complex cost accounting system or perform complex cost variance reporting. An organizational unit in DOA does, however, have a system to help agencies prepare agency and statewide cost allocation plans, and they do provide agency training.

To improve reporting features, CARS II does possess an Ad-hoc reporting capability that was not tested at a user agency at the time of our study. An ability to print reports at user agencies was also not tested at a user agency at the time of our study. CARS produces hundreds of reports and during the month of April generated 46 million lines of print, 140,000 general warrants, and processed almost 200,000 transactions."

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Eddie N. Moore (52115) Assistant Comptroller

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Page 5-99 last sentence "Thus, no agency has a formal, documented disaster recovery plan."

(reference page 5-99-5-100 of draft)

DOA's Comment on the Observation or Conclusion

The last sentence on page 5-99 is not true. DOA has a disaster recovery plan that has been audited by the APA for several years. This plan is upgraded and maintained current at all times. It is adequate, formally documented, and is acceptable to the APA.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

Eliminate the comments on page 5-100 concerning disaster recovery plans and replace with the following. "The Department of Accounts maintains a formal documented disaster recovery plan, which has been audited by the APA. The plan is complete and maintains complete task assignments necessary to recover from a DOA disaster along with current personnel assignments, describing in detail those actions that will be taken in the event of a disaster."

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

W. H. Robinson, DOA - 804-225-2114

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Page 147 - The draft states, "Agency Planning. E&W found that DMV is the only agency of the seven with a formal long-term plan for implementing new systems and modifying existing systems."

Page 148 - "E & W found that none of the agencies formally linked the system functions to agency policy."

(reference pages 147-148 of draft)

DOA's Comment on the Observation or Conclusion

This comment is factually incorrect. The Department of Accounts has an established, prioritized list of systems projects that need to be conducted. Agency management meet on a monthly basis to discuss the status of current projects, the addition of new projects, and to establish priority. This effort is tied to agency mission and policy. Procedures for accomplishing this effort are formally established and monthly status reports are documented and filed.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

On page 147 replace first sentence with, "E & W found that DMV and DOA are the only agencies and on Page 148 delete the sentence "E & W found that none of the agencies formally linked

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

Edward J. Mazur, CPA, (52109), State Comptroller

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Page 149 – Functionally Redundant Systems. Agencies maintain a number of functionally redundant systems, potentially in accounting and reporting.

(reference page 149 of draft)

DOA's Comment on the Observation or Conclusion

Redundant systems such as those mentioned existed prior to CARS II and CIPPS implementation. In fact they existed prior to CARS I and central payroll to a much greater degree. However, with CARS II and CIPPS implementation it is planned that both CARS II and CIPPS will provide the Commonwealth with central application capabilities not available prior to these systems. Specific projects are now under way to assist user agencies such as VSRS, DRS, Supreme Courts, and others to convert applications to the central systems operations. VSRS has recently abandoned an effort to acquire its own updated general ledger system because of the costs and its similarities to CARS features. VSRS will continue to use CARS for its administrative accounting.

Both the CARS II and CIPPS systems were developed with capabilities that facilitate both on-line and automated systems interface between user agencies and these central systems. DOA and selected agencies, according to priority, are currently in the process of implementing these interface capabilities.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

We recommend adopting the following:

"Although almost all non-higher education agencies use CARS as their primary accounting system, some agencies supplement CARS to meet unique needs. These needs include complex cost accounting, accrual accounting, and billing/receivable capabilities not offered through CARS. Agencies that do not rely primarily on CARS for general accounting purposes had their own systems prior to implementing CARS II in July of 1986. CARS II is essentially the same system as CARS with the addition of numerous improvements instituted to meet requests of agencies for more timely and useful information, ensure compliance with the Prompt Payment Act, provide improved cash management capabilities, establish vendor identification capabilities, and take advantage of new data processing on-line capabilities."

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

W. H. Robinson – 804-225-2114 – DOA
John Crump – 804-225-2373 – DOA

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Page 152-153 - E & W comment: CARS II is the "official" general ledger of Virginia government. It is maintained by the Department of Accounts, and was implemented for statewide use on July 1, 1986. It uses the Commonwealth's chart of accounts, which often times is different from the various agencies' chart of accounts.

General ledger applications generally do not require complex data structures. Detailed journal entry records are typically accessed by agency identification, fund, accounting period and account number. ADABAS is capable of this, and much more, and the NATURAL language does provide an easy facility for report writing and user inquiry. However, it is questionable whether the power of ADABAS/NATURAL is efficiently utilized by this application. The same functionality might have been achieved through the use of CICS/VSAM with individual agency extract files for the summary data. Special reports could be run by agency-written routines via COBOL, Easytrieve or SAS, and inquiries supported via CICS. STAR, the predecessor system to CARS II is implemented in Maryland using CICS/VSAM, and has the cost center reporting functionality of CARS II.

(reference page 152-153 of draft)

DOA's Comment on the Observation or Conclusion

Several comments as stated in this section of the report are factually incorrect. The chart of accounts used by the CARS system is the official chart of accounts for all agencies of the Commonwealth. Some agencies modify or use subsidiary accounts to meet unique agency accounting requirements due to the nature of their particular service applications.

General ledger applications of the size of CARS II require complex data structures. Detailed journal entry records are typically accessed by agency identification, fund, accounting period, program, subprogram, element, object code, and transaction number. ADABAS is capable of this, and much more, and the NATURAL language does provide an easy facility for report writing and user inquiry. Special reports can be run by agency-written routines via COBOL, Easytrieve or SAS, and inquiries supported via CICS.

The problems associated with extracting agency data for use at line agencies would be the same for all database users due to a lack of uniform telecommunications and compatible systems at agencies.

STAR, the system in Maryland is the predecessor to the original version of CARS that was implemented on July 1, 1978, not to CARS II. Accordingly, the Maryland system represents technology that is older than that comprehended in CARS II. CARS is the predecessor to CARS II.

DOA's Proposed Approach for Correcting the Observation or Conclusion:

The emphasis needed in this evaluation process would better lend itself to an evaluation of how overall planning and direction could bring all facets of data processing capabilities into focus and use. This could be accomplished by having structured data bases implemented statewide where related data was being used by multiple agencies for related purposes. Structured telecommunications facilities in use with compatible hardware and vendor supplied software in all user work areas should also be considered.

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

W. H. Robinson, DOA - 804-225-2114

June 24, 1987

DOA COMMENTS REGARDING 5/22/87 DRAFT JLARC REPORT

Original Comment Included in Draft Report:

Page 159 – The draft reads, "The State needs to adopt policies that specify under what conditions agencies should be permitted to develop their own computer systems."

(reference page 159 of draft)

DOA's Comment on the Observation or Conclusion

This is a misleading statement and does not provide information relating to DOA's established policy (Directive 4-86) regarding the conditions under which agencies should be permitted to develop their own computerized accounting systems.

DOA's Proposed Approach for Clarifying the Observation or Conclusion:

Page 159 – Delete the sentence as stated and write,

"The Department of Accounts has a policy statement, last revised in 1986, that specifies the conditions under which an agency can develop its own computerized accounting system. This statement has not eliminated some redundancies because, until CARS II, certain features were not included in the central system, and some the agency systems were developed prior to the policy statement. The Commonwealth does need to evaluate the need for certain agency based systems and develop policies to guide future system development and the elimination of all redundant systems.

Reference: Comptroller's Directive, "Required Approval of Agency-Based Accounting Systems," June 6, 1986.

DOA's Recommendation on Potential Contact Person(s) Who Can Aid in the Clarification

John Crump (52373) Manager, Agency Review and Assistance

June 24, 1987



COMMONWEALTH of VIRGINIA

Office of the Comptroller

EDWARD J. MAZUR, C.P.A.
COMPTROLLER

P.O. BOX 6-N
RICHMOND, VIRGINIA 23215

July 9, 1987

Mr. Philip A. Leone, Director
Joint Legislative Audit and
Review Commission
Suite 1100, General Assembly Building
Capitol Square
Richmond, Virginia 23219

Dear Phil:

Thank you very much for your letter of July 7, and the opportunity to review selected pages of the final report concerning the State's computer operations. We are very pleased that, in response to my letter of June 24, 1987, you amended the earlier draft of the report in several areas to improve its accuracy and clarity as it pertains to the computer systems and computer operations of the Department of Accounts.

In reviewing the final draft, it appeared that you were not able to respond to all suggestions made in my letter of June 24. Accordingly, I would appreciate it if my original letter and comments were published with the final report. I would also appreciate it if this letter was published as well.

As a general comment, I continue to believe that there are selected ways in which the report might have been clearer and might have enabled its readers to have a greater appreciation for the context within which certain comments and recommendations were made. We understand that your staff encouraged Ernst & Whinney to contact us subsequent to my letter of June 24. Unfortunately, contact was not made until July 8, and this may provide some insight as to why some of our original comments did not lead to any adjustment, or any significant adjustment, in the final draft.

I was pleased to see the final report made more clear the cause and effect relationship between the execution of responsibilities that are clearly assigned to DIT and the general and specific effectiveness with which individual agencies and institutions utilize computing services. As one of the very largest users of services provided by the Department of Information Technology, it is very important for the readers of your report to understand that the decisions rendered by DIT in executing their authority to control

Mr. Philip A. Leone
July 9, 1987
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the procurement process can have a very significant impact on the ultimate efficiency with which an agency operates its computers, and utilizes the computing services provided directly by DIT. Equally, it is important for the readers to appreciate how vital it is that an effective communications link be maintained between DIT and an agency during the period in which a major system is being developed and implemented. Although many agencies maintain a highly capable staff of computer support people, as is in the case of DOA, it is equally evident that the technical prowess of DIT, together with the technical resources that are at its command from outside vendors, can be vital in ensuring that a new computer system, such as CARS II, is "fine-tuned" to ensure that it consumes the least amount of DIT computer costs and other DIT provided services.

In response to the pages of the final draft that were provided with your memo of July 7, there are several brief points that I would like to make. They follow and are referenced to the page of the final draft that was given to us.

Page 153.

There is a comment concerning the new Commonwealth Integrated Payroll/Personnel System (CIPPS). It is important for the readers of the final report to note that the Department of Personnel and Training was not authorized nor funded to replace its Personnel Management Information System (PMIS) at the time the General Assembly authorized the development of the new payroll system. Nevertheless, both departments made considerable efforts to recognize the close relationship between payroll and personnel functions, and to bring PMIS and CIPPS as close together as possible. Those efforts resulted in a general understanding, at the end of the detailed design effort, that it was conceivable that CIPPS could some day replace, in part or in whole, the PMIS system, thereby resulting in one truly integrated payroll and personnel system.

Further, it is noted that CIPPS has not yet replaced certain redundant leave accounting functions. Readers should be aware that as a planned prelude to the implementation of CIPPS, the Department of Accounts began a phased implementation of a Statewide Leave Accounting System that was a bridging system between the inefficient and largely manual leave systems maintained by agencies and institutions and the capabilities found in CIPPS. One hundred agencies representing 21,000 employees now utilize the more modern SLAS system.

Page 153.

A comment on this page indicated that "none of the agencies linked systems functions to agency policies." Perhaps we do not clearly understand the point that is trying to be made here; however, it is important for readers to know that, as it relates to the Department of Accounts, there has been a very formal and written linkage between the various systems that the Department has developed and the financial accounting and financial reporting policies that have been issued by the Comptroller, for the most part in the form of "Comptroller's Directives."

Page 156.

Table 14 presents a matrix of functionally redundant systems. The Department of Accounts is shown as maintaining functionally redundant systems in the areas of vendor payment, general ledger, payroll, personnel leave, and human resources. It is very important for readers to understand that the Department of Accounts does not maintain functionally redundant systems, but it is, in fact, charged by the Code of Virginia to maintain "the accounting systems for the Commonwealth." Accordingly, the systems maintained by the Department of Accounts in the area cited are the official systems of the Commonwealth. This would include our relationship with DPT's PMIS system.

Page 156.

There is a notation that agencies "do not have strategic or acquisition plans to guide systems improvements." Perhaps this is just a question of semantics, but we believe that it is important for readers to understand that, in regards to the Department of Accounts, the Department has carried out extensive planning efforts in association with the development of the following systems:

- Commonwealth Accounting and Reporting System (CARS II)
- Central Integrated Payroll/Personnel System (CIPPS)
- Statewide Leave Accounting System (SLAS)
- Fixed Assets Accounting and Control System (FAACS)
- Statewide Lease Accounting System
- Savings Bond Accounting System

Each of these systems involved, where appropriate, the utilization of the agency procurement request procedures, and were developed in full compliance with the requirements of the system's life cycle, which requires all essential planning for a new system to be formally developed and documented. The system's development life cycle approach has been a

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long-established standard put forth by DIT. Beyond this, the State's and the Department's own budget planning efforts also completely comprehended all such systems development efforts.

Page 157.

The report noted that CARS II may not have made the best use of DIT resources because it utilized a database management system known as ADABAS. The reader should be aware that the ADABAS system was a database management system authorized and approved for use by the Department of Information Technology and that several State agencies and institutions utilize the same system. It was selected, in part, as the system best suited to meet the accounting needs of agencies and institutions over the anticipated life of CARS II, which should be somewhere in the range of ten years.

With regard to DOA's use of ADABAS, it was helpful to note that on page 150 of the final report, the Ernst & Whinney consultants cited the fact that DOA would have benefited in its implementation of CARS II had the experience of the Department of Motor Vehicles in refining its use of ADABAS been shared, in cooperation with DIT, with the Department of Accounts.

Page 203.

The report recounted DOA's struggle during the fall of 1986 with unanticipated increases in charges from DIT due largely to the implementation of CARS II. Readers should be aware of the fact that DOA assumed complete technical leadership responsibilities for refining the way in which CARS II operates within DIT, to include initiating contact with Software AG, the vendor that produces ADABAS. These efforts were highly successful and resulted in the returning, by the end of the year, the average monthly bill from DIT to approximately that included in the original budget estimates of DOA.

I look forward to receiving a copy of the full final report in the near future. If, at that time, there are points that I believe need to be clarified, I will then provide you with additional correspondence. Again, we sincerely appreciate the opportunity to comment on the drafts of the report and appreciate having my letter of June 24, together with this letter, included in the final report.

Sincerely yours,



Edward J. Mazur

EJM/act

cc: The Honorable Stuart W. Connock, Secretary of Finance
Ms. Karen F. Washabau, Deputy Secretary of Finance



COMMONWEALTH of VIRGINIA

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July 7, 1987

Mr. Philip A. Leone, Director
Joint Legislative Audit and Review Commission
Suite 1100, General Assembly Building
Richmond, Virginia 23219

Dear Phil:

I thought it might be helpful to recap some of the background to the JLARC exposure draft entitled "Information Technology in Virginia State Government" before getting into our specific comments.

The Department of Planning and Budget (DPB) has had continuing concerns over the cost of computer services in the Commonwealth. As a result, DPB and members of the two money committee staffs suggested that JLARC staff expand its biennial review of Department of Information Technology's (DIT) internal service fund rates to include a study of costs charged for computer services in the Commonwealth.

DPB requested a \$200,000 appropriation for a consultant to assist JLARC and JLARC subsequently agreed to undertake the study. The details of the agreement between the two agencies (DPB and JLARC) are reflected in the Memorandum of Understanding (attached) signed in June 1986.

Now let me turn to the issues in the exposure draft on which we would like to comment. Aside from the fact that the draft does not adequately acknowledge the involvement of the Executive Branch in the events leading up to the study, we have the following specific concerns.

Page 186: The example on this page needs clarification. It implies that DPB approved the increase in sum sufficient appropriation without a thorough review; this is incorrect. The documentation in our files indicates the specific reasons for this increase. DIT's FY 1986 appropriations were based on "accrual" accounting, whereas, DOA treated expenditures on a "cash" basis. The differences in the two accounting methods resulted in an artificial deficit in DIT's appropriations for FY 1986.

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Page 186: The report states that DPB should be more involved in projecting service needs for computer services. We concur. Over the past two years, my staff has held periodic meetings with DIT to obtain revised projections for computer usage and the impact of revised projections on agency budgets. We have also requested DIT to keep us posted on any anticipated adjustments to DIT's rates and its implications on agency budgets.

Page 204: The second sentence in the first paragraph states "The Department of Planning and Budget and the General Assembly may also adjust budgeted amounts for computer services." Although DPB has the delegated authority to approve appropriation adjustments within agency programs (assuming, the adjustments do not require an increase in the total appropriation specified in the Appropriations Act), we do not have the authority to approve an increase in appropriation (except for sum sufficient appropriations and cases where a special language in the Appropriations Act permits the change).

The Governor, however, may approve a request for additional appropriations as permitted by the General Provisions of the Appropriations Act. Accordingly, I suggest the sentence be changed to read "The Governor and the General Assembly may also adjust budgeted amounts for computer services."

Page 205: Towards the bottom of this page, the report says that DOA expects to spend approximately \$3.6 million by the end of FY 1987. According to DPB and DOA records the projected expenditure for FY 1987 is \$3.4 million.

Page 210: The first paragraph on this page states that DPB should participate with DIT and other agencies in developing original estimates of computer services for each biennial budget. Again, referring back to our earlier comments (under page 186), this is something in which my staff is already involved. I might add that, as budgetary issues are concerned, it is a top priority.

I appreciate the opportunity to comment. My staff and I are available to discuss our comments with you and the members of your staff.

Sincerely,



Paul W. Timmreck

PWT/2108C/msg
Attachments

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