COUNCIL ON INFORMATION MANAGEMENT

Commonwealth of Virginia

Mission Focused Information Management

Mission Focused Information Management

COMMONWEALTH OF VIRGINIA
STRATEGIC INFORMATION RESOURCES MANAGEMENT PLAN
MARCH 1997

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Executive Summary

New ways of managing information and information technology have become either a critical path or a stumbling block to nearly every significant performance improvement in both the public and private sectors. With shrinking public resources and continued pressure to do more with less, it is essential that the Commonwealth focus its use of information resources toward activities that maximize improvements in mission performance. Mission Focused Information Management (MFIM) is a conceptual framework for developing new business strategies to accomplish mission objectives and improve mission performance. The need for this new strategy has become clear over the past 18 months, during which time the Council on Information Management staff undertook a comprehensive review of the Council's mission, responsibilities and operations, and held discussions with the Department of Planning and Budget (DPB) to identify existing and potential synergies between CIM's information technology planning and DPB's performance budgeting activities.

MISSION FOCUSED INFORMATION MANAGEMENT IS A CONCEPTUAL FRAMEWORK FOR DEVELOPING NEW BUSINESS STRATEGIES TO ACCOMPLISH MISSION OBJECTIVES AND IMPROVE MISSION PERFORMANCE.

The Council on Information Management has adopted MFIM as the framework for its statewide information technology planning. Consistent with MFIM, this document establishes as the Commonwealth's primary planning strategy an investment management process that closely parallels the capital planning processes frequently used in both private and public sector organizations.

Mission Focused Information Management

Mission Focused Information Management recognizes the rapidly changing technical, political and organizational environment in which state agencies must operate. It seeks to promote a highly adaptable approach to information management; consistent with current technological frameworks and the best practices of leading organizations in both the public and the private sectors. The framework emphasizes agency senior management responsibility for information resources and integrates information management with their other strategic management responsibilities. MFIM places information and information technology in the proper context of agency mission, core activities and related decisions.

MFIM PLACES INFORMATION AND INFORMATION TECHNOLOGY IN THE PROPER CONTEXT OF AGENCY MISSION, CORE ACTIVITIES AND RELATED DECISIONS.

Principles

Seven principles govern successful Mission Focused Information Management:

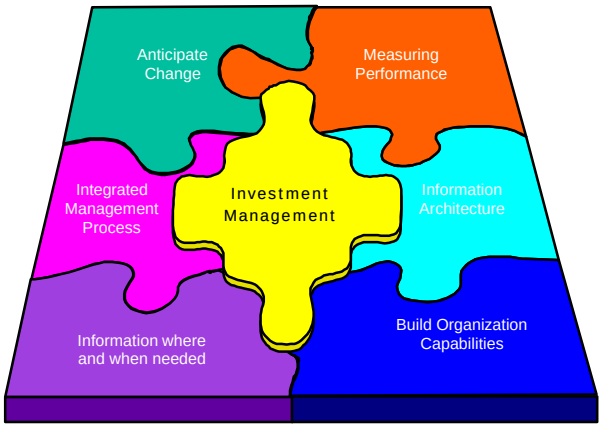

Figure 1. Mission Focused Information Management Principles

1. Information management practices should anticipate change.
2. Planning, budgeting and evaluation processes should be integrated.
3. Achieving mission objectives requires that the right people get the right information when and where they need it, in a format that they can use.
4. Measuring performance is critical to achieving mission objectives.
5. Process improvements should be made in the context of an architecture that fosters a high degree of local control and flexibility.
6. Organization-wide information management capabilities should be built to address mission needs.
7. Information management projects should be managed as investments.

Practices

Mission Focused Information Management has its roots in a 1994 study of leading public and private sector organizations by the U.S. General Accounting Office.[1] The study identifies a consistent set of eleven best practices used by senior managers to improve mission performance through strategic information management. The GAO study groups the eleven best practices into three key senior management commitments

DECIDE TO CHANGE	DIRECT CHANGE	SUPPORT CHANGE
1. Recognize the need to fundamentally change information management practices.	4. Make external customer needs and mission goals a central driver of all organizational improvement efforts.	9. Define clear responsibilities for line managers and information management professionals.
2. Create line management ownership and incorporate information management into business planning.	5. Make serious efforts to objectively measure performance.	10. Position a senior-level advocate to bridge top management, line users, and technical professionals in identifying and resolving information management issues.
3. Take specific actions to maintain momentum over time.	6. Focus on process improvements.	11. Anticipate and develop key skills needed for future improvement efforts.
	7. Tightly control information technology investments.	
	8. Integrate planning, budgeting, and performance evaluation processes.	

Figure 2. MFIM Practices

[1] *Executive Guide: Improving Mission Performance through Strategic Information Management and Technology* (GAO/AIMD-94-115, May 1994).

crucial to building an effective information management infrastructure: 1) deciding to work differently, 2) directing resources toward high-value uses; and 3) supporting improvements with the right skills, roles, and responsibilities (See Figure 2).

Mission Focused Information Management in the Commonwealth

Mission Focused Information Management (MFIM) is intended to suggest a common language for Virginia's state agencies and public institutions of higher education as they plan, propose, review, and assess their use of information resources and information technology projects. Its purpose is to communicate "best practices" in order to help agencies to benefit from each other's experiences and improve information resources management throughout state government.

Over the next five years the Council will work to implement MFIM through education, advocacy and facilitation. Changes will not occur overnight and they will not be easy. Nonetheless, some actions must be taken now and tangible near-term benefits can be expected—low-value projects can be eliminated, unnecessary risks can be uncovered and mitigated, existing projects can be given an increased likelihood of success, and productivity improvements in information management operations can be stimulated.

Information Resources Investment Management

Information Resources Investment Management (IRIM) is a strategy, consistent with the MFIM framework, for achieving mission objectives and improving mission performance. Agencies must begin looking at information resources and information technology projects—proposed, under development, and operational—as investments within a strategic investment portfolio that support the agency's missions.

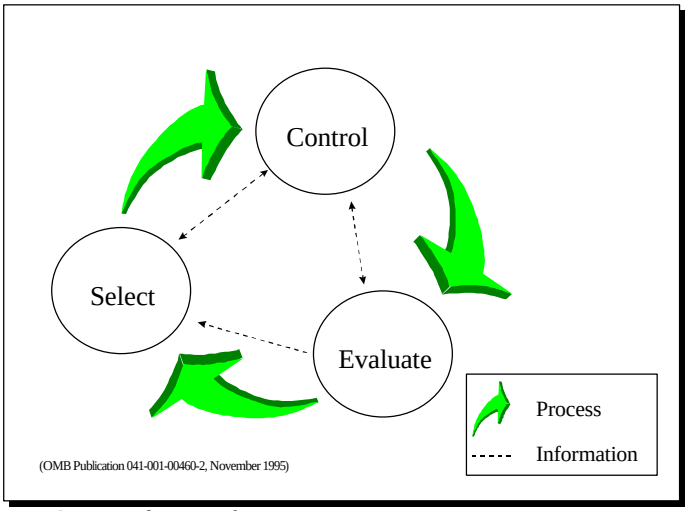

Figure 3: Iterative decision-making process

While the specific processes used to implement an investment approach may vary depending upon the structure of an organization, leading organizations, regardless of structure, maintain an iterative, three-phase, decision-making process—Selection, Control, and Evaluation— designed to minimize risks and maximize return on investments. Looking at information technology projects as investments allows agencies to create a portfolio of information technology projects that maximize mission performance.

Once selected, executives monitor the projects against their projected costs, schedule and benefits throughout their life cycle, taking quick actions to mitigate the effects of changes in risks and costs to ensure that the investments are providing expected benefits. After a project has been implemented, the organization evaluates actual versus expected results for the project, revising their investment management processes based on the "lessons learned".

These selection, control and evaluation processes can be implemented uniformly at an enterprise level and within each agency, department, division or other business unit of the organization. This enables an enterprise, even one that is highly decentralized like Virginia state government, to systematically identify cross-functional investment opportunities and to determine tradeoffs between projects both within and across business units.

Implementation

Maximizing the returns and minimizing the risks on the millions of dollars that are spent each year on state information resources will require continued, long-term efforts on two fronts.

First, agencies must critically assess how they select and manage their information technology projects. They must use a structured approach to information technology planning that encompasses all aspects of the investment process—Selection, Control, and Evaluation.

Second, the Council's oversight attention must be focused on both agency investment management processes and specific outcomes. Such attention will include the development of policies, standards and guidelines as well as selective evaluations of agency processes and results.

To this end, each agency on July 1 will, in conjunction with the budgeting processes, submit to CIM a Capital Improvement Plan for Information Resources (CIP-IR). This plan replaces the annual information technology plans currently submitted to the Council. The CIP-IR consists of a description and analysis of the agency's information resources investment portfolio in support of the agency's mission.

In August/September of each year, agencies will submit information resources related budget requests to the Department of Planning & Budget (DPB) and the Council. This submission will be in the form of proposed changes to the agency's CIP-IR. In the spring, after the General Assembly session, agencies will incorporate changes based on the results of the session into their CIP-IR and will prepare it for submission to CIM the following July 1.

Throughout the year, agencies will continue to use Selection-Control-Evaluation processes to manage their information systems projects within the context of their investment portfolio.

The Council on Information Management will receive the capital improvement plans from the various agencies in July and will publish a summary report on statewide information resources investment on October 1 of each year.

In October/November CIM will use the results produced by the improved agency investment process to develop recommendations for the Governor's budget that reflect an agency's actual track record in delivering mission performance for information technology funds expended.

The Council will also review selected agencies' activities annually to assure compliance with statewide directives, identify deficiencies that need to be remedied, and identify best practices.

Policies, Standards, and Guidelines

As one of the first steps toward implementation of this plan, the Council will undertake a thorough review and revision of all-existing policies, standards and guidelines to ensure consistency with MFIM. CIM will focus these and future development efforts in four areas—investment management, information and information technology architecture, information policy, and organizational development.

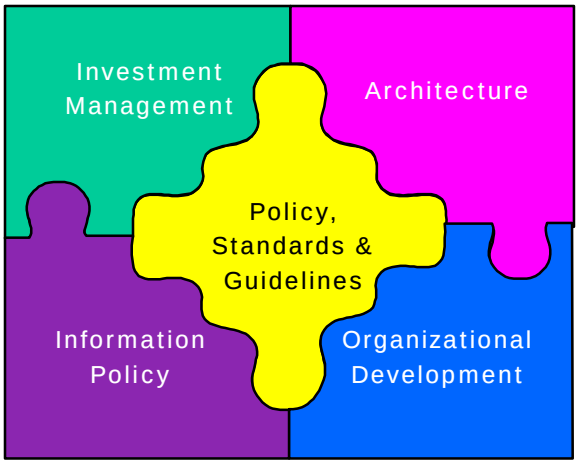

Figure 4. Policy, Standard & Guideline Suites

Peer Review Committees

Senior agency management defines the roles, responsibilities, and criteria for determining the types of project that will be reviewed at the different organizational levels. The Council will define similar appropriate thresholds for all of state government.

The Council will review agency projects that meet these thresholds via a peer review system. The Council will select a core group of individuals from executive branch agencies based on their knowledge of information technology, program management, technology acquisition management, and information resources investment management. These individuals will serve as a pool of experts from which the Council can draw upon as needed to conduct selected peer reviews. The Council's peer review committees will also serve as a resource to agency heads seeking independent assessments of specific agency projects.

The Council will publicize lessons learned and promising practices identified during these peer reviews and may adopt new policies, standards and guidelines based on recommendations from the review committees.

Education

Education is critical to the successful implementation of Mission Focused Information Management. CIM efforts will be concentrated in (1) MFIM and IRIM principles and practices, and (2) emerging technologies. These efforts will also be targeted toward two distinct populations: (1) senior management, and (2) information technology professionals.

Implementation Schedule

The Council has established an aggressive implementation schedule that has agencies submitting their first CIP-IR on July 1, 1998 and CIM issuing its first statewide summary of information resources investments October 1, 1998. In order to meet this timetable a number of activities must be taken on immediately.

The Council will begin developing the various policies, standards and guidelines in March 1997. In this time frame the Council will also begin identifying a pool of individuals from the various agencies to serve on peer review committees and will begin developing training material for the peer review committees and for CIM's other education activities.

Actual education related activities will begin in January 1998 with a series of briefings on MFIM and IRIM. In addition to the submission of the first agency CIP-IR, July 1998 will also mark the

TIMELINE		
1997		
	March	CIM begins development of Policies, Standards, and Guidelines
	March	Develop pool for Peer Review Committees
1998		
	January	CIM begins MFIM/CIP-IR education efforts.
	July	Agencies submit first CIP-IR
	July	CIM begins best practices and emerging technologies education activities
	October	CIM publishes first Summary of Information Resources Investments in the Commonwealth of Virginia
	October	Agencies submit IR budget requests to DPB/CIM
1999		
	January	CIM begins agency information resources investment management reviews.
	July	Agencies submit CIP-IR
	October	CIM publishes Summary of Information Resources Investments in the Commonwealth of Virginia
	October	Agencies submit IR budget requests to DPB/CIM
2000		
	July	Agencies submit CIP-IR
	October	CIM publishes Summary of Information Resources Investments in the Commonwealth of Virginia
	October	Agencies submit IR budget requests to DPB/CIM
2001		
	March	Comprehensive review of Mission Focused Information Management

Figure 5. Timeline

beginning of CIM sponsored best practices and emerging technology related educational activities. The Council will begin reviewing selected agency information resources investment management practices in January 1999.

CIM will schedule a comprehensive review of Mission Focused Information Management and the capital improvement planning process in early 2001. By this time, the Commonwealth will have gone through the process three times and will be in a position to assess the improvements in mission performance this strategy offers.

Mission Focused Information Management

Commonwealth of Virginia Strategic Information Resources Management Plan

Statement of Intent

Mission Focused Information Management (MFIM) is intended to suggest a common language for Virginia's state agencies and public institutions of higher education as they plan, propose, review, and assess their use of information resources and information technology projects. Its purpose is to communicate "best practices" in order to help agencies to benefit from each other's experiences and improve information resources management throughout state government.

Future development of the MFIM methodology will take into account existing agency planning and assessment processes so as not to impose redundant and costly reporting requirements on agencies and institutions. In addition the implementation of MFIM-related reporting requirements will be responsive to the unique characteristics of the various agencies and institutions of higher education and the nature of their information resources investments.

Introduction

New ways of managing information and information technology have become either a critical path or a stumbling block to nearly every significant performance improvement in both the public and private sectors. When applied well, information technology (IT) can yield dramatic successes. When neglected, it can produce painful failures and actually inhibit improvement efforts. With shrinking public resources and continued pressure to do more with less, it is essential that the Commonwealth focus its use of information resources toward activities that maximize improvements in mission performance.

Mission Focused Information Management (MFIM) is a conceptual framework for developing new business strategies to accomplish mission objectives and improve mission performance. The Council on Information Management (CIM) has adopted MFIM as the framework for its statewide IT planning. This document establishes Information Resources Investment Management (IRIM) as the Commonwealth's primary planning strategy.

MISSION FOCUSED INFORMATION MANAGEMENT IS A CONCEPTUAL FRAMEWORK FOR DEVELOPING NEW BUSINESS STRATEGIES TO ACCOMPLISH MISSION OBJECTIVES AND IMPROVE MISSION PERFORMANCE

The need for this new strategy has become clear over the past 18 months, during which time CIM staff undertook a comprehensive review of the Council's mission, responsibilities and operations. The issues assessment portion of the 1996-98 performance budgeting process, provided both the impetus and the opportunity to critically evaluate CIM activities. The spring 1996 survey of state agencies regarding current information technology planning and procurement processes, conducted by CIM's Agency Advisory Committee, supplied further insights into CIM' s performance. And, discussions with the Department of Planning and Budget (DPB) identified existing and potential synergies between CIM's information technology planning and DPB's performance budgeting activities.

These review and assessment activities revealed a number of significant shortcomings in current information technology planning in the Commonwealth. They also identified a number of factors, described below, that underscore the need for a new strategy for information technology planning and make clear the importance of a mission focused approach to information resources management in the Commonwealth.

1. Size and benign neglect. Information technology and information assets are typically substantial, poorly understood, and under-controlled areas of agency budgets; and expenditures for information resources are growing, not shrinking. Information technology planning in the Commonwealth is frequently conducted separate and apart from agency business planning. Decisions on technology investments are often deferred to information technology personnel without a clear understanding by agency management of the impacts of such investments on the agency's mission.

2. Risk. Large, complex information systems projects have an inherently high risk of failure, delay and overspending. There is increasing concern in the Commonwealth about the high costs and risk of large, complex information technology projects. Recent high-profile failures to control spending and complete projects on schedule and the resulting after-the-fact investigations, have emphasized the need for effective planning and clearly defined control mechanisms. Additionally, current CIM procurement reviews typically occur too late in the process to have any significant positive impact. Sound principles and practices need to be incorporated into projects at the earliest stages of their development and consistently implemented throughout their lifecycle, not tacked on at the end after significant resources and time have been wasted.

3. Changing technology and business cycles. Rapid changes in technology have rendered much of the Commonwealth's technology inventory obsolete. And, the rate of change continues to increase beyond the ability of existing management techniques to adapt. Concurrent with changing technology, business cycles in the private and public sectors are being compressed. Rapid, continual changes in mission focus, political and organization structures, and cycle time are forcing new approaches to management. Council activities to date do not adequately accommodate the highly decentralized nature of Virginia State government and the rapidly changing environment. More attention needs to be given to supporting agency management in understanding and using technology to support changing business requirements. CIM emphasis must be to educate, advocate and facilitate rather than to regulate.

4. Changing expectations. Citizen expectations of state government, especially with regards to information dissemination, have changed, requiring the Commonwealth to do more with less. New strategies must be established to assure that agencies maximize the mission benefits of resource investments.

5. Benefits and leverage. In most organizations, information and information technology influences the quality, cost, and speed of nearly every major activity. Information and information technology influences

decision-making, productivity, and even morale of employees. Current information technology planning efforts in the Commonwealth are focused almost entirely on technology architecture—i.e. hardware and software. Information architecture—how information is organized and used to support an agency's priority business activities—should, however, receive equal if not greater attention.

These factors demonstrate the need for a new strategy for information technology planning in the Commonwealth. If state government is to successfully adapt to these forces of change and realize the benefits of information technology, we must change the way we think of and manage state information resources.

Mission Focused Information Management

Mission Focused Information Management recognizes the rapidly changing technical, political and organizational environment in which state agencies must operate. It seeks to promote a highly adaptable approach to information management, consistent with current technological frameworks and the best practices of leading organizations in both the public and the private sectors. The framework emphasizes agency senior management responsibility for information resources and integrates information management with their other strategic management responsibilities.

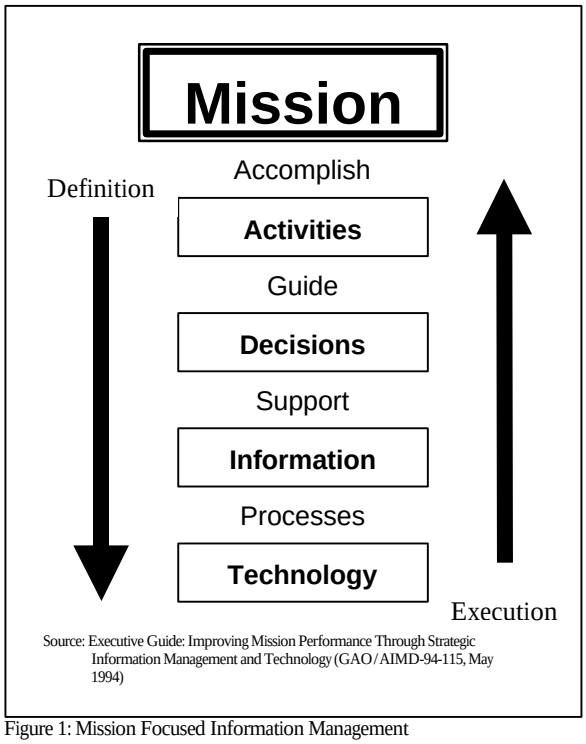

Figure 1: Mission Focused Information Management

MFIM places information and information technology in the proper context of agency mission, core activities and related decisions.

MFIM calls for defining a *mission* based on customer segments and needs; establishing core *activities* and work processes that accomplish the mission; understanding the key *decisions* that guide mission delivery activities; supporting those decisions with the right *information* available to the right people at the right time; and using *technology* to collect, process, and disseminate information in ways that improve the delivery of products and services to customers. As illustrated in Figure 1, MFIM defines information resources requirements from the top down and executes information resources plans from the bottom up.

MISSION FOCUSED INFORMATION MANAGEMENT DEFINES INFORMATION RESOURCES REQUIREMENTS FROM THE TOP DOWN AND EXECUTES INFORMATION RESOURCES PLANS FROM THE BOTTOM UP.

Principles

Seven principles govern successful Mission Focused Information Management. Organizations that adopt these principles display certain attributes. The principles and their related attributes are described in detail in Appendix 1. Mission Focused Information Management Principles. They are summarized below.

1. Information management practices should anticipate change.
2. Planning, budgeting and evaluation processes should be integrated.
3. Achieving mission objectives requires that the right people get the right information when and where they need it, in a format that they can use.
4. Measuring performance is critical to achieving mission objectives.
5. Process improvements should be made in the context of an architecture that fosters a high degree of local control and flexibility.
6. Organization-wide information management capabilities should be built to address mission needs.
7. Information management projects should be managed as investments.

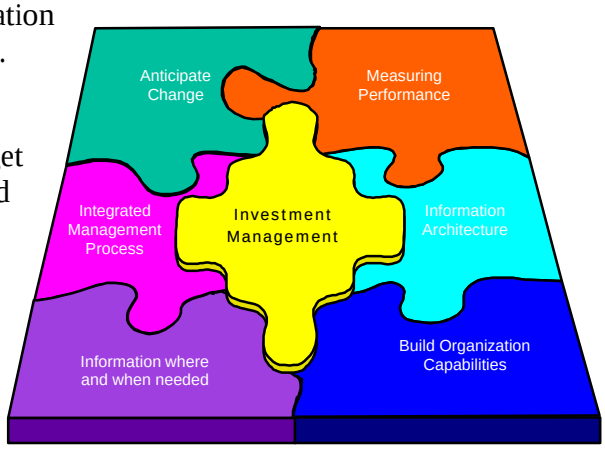

Figure 2. Mission Focused Information Mangement Principles

Best Practices

Mission Focused Information Management has its roots in a 1994 study of leading public and private sector organizations by the General Accounting Office.[2] The study identifies a consistent set of eleven best practices used by senior managers to improve mission performance through strategic information management. These best practices operationalize the principles described above. The GAO study groups the eleven best practices into three key senior management commitments critical to building an effective information management infrastructure: 1) deciding to work differently; 2) directing resources toward high-value uses, and 3) supporting improvements with the right skills, roles, and responsibilities.

2 Executive Guide: Improving Mission Performance through Strategic Information Management and Technology (GAO/AIMD-94-115, May 1994).

Successful implementation of the MFIM principles requires that senior management in the Commonwealth of Virginia make these same commitments and adopt these same practices. These practices work because, over time, they institutionalize new ways of doing business that are required to capture the value of information resources. They are also most effective when implemented together as mutually reinforcing activities, rather than as ad hoc efforts. The commitments and their related best practices are described below.

Decide to Change

Senior managers in leading organizations actively initiate, mandate, and facilitate major changes in information management to improve mission performance. They do this, in part, by (1) recognizing the need to fundamentally change information management practice, (2) creating line management ownership and incorporate information management into business planning, and (3) taking specific actions to maintain momentum over time.

Direct Change

Once the commitment is made to change information resource management practices, it is critical that an outcome-oriented, integrated strategic information resource management process be institutionalized. High performance organizations (4) make external customer needs and mission goals a central driver of all organizational improvement efforts, (5) make serious efforts to objectively measure performance, (6) focus on process improvements, (7) tightly control information technology investments, and (8) integrate the planning, budgeting, and performance evaluation processes.

Support Change

Neither a commitment to change or directed activities can succeed without defining and providing the necessary skills and resources. Hence, the goal of the third group of practices is to support improvements with the right skills, roles and responsibilities and building organization-wide information management capabilities that address mission needs.

Leading organizations (9) define clear responsibilities for line managers and information management professionals, (10) position a senior-level advocate to bridge top management, line users, and technical professionals in identifying and resolving information management issues, and (11) anticipate and develop key skills needed for future improvement efforts.

MFIM in the Commonwealth

The principles, practices and commitments of Mission Focused Information Management require a fundamental shift in the way information resources are viewed and managed in the Commonwealth. Over the next five years, the Council will work to effect this shift through education, advocacy and facilitation. The Council will also issue, as appropriate, policies, standards and guidelines and will exercise its oversight

authority and budgeting responsibilities to assure that agencies are effectively implementing these principles. The Council will work with executive branch officials and the General Assembly to fully realize the benefits of MFIM. Changes will not occur overnight and they will not be easy. The Commonwealth must take a long-term view of MFIM and recognize that many of the benefits will not be realized for some time. Nonetheless, some actions must be taken now and tangible near-term benefits can be expected—low-value projects can be eliminated, unnecessary risks can be uncovered and mitigated, existing projects can be given an increased likelihood of success, and productivity improvements in information management operations can be stimulated.

MISSION FOCUSED INFORMATION MANAGEMENT REQUIRES A FUNDAMENTAL SHIFT IN THE WAY INFORMATION RESOURCES ARE VIEWED AND MANAGED IN THE COMMONWEALTH

Information Resources Investment Management

Information Resources Investment Management (IRIM) is a strategy, consistent with the MFIM framework identified above, for achieving mission objectives and improving mission performance. A description of this strategy, along with specific steps for its implementation within the Commonwealth, follows.

Information technology is increasingly being recognized as a key enabler to achieving business goals and objectives. Traditionally, information technology has been viewed as part of the overhead of an organization. Information technology should, however, be viewed as an asset that contributes to the achievement of an agency's mission. Information technology assures that the right people have the information they need to make the critical decisions that guide mission delivery activities. Agencies must begin looking at information resources and information technology projects—proposed, under development, and operational—as investments within a strategic investment portfolio that support the agency's missions.

This portfolio investment process is analogous to the capital planning and budgeting process frequently used in both public and private sector organizations. And, like these processes, investments in information require special managerial and accounting processes that recognize the value of the resources over time. Just as office buildings and schools, the traditional bricks and mortar of capital budgets, provide the space in which human resources work and accomplish the missions of agencies, information systems provide the space in which information resources are put to work. The construction of both buildings and information systems are investments in the Commonwealth's ability to accomplish its mission. Viewed in this way, information resources take on an entirely new meaning, and the level of discourse about the strategic use of those resources is elevated. Information resources cease to be overhead expenditures, necessary evils, which should be limited; they become agency assets, providing the information needed to make mission critical business decisions.

INFORMATION RESOURCES CEASE TO BE OVERHEAD EXPENDITURES, NECESSARY EVILS, WHICH SHOULD BE LIMITED; THEY BECOME AGENCY ASSETS, PROVIDING THE INFORMATION NEEDED TO MAKE MISSION CRITICAL BUSINESS DECISIONS.

While the specific processes used to implement an investment approach may vary depending upon the structure of the agency, there are common management practices related to the strategic use of information resources. A joint OMB/GAO document rooted in the 1994 GAO study referenced earlier concludes that leading organizations, regardless of structure, maintain an iterative, three-phase, decision-making process. The phases— Selection, Control, and Evaluation— are designed to minimize risks and

maximize return on investments[3]. These conclusions are reiterated in September 1996 GAO document—*Information Technology Investment*[4]. As shown in Figure 3, the three phases of the investment process occur in a continuous cycle of selection, control, and evaluation. Information from each phase flows freely among all of the other phases with the exception of Evaluation. The Evaluation component of the process has a unidirectional information flow to the Selection component. The Evaluation component is used to verify or modify the criteria used during Selection.

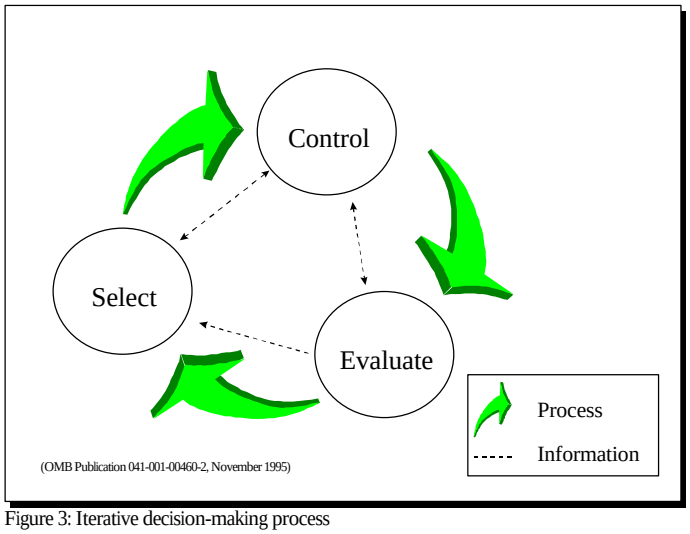

Figure 3: Iterative decision-making process

Looking at information technology projects as investments allows agencies to create a portfolio of information technology project investments that maximize mission performance. Once selected, executives monitor the projects against their projected costs, schedule and benefits throughout their life cycle, taking quick actions to mitigate the effects of changes in risks and costs to ensure that the investments are providing expected benefits. After a project has been implemented, the organization evaluates actual versus expected results for the project, revising their investment management processes based on the "lessons learned".

Leading organizations implement this iterative decision-making process uniformly at an enterprise level and within each business unit of the organization (See Figure 4). This enables an enterprise, even one that is highly decentralized like Virginia state government, to systematically identify cross-functional investment opportunities and to determine tradeoffs between projects both within and across business units.

The key to scaling this process is being able to determine which IT projects and resources are shared (and should be reviewed at higher levels) and which are unique to each agency, division or program within agencies. The common criteria used by

[3] *Evaluating Information Technology Investments: A Practical Guide*, Office of Management and Budget, Executive office of the President (OMB Publication 041-001-00460-2, November 1995)

[4] Information Technology Investment: Agencies can improve performance, reduce costs, and minimize risks. (GAO/AIMD-96-64, September 1996).

leading organizations are applicable in the state setting. These threshold criteria include:

1. High-dollar, high risk IT projects;
2. Cross-functional projects (two or more organizational units will benefit from the project); and
3. Common infrastructure support (hardware and telecommunications).

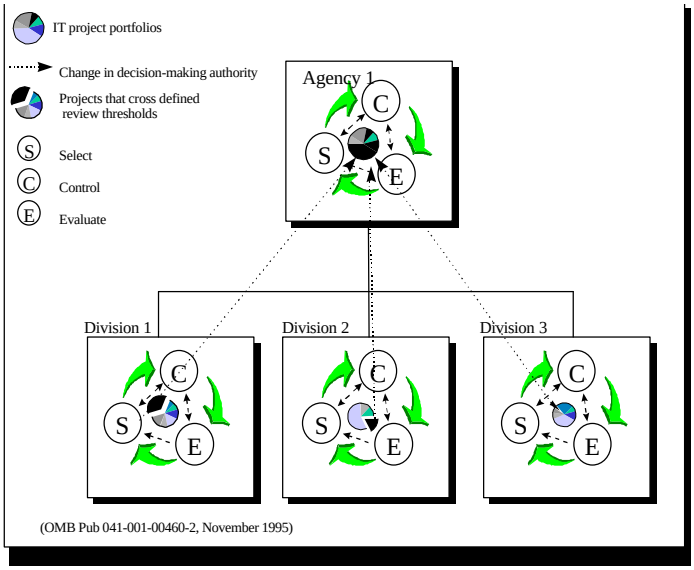

Figure 4: Iterative decision-making process at various levels within the organization

Projects that meet these particular threshold criteria are discussed, reviewed, and decided upon at a higher level. Successfully scaling this process at the multiple levels requires clearly defined roles, responsibilities, and criteria for determining the types of projects that will be reviewed at the different organizational levels.

Equally essential is the need for good data. To make high-quality decisions on information resources investments, consistent, well-defined, and up-to-date data are essential for all projects throughout the terms of the investments. This information, which includes cost and benefit data, risk assessments, benchmarks, implementation plans, and performance measures, allows senior managers to rigorously evaluate the current status of projects. In addition, good information allows senior executives to compare information technology projects across the organization; consider continuation, delay, or cancellation tradeoffs; and take action accordingly.

Phase One: Selection

In the investment selection process, organizations assess and prioritize current and proposed information technology projects in order to create a complete strategic investment portfolio. This phase combines rigorous technical evaluations of project proposals with executive management business knowledge, direction, and priorities. Key to this phase is the use of consistent decision criteria allowing senior executives to make project selection and prioritization decisions based on a consistent set of criteria that compares costs, benefits, risks, and potential returns of the various information technology projects.

By analyzing the entire portfolio, managers examine the costs of maintaining existing systems versus investing in new ones. By continually and rigorously reevaluating the entire agency investment portfolio based on mission priorities, organizations can reach decisions on systems based on overall contribution to organizational goals. The four step Selection process involves 1) screening information technology projects and proposals; 2) analyzing risks, benefits, and costs; 3) prioritizing projects based on risk and return; and 4) determining the right mix of projects and making the final cut.

SELECTION ATTRIBUTES
An executive management team that makes funding decisions based on comparisons and tradeoffs between competing project proposals, especially for those projects expected to have organization-wide impact.
A documented and defined set of decision criteria that examines expected return on investment (ROI), technical risks, improvement to program effectiveness, customer impact, and project size and scope.
Predefined dollar thresholds and authority levels that recognize the need to channel project evaluations and decisions to appropriate management levels to accommodate unit-specific versus agency-level and higher needs.
Where comparable processes and organizations in the public or private sectors exist, quantitative benchmarking of agency performance against those organizations in terms of cost, speed, productivity, and quality of outputs and outcomes.
Risk assessments that expose potential technical and managerial weaknesses.

Step 1—Screen information technology project proposals

Information technology proposals are screened for the level of review as well as relevance and feasibility. In this step agencies screen projects for explicit links to mission needs and program performance improvement targets using a standard set of decision criteria. The agency investment screening process should prescribe the amount of documentation and the level of analytical rigor consistent with the projects type (i.e. mission critical, infrastructure, etc.) and phase (i.e. initial concept, new, ongoing, and operational). The process should also identify if the project meets agency or CIM established thresholds that require the project be reviewed at a higher level.

Step 2—Analyze project risks, benefits, and costs

In this step, information technology project proposals are reduced to those with the highest potential to support the agency's mission critical operations. A detailed evaluation of each proposal's supporting analyses is conducted and summarized so that senior management can begin examining tradeoffs among competing proposals that are to occur in the next step. At this stage, a technical review team evaluates the soundness of the project's benefit-cost and risk analyses. In particular, the review team examines how the project is expected to improve program or operational performance and the performance measures that will be used to monitor expected versus actual results.

Step 3—Prioritize projects based on risk and return

During this step, information technology proposals are rigorously compared against one another to create a prioritized list of all investments under consideration. After completing this analysis, the agency develops a ranked listing of information technology projects. This listing uses expected risk and benefits to identify candidate projects with the greatest potential to effectively support key mission objectives within given organizational, political, and budgetary constraints.

Step 4—Determine the right mix of projects and make the final cut

During this final step, an executive level decision making body determines which projects will be funded based on analyses completed in the previous steps. Determining the right mix of projects to fund is ultimately a management decision that considers the technical soundness of projects, their contribution to mission needs, performance improvement priorities, budgetary and other constraints.

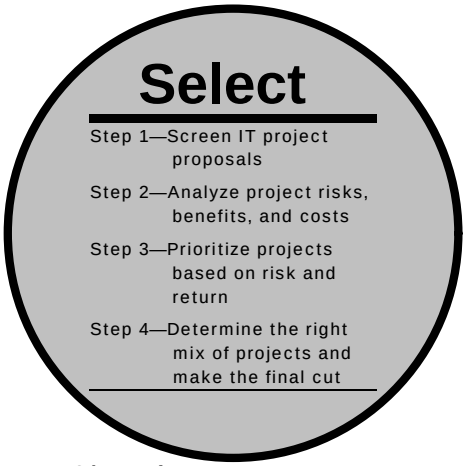

Figure 5: Selection Phase

In determining the right mix, senior managers consider such balancing factors as strategic improvements vs. maintenance of current operations; new projects vs. ongoing projects; high vs. low risk; impact of one project on another; other complicating factors; opportunity costs; external funding; and budgetary constraints.

After consideration of all of the factors mentioned above, senior management should have enough information to make knowledgeable investment decisions. Senior management should also establish a review schedule based on the level of risk and any steps that the project team must take to mitigate that risk.

Project review schedules, risk mitigation plans and cost-benefit plans from prior steps all feed directly into the next section of the investment process—Control.

Phase Two: Control

While agencies select proposals largely once a year as part of the performance budgeting process, the Control phase is an ongoing activity to review new and ongoing projects, as well as operational systems. During the Control phase, senior management regularly monitors the progress of ongoing information technology projects against projected cost, schedule, performance, and delivered benefits. The type and frequency of the reviews associated with this monitoring activity are based on the analysis of risk, complexity, and cost that went into selecting the project and are performed at critical project milestones as defined in the Selection phase. If a project is late, over budget, or

not meeting performance expectation, senior executives decide whether it should be continued, modified or canceled.

CONTROL ATTRIBUTES
Processes involve senior managers in ongoing reviews and force decisive action to address problems early in the process.
Explicit cost, schedule, and performance measures are used to monitor expected versus actual project outcomes.
An information system collects project cost, schedule, and performance data, in order to create a record of progress for each project.
Incentives are developed for exposing and solving project problems.

The Control phase enables senior executives to identify and focus on managing high-potential or high-risk projects; reevaluate investment decisions early in a project's life cycle if problems arise; be responsive to changing external and internal conditions in mission priorities and budgets; and learn from past successes and mistakes in order to make better decisions in the future. Rather than avoiding problems and concerns emerging from unexpected risks, this phase accentuates the need for management accountability by creating pre-arranged checkpoints for projects and forcing corrective action when necessary. There are two steps in the Control phase: 1) monitor projects/systems against projected costs, schedule, and performance; and 2) take action to correct deficiencies.

Step 1—Monitoring projects/systems against projected costs, schedule, and performance

Senior managers compare the preliminary results being achieved by a project against its projected costs, benefits and risks, and identify actual or potential managerial, organizational, or technical problems.

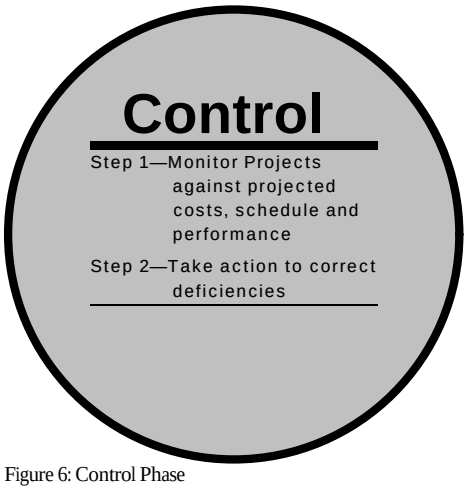

Figure 6: Control Phase

Senior management determines whether a project is on track to achieve its projected mission benefits. The key is to use a set of performance measures consistently so those senior program managers are provided early warning of potential or actual problems. It is essential to refresh these measures as costs, benefits, and risks become better known to ensure the continued viability of an information system prior to and during implementation.

As with the Selection phase, the concept of thresholds comes into play at this point. Senior agency management establishes thresholds for variance from projected costs, schedules and performance. When these thresholds are crossed, the project must be

reviewed and corrective action taken at the next higher level within the agency. Similarly, when CIM established thresholds are met, the Council will review the project.

Step 2—Taking action to correct deficiencies

Information provided in step one should result in a deliberate decision to continue, modify, or cancel each project. This is fundamentally a management decision. Senior management must ensure line management involvement so that the solutions to problems are not the sole province of the MIS organization. Senior managers ensure that all management decisions are documented along with data supporting the required changes. Common problems and their solutions, which are applicable to one information technology project, should be evaluated as to how they apply to other information technology projects under management's purview.

Before an organization can fully implement the Control steps, uniform mechanisms for collecting, automating and processing data on expected versus actual costs, schedule, and returns must be in place for all projects.

Proper control of information technology investments enables senior management to mitigate risks of schedule delays, cost overruns, and development of products that do not meet the goals originally intended. This process is highly dependent on facts provided through continual measurement of new and ongoing projects. The data fed from the Selection phase to the Control phase supports this requirement, as do the measurements taken throughout the life of the project.

EVALUATION ATTRIBUTES
Post implementation reviews are conducted to determine actual costs, benefits, risks, and returns.
Where comparable processes and organizations in the public or private sectors exist, agency performance is quantitatively benchmarked against those organizations in terms of cost, speed, productivity, and quality of outputs and outcomes.
A mechanism for modifying decision criteria and investment management processes, based on lessons learned and benchmarking, is established to improve the Selection process.
Accountability is fostered by measuring actual project performance and creating incentives through the personnel employee evaluation process for even better project management in the future.

Phase Three: Evaluation

The Evaluation phase provides a mechanism for constantly improving the organization's information resources investment process. Once projects have been implemented and become operational, organizations evaluate them to determine whether they have achieved the expected benefits. They do this by conducting project post implementation reviews to compare actual to projected costs, returns and risks and determine the causes of any differences between planned and actual results. The post implementation review results are used to calculate a final return on investment, determine whether any unanticipated modifications may be necessary to the project, and provide "lessons learned" input for changes to the organization's information resources investment

processes and strategy. This phase consists of three steps: (1) conducting post implementation reviews; (2) deciding on adjustments; and (3) identifying lessons learned.

Step 1—Conduct post implementation reviews

In this step, senior managers conduct and review the results of post implementation reviews, focusing on anticipated versus actual results in terms of cost, schedule, performance, and mission improvement outcomes. The causes of major differences between plans and end results are also determined. Post implementation reviews give senior management the information they need to decide whether to continue, modify, or cancel operational systems.

Step 2—Decide on adjustments

Using the results of the post implementation review as a baseline, senior managers decide either to continue the system without adjustment, to modify it to improve performance or, if necessary, to consider alternatives to the implemented system. Even with a good system development process, it is possible that a new system will have problems or even major flaws that must be taken care of in order for the agency to get the full benefit of its investment.

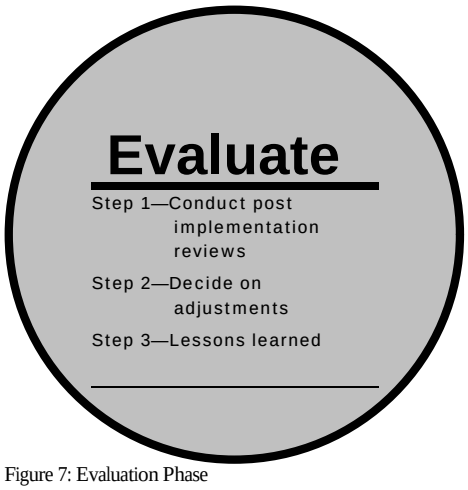

Figure 7: Evaluation Phase

The post implementation review provides senior management with useful information on how best to modify a system, or to work around the flaws in a system, in order to improve performance and to bring the system further in alignment with the customer needs.

Step 3—Lessons learned

Using the collective results of post implementation reviews across completed systems, senior managers modify the organization's existing investment Selection and Control process based on lessons learned.

The information from post implementation reviews helps senior management develop better decision criteria during the Selection process and improve the evaluation of ongoing projects during the Control process.

Implementation

Information Resources Investment Management incorporates the principles of Mission Focused Information Management and will improve mission performance statewide. Maximizing the returns and minimizing the risks on the millions of dollars that are spent each year on information resources, however, will require continued long-term efforts on two fronts.

First, agencies must critically assess how they select and manage their information technology projects. They must use a structured approach to information technology planning that encompasses all aspects of the investment process—Selection, Control, and Evaluation.

Second, the Council must exert its oversight far beyond current levels. Attention must be focused on both agency investment management processes and specific outcomes. Such attention will include the development of policies, standards and guidelines as well as selective evaluations of agency processes and results.

Implementing IRIM in the Commonwealth requires specific actions be taken by agencies and the Council. Those actions are described below.

Agencies and Institutions of Higher Education

Annually on July 1, in conjunction with the budgeting processes, agencies will submit to CIM a Capital Improvement Plan for Information Resources (CIP-IR). This plan will replace the annual information technology plans submitted to the Council.

The CIP-IR consists of a description and analysis of the agency's information resources investment portfolio in the context of the agency's information architecture— common standards and rules for processes, data, and technology— supporting the agency's mission.

CIP-IR ATTRIBUTES
Performance measures for all investments are provided.
Projected cost, schedule and performance data for new projects and for changes to existing investments are identified.
Cost, schedule, milestones, and updated performance measures for ongoing and operational information systems, with descriptions of remedial actions taken to address projects which have significantly deviated from these schedules, are presented.
Post implementation review data for recently completed systems that are now operational, identifying differences between expected and achieved results, and lessons learned are described.

In August/September of each year, agencies will submit information resources related budget requests to the Department of Planning & Budget (DPB) and CIM. This submission will be in the form of proposed changes to the agency's CIP-IR— by reallocating resources from one investment to another within the existing agency

investment portfolio, by adding new resources to an existing investments, or by proposing a new system for inclusion in the portfolio.

In the spring, after the General Assembly session, agencies will incorporate changes based on the results of the session into their CIP-IR and will prepare it for submission to CIM the following July 1.

Throughout the year, agencies will continue to use the Selection-Control-Evaluation process to manage their information systems projects within the context of their investment portfolio. Under this timetable, agencies will complete their investment portfolio analysis and submit their CIP-IR about the same time the issue assessment phase of DPB's performance budgeting process begins. In this way, each year's CIP-IR is both (1) an output of the previous year's performance budgeting and General Assembly related activities, and (2) an important input into the next year's performance budgeting process.

The Council on Information Management

The Council on Information Management has a related schedule and oversight responsibility. The Council will receive the capital improvement plans from the various agencies in July and will publish a summary report on statewide information resources investment on October 1 of each year.

In October/November the Council will use the results produced by the improved agency investment process to develop recommendations for the Governor's budget that reflect an agency's actual track record in delivering mission performance for information technology funds expended. In making these recommendations CIM will look at agency information resources management practices and the actual results of agency information technology investments.

In its review of the CIP-IRs submitted by agencies, the Council will compare projected costs, benefit and risk data with the actual results of agency information technology investments. This analysis will produce an agency track record that not only demonstrates actual mission performance per information technology dollar expended, but also highlights the quality and reliability of agency projections. The Council will also exercise its oversight authority by reviewing selected agencies' activities annually. These reviews will assure compliance with statewide directives, will identify deficiencies that need to be remedied, and will identify best practices. CIM will document its findings and distribute the results widely to help other agencies improve performance.

Supporting Activities and Structures

The introduction of Mission Focused Information Management through Information Resources Investment Management will require significant changes in the way CIM does business. In addition to changing the information technology and planning process and instituting agency information resources management reviews, CIM will need to establish a number of supporting activities and structures.

Policies, standards, and guidelines

The Council is mandated to promulgate information resources management policies, standards and guidelines. While the existing set of policies, standards and guidelines (See Appendix 2. Current Policies, Standards and Guidelines) have served the Commonwealth well, it is necessary to reevaluate their contribution from the perspective of Information Resources Investment Management.

The Council will undertake a thorough review of existing policies, standards and guidelines and will make appropriate additions, deletions, and modifications.

The principles of MFIM suggest four areas in which CIM should focus its policy, standard and guideline development efforts—investment management, information technology architecture, information policy, and organizational development. Future policy, standard and guideline development efforts will be focused in these areas.

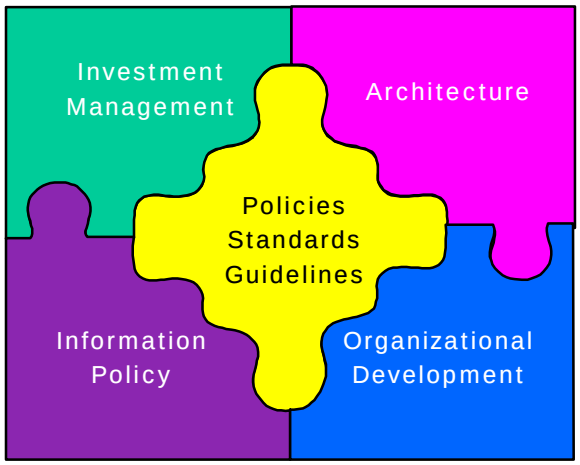

Figure 8: Policies, Standards & Guidelines Suites

Investment Management

The investment management suite of policies, standards and guidelines will contain Information Resources Investment Management implementation guidance. It will cover performance measures, benchmarking, data quality, risk assessments, post implementation reviews and related issues.

Information Architecture

The information architecture suite will help agencies develop agency-specific information and information technology architectures. It will also define the limited central architecture necessary to achieve statewide goals and economies while fostering a high degree of local control and flexibility. Issues such as open networking, electronic commerce, security, assistance for individuals with disabilities, cabling, and the appropriate use of the Internet, will be addressed in this suite.

Information Policy

The information policy portion of CIM's policies, standards and guidelines will deal with the issues related to the acquisition and dissemination of government information.

Organizational Development

Finally, the organization development suite will deal with issues related to staff development and training. Emphasis will be placed on training line managers to effectively manage information technology related projects and on assuring that agencies develop the technical resources of their organization consistent with program and agency architectural goals.

Peer review committees

The implementation of threshold criteria in the investment Selection-Control-Evaluation process assures that project management decisions occur at the lowest possible level within the agency by those line managers closest to the project, while providing a clearly defined mechanism for projects to be reviewed at higher levels when needed.

Thresholds come into play in two distinct circumstances: 1) in the Selection phase when new projects are being considered; and 2) in the Control phase when actual versus projected costs, schedules and performance are being measured. In the Selection phase, thresholds determine who will ultimately be responsible for the project. In the Control phase, thresholds ensure that when projects deviate significantly from projections, the project is reviewed and corrective action taken by senior management.

PEER REVIEW ATTRIBUTES
Clearly defined roles, responsibilities, and threshold criteria are established within agencies and statewide.
A pool of "in-house" experts in information technology, program, technology acquisition and investment management is developed.
Independent evaluations are made of specific projects meeting established thresholds or at agency head/Council request.
Lessons learned and best practices identified in peer reviews are widely publicized and serve as inputs into the policy, standard and guideline development process.

Senior agency management set clear thresholds for high-dollar, high-risk information technology projects, cross-functional projects, and projects that build common infrastructure within the agency. They also establish clear thresholds for variance from projected costs, schedules and performance. Finally, senior agency management establish clearly defined roles, responsibilities, and criteria for determining the types of projects that will be reviewed at the different organizational levels.

The Council will define similar appropriate thresholds for all of state government. The Council will review agency projects that hit these thresholds. To facilitate these reviews the Council will establish a peer review system. Under this system the Council will select a core group of individuals from executive branch agencies based on their knowledge of information technology, program management, technology acquisition management and information resources investment management. These individuals will receive training related to the peer review process and will serve as a pool of experts from which the Council can draw upon as needed to conduct peer reviews.

Projects meeting threshold criteria set by the Council will be reviewed by a peer review committee created by the Council from the pool of "in-house experts" along with other individuals identified as having special skills related to the specific project being reviewed. The Committee will provide recommendations to the agency head and the Council as appropriate.

The Council's peer review committees will also serve as a resource to agency heads seeking independent assessments of specific agency projects. At the request of an agency head the Council may establish a peer review committee to review specific investments, proposed, under development, or operational and make recommendations to the agency regarding the status of the system and next steps.

The Council will publicize lessons learned and promising practices identified during these peer reviews and may adopt new policies, standards and guidelines based on recommendations from the review committees.

Education

Education is critical to the successful implementation of Mission Focused Information Management. Just as agencies must spend a significant portion of their resources in developing organization-wide skills and capabilities of line and information management, a significant portion of the Council's efforts will be focused on education.

EDUCATION ATTRIBUTES
CIM education efforts will focus on 1) Mission Focused Information Management principles and practices; and 2) emerging technologies.
CIM education efforts will be geared towards 1) senior management and 2) information technology professionals.
CIM education programs will augment, not replace, agency development activities.
Periodic best practices and emerging technology seminars will be offered.
Regular executive-level white papers on best practices and emerging technologies will be disseminated.

CIM efforts will be concentrated in two distinct areas: (1) MFIM and investment management principles and practices and (2) emerging technologies. These efforts will also be targeted toward two distinct populations: (1) senior management and (2) information technology professionals. Both populations require significant training in both areas, but their differing roles require different approaches.

The Council will develop and implement a series of half-day training seminars on Information Resources Investment Management and the new processes established by this plan. Once the initial training is complete, the Council will continue to pursue an aggressive education effort. Through executive briefs and seminars, the Council will keep senior executives informed about MFIM principles and practices and emerging technologies. These education activities will present the information in a non-technical, mission- focused format. As necessary, and especially when related to central architecture issues, the Council will also issue technical briefs and conduct seminars geared towards information management professionals.

Currently the Council intends to conduct one best practices seminar and two emerging technology seminars annually. Other education related activities, including the issuance of best practices and emerging technologies executive and technical briefs, will occur on a continuing basis.

Schedule

Given the significant changes envisioned under this plan, the Council has established an aggressive implementation schedule that has agencies submitting their first CIP-IR on July 1, 1998 and CIM issuing its first statewide summary of information resources investments October 1, 1998. In order to meet this timetable a number of activities must be taken on immediately.

The Council will begin developing the various policies, standards and guidelines in March 1997. In this time frame the Council will also begin identifying a pool of

TIMELINE	
1997	
March	CIM begins development of policies, standards, and guidelines
March	Develop pool for Peer Review Committees
1998	
January	CIM begins MFIM/CIP-IR education efforts.
July	Agencies submit first CIP-IR
July	CIM begins best practices and emerging technologies education activities
October	CIM publishes first Summary of Information Resources Investments in the Commonwealth of Virginia
October	Agencies submit IR budget requests to DPB/CIM
1999	
January	CIM begins agency information resources investment management reviews.
July	Agencies submit CIP-IR
October	CIM publishes Summary of Information Resources Investments in the Commonwealth of Virginia
October	Agencies submit IR budget requests to DPB/CIM
2000	
July	Agencies submit CIP-IR
October	CIM publishes Summary of Information Resources Investments in the Commonwealth of Virginia
October	Agencies submit IR budget requests to DPB/CIM
2001	
March	Comprehensive review of Mission Focused Information Management

individuals from the various agencies to serve on peer review committees and will begin developing training material for the peer review committees and for CIM's other education activities. Actual education related activities will begin in January 1998 with a series of briefings on MFIM and IRIM.

In addition to the submission of the first agency CIP-IR, July 1998 will also mark the beginning of CIM sponsored best practices and emerging technology related educational activities. The Council will begin reviewing selected agency information resources investment management practices in January 1999.

Throughout this time period, CIM will be evaluating the entire process through its own performance measures and will make appropriate modifications as necessary. CIM will, however, schedule a comprehensive review of MFIM and the IRIM process in early 2001. By this time, the Commonwealth will have gone through the plan submission and review cycle three times and will be in a position to assess the improvements in mission performance this strategy offers.

Conclusion

Rapidly changing business cycles and increasing citizen expectations, in combination with diminishing resources, have made the effective use of information technology a critical element of governance. Rapidly changing technology has rendered the old ways of managing information resources obsolete. New ways of managing information and information technology are a critical element of nearly every significant performance improvement in both the public and private sectors. Properly applied, information technology can yield dramatic successes. When neglected, it can produce painful failures and actually inhibit improvement efforts.

Mission Focused Information Management places agency information resources in the proper context of the agency's mission and customer needs and provides a common framework from which to discuss critical information resources requirement in the Commonwealth of Virginia. Information Resources Investment Management provides a process within which those discussions can take place and gives decision-makers the information they need to make informed choices among competing demands for resources.

This plan constitutes a significant shift in the way information resources are viewed and managed in the Commonwealth. Change will not occur overnight, nor will it be easy. It is, however, necessary. The Council is committed to helping agency heads make this transition as quickly and easily as possible.

Appendix 1. Mission Focused Information Management Principles

Seven principles govern successful Mission Focused Information Management. Organizations that adopt these principles display certain attributes. The principles and their related attributes are described below.

Principle 1. Information management practices should anticipate change

Organizations must recognize and anticipate the rapid changes in business cycles and technologies and consistently pursue process improvements to adapt to and benefit from these changes.

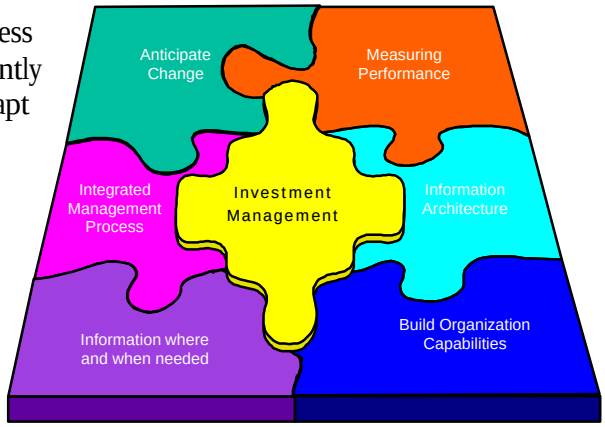

Figure 1. Mission Focused Information Management Principles

Organizations that recognize and communicate the need for continuous improvement assess specific mission-related performance problems, then clarify their linkage to information management practices. They emphasize the need for solutions that integrate mission and information technology decision-making organization-wide. They also aggressively study, or benchmark, themselves against other leading organizations both to challenge accepted habits and to set appropriate targets for change.

Because of the barriers that exist to improving information management, organizations must give considerable attention to initiating the change process and ensuring that it maintains momentum.

Perhaps the most important starting point is educating line management. Unless all line managers begin to understand how information management can make a difference in their performance, only marginal change will occur. Carefully picked and placed champions also create daily pressure to change by removing bottlenecks and resolving thorny

EFFECTIVE IMPROVEMENT EFFORTS REQUIRE LINE MANAGEMENT INVOLVEMENT AND OWNERSHIP IN INFORMATION MANAGEMENT PLANNING.

operational issues that can easily stall an improvement initiative, particularly in public sector organizations.

Effective improvement efforts require line management involvement and ownership in information management planning. Starting with the agency head and extending through all levels of the organization, establishing line accountability immediately focuses information management decision-making and systems development activities on measurable mission outcomes of strategic importance. This, in turn, ensures more realistic benefits projections, greater attention to improving performance, and more extensive and intensive line actions to realize benefits throughout the life of the projects. Without this accountability, it is too easy for the line organization to delegate decision-making irresponsibly, accept project delays, or fail to discern the loss of projected benefits.

PRINCIPLE 1 ATTRIBUTES
Mission performance and the contribution made by information and technology are identified and assessed.
Information management strategies, activities, and applications are understood to be critical to solving performance problems and improving mission performance.
Senior executives communicate specific mission-related performance problems and make the business case for integrating information management decision making with other mission operations.
Information management performance is benchmarked against leading, comparable organizations to challenge accepted habits and set appropriate targets for change.
Line managers are meaningfully involved in critical information management decisions.
The agency head communicates clear information management goals for all management levels and holds line management accountable for the mission impact of information management decisions.
Senior executives act short term (exploiting opportunities to signal the need for mission improvement initiatives) while thinking long term (clearly setting directions, and milestones for information management projects).
A transition strategy to align the information management program with future needs is developed and maintained.
Line managers are expected to know how information management is or is not being used to make a difference in mission performance.
Internal champions are picked and placed to shepherd day-to-day improvement actions.
Incentives tied to successful resolution of identified performance problems are established.

Incentives often become the tangible representation of the organization's level of interest in change. Once performance evaluations include information management issues, previously embedded behavior will improve. Education, champions, and incentives all work because they address the root causes that inhibit change--ignorance, lack of focus, and lack of interest. Without addressing these root causes, even improvement efforts that get a good start will tend to fade quickly.

Principle 2. Measuring performance is critical to achieving mission objectives

Performance measures operationalize mission goals and objectives, quantify problems, evaluate alternatives, allocate resources, track progress, and learn from mistakes.

Performance measures also measure whether information systems projects are really making a difference. Good measures define the information needed to perform a mission well and allow organizations to learn objectively and consistently over time. Without performance measures, managers often have great difficulty getting results from information systems because they cannot define their needs precisely.

PRINCIPLE 2 ATTRIBUTES
Outcome-based performance measures are identified for major mission areas that directly link to key external customer needs.
Specific performance measures are developed for all information management products and services that reflect mission outcome requirements.
Mission delivery and information management performance measure analyses are built into key management processes--including planning, budgeting, investment selection, performance evaluations--to influence decision making and support continuous improvement.
Internal and external benchmarks are used to help assess relative performance and encourage improvement.
Performance measures are tailored to accurately gauge the mission value of information management.

Once the right measures are chosen, they act as a common focus for management to target problem areas, highlight successes, and generally increase the rate of performance improvements through enhanced organizational learning. Business plans identify measurable outcomes and outputs expected from major information systems projects. By focusing on the effects these investments have on operations, performance measures help identify and track their true value.

Principle 3. Achieving mission objectives requires that the right people get the right information when and where they need it, in a format that they can use

Focusing information management practices on mission improvement and recognizing the role of technology in providing mission critical information to decision-makers establishes a customer/supplier relationship between line managers and information management professionals. Nurturing the customer/supplier relationship enables an organization to maximize the benefits of new management processes. Line managers behave as a customer of information management professionals or organizational units by asserting control over information system project funding and

PRINCIPLE 3 ATTRIBUTES
Line managers are responsible for identifying critical information and performance needs, work requirements, and economic benefits of mission improvement projects.
Information management professionals are responsible for supporting line managers as investment counselors and product/service providers.
The organization clarifies roles and responsibilities at the corporate, mission and project levels--focusing corporate management on reinforcing accountability and facilitating mission success.
The senior executive manages the organizational architecture with a bias towards local control and ownership, but also a strong central counterbalance to maximize cross-cutting systems integration needs.
Line managers rigorously understand the economics of information management functions (internal and external costs) as well as product service needs of line management customers.

direction. Key line responsibilities include identifying specific mission goals, the core processes required to accomplish them, key decisions that guide work processes, and the critical information needed to support decision-making.

Information management professionals work to support line management's efforts to meet mission objectives, make critical decisions, and solve business problems. The job of information management professionals involves more than the traditional responsibilities of producing and servicing information systems. Information management professionals should provide investment advisory services and strategic architectural design and management. The focus is on achieving specific mission goals and objectives, rather than satisfying unclear and often unrelated user requirements.

Establishing formal customer/supplier relationships between line managers and information management professionals has the added benefit of placing information-related assets on a par with other physical and intellectual resources and places the information management organization alongside other suppliers as a competitor for the line unit's business. These two effects contribute to organizational learning by creating a constructive tension and interdependency between line and information management organizations.

Principle 4. Planning, budgeting and evaluation processes should be integrated

Integrating planning, budgeting, performance measurement and personnel evaluations allows organizations to treat information systems projects consistently throughout sometimes-disparate management processes. It also helps force the linkage of information systems efforts to the mission, provides tight controls during implementation, and allows regular assessment to ensure that benefits accrue.

PRINCIPLE 4 ATTRIBUTES
The organization integrates long-term strategic business and information planning, systems life cycle and project level planning, budget review, performance assessment, and architecture management so that outputs from one process are used as inputs for the next.
Executives and senior management fully participate in and take responsibility for all major information management project decisions throughout their life cycle from initiation to post-implementation reviews.
Agency heads and senior executives use the strategic planning process to manage operations and make key decisions and assessments -- especially those involving program budgets and information systems investments.

This integration of once-separate processes is the real test of whether an organization's information management approach is truly strategic and thus will be able to improve consistently over time. Without links to planning, budgeting becomes a reactive

WITHOUT LINKS TO PLANNING, BUDGETING BECOMES A REACTIVE EXERCISE TO PRIORITIES OF THE MOMENT THAT ARE NOT WEIGHED ADEQUATELY AGAINST THOSE OF THE FUTURE.

exercise to priorities of the moment that are not weighed adequately against those of the future. Without links to performance measurements, mistakes are not discovered and are often repeated in planning. And without links to budgeting, plans often become mere paper exercises in rationalization.

Principle 5. Process improvements should be made in the context of an architecture that fosters a high degree of local control and flexibility

Accomplishing order-of-magnitude improvements in performance nearly always requires streamlining or redesigning critical work processes. Information systems initiatives must be focused on process improvements and guided by an organizational architecture—common standards and rules for processes, data and technology.

PRINCIPLE 5 ATTRIBUTES
A comprehensive architecture that ensures the appropriate integration of mission-critical information systems through common standards and emphasizes local control and flexibility in adapting to new processes and technologies is established.
Core business processes, based on critical mission needs, are identified and prioritized to support a comprehensive process improvement program.
Efforts are targeted toward core mission delivery processes-- defined as those that, because of their costs and/or importance to customers, have a unique potential for return on investment.
Large-scale improvement efforts are distinguished from others by concentrating on order-of-magnitude improvements in cost, quality, or timeliness.
Strategic resources are focused on a limited number of large-scale process improvement efforts, consistent with organizational resources and staff capacity.

Information systems projects that do not consider business process redesign typically fail or reach only a fraction of their potential. Using business process reengineering to drive information systems initiatives can lead to order-of-magnitude customer satisfaction gains and/or cost savings, rather than marginal efficiency gains normally associated with initiatives that use technology to do the same work, the same way, only faster.

However, if several process improvement efforts using information systems are pursued in an uncoordinated fashion, incompatibility and fragmentation can result. Similarly, rapidly evolving technologies that have organization-wide impact need to be integrated into redesigned work processes systematically. To maximize the benefits of process improvements across an organization and reduce risks, certain shared standards and rules for processes, data and machines are vital. Standards, however, often limit organizational units' ability to rapidly adapt to changes in circumstance and mission needs. In establishing standards, organizations must recognize the potential negative impacts and develop an architecture that fosters a high degree of local control and flexibility.

STRATEGIC BUSINESS AND INFORMATION SYSTEM PLANS SHOULD BE TIGHTLY LINKED TO EXPLICIT, HIGH-PRIORITY CUSTOMER NEEDS.

Principle 6. Information management projects should be managed as investments

Strategic business and information system plans should be tightly linked to explicit, high-priority customer needs.

This emphasis on customer needs helps an organization understand the source, nature and priority of demands on its resources. The criteria for successful information systems are more than merely those systems that are delivered on time and within budget. Successful information systems must produce meaningful improvements in cost, quality and timeliness of service.

PRINCIPLE 6 ATTRIBUTES
The organization specifically defines its products and services by internal and external customer groups and needs.
The organization links customer group needs to specific mission problems and evaluates corresponding opportunities for improvement.
Senior executives focus strategic planning on highest priority customer needs and mission goals.
Consistent with mission goals, the organization tailors products and services to the needs of key customer groups.
Information systems decisions are tightly linked to program budget decisions and mission improvement.
A high-level investment review board that fully involves senior program and information management is established to help in key decisions throughout a project's life cycle.
A disciplined process-- based on explicit decision criteria and quantifiable measures assessing mission benefits, risks, and costs-- is used to select, control and evaluate information systems projects.
Post implementation reviews of projects are made and the results are fed back into the decision-making processes.
Information systems projects are made as narrow in scope and brief in duration as possible to reduce risk and increase probability of success.
The organization distinguishes between maintenance of existing information systems and strategic investments in new systems; and tracks and analyses investment decisions across and within these categories over time.

Without a customer focus, an organization risks missing its real needs and ignoring what matters to key stakeholders. With it, corresponding mission goals can be more easily developed to satisfy each demand, and the needs of customer groups can be prioritized and aligned with specific products and services.

Following a customer-driven approach, in turn, provides accurate, detailed descriptions of requirements and specifications, which are needed to design and develop supporting information systems. This allows the organization to set mission performance goals for improving service delivery or product responsiveness, costs or quality-based on customer needs. Reengineering and information systems projects can also be targeted and designed to improve specific performance areas.

As information management capability increases, projects are viewed more as investments in mission improvement and less as information technology efforts. Senior management teams become personally involved in project selection, control, and evaluation. The basis of decision-making is an explicit set of quantitative and qualitative criteria assessing the mission benefits, risks, and costs of each project.

This investment focus systematically reduces inherent risks while maximizing benefits for complex projects. It does so by concentrating top management's attention on assessing and developing new performance capabilities. Conflicts between competing programs surface and tradeoffs are evaluated during the annual budget decision-making process. With a disciplined process organizations can avoid investments in projects with low potential to provide mission benefits. They can help make explicit links between project outcomes and program needs in complex and often ambiguous budget debates. Line accountability for improved performance is also reinforced. This typically means larger successes, fewer failures, and more significant information systems contributions to organizational goals.

Principle 7. Organization-wide information management capabilities should be built to address mission needs

Strengthening the skills and capabilities of line and information management units is the final part of the formula for building strategic information management capabilities. Lasting improvements in information management are impossible without upgrading the knowledge and skills of executives and managers. Senior line managers need to gain a better understanding of information management and information managers need to learn not only about new and emerging technologies, but also about the business, missions and goals of the line organizations they support.

LASTING IMPROVEMENTS IN INFORMATION MANAGEMENT ARE IMPOSSIBLE WITHOUT UPGRADING THE KNOWLEDGE AND SKILLS OF EXECUTIVES AND MANAGERS.

PRINCIPLE 7 ATTRIBUTES
Line executives and managers are taught how to identify important information management issues, opportunities and decisions,
Information management professionals acquire line management and leadership skills
Existing skills are identified, future skills are explicitly targeted, and the organization moves systematically to newer levels of capability
The organization finds the right mix of technology dependent and independent skills
The CIO understands the organization's mission and works closely as a peer with top management to help increase awareness, understanding, and skill in identifying and resolving information management issues.
The CIO catalyzes, designs, and facilitates implementation of new organizational capabilities by clearly articulating the role of information systems in mission improvement.
The CIO bridges gaps between top management, line users, and the information management units by acting as an adviser and architect.
The CIO helps create an appropriate balance of decision-making authority between corporate and program levels on information management issues.

In a rapidly evolving world of information technology, remaining current is critical. Organizations that fail to improve themselves continuously become trapped in antiquated skill bases which then become an anchor inhibiting the organization's ability to change.

Positioning an advocate, such as a Chief Information Officer (CIO), as a senior management partner is critical to building organization-wide

information management capability. By creating a customer/supplier relationship at the highest levels, it helps line executives change how information is managed organization-wide.

This senior level individual serves as a bridge between top management, line management and information management support professionals, including focusing and advising senior management on high-value issues, decisions, and investments. This person also works with the line management to (1) design and manage an organization-wide architecture, (2) clearly articulate how information management will play a pivotal role in mission improvement, and (3) ensure continued development of organizational capabilities.

In large agencies a CIO may be established to fill this role. In smaller organizations in which a separate CIO position is not possible, an individual should be identified to perform this function and his/her performance evaluations should reflect these added responsibilities. This individual should be more than simply the head of the information management unit. In fact, in successful organizations this person will typically not have day-to-day MIS operational responsibilities; instead, he/she should be a strategic advisor, an architect and a vital member of the top management team.

Appendix 2. Current Policies, Standards and Guidelines

COV ITRM POLICIES:

90-1	Information Technology Security (Revised 5/19/95)
91-1	Systems Development & Maintenance (1/1/92)
92-1	Technology Assistance for Individuals with Disabilities (1/1/93)
94-1	Statewide Kiosk Program (9/16/94)
95-1	Electronic Commerce Implementation Policy (8/8/95)
96-1	Open Systems Environment (5/24/96)

COV ITRM STANDARDS:

90-1	Policies, Standards, & Guidelines: Procedures for Development, Adoption, and Distribution (Revised 11/18/94)
93-1	Technical Advisories: Procedures for Review, Adoption & Distribution (6/1/93)
94-1	Spatial Data Transfer Standard (SDTS) (11/18/94)
95-1	Information Technology Security (1/31/95)
96-1	Telecommunications Cabling (1/26/96)

COV ITRM GUIDELINES:

91-2	Imaging (includes a Research Paper on Imaging Technologies) (7/8/91)
91-3	Model Standard for Large Scope Projects (1/1/92)
91-4	Model Standard for Small Scope Projects (1/1/92)
91-5	Model Standard for Maintenance & Enhancement Projects (1/1/92)
91-6	CASE: Automating the Systems Development Process (1/1/92)
92-1	Model Virginia Map Accuracy Standards (3/20/92)
92-2	selecting a Database Management System (6/26/92)
92-3	Estimating Alternative Technology Systems Costs (6/26/92)
94-1	telecommuting (2/1/94)
94-3	Global Positioning Systems (GPS) (7/15/94)
95-1	Local Area Networks (1/31/95)

Appendix 3. Glossary

Agency. The term "agency" means executive branch agencies and institutions of higher education.

Government Information. The term "government information" means information created, collected, processed, disseminated, or disposed of by or for state government.

Guideline. The term "guideline" means a directive or specifications that is advisory in nature and constitutes a recommendation that is not binding on agencies and institutions of higher education.

Information Resources Investment. The term "Information Resources Investment" means an expenditure of money and/or resources for Information Resources involving managerial, technical, and organizational risk for which there are expected benefits to the organization's performance. These benefits are defined as improvements either in efficiency of operations or effectiveness in services (such as reductions in process cycle time or operation costs, increases in speed or quality of customer services, or improvements in productivity).

Information Resources Investment Portfolio. The term "Information Resources Investment Portfolio" means all information resources investments—planned, under development, and operational—within an organization—agency, division, secretariat, etc.

Information Resources. The term "information resources" includes government information, information technology, and associated personnel.

Information Resources Management. The term "information resources management" means the process of managing (planning, budgeting, organizing, directing, training, promoting, controlling) information resources to accomplish state and agency missions. The term encompasses both information itself and the related resources, such as personnel, equipment, funds, and information technology.

Information Systems. The term "information systems"' means a discrete set of information resources organized for the collection, processing, maintenance, transmission, and dissemination of information, in accordance with defined procedures, whether automated or manual.

Information. The term "information" means any communication or representation of knowledge such as facts, data, or opinions in any medium or form,

including textual, numerical, graphic, cartographic, narrative, or audiovisual forms.

Information Technology. The term "information technology" means any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, inter-change, transmission, or reception of data or information by an agency. For purposes of the preceding sentence, equipment is used by an agency if the equipment is used by the agency directly or is used by a contractor under a contract with the executive agency which (1) requires the use of such equipment, or (2) requires the use, to a significant extent, of such equipment in the performance of a service or the furnishing of a product. The term "information technology" includes computers, ancillary equipment, software, firmware and similar procedures, services (including support services), and related resources.

Information Technology Architecture. The term "information technology architecture", means an integrated framework for evolving or maintaining existing information technology and acquiring new information technology to achieve the agency's strategic goals and information resources management goals.

Policy. The term "policy" means a general statement of direction and purpose designed to promote the coordinated planning, practical acquisition, effective development, and efficient use of information technology resources.

Standard. The term "standard" means a directive or specification governing the management, development, and use of information technology resources.

Appendix 4. Selected Readings

Evaluating Information Technology Investments: A Practical Guide, Office of Management and Budget, Executive office of the President (OMB Publication 041-001-00460-2, November 1995)

Executive Guide: Effectively Implementing the Government Performance and Results Act (GAO/GGD-96-118, June 1996)

Executive Guide: Improving Mission Performance through Strategic Information Management and Technology (GAO/AIMD-94-115, May 1994)

Executive Order #13011 Federal Information Technology.

Evaluating Information Technology Investments: A Practical Guide, Executive Office of the President, Office of Management and Budget, November 1995.

Implementation of the Government Performance and Results Act (GRPA), A report on the Chief Financial Officer's Role and Other Issues Critical to the Governmentwide Success of GPRA, Chief Financial Officers Council, GRPA Implementation Committee, May 1995.

Information Technology Investment: Agencies can improve performance, reduce costs, and minimize risks. (GAO/AIMD-96-64, September 1996).

Managing for Results: State Experiences Provide Insights for Federal Management Reforms (GAO/GGD-95-22, Dec 21, 1994)

Managing for Results: Status of the Government Performance and Results Act (GAO/T-GGD-95-193, June 27, 1995)

Performance Budgeting: State Experiences and Implications for the Federal Government (GAO-AFMD-93-41, February 17, 1993)