

**The Modernization Program Is Establishing
a Requirements Management Office to
Address Requirements Development and
Management Problems**

January 2005

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DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

INSPECTOR GENERAL
for TAX
ADMINISTRATION

January 19, 2005

MEMORANDUM FOR CHIEF INFORMATION OFFICER

Gordon C. Milbourn III

FROM: Gordon C. Milbourn III
Assistant Inspector General for Audit
(Small Business and Corporate Programs)

SUBJECT: Final Audit Report - The Modernization Program Is Establishing a
Requirements Management Office to Address Requirements
Development and Management Problems
(Audit # 200320026)

This report presents the results of our review of the Internal Revenue Service's (IRS) Business Systems Modernization Office (BSMO) requirements development and management activities. The overall objective of this review was to determine whether the BSMO has established and is following adequate requirements management practices to assure the effective development of modernization projects that meet customer needs. This review was part of our Fiscal Year (FY) 2004 Annual Audit Plan for reviews of the IRS Business Systems Modernization (BSM) efforts.

In summary, from November 2001 through November 2004, the Treasury Inspector General for Tax Administration (TIGTA) issued 16 reports identifying BSM requirements development and management problems. Our analysis of these reports identified two recurring issues:

- 1) Project management did not adequately identify requirements to address customers' needs and project development criteria (e.g., computer programming naming standards and financial reporting requirements) before initiating development activities.
- 2) Project management did not trace all requirements to test cases to ensure the projects' operations met expectations.

As a result of these continuing problems, some modernization projects have experienced scheduling delays and increased costs to resolve the requirements development and management issues.

The new Associate Chief Information Officer (CIO), BSM, recognized the significance of these issues and has developed a proposal for establishing a Requirements Management Office. Once established, this Office will work to resolve the requirements development and management problems affecting the BSM program.

The proposal for establishing the Requirements Management Office includes three options. These options have varying degrees of depth in proposed management and control goals, each dependent on the FY 2005 budget allocation for this Office. All three options include using an independent requirements contractor to facilitate the requirements development and management of the modernization projects. The BSMO is in the process of defining and deciding upon the responsibilities for this Office. Consequently, detailed analyses estimating the costs and resources necessary for each of the proposed options have not been completed. The BSMO is currently developing a work breakdown structure¹ which should aid in defining and clarifying the related tasks needed to establish and operate the Requirements Management Office.

Our review of the proposal determined the Requirements Management Office options can be enhanced to ensure effective development and management of requirements. The options as presented in the proposal do not include specific direction to adequately address issues we previously reported. In addition, the options can be enhanced by addressing all guidelines for developing and managing requirements that are included in the Enterprise Life Cycle (ELC)² and the Carnegie Mellon Software Engineering Institute's (SEI)³ Capability Maturity Model Integration (CMMI) models.⁴

Further, the Requirements Management Office proposal has not yet thoroughly considered several key scope aspects that will allow it to begin operating effectively. These scope aspects include determining the Office's specific responsibilities, the source and amount of funding, the staffing needs, the time period for establishing the Office, and a schedule of current or planned modernization projects that will need requirements development and management services.

As part of the ongoing development of the proposed Requirements Management Office, we recommended the CIO ensure the Office's proposed oversight responsibilities address previous TIGTA report findings and consider incorporating ELC and CMMI guidance. In addition, the CIO should ensure the BSMO prepares detailed analyses of

¹ A work breakdown structure is a grouping of products and services created to meet the objectives. Each descending level represents an increasingly detailed definition of the products or services.

² The ELC establishes a set of repeatable processes and a system of reviews that reduce the risks of system development on BSM projects. See Appendix VIII for an overview of the ELC.

³ The SEI is a Federally funded research and development center sponsored by the Department of Defense. Its core purpose is to help others make measured improvements in their software engineering capabilities.

⁴ The CMMI models provide guidance for an organization to use when developing its processes. These models help an organization appraise its capability, establish priorities for improvement, and implement these improvements.

anticipated costs and resources to serve as justification for establishing and operating the Office.

Management's Response: IRS management agreed with the report recommendations, and corrective actions are underway to address them. The CIO is reviewing the previous TIGTA reports for program-wide requirements management issues. Consideration is being given to adopting applicable CMMI capabilities in establishing the Requirements Management Office and in developing more effective requirements development and management processes. The CIO also plans to follow the required guidance and procedures for standing up a new office. To date, the CIO has a high-level plan for standing up the Requirements Management Office and has drafted mission and functional statements, built a framework for the concept of operations, and identified staffing needs for the proposed Office. The CIO is evaluating proposals for requirements development and management contractual services for developing a pilot plan and schedule. After evaluating stakeholder input to the Requirements Management Office's concept of operations and the results of the pilot, the CIO will assess the cost and risk parameters to make changes and implement new capabilities. Management's complete response to the draft report is included as Appendix IX.

Copies of this report are also being sent to the IRS managers affected by the report recommendations. Please contact me at (202) 622-6510 if you have questions or Margaret E. Begg, Assistant Inspector General for Audit (Information Systems Programs), at (202) 622-8510.

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Background

A requirement is a condition or capability that a user must have to solve a problem or achieve an objective. More specifically, a requirement is a formalization of a need and is the statement of a capability or condition that a system, subsystem, or system component must have or meet to satisfy a contract, standard, or specification.

Requirements management is the process that controls and documents all project requirements for the duration of the project. It involves establishing the requirements, controlling all subsequent requirements changes, and establishing and maintaining agreement among the customers and those who provide the requested products or services. Requirements management ensures requirements are unambiguous, traceable, verifiable, documented, and controlled. An effective requirements development and management process can prevent potential problems before they become serious problems that cause schedule delays and additional costs.

In the Internal Revenue Service's (IRS) Business Systems Modernization (BSM) program, project managers work jointly with other IRS representatives and stakeholders to develop product requirements to ensure business needs are well understood. Typically a contractor, working with the IRS, is tasked to define the requirements.

A study by the Savant Institute¹ reported poor communication between the user and analyst in defining requirements caused 56 percent of the errors in installed systems. These errors were the most expensive to correct, using 82 percent of available staff time. This study further noted over 30 percent of application development projects will be cancelled before they begin, over 50 percent of the projects will exceed their budget by 89 percent, and only 16 percent of the projects are completed on time. The primary reasons for the success and failure of projects center on requirements development and management.

The IRS is involved in a 15-year, \$8 billion BSM effort and has started 13 modernization projects² in the past 5 years.

¹ Management Concepts Incorporated, *Defining and Managing Information Technology Project Requirements*, dated 2003.

² Appendix V lists the individual modernization projects.

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To date, we have reported nine of these projects have encountered varying degrees of problems associated with requirements development and management. In four projects, these problems have been severe enough to contribute to schedule delays and cost overruns. The cost of repairing requirement-related defects grows exponentially as the project progresses through its life cycle.

This audit was performed at the BSM Office (BSMO) facilities in New Carrollton, Maryland, during the period August through November 2004. The audit was conducted in accordance with *Government Auditing Standards*. Detailed information on our audit objective, scope, and methodology is presented in Appendix I. Major contributors to the report are listed in Appendix II.

Continuing Requirements Development and Management Problems Encouraged the Modernization Program to Propose a Requirements Management Office

From November 2001 through November 2004, the Treasury Inspector General for Tax Administration (TIGTA) issued 16 reports identifying requirements development and management problems. We made 26 recommendations about requirements development and management in these reports. The BSMO completed corrective actions to implement 19 of these recommendations, 4 are in process, and 3 have not been acted on by management. The TIGTA disagreed with the adequacy of one of the completed corrective actions. See Appendix VI for details on the recommendations and corrective actions for the 16 reports.

The new Associate Chief Information Officer (CIO), BSM, recognized the significance of these issues and has developed a proposal for establishing a Requirements Management Office. Once established, this Office will work to resolve the requirements development and management problems affecting the BSM program. This includes providing oversight for all participants involved in modernization requirements development and management activities.

Our analysis of the 16 reports identified 2 recurring problems that will need to be addressed by the new Requirements Management Office. These problems recurred even though the BSMO addressed similar issues with corrective actions in other project activities. The recurring problems are:

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- Project management did not adequately identify requirements to address customers' needs and project development criteria (computer programming naming standards, financial reporting requirements, etc.) before initiating development activities.
- Project management did not trace all requirements to test cases to ensure the projects' operations met expectations.

Identifying requirements prior to initiating development activities

In a November 2001 report about the BSM's key system development processes,³ we reported business requirement identification was not completed by the modernization projects before entering the Development phase. We recommended the BSMO identify and incorporate business requirements meeting customer needs prior to entering the Development phase.

In July 2002, the BSMO responded that no additional corrective action was needed because the BSMO approved the Enterprise Architecture which established the high-level requirements and standards for the IRS' business activities. Additionally, the Enterprise Life Cycle (ELC)⁴ already called for the identification of requirements early in the development of the projects.

Since November 2001, we have issued nine reports with findings about project activities not completely identifying requirements before entering the Development phase (see Appendix VI, Table 1 for details).

Tracing requirements to test cases

In March 2002, we reported testing processes did not ensure all requirements were working as intended and recommended the BSMO receive documentation from the

³ *Modernization Project Teams Need to Follow Key Systems Development Processes* (Reference Number 2002-20-025, dated November 2001).

⁴ The ELC establishes a set of repeatable processes and a system of reviews that reduce the risks of system development on BSM projects. See Appendix VIII for an overview of the ELC.

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contractor tracing the project requirements to test cases.⁵ The BSMO took no additional action to address this issue, citing a July 2001 procedure requiring the traceability of requirements to test cases.

Since March 2002, we have issued six reports with findings about problems in tracing the development and performance of modernization projects' requirements (see Appendix VI, Table 2 for details).

The BSMO has taken corrective actions to address most of the requirements development and management findings we reported. However, the recurring issues have continued. As a result of these issues, some modernization projects have experienced scheduling delays and increased costs to resolve their requirements development and management issues.

The BSMO's July 2004 presentation proposing the Requirements Management Office includes three options. The three options have varying degrees of depth in proposed management and control goals, each dependent on the Fiscal Year 2005 budget allocation for this Office. All three options include using an independent requirements contractor to facilitate the requirements development and management of the modernization projects.

Table 1 presents the proposed Requirements Management Office's responsibilities under each of the recommended options. Currently, BSMO management intends to implement Option 2.

Industry Guidance and Prior Audit Results Will Assist the Proposed Requirements Management Office in Effectively Developing and Managing Project Requirements

⁵ *The Customer Communications Project 2001 Release Was Deployed, But Testing Processes Did Not Ensure All Applications Were Working As Intended* (Reference Number 2002-20-056, dated March 2002).

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**Table 1: Proposed Requirements Management Office
Responsibility Options**

Proposed Requirements Management Office Responsibilities	Option 1	Option 2	Option 3
Cofacilitate business requirements with the requirements contractor to ensure use of standard requirements development techniques.	•		
Assist in the identification and integration of enterprise requirements.	•		
Build the consolidated IRS requirements database.	•	•	
Set up and manage a requirements development and management web site.	•	•	
Provide requirements training and coaching to modernization projects.	•	•	
Establish requirements standards and templates. Monitor and report on compliance and performance.	•	•	•
Establish requirements governance.	•	•	•
Establish requirements development and management responsibilities across the enterprise.	•	•	•
Manage the requirements contractor.	•	•	•
Define requirements metrics.	•	•	•

Source: BSMO Business Integration Office – BSMO Requirements Management Office – Recommendations, July 2004.

When developing its processes, the Requirements Management Office should consider addressing previous TIGTA report issues

To assess the adequacy of the plans for the Requirements Management Office, we identified ELC and Carnegie

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Mellon Software Engineering Institute (SEI)⁶ guidance for requirements development and management. Both the ELC and SEI provide guidance that supports the need to address the two recurring issues we have reported.

As shown in the July 2004 presentation, the BSMO's recommended options for the proposed Requirements Management Office do not include detailed direction to address the previously reported issues. Specifically, the options do not provide details to ensure modernization project requirements are complete prior to beginning development activities, nor do they specify processes to ensure test cases are traced to the original customer requirements. Appendix VII presents a comparison of the audit findings and related requirements development and management guidelines with the July 2004 presentation's proposed Requirements Management Office responsibility options. We provided the BSMO an early version of this analysis to help it with start-up activities for the Office.

When developing its processes and responsibilities, the proposed Requirements Management Office should incorporate all appropriate industry guidance for developing and managing requirements

The SEI's Capability Maturity Model Integration (CMMI) models provide guidance for an organization to use when developing its processes. These models help an organization appraise its capability, establish priorities for improvement, and implement these improvements. The CMMI models include the essential elements to guide an organization to improve its requirements development, management, and verification and validation processes.

The BSMO requested the SEI to perform a Standard CMMI Appraisal Method for Process Improvement (SCAMPI). The September 28, 2004, SCAMPI Final Findings Briefing identified acquisition program strengths of project team requirements development and management activities that included using a team approach with business

⁶ The SEI is a Federally funded research and development center sponsored by the Department of Defense. Its core purpose is to help others make measured improvements in their software engineering capabilities.

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representatives and other stakeholders throughout the project life cycle, developing and maintaining a requirements management plan, and using a change control board to assess the impact of changes to a system. The SCAMPI Final Findings Briefing also identified overall modernization program acquisition weaknesses affecting project requirements development and management activities, including problems in managing acquisition project schedules and resources, an absence of adequate senior management reviews, and an absence of the use of measures to assess project status.

We compared CMMI model guidelines to the three recommended options for the proposed Requirements Management Office. The July 2004 presentation proposing the Office's responsibilities did not incorporate the following important CMMI requirements development and management guidelines:

- Develop an understanding with the requirements providers of the meaning of the requirements.
- Manage changes to the requirements as they evolve during the project.
- Identify inconsistencies between project work and requirements.
- Analyze requirements to ensure they are necessary and sufficient.
- Validate requirements to ensure the resulting product will perform appropriately in its intended-user environment.
- Place designated work products from the requirements management, development, and verification and validation processes under appropriate levels of configuration management.
- Review the activities, status, and results of the requirements management, development, and verification and validation processes with higher-level management and resolve any issues.

Incorporating all applicable requirements development and management guidelines into the oversight responsibilities

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for the proposed Requirements Management Office will help avoid the recurring issues that have negatively affected the BSM program and contributed to additional project costs and delays. For example, in March 2004 we reported ineffective project design coordination delayed the Modernized e-File project's deployment.⁷ The delay occurred because the infrastructure requirements were not communicated to the application developer during the project design. During the development of the Modernized e-File application, the project team determined the modernized infrastructure⁸ could not accept the application. To deploy the application, the project team had to develop a solution to allow it to function on the infrastructure.

At the time of the report's issuance in March 2004, a cost estimate was not available for the infrastructure changes needed to accept the Modernized e-File application. The PRIME contractor⁹ has now estimated \$1.25 million was needed to pay for the changes to the infrastructure to accept the application. If the requirements had been identified prior to development activities, this rework would not have been needed and \$1.25 million of BSM funding could have been put to better use. Appendix IV presents detailed information on the measurable impact that our recommended corrective action will have on tax administration.

The BSMO recognizes the need for improvements in its requirements development and management processes. It has taken steps to improve project development activities, which include requirements development and management. In August 2004, the IRS implemented an ELC directive

⁷ *Modernized e-File Project Integration Difficulties Have Delayed Its Deployment* (Reference Number 2004-20-072, dated March 2004).

⁸ The modernized infrastructure under development is geographically dispersed over various sites and includes numerous pieces of hardware and software, which must effectively communicate and interact with each other as they support projects that provide benefits to taxpayers and IRS employees.

⁹ The PRIME contractor is the Computer Sciences Corporation, which heads an alliance of leading technology companies brought together to assist with the IRS' efforts to modernize its computer systems and related information technology.

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which includes revised ELC Milestone Readiness Criteria.¹⁰ As of August 20, 2004, all BSMO modernization projects were expected to follow the revised ELC processes and procedures. This revised ELC places greater emphasis on agreement and ownership, establishes more rigorous milestone exit¹¹ criteria, and requires completion of the physical design prior to initiation of project development.

Although the BSMO has established the above policy, the proposed Requirements Management Office has not yet completed the details of its processes to include the revised milestone readiness criteria as part of its oversight responsibilities. Further, it has not yet included all necessary requirements development and management guidance suggested by the CMMI to aid in ensuring the success of BSM project design and development.

Recommendation

As part of the ongoing development of the proposed Requirements Management Office, the CIO should ensure:

1. The Office's proposed oversight responsibilities address the previous TIGTA report findings and consider incorporating the recently updated ELC milestone exit criteria and all appropriate CMMI guidance.

Management's Response: The CIO is reviewing the previous TIGTA reports for program-wide requirements management issues. Consideration is being given to adopting applicable CMMI capabilities in establishing the Requirements Management Office and in developing more effective requirements development and management processes. After deciding on the approach and assessing the gaps, the CIO will assess the cost and risk parameters to make changes and implement new capabilities.

¹⁰ Milestone Readiness Criteria list artifacts, deliverables, and work products that are essential for all project Milestone exits.

¹¹ Milestone exits (i.e., Milestone 1, 2, 3, 4A, 4B, and 5) are key decision points in the lifecycle of the project development effort.

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Detailed Cost and Resource Analyses Will Help the Proposed Requirements Management Office Determine the Extent of Services It Can Offer

The BSMO is in the process of defining and deciding upon the responsibilities for the Requirements Management Office. Consequently, detailed analyses estimating the costs and resources necessary for each of the proposed options have not been completed. The BSMO is currently developing a work breakdown structure¹² which should aid in defining and clarifying the related tasks needed to establish and operate this Office.

Before the Requirements Management Office can be established and begin operating effectively, a number of key scope aspects need to be addressed, including:

- Specific responsibilities of the Office.
- Source and amount of funding for the Office.
- Staffing needs to carry out the Office's responsibilities.
- Time period for establishing the Office.
- Schedule of which current or planned modernization projects will need requirements development and management services.

The Internal Revenue Manual (IRM) provides guidelines for establishing policy, procedures, and responsibility for organizing the mission, function and structure of the IRS.¹³ This guidance provides direction for planning and proposing the desired organizational component. The guidance suggests development of a written proposal describing and justifying the need, the proposed changes and the expected impact, and describing how the impact will be implemented and evaluated. The proposal provides the approving official all information required to make a sound, informed decision.

The IRM guidance also provides for a comprehensive reorganization proposal including elements such as the purpose of the proposed changes in terms of the business need, the mission and functional statements of the proposed organization, and current and proposed staffing. Also, the

¹² A work breakdown structure is a grouping of products and services created to meet the objectives. Each descending level represents an increasingly detailed definition of the products or services.

¹³ IRM 1.1.4, Organizational Planning.

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IRM suggests a list and analysis of costs, savings and benefits – particularly the costs and savings for personnel, support services (e.g., space, equipment, relocation, telecommunications, supplies), and any intangible costs and benefits.¹⁴

In the development of the work breakdown structure, detailed cost and resource analyses would help the BSMO justify the funding needed to address the requirements development and management issues. In addition, these analyses would help identify when and how the proposed Requirements Management Office can perform requirements development and management activities to support the BSM projects.

Recommendation

The CIO should ensure the BSMO:

2. Prepares detailed analyses of anticipated costs and resources to serve as justification for establishing the Requirements Management Office. The analyses should include items such as the Office's responsibilities, the source and amount of funding, the staffing needs, the time period for establishing the Office, and a schedule for providing its services to modernization project teams.

Management's Response: The CIO will follow the required guidance and procedures for standing up a new office. To date, the CIO has a high-level plan for standing up the Requirements Management Office and has drafted mission and functional statements, built a framework for the concept of operations, and identified staffing needs for the proposed Office. The CIO is evaluating proposals for requirements development and management contractual services for developing a pilot plan and schedule. After evaluating stakeholder input to the Requirements Management Office's concept of operations and the results of the pilot, the CIO

¹⁴ IRM 1.1.4.5, Planning and Proposal.

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will assess the cost and risk parameters to make changes and implement new capabilities.

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Appendix I

Detailed Objective, Scope, and Methodology

The overall objective for this review was to determine whether the Business Systems Modernization Office (BSMO) has established and is following adequate requirements management practices to assure the effective development of modernization projects that meet customer needs. To accomplish this objective, we:

- I. Researched the Internal Revenue Manual, the Enterprise Life Cycle,¹ and the Carnegie Mellon Software Engineering Institute's (SEI)² Capability Maturity Model Integration (CMMI)³ guidance to identify applicable guidance to ensure project requirements are appropriately considered in managing modernization project development.
- II. Researched prior Treasury Inspector General for Tax Administration (TIGTA) reports for previously reported requirements development and management issues.
 - A. Determined whether there were recurring issues identified even though there have been corrective actions reported as completed.
 - B. Identified potential outcomes based on the BSMO's actions to ensure the requirements were developed and deployed.
- III. Identified potential results of ongoing or recently completed audits related to requirements development and management and determined whether repeat issues were to be reported in these audits.
- IV. Analyzed planned actions to improve requirements development and management to determine whether guidelines and previously reported TIGTA issues will be addressed.
 - A. Interviewed BSMO staff to determine the actions being taken to address requirements development and management guidelines and previously identified TIGTA issues not identified in the Requirements Management Office – Recommendations presentation, dated July 23, 2004.

¹ The Enterprise Life Cycle establishes a set of repeatable processes and a system of reviews that reduce the risks of system development on Business Systems Modernization projects.

² The SEI is a Federally funded research and development center sponsored by the Department of Defense. Its core purpose is to help others make measured improvements in their software engineering capabilities.

³ The CMMI models provide guidance for an organization to use when developing its processes. These models help an organization appraise its capability, establish priorities for improvement, and implement these improvements.

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- B. Interviewed the Deputy Associate Chief Information Officer, Business Integration, to determine the current status for establishing the proposed Requirements Management Office including the time periods for initiating the Office and problems that might affect its implementation.

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Appendix II

Major Contributors to This Report

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Appendix III

Report Distribution List

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Appendix IV

Outcome Measures

This appendix presents detailed information on the measurable impact that our recommended corrective action will have on tax administration. This benefit will be incorporated into our Semiannual Report to the Congress.

Type and Value of Outcome Measure:

- Cost Savings, Funds Put to Better Use – Actual; \$1,250,000 (see page 4).

Methodology Used to Measure the Reported Benefit:

In a prior audit report, we reported ineffective project design coordination delayed the Modernized e-File project's deployment.¹ The delay occurred because the infrastructure requirements were not communicated to the application developer during the project's design. During the development of the Modernized e-File application, the project team determined the modernized infrastructure² could not accept the application. To deploy the application, the project team had to develop a solution to allow it to function on the infrastructure. At the time of the report's issuance in March 2004, a cost estimate was not available for the infrastructure changes needed to accept the Modernized e-File application. The PRIME contractor³ has now estimated \$1.25 million was needed to pay for the changes to the infrastructure to accept the application based on actual charges during the period September through November 2003. If the requirements had been identified prior to development activities, this rework would not have been needed.

¹ *Modernized e-File Project Integration Difficulties Have Delayed Its Deployment* (Reference Number 2004-20-072, dated March 2004).

² The modernized infrastructure under development is geographically dispersed over various sites and includes numerous pieces of hardware and software, which must effectively communicate and interact with each other as they support projects that provide benefits to taxpayers and Internal Revenue Service (IRS) employees.

³ The PRIME contractor is the Computer Sciences Corporation, which heads an alliance of leading technology companies brought together to assist with the IRS' efforts to modernize its computer systems and related information technology.

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Appendix V

Internal Revenue Service Modernization Projects

Table 1 presents the modernization projects initiated by the Internal Revenue Service (IRS) in the past 5 years.

Table 1: IRS Modernization Projects

	Project	Year Initiated	Description
1.	Custodial Accounting Project/Planning, Analysis and Decision Support*	1999	Uses a data warehousing approach for storing, analyzing, and reporting taxpayer accounts and collections information.
2.	Customer Communications*	1999	Provides needed enhancements to the IRS telephone infrastructure.
3.	Customer Relationship Management Exam	1999	Provides a commercial-off-the-shelf software package that can be used by revenue agents to accurately and consistently compute complex corporate taxes.
4.	Security and Technology Infrastructure Release	1999	Provides a customer-focused technical infrastructure for secure telephony and electronic interaction among employees, tax practitioners, and taxpayers.
5.	Customer Account Data Engine*	2000	Provides an online, modernized data infrastructure which will house the authoritative taxpayer account and return data.
6.	e-Services*	2000	Focuses on revolutionizing the way taxpayers transact and communicate with the IRS.
7.	Enterprise Systems Management*	2000	Executes a strategy to provide network and systems management to improve the information technology infrastructure availability and performance.
8.	Integrated Financial System*	2001	Provides the IRS better financial budgeting, planning, tracking, reporting, and management.
9.	Internet Refund/Fact of Filing*	2001	Builds upon the improvements delivered in the Customer Communications project by providing initial Internet capability for refund information.
10.	Customer Account Management	2002	Creates the interface and redesigned business processes that will be used on a daily basis by IRS customer service representatives. Due to budget constraints, the project has not been funded since Fiscal Year 2003.

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	Project	Year Initiated	Description
11.	Filing and Payment Compliance	2002	Improves the processes and technologies that support the IRS' filing compliance and collection activities and managing the associated organizational change.
12.	Infrastructure Shared Services*	2002	Establishes a program to build and deliver an agile infrastructure that is scalable, interoperable, flexible, manageable, and features standardized operations and a single security and enterprise systems management framework.
13.	Modernized e-File*	2002	Develops the modernized web-based platform for filing IRS forms electronically.

Source: The IRS Business Systems Modernization online web site.

* We reported problems in developing and managing requirements for this project.

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Appendix VI

**Previously Reported Findings on
Requirements Development and Management Activities**

The following tables present the two major requirements management issues identified as continuing concerns in Treasury Inspector General for Tax Administration (TIGTA) reports issued since November 2001. Table 1 presents TIGTA report findings for which requirements identification was not complete before projects entered the development process. Table 2 presents TIGTA report findings for which project requirements were not traced throughout the project development life cycle. The tables identify the TIGTA report, the findings and recommendations, and the status and synopsis of management’s proposed corrective actions. Unless otherwise noted, the recommendations were directed to the Chief Information Officer (CIO) for corrective action.

Table 1: TIGTA Reports With Incomplete Requirements Issues

Report	Finding/Recommendation	Corrective Action
<p><i>Modernization Project Teams Need to Follow Key Systems Development Processes</i> (Reference Number 2002-20-025, dated November 2001).</p>	<p>Finding: Business requirement identification was not completed before entering the project development process.</p> <p>Recommendation: Identify and incorporate business requirements meeting customer needs prior to entering Development phase.</p>	<p>Management Response July 23, 2002 – No additional corrective action needed. The Business Systems Modernization Office (BSMO) approved the Enterprise Architecture which established the high-level requirements and standards for the business. Also, the Enterprise Life Cycle (ELC)¹ already called for the identification of requirements early in the development of the projects.</p>

¹ The ELC establishes a set of repeatable processes and a system of reviews that reduce the risks of system development on Business Systems Modernization projects. See Appendix VIII for an overview of the ELC.

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Report	Finding/Recommendation	Corrective Action
<p><i>Critical Processes and Dependencies Need to Be Addressed to Avoid Further Delays in Deployment of the Enterprise Systems Management Project</i> (Reference Number 2002-20-084, dated May 2002).</p>	<p>Finding: The requirements management process needs to be strengthened and formalized.</p> <p>Recommendations:</p> <p>1) Develop and implement formalized, proactive methods for assisting other modernization projects in refining their system requirements.</p> <p>2) Address MITRE's² recommendations from the review of the ESM project's System Requirements Report (SRR). The recommendations included making requirements more detailed so they can be tested.</p>	<p>1) Management Response April 4, 2002 – No corrective action taken. The Enterprise Systems Management (ESM) project team includes a requirements manager who proactively works with modernization projects to educate and gather ESM requirements from stakeholders.</p> <p>2) Completed May 2, 2002 – MITRE's role is to provide advice and guidance to the Internal Revenue Service (IRS) executives overseeing the Business Systems Modernization (BSM) projects. Since the audit, the IRS considered MITRE's recommendations for ESM and incorporated them into guidance as appropriate.</p>

² The MITRE Corporation (MITRE) is a not-for-profit organization chartered to work in the public interest. As a national resource, it applies its expertise in systems engineering, information technology, operational concepts, and enterprise modernization to address its sponsors' critical needs.

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Report	Finding/Recommendation	Corrective Action
<p><i>Adhering to Established Development Guidelines Will Help to Ensure the Customer Account Data Engine Meets Expectations</i> (Reference Number 2003-20-089, dated March 2003).</p>	<p>Findings:</p> <ol style="list-style-type: none"> 1) The balancing, control, and reconciliation process needs to be completed and tested prior to Release 1. 2) Release 1 entered the Development phase before all design requirements were identified. 3) File and job names need to be compatible with current tax processing systems. <p>Recommendations:</p> <ol style="list-style-type: none"> 1) Require the PRIME contractor³ to complete the balancing, control, and reconciliation process and fully test these processes to ensure they meet the design requirements. 2) Ensure the business system design is complete before entering the Development phase for Release 2 and future releases. 	<ol style="list-style-type: none"> 1) Completed December 23, 2003 – Critical balancing, control, and reconciliation processes for Release 1 have been completed and tested. 2) Completed August 1, 2003 – The Release strategy has been revised to ensure the Development phase for Release 2 and future releases will not begin until the completion of system design.

³ The PRIME contractor is the Computer Sciences Corporation, which heads an alliance of leading technology companies brought together to assist with the IRS' efforts to modernize its computer systems and related information technology.

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Report	Finding/Recommendation	Corrective Action
<p><i>Adhering to Established Development Guidelines Will Help to Ensure the Customer Account Data Engine Meets Expectations</i> (Reference Number 2003-20-089, dated March 2003). (Continued)</p>	<p>3) Ensure development of job and file naming standards is expeditiously completed by the IRS Enterprise Operations Services organization. Also, ensure these naming standards are used in the development of future Customer Account Data Engine (CADE) releases and all other IRS modernization projects.</p>	<p>3) Completed October 1, 2003 – The Modernization Information Technology Services organization’s naming standards have been approved, and the System Information Bulletins requiring the necessary programming are being implemented.</p>
<p><i>Improvements to the Modernized Infrastructure Are Needed to Support the Deployment of Business Systems Modernization Projects</i> (Reference Number 2003-20-161, dated August 2003).</p>	<p>Finding: A decision to deploy was made even with significant cost increases and limitations on system performance.</p> <p>Recommendation: Require additional efforts to ensure performance and capacity planning are adequately addressed at an enterprise level and do not allow deployment of any BSM project without demonstration of the capability to meet performance requirements.</p>	<p>Completed May 12, 2004 – The IRS is developing an End-to-End Capacity and Performance process for the infrastructure projects to follow in support of application projects capacity and performance requirements.</p>

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Report	Finding/Recommendation	Corrective Action
<p><i>Requirements Definition of the Integrated Financial System</i> (Reference Number 2003-10-179, dated August 2003).</p>	<p>Finding: Not all Federal Government financial management system requirements addressed.</p> <p>Recommendations: The Chief Financial Officer (CFO) should –</p> <p>1) Ensure the Joint Financial Management Improvement Program (JFMIP)⁴ requirements are fully addressed, the mandatory requirements are included in the SRR, and the value-added requirements are properly evaluated to ensure compliance with the JFMIP.</p> <p>2) Take a more active role to ensure the contractor is meeting its responsibilities to deliver a JFMIP-compliant system.</p>	<p>1) Completed August 15, 2003 – Management will ensure the PRIME contractor includes or identifies the remaining 4 mandatory and 20 value-added requirements in the revalidated SRR during Milestone 2/3 of each of the appropriate future releases.</p> <p>2) Completed August 29, 2003 – Management will respond immediately to identified gaps in requirements. Also, significant CFO resources were identified to participate in Application Quality Testing and Systems Integration Testing to ensure the system meets established requirements.</p>

⁴ The JFMIP is a joint undertaking of the Department of the Treasury, the Government Accountability Office, the Office of Management and Budget, and the Office of Personnel Management working in cooperation with each other and other agencies to improve financial management practices in the Federal Government.

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Report	Finding/Recommendation	Corrective Action
<p><i>Oversight of the Business Systems Modernization Contractor Needs Improvement</i> (Reference Number 2004-20-034, dated January 2004).</p>	<p>Finding: The IRS did not obtain written assurance that new computer systems will meet business requirements.</p> <p>Recommendations:</p> <p>1) Ensure future task orders include the requirement that the PRIME contractor provide written assurance it and its major subcontractors performed adequate diligence in defining all significant business requirements and the proposed new systems will deliver all of the essential functional and operational capabilities needed by the systems' users.</p> <p>2) Conduct an analysis of future change requests to determine whether the change should have been part of the contractor's normal requirements gathering. Task orders to define business requirements should be written to hold the PRIME contractor responsible for making such changes at no additional cost to the IRS.</p>	<p>1) Completed September 7, 2004 – Late last year, the CIO issued a directive requiring fixed-price contracting for all systems development and implementation projects. The new ELC Framework signed August 20, 2004, establishes a formal checkpoint, Milestone 4A,⁵ at which point mutually agreed detailed specifications are required and agreed to by the contractor by signing the firm fixed-price contract.</p> <p>2) Corrective action in process – open as of November 18, 2004 – The BSMO will include contracting language that failure to identify any material requirement is the PRIME contractor's responsibility and any work to include such a requirement is included under the agreed price.</p>

⁵ The Milestone 4 activities are separated by two checkpoints. Activities leading up to Milestone 4A involve further requirements definition, production of the system's physical design, and determination of the applicability of fixed-price contracting to complete system development and deployment. To achieve Milestone 4B, the system is integrated with other business systems and tested, piloted (usually), and prepared for deployment.

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Report	Finding/Recommendation	Corrective Action
<p><i>Requirements Changes and Testing Delays Have Further Increased the Costs and Delayed the Benefits of the e-Services Project</i> (Reference Number 2004-20-036, dated February 2004).</p>	<p>Finding: Previous business case estimates have been significantly inaccurate.</p> <p>Recommendation: Establish a more formal discipline to ensure system requirements are established prior to beginning development.</p>	<p>Completed September 30, 2003 – A Directive was issued to establish a Configuration Management process and procedures for monitoring change requests. Further improvement to the requirements management will be completed through actions within the Challenges Action Plan.</p>
<p><i>Modernized e-File Project Integration Difficulties Have Delayed Its Deployment</i> (Reference Number 2004-20-072, dated March 2004).</p>	<p>Finding: Ineffective coordination about the project design has delayed deployment.</p> <p>Recommendation: Update ELC project development process to include provisions to certify the project’s physical design is in compliance with the Enterprise Architecture.</p>	<p>Completed August 20, 2004 – The CIO signed the revised ELC guidelines. This revised ELC requires a physical design to be completed (at Milestone 4A) prior to the commencement of development.</p>

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Report	Finding/Recommendation	Corrective Action
<p><i>The Integrated Financial System Software Does Not Comply With Some Accounting Standards or Contain Certain Functionality as Originally Asserted by the Vendor</i> (Reference Number 2004-10-187, dated September 2004).</p>	<p>Findings:</p> <p>1) Risk of noncompliance with the Federal Financial Management Improvement Act (FFMIA) of 1996.⁶</p> <p>2) Asserted out-of-the-box requirements were not met by vendor software.</p> <p>Recommendations:</p> <p>1) The CFO should ensure all JFMIP and FFMIA requirements and accounting standards are operating before the Integrated Financial System (IFS) deployment. If this is not feasible, the IRS should move to the Federal Government version of the IFS as soon as possible, and the CFO should ensure these requirements are included in that version.</p>	<p>1) Corrective action in process – open as of November 18, 2004 – The CFO will ensure those requirements not satisfied in Release 1 are implemented in subsequent enhancements or upgrades. Upon successful implementation of the IFS, Release 1, the CFO will develop an action plan to address enhancements and future releases of the IFS—especially the upgrade to the Federalized version of the software which should close many of the existing JFMIP gaps.</p>

⁶ Pub. L. No. 104-208, 110 Stat. 3009.

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Report	Finding/Recommendation	Corrective Action
<p><i>The Integrated Financial System Software Does Not Comply With Some Accounting Standards or Contain Certain Functionality as Originally Asserted by the Vendor</i> (Reference Number 2004-10-187, dated September 2004). (Continued)</p>	<p>2) The CFO, in concert with the Director, Procurement, and the Associate CIO, BSM, should ensure a coordinated and united stance is taken when conducting any negotiations with the IFS contractor concerning the cost associated with the functionality of accounting requirements that were asserted to be ready for deployment by the software subcontractor.</p> <p>3) The CFO should ensure all costs are considered when any negotiations are held concerning system requirement deferrals.</p>	<p>2) Completed September 30, 2004 – The CFO has implemented the recommendation to coordinate the IFS contract negotiations with the Director, Procurement, and the Associate CIO, BSM.</p> <p>3) Completed September 30, 2004 – The IRS has worked together to ensure all costs associated with requirements that were asserted to be ready for deployment by the software subcontractor, but not delivered in Release 1, were included in the negotiations.</p>
<p><i>To Ensure the Customer Account Data Engine's Success, Prescribed Management Practices Need to Be Followed</i> (Reference Number 2005-20-005, dated November 2004).</p>	<p>Findings:</p> <p>1) Manual processes within the CADE Release 1.1 need to be automated for future releases.</p> <p>2) The CADE Program does not have a dedicated system architect.</p>	

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Report	Finding/Recommendation	Corrective Action
<p><i>To Ensure the Customer Account Data Engine's Success, Prescribed Management Practices Need to Be Followed</i> (Reference Number 2005-20-005, dated November 2004). (Continued)</p>	<p>Recommendations:</p> <p>1) Ensure inefficient manual processes, including the processes cited above, are automated in future CADE releases.</p> <p>2) Ensure the BSMO makes the system architecture resources being acquired available to the CADE program on a full-time basis.</p>	<p>1) Corrective action in process – open as of November 22, 2004 – The CIO plans a number of specific changes for the January 2005 and July 2005 CADE release deliveries to address known operational inefficiencies.</p> <p>2) Corrective action in process – open as of November 22, 2004 – The CIO has been recruiting for the last year to find qualified engineering resources, some of which will be dedicated to the CADE project. Until the additional staffing is on the rolls, the BSMO is providing the CADE engineering/architecture support from the existing Enterprise Architecture team and MITRE.</p>

Source: TIGTA audit reports.

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Table 2: TIGTA Reports With Requirements Traceability Issues

Report	Finding/Recommendation	Corrective Action
<p><i>The Customer Communications Project 2001 Release Was Deployed, But Testing Processes Did Not Ensure All Applications Were Working As Intended</i> (Reference Number 2002-20-056, dated March 2002).</p>	<p>Finding: Testing processes did not ensure all capabilities were working as intended.</p> <p>Recommendation: Perform reviews to ensure the BSMO receives documentation from the PRIME contractor showing project system requirements are traced to use cases, test cases, and test procedures.</p>	<p>Completed March 1, 2002 – On July 13, 2001, the PRIME contractor issued its Program Validation and Verification Plan that requires all test plans to include a requirements traceability matrix that maps all requirements to the test case and test phase. The IRS Product Assurance organization will conduct reviews of the requirements traceability matrices.</p> <p><u>Office of Audit Comment:</u> Management’s response shows this action was completed in July 2001. We question whether that date is accurate, since we raised this issue after that date and were not provided information regarding corrective actions. If this corrective action was taken before we identified the issue, then we must conclude that the actions taken were either incomplete or ineffective.</p>

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Report	Finding/Recommendation	Corrective Action
<p><i>Enhancements to the Internet Refund Project Need to Be Completed to Ensure Planned Benefits to Taxpayers Are Realized</i> (Reference Number 2003-20-053, dated February 2003).</p>	<p>Finding: The Internet Refund Fact of Filing Project is not complete, has not provided all expected benefits, and has exceeded planned costs.</p> <p>Recommendation: Recommendations for corrective actions to address the issues were reported in previous TIGTA reports.</p>	<p>Not Applicable</p>
<p><i>Risks Are Mounting as the Integrated Financial System Project Team Strives to Meet an Aggressive Implementation Date</i> (Reference Number 2004-20-001, dated October 2003).</p>	<p>Finding: Project testing practices can be improved. The Application Qualification Testing requirements traceability verification matrix (RTVM) was not complete.</p> <p>Recommendation: Ensure System Integration and Test practices are strengthened based on lessons learned during the initial Application Qualification Testing.</p>	<p>Completed April 30, 2004 – The Acquisition Project Manager performed an independent verification of the RTVM.</p>
<p><i>Requirements Changes and Testing Delays Have Further Increased the Costs and Delayed the Benefits of the e-Services Project</i> (Reference Number 2004-20-036, dated February 2004)</p>	<p>Finding: Requirements changes were not easily traceable.</p> <p>Recommendation: Ensure the e-Services requirements database clearly reflects when a requirement is changed and which approval change request documents the change. Additionally, the change request document should indicate specific requirements affected.</p>	<p>Completed April 1, 2004 – Management prepared a change request to add additional fields to the requirements database to ensure clear traceability and level of approval indicator.</p>

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Report	Finding/Recommendation	Corrective Action
<p><i>Improvements Are Needed for Subsequent Integrated Financial System Testing</i> (Reference Number 2004-10-052, dated March 2004).</p>	<p>Finding: Some test cases and scripts were incomplete or inaccurate, and some system requirements could not be easily traced.</p> <p>Recommendation: The CFO should ensure subsequent System Integration and Test plans, cases, and scripts are complete and accurate and all applicable financial system requirements can be readily accounted for during the testing process.</p>	<p>Completed October 21, 2003 – The IRS created and is maintaining a current list of all requirements and has verified all requirements are being tested adequately.</p> <p>Completed October 1, 2003 – The RTVM has been reviewed and validated by the IRS to ensure all requirements have been properly mapped to test plans.</p> <p>Completed March 1, 2004 – The RTVM is reviewed weekly by the IRS to ensure all requirement change requests and any other changes have been properly reflected in the RTVM and documented.</p> <p>Completed March 1, 2004 – During testing, the IRS subject matter expert is responsible for reverifying that the requirements are mapped properly and have been met by the functionality tested in the test plan.</p>

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Report	Finding/Recommendation	Corrective Action
<p><i>The Integrated Financial System Project Team Needs to Resolve Transition Planning and Testing Issues to Increase the Chances of a Successful Deployment</i> (Reference Number 2004-20-147, dated August 2004).</p>	<p>Finding: Testing practices continue to need improvement.</p> <p>1) The RTVM and related documentation were incomplete.</p> <p>2) Deviation forms did not include all signatures.</p> <p>3) Some required security features are not being tested.</p> <p>Recommendations:</p> <p>1) The RTVM should be updated to include a verification and validation method for all requirements.</p> <p>2) Deviation forms should be updated to include a signature line for all required approving officials.</p>	<p>1) Completed August 31, 2004 – The new ELC framework, signed by the CIO on August 20, 2004, requires updates to the RTVM beginning at Milestone 2 and updates at each successive milestone, as a condition of milestone exit.</p> <p>2) Completed August 26, 2004 – The ELC requires the Program Office Director’s signature for test case waivers and deferrals. This signature line is included in all but the earliest waiver forms.</p>

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Report	Finding/Recommendation	Corrective Action
<p><i>The Integrated Financial System Project Team Needs to Resolve Transition Planning and Testing Issues to Increase the Chances of a Successful Deployment</i> (Reference Number 2004-20-147, dated August 2004). (Continued)</p>	<p>3) Trusted recovery and object reuse testing should occur or the risk of not conducting these tests should be documented.</p>	<p>3) Rejected August 26, 2004 – The IRS is no longer required by the Department of the Treasury to test for object reuse capabilities.</p> <p><u>Office of Audit Comment:</u> While the Department of the Treasury requirement may have changed, the Internal Revenue Manual still requires object reuse testing. Therefore, we believe the IRS should conduct the required testing, particularly since it plans to perform object reuse testing on one computer platform and not the other. In addition, the IRS’ response did not address trusted recovery testing.</p>
<p><i>System Requirements Were Not Adequately Managed During the Testing of the Custodial Accounting Project</i> (Reference Number 2005-20-019, dated December 2004).</p>	<p>Finding: System requirements were not adequately managed during testing.</p> <p>Recommendation: Ensure the IRS and contractor implement appropriate requirements management practices, as required by the ELC, to adequately define, track, and report on system requirements for testing and delivery of future releases.</p>	<p>Completed June 30, 2004 – The CIO responded the corrective action has been completed with a strengthened requirements management process to ensure system requirements are defined, tracked, and reported.</p>

Source: TIGTA audit reports.

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Appendix VII

**Comparison of Audit Findings,
Requirements Development and Management Guidelines, and
Proposed Requirements Management Office Responsibility Options**

The following tables present a comparison of the audit findings reported by the Treasury Inspector General for Tax Administration (TIGTA) with associated requirements development and management guidelines and the proposed Business Systems Modernization (BSM) Office Requirements Management Office responsibility options related to the TIGTA report findings.

Table 1: Analysis of Findings and Guidelines to Complete Requirements Prior to Development

Finding/Guideline	Source	Addressed in Option			Requirements Management Office's Responsibilities
		1	2	3	
Requirements need to be completed before development begins.	TIGTA Reports: Key Processes 11/01; Enterprise Systems Management 5/02; Customer Account Data Engine 3/03; Oversight of BSM Contractor 1/04; e-Services 2/04	X			Cofacilitate business requirements with the requirements contractor to ensure use of standard requirements development techniques.
Requirements need to meet the Internal Revenue Service and Federal Government standards for information systems.	TIGTA Reports: Customer Account Data Engine, 3/03; Integrated Financial System 8/03; Modernized Infrastructure 8/03; Modernized e-File 3/04; Integrated Financial System 9/04	X			1) Cofacilitate business requirements with the requirements contractor to ensure use of standard requirements development techniques. 2) Assist in the identification and integration of enterprise requirements.

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Finding/Guideline	Source	Addressed in Option			Requirements Management Office's Responsibilities
		1	2	3	
Obtain commitment to requirements.	CMMI-SE-SW-IPPD-SS ¹ pgs 86, 87 (Maturity Level 2) and BSMO-PD Req D&M ² Sect 5	X			Cofacilitate business requirements with the requirements contractor to ensure use of standard requirements development techniques.
Complete understanding of customers' needs and requirements.	CMMI-SE-SW-IPPD-SS pgs 206, 210, 213-214, and 216-217 (Maturity Level 3)	X			1) Cofacilitate business requirements with the requirements contractor to ensure use of standard requirements development techniques. 2) Assist in the identification and integration of enterprise requirements.
Identify and involve the relevant stakeholders.	CMMI-SE-SW-IPPD-SS pg 91 (Maturity Level 2) and BSMO-PD Req D&M				None
Eliciting requirements needs an approach to proactively identify requirements not explicitly provided by customers.	CMMI-SE-SW-IPPD-SS pg 210 (Maturity Level 3)				None

Source: TIGTA audit reports.

¹ Carnegie Mellon Software Engineering Institute's Capability Maturity Model Integration [CMMI]-Systems Engineering-Software Engineering-Integrated Product and Process Development-Supplier Sourcing, March 2002. The CMMI models provide guidance for an organization to use when developing its processes. These models help an organization appraise its capability, establish priorities for improvement, and implement these improvements.

² Business Systems Modernization Office Process Description-Requirements Development and Management, January 31, 2004.

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Table 2: Analysis of Findings and Guidelines to Allow Project Requirements Traceability With Product Development Activities

Finding/Guideline	Source	Addressed in Option			Requirements Management Office's Responsibilities
		1	2	3	
Requirements traceability needs to be verified.	TIGTA Reports: Customer Communications, 3/02; Internet Refund Fact of Filing, 2/03; Integrated Financial System, 10/03; e-Services, 2/04; and Integrated Financial System, 3/04 and 8/04				None
Maintain bidirectional traceability of requirements and confirm the requirements are testable.	CMMI-SE-SW-IPPD-SS pg 88 (Maturity Level 2) and BSMO-PD Req D&M Sect 7.1				None
Validation demonstrates the product, as provided, will fulfill its intended use; whereas, verification addresses whether the work product properly reflects the specified requirements.	CMMI-SE-SW-IPPD-SS pg 282 (Maturity Level 3)				None

Source: TIGTA audit reports.

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Appendix VIII

Enterprise Life Cycle Overview

The Enterprise Life Cycle (ELC) defines the processes, products, techniques, roles, responsibilities, policies, procedures, and standards associated with planning, executing, and managing business change. It includes redesign of business processes; transformation of the organization; and development, integration, deployment, and maintenance of the related information technology applications and infrastructure. Its immediate focus is the Internal Revenue Service (IRS) Business Systems Modernization (BSM) program. Both the IRS and the PRIME contractor¹ must follow the ELC in developing/acquiring business solutions for modernization projects.

The ELC framework is a flexible and adaptable structure within which one plans, executes, and integrates business change. The ELC process layer was created principally from the Computer Sciences Corporation's Catalyst[®] methodology.² It is intended to improve the acquisition, use, and management of information technology within the IRS; facilitate management of large-scale business change; and enhance the methods of decision making and information sharing. Other components and extensions were added as needed to meet the specific needs of the IRS BSM program.

ELC Processes

A process is an ordered, interdependent set of activities established to accomplish a specific purpose. Processes help to define what work needs to be performed. The ELC methodology includes two major groups of processes:

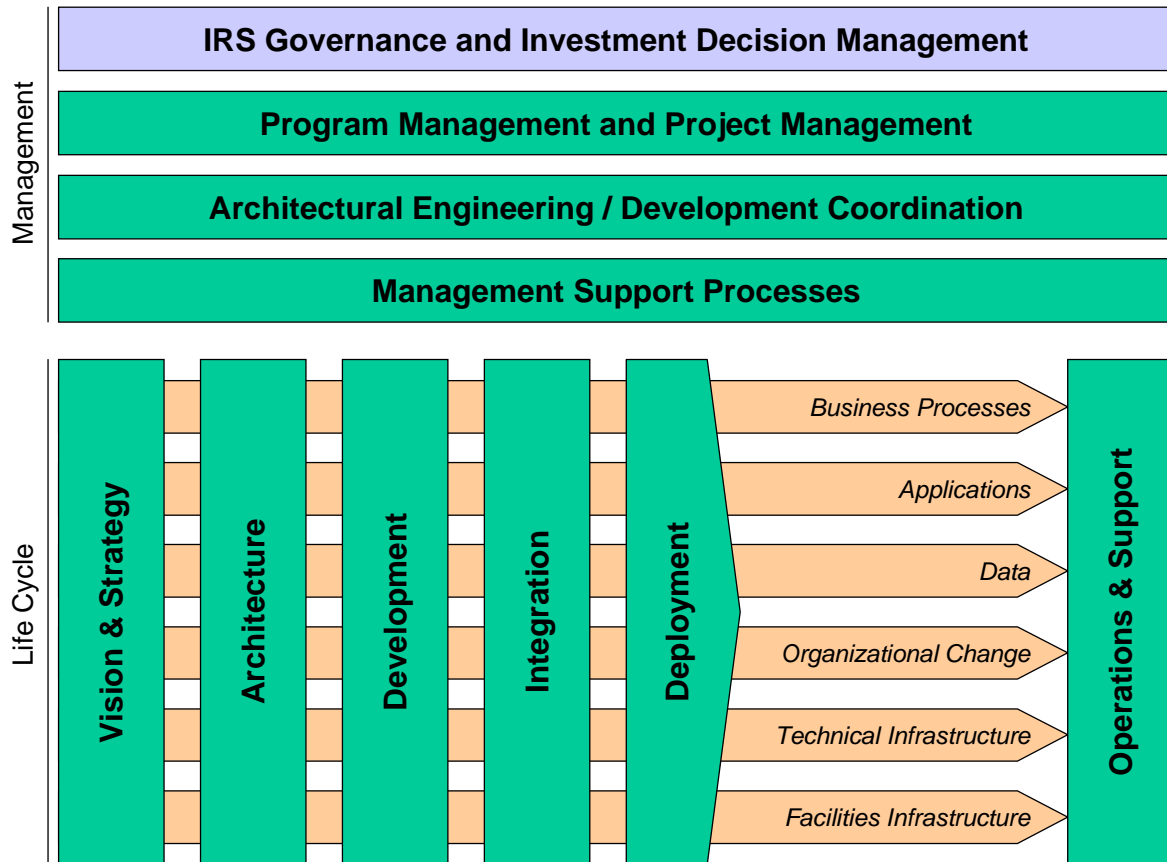
1. **Life-Cycle Processes**, which are organized into phases and subphases and address all domains of business change.
2. **Management Processes**, which are organized into management areas and operate across the entire life cycle.

¹ To facilitate success of its modernization efforts, the IRS hired the Computer Sciences Corporation as the PRIME contractor and integrator for the BSM program and created the Business Systems Modernization Office to guide and oversee the work of the PRIME contractor.

² The IRS has acquired a perpetual license to Catalyst[®] as part of the PRIME contract, subject to certain restrictions. The license includes rights to all enhancements made to Catalyst[®] by the Computer Sciences Corporation during the contract period.

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Enterprise Life-Cycle Processes



Source: ELC Guide, Page 2-16.

Life-Cycle Processes

The life-cycle processes of the ELC are divided into six phases, as described below:

- **Vision and Strategy** – This phase establishes the overall direction and priorities for business change for the enterprise. It also identifies and prioritizes the business or system areas for further analysis.
- **Architecture** – This phase establishes the concept/vision, requirements, and design for a particular business area or target system. It also defines the releases for the business area or system.

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- **Development** – This phase includes the analysis, design, acquisition, modification, construction, and testing of the components of a business solution. This phase also includes routine planned maintenance of applications.
- **Integration** – This phase includes the integration, testing, piloting, and acceptance of a release. In this phase, the integration team brings together individual work packages of solution components developed or acquired separately during the Development phase. Application and technical infrastructure components are tested to determine whether they interact properly. If appropriate, the team conducts a pilot to ensure all elements of the business solution work together.
- **Deployment** – This phase includes preparation of a release for deployment and actual deployment of the release to the deployment sites. During this phase, the deployment team puts the solution release into operation at target sites.
- **Operations and Support** – This phase addresses the ongoing operations and support of the system. It begins after the business processes and system(s) have been installed and have begun performing business functions. It encompasses all of the operations and support processes necessary to deliver the services associated with managing all or part of a computing environment.

The Operations and Support phase includes the scheduled activities, such as planned maintenance, systems backup, and production output, as well as the nonscheduled activities, such as problem resolution and service request delivery, including emergency unplanned maintenance of applications. It also includes the support processes required to keep the system up and running at the contractually specified level.

Management Processes

Besides the life-cycle processes, the ELC also addresses the various management areas at the process level. The management areas include:

- **IRS Governance and Investment Decision Management** – This area is responsible for managing the overall direction of the IRS, determining where to invest, and managing the investments over time.
- **Program Management and Project Management** – This area is responsible for organizing, planning, directing, and controlling the activities within the program and its subordinate projects to achieve the objectives of the program and deliver the expected business results.
- **Architectural Engineering/Development Coordination** – This area is responsible for managing the technical aspects of coordination across projects and disciplines, such as managing interfaces, controlling architectural changes, ensuring architectural compliance, maintaining standards, and resolving issues.

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- **Management Support Processes** – This area includes common management processes, such as quality management and configuration management that operate across multiple levels of management.

Milestones

The ELC establishes a set of repeatable processes and a system of milestones, checkpoints, and reviews that reduce the risks of systems development, accelerate the delivery of business solutions, and ensure alignment with the overall business strategy. The ELC defines a series of milestones in the life-cycle processes. Milestones provide for “go/no-go” decision points in the project and are sometimes associated with funding approval to proceed. They occur at natural breaks in the process where there is new information regarding costs, benefits, and risks and where executive authority is necessary for next phase expenditures.

There are five milestones during the project life cycle:

- **Milestone 1 – Business Vision and Case for Action.** In the activities leading up to Milestone 1, executive leadership identifies the direction and priorities for IRS business change. These guide which business areas and systems development projects are funded for further analysis. The primary decision at Milestone 1 is to select BSM projects based on both the enterprise-level Vision and Strategy and the Enterprise Architecture.
- **Milestone 2 – Business Systems Concept and Preliminary Business Case.** The activities leading up to Milestone 2 establish the project concept, including requirements and design elements, as a solution for a specific business area or business system. A preliminary business case is also produced. The primary decision at Milestone 2 is to approve the solution/system concept and associated plans for a modernization initiative and to authorize funding for that solution.
- **Milestone 3 – Business Systems Design and Baseline Business Case.** In the activities leading up to Milestone 3, the major components of the business solution are analyzed and designed. A baseline business case is also produced. The primary decision at Milestone 3 is to accept the logical system design and associated plans and to authorize funding for development, test, and (if chosen) pilot of that solution.
- **Milestone 4 – Business Systems Development and Enterprise Deployment Decision.** In the activities leading up to Milestone 4, the business solution is built. The Milestone 4 activities are separated by two checkpoints. Activities leading up to Milestone 4A involve further requirements definition, production of the system’s physical design, and determination of the applicability of fixed-price contracting to complete system development and deployment. To achieve Milestone 4B, the system is integrated with other business systems and tested, piloted (usually), and prepared for deployment. The primary decision at Milestone 4B is to authorize the release for enterprise-wide deployment and commit the necessary resources.

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- **Milestone 5 – Business Systems Deployment and Postdeployment Evaluation.** In the activities leading up to Milestone 5, the business solution is fully deployed, including delivery of training on use and maintenance. The primary decision at Milestone 5 is to authorize the release of performance-based compensation based on actual, measured performance of the business system.

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Appendix IX

Management's Response to the Draft Report



CHIEF INFORMATION OFFICER

DEPARTMENT OF THE TREASURY
INTERNAL REVENUE SERVICE
WASHINGTON, D.C. 20224

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MEMORANDUM FOR ASSISTANT INSPECTOR GENERAL FOR AUDIT
(SMALL BUSINESS AND CORPORATE PROGRAMS)

FROM: W. Todd Grams *WTG*
Chief Information Officer

SUBJECT: Draft Audit Report – The Modernization Program Is Establishing
a Requirements Management Office to Address Requirements
Development and Management Problems (Audit # 200320020;
ECMS# 0412-67WQN4RA)

Thank you for the opportunity to review the referenced draft audit report. In general, we agree with your recommendations. We would also like to express our appreciation for the additional meetings we had with the audit team to discuss our concerns with some of the report's observations. As a result of these meetings, the audit team incorporated many of our recommended changes into the current draft report.

We are pleased the report acknowledges that we:

- Recognized the significance of requirements development and management practices, and that we are actively pursuing improvements.
- Completed and implemented 17 of the 23 corrective actions related to requirements identified in previous TIGTA audit reports, and we are completing corrective actions for others.
- Developed a proposal for establishing a Requirements Management Office (RMO) to assist in the resolution of requirements development and management challenges affecting the BSM program.

As noted in the report, we have made additional improvements in our requirements development and management processes. For example, we:

- Acted on recommendations resulting from recent independent studies. To strengthen the roles and responsibilities of key stakeholders in each of the projects, these stakeholders must now provide signature approvals for changes in requirements for their respective areas of expertise.

The Modernization Program Is Establishing a Requirements Management Office to Address Requirements Development and Management Problems

- Assigned a business unit leader to each project with responsibility for leading the related BSM Governance Committee and sharing accountability for delivering the modernization project as stated in their annual performance commitments.
- Augmented the life cycle methodology with Milestone 4a/b guidance to ensure that development does not begin until the business requirements are defined. With fully developed design specifications and a technical infrastructure in place we are able to negotiate fixed price contracts.

Since the conclusion of the audit, we have continued to make further progress. For example, we:

- Formulated a phased in approach for standing up the RMO and piloting initial capabilities in FY 2005.
- Begun the development of a draft concept of operations for the RMO that outlines the high level requirements processes, key capabilities of the RMO, and the roles and responsibilities of the major stakeholders.
- Developed a statement of work to engage requirements management expertise to further develop, refine, and pilot the requirements management services, processes, and procedures.

Additional comments for all of the recommendations are provided in the attachment.

We would like to express our apprehension regarding the measurable impact the recommended corrective actions will have on tax administration. The audit report indicates that ineffective project design coordination delayed the deployment of Modernized e-File (MeF) and increased costs by approximately \$1.25 million.

We spent the additional funds to properly identify the design solution in compliance with the enterprise architecture for MeF. While additional resources were required to rollout the project, we now have an infrastructure that provides greater capabilities for future modernization projects and cost efficiencies are being realized in subsequent releases of MeF and other modernization projects. However, any corrective action that we might implement at this phase cannot deliver the desired cost savings indicated in the report.

We appreciate your continued support and the valuable assistance and guidance from your staff. If you have any questions, please contact me at (202) 622-6800, or Richard Spires, Associate Chief Information Officer, Business Systems Modernization, at (202) 622-7458.

Attachment

The Modernization Program Is Establishing a Requirements Management Office to Address Requirements Development and Management Problems

Draft Report - The Modernization Program Is Establishing a Requirements Management Office to Address Requirements Development and Management Problems (Audit # 200320026) Attachment

RECOMMENDATION #1: As part of its ongoing development of the proposed Requirements Management Office, the CIO should ensure the Office's proposed oversight responsibilities address the previous TIGTA report findings and consider incorporating the recently updated ELC milestone exit criteria and all appropriate CMMI guidance.

CORRECTIVE ACTION: We agree with this recommendation. We are reviewing all previous TIGTA reports for program-wide requirements management issues. We may also adopt the applicable Carnegie Mellon Software Engineering Institute's Capability Maturity Model integration capabilities as part of establishing the new RMO office and in developing more effective requirements development and management processes. Once we decide our approach and assess the gaps, we will assess cost and risk parameters to determine the most effective and efficient way to make changes and implement new capabilities. We expect this will be done in a phased approach taking resource and cost implications into consideration.

IMPLEMENTATION DATE: September 1, 2005 – Initial Operating Capability (IOC)

RESPONSIBLE OFFICIAL: Deputy Associate Chief Information Officer for Business Integration

CORRECTIVE ACTION MONITORING PLAN: We enter accepted corrective actions into the Item Tracking, Reporting and Control System (ITRAC), and we monitor them monthly until completion.

RECOMMENDATION #2: The CIO should ensure the BSMO prepares detailed analyses of anticipated costs and resources to serve as justification for establishing the Requirements Management Office. The analyses should include items such as the Office's responsibilities, the source and amount of funding, staffing needs, the time period for establishing the Office, and a schedule for providing its services to modernization project teams.

CORRECTIVE ACTION: We agree with this recommendation. We will follow the required guidance and procedures for standing up a new office within MITS. To date, we have developed a high level plan for standing up the RMO, drafted the RMO mission and functional statements, built a framework for the concept of operations, and identified staffing needs for the proposed office. We are also in the process of evaluating proposals for requirements development and management contractual services for developing the pilot plan and schedule. After evaluating the stakeholder input to the RMO CONOPS and the results of the pilot, we will assess cost and risk parameters to determine the most effective and efficient way to make proposed changes and implement new capabilities. We expect that this will be done in a phased approach taking resource and cost implications into consideration.

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IMPLEMENTATION DATE: October 1, 2005

RESPONSIBLE OFFICIAL: Deputy Associate Chief Information Officer for Business Integration

CORRECTIVE ACTION MONITORING PLAN: Same as monitoring plan for Recommendation # 1.