



*While Improvements Have Been Made,
Business Systems Modernization Cost and
Schedule Estimation Processes Have Not
Always Been Followed and Major Changes
Are Planned*

October 2005

Reference Number: 2006-20-002

This report has cleared the Treasury Inspector General for Tax Administration disclosure review process and information determined to be restricted from public release has been redacted from this document.

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October 19, 2005

MEMORANDUM FOR CHIEF INFORMATION OFFICER

FROM: *Michael R. Phillips*
Michael R. Phillips
Deputy Inspector General for Audit

SUBJECT: Final Audit Report – While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned (Audit # 200520004)

This report presents the results of our review of Business Systems Modernization (BSM) cost and schedule estimation processes and trends. The overall objective of this review was to determine the status and effectiveness of corrective actions implemented in response to our prior audit report¹ on the cost and schedule estimation process for the BSM program. In addition, we followed up on another prior report² to update trends in the BSM program's accomplishments against initial cost and schedule estimates.

The BSM program has been plagued with cost and schedule overruns and criticized for its ineffective cost and schedule estimation capabilities. The Government Accountability Office (GAO) recently reported³ BSM projects had exceeded cost estimates by over \$400 million and schedule estimates by up to 33 months. The GAO concluded cost and schedule shortfalls were likely to continue until cost and schedule estimation practices were fully implemented.

¹ *The Cost and Schedule Estimation Process for the Business Systems Modernization Program Has Been Improved, but Additional Actions Should Be Taken* (Reference Number 2003-20-219, dated September 2003).

² *Analysis of Business Systems Modernization Cost, Schedule, and Functionality Performance* (Reference Number 2003-20-007, dated October 2002).

³ *Business Systems Modernization: IRS's Fiscal Year 2004 Expenditure Plan* (GAO-05-46, dated November 2004).



While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

Synopsis

The BSM Office (BSMO) has made progress in implementing the cost and schedule estimation recommendations included in our prior audit report.⁴ Corrective actions for three of the five previous audit recommendations were completed. For example, the PRIME contractor⁵ developed procedures for calibrating⁶ cost and schedule estimation models, and the BSMO conducted cost and schedule estimate reviews and had begun to trend the results. However, corrective actions for two of the five previous audit recommendations were not timely completed and will be affected by planned program changes.

We also concluded cost and schedule estimation processes in the BSM program were not always followed. We determined estimate review documentation did not explain the results of using a second cost and schedule estimation method, the PRIME Estimation Guidebook did not clearly present the requirements to use a second cost and schedule estimation method, cost and schedule estimate proposals submitted for review did not contain the required supporting documentation, and issues identified during estimation activities were not input to the Item Tracking Reporting and Control (ITRAC)⁷ system.

To update our cost and schedule estimate trend analysis from October 2002,⁸ we reviewed information presented in all available BSM expenditure plans.⁹ We determined active and deployed BSM projects have varied from original cost estimates contained in the expenditure plans by over \$480 million. This equates to 78 percent more than the estimates originally provided to Congress. Cost variances are generally trending downward; however, the trend is not consistent. We determined the inconsistency was due to the projects and their associated life cycle¹⁰ phases being funded in each expenditure plan. Generally, the expenditure plans that fund major systems moving into the later phases of the life cycle have higher cost variances than those mainly funding projects early in the life cycle. We also determined active and deployed BSM projects have varied from original schedule estimates by an average of 18 months.

⁴ *The Cost and Schedule Estimation Process for the Business Systems Modernization Program Has Been Improved, but Additional Actions Should Be Taken* (Reference Number 2003-20-219, dated September 2003).

⁵ 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.

⁶ Calibration involves reviewing and adjusting estimation models to ensure they represent the PRIME contractor's specific cost and product history.

⁷ The BSM Risk Management Plan requires all modernization organizations use the ITRAC database to record and update the status of issues.

⁸ *Analysis of Business Systems Modernization Cost, Schedule, and Functionality Performance* (Reference Number 2003-20-007, dated October 2002).

⁹ The BSMO provides Congress justification to release funds specifically set aside for the BSM effort by submitting BSM expenditure plans.

¹⁰ See Appendix V for an overview of the Enterprise Life Cycle.



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The Internal Revenue Service (IRS) recently reported Fiscal Year 2004 was a banner year for meeting cost and schedule estimates. Our analysis of the rebaselined project deliveries confirmed the IRS' assessment that implemented project releases were generally within budget and on time, based on estimates from the May 2004 BSM Expenditure Plan. While the ability to meet short-term goals is a noteworthy accomplishment, the ability of the BSM program to sustain its Fiscal Year 2004 accomplishments with projects in earlier stages of the life cycle remains to be seen.

The IRS has recently taken steps to limit cost increases and schedule delays. For example, the IRS is establishing a Requirements Management Office to help avoid the recurring issues that have contributed to additional project costs and delays. IRS executives also stated they were concerned the prevailing variance methodology did not accurately depict variances within the BSM program and had begun discussions to revise the methodology for computing variances.

Recommendations

To ensure cost and schedule estimate reviews can be conducted effectively in the absence of the PRIME Estimation Guidebook, we recommended the Chief Information Officer (CIO) ensure all modernization systems development contractors provide consistent cost and schedule estimation data. To ensure adequate documentation on the use of a second cost and schedule estimation method is received for review, we recommended the CIO develop an alternative way to clearly inform modernization contractors when the use of a second estimation method is needed and issue clear guidance requiring the results of using multiple estimation methods to be explained. To ensure issues are formally tracked to closure, the CIO should determine if any remaining issues from the IRS PRIME Validation Report¹¹ are relevant to the new environment. If any issues are determined to be relevant, these issues should be documented and tracked in the ITRAC system.

Response

IRS management agreed to the three report recommendations. The IRS is developing a revised Basis of Estimate (BOE)¹² guidance document which outlines expectations for substantiating cost and schedule estimates. The IRS will conduct a 6 month trial implementation period, after which the IRS will determine the impact of the revised guidance on contract costs and assess the cost effectiveness of implementing the guidance across the entire BSM program. The IRS will also

¹¹ The PRIME Validation Report provides the results of the IRS' review of the PRIME contractor's cost and schedule estimation capability.

¹² A BOE template is a tool used to estimate all task order proposals. It includes specific sections that must be documented to justify the estimate proposal, such as what work will be performed, the schedule estimate, and the staffing summary.



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obtain a second estimate through either an Independent Government Cost Estimate¹³ or a BOE. The IRS stated it has completed an assessment of the IRS PRIME validation report and, due to the program changes, determined that no relevant issues remained. Management's complete response to the draft report is included as Appendix X.

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.

¹³ The purpose of an Independent Government Cost Estimate is to provide an independent and realistic estimate that can be compared with the contractor's proposed cost.



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Background

The Internal Revenue Service (IRS) is currently modernizing its computer systems and business processes and practices. This effort is known as the Business Systems Modernization (BSM). Since the inception of the BSM, the Government Accountability Office (GAO) has designated the program as high risk, in part because of its size, complexity, and immense importance to improving IRS performance and accountability.

In December 1998, the IRS hired the Computer Sciences Corporation as the PRIME contractor to design and develop the BSM program and projects. The expectation was that the PRIME contractor would strengthen the IRS' ability to manage and control modernization initiatives. In addition, the IRS created the Business Systems Modernization Office (BSMO) to coordinate and oversee the work of the PRIME contractor.

While the partnership between the PRIME contractor and the BSMO was meant to strengthen systems acquisition and development capabilities, the BSM program has been plagued with cost and schedule overruns and criticized for its ineffective cost and schedule estimation capabilities. For example, in October 2002, we reported the BSM program had experienced a \$75 million, or 24 percent, cost increase for the 20 projects initiated since 1999.¹ Since that time, cost increases and schedule delays have continued to mount. In November 2004, the GAO reported BSM projects had exceeded cost estimates by over \$400 million and schedule estimates by up to 33 months.² The GAO concluded cost and schedule shortfalls were likely to continue until cost and schedule estimation practices were fully implemented.

We completed our initial review of the cost and schedule estimation process in September 2003.³ We found the BSMO and the PRIME contractor had made progress in establishing a cost and schedule estimation system; however, we determined the BSMO could take additional steps to further improve the cost and schedule estimation system.

In September 2004, the BSMO issued a report on the validation of the PRIME contractor's cost and schedule estimation capability. The report stated, in summary, that the PRIME contractor's cost and schedule estimation capability had significantly improved, but estimation processes and compliance were still inadequate in some respects. The report stated the primary area of observed weakness was execution. Despite efforts to provide a sound estimation foundation

¹ *Analysis of Business Systems Modernization Cost, Schedule, and Functionality Performance* (Reference Number 2003-20-007, dated October 2002).

² *Business Systems Modernization: IRS's Fiscal Year 2004 Expenditure Plan* (GAO-05-46, dated November 2004).

³ *The Cost and Schedule Estimation Process for the Business Systems Modernization Program Has Been Improved, but Additional Actions Should Be Taken* (Reference Number 2003-20-219, dated September 2003).



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within the PRIME contractor, there was little evidence the guidance was being followed. The PRIME contractor agreed with the assessment.

By Fiscal Year (FY) 2005, funding levels for the BSM program had decreased and the IRS had to initiate changes in critical program-level roles that were previously performed by the PRIME contractor, including development and implementation of effective cost and schedule estimation processes. The Associate Chief Information Officer (ACIO), BSM, informed us of these changes as we were completing our audit work. Because these changes have a significant effect on our audit work, we have correlated our work to planned changes in the BSM program throughout this report (see *Effect of Program Changes* sections throughout the report).

In addition, we communicated interim results of our audit, as well as suggestions for improvement, to the BSMO in February 2005. Any continuing changes that have occurred since we concluded our analyses are not reflected in this report. As a result, this report may not reflect the most current status.

This review was performed at the BSMO facilities in New Carrollton, Maryland, during the period October 2004 through March 2005. The audit was conducted in accordance with *Government Auditing Standards*. Detailed information on our audit objectives, scope, and methodology is presented in Appendix I. Major contributors to the report are listed in Appendix II.



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Results of Review

The Business Systems Modernization Office Has Made Progress in Implementing Cost and Schedule Estimation Recommendations and Will Need to Continue to Make Adjustments Due to the Effect of Program Changes

The BSMO has made progress in implementing the cost and schedule estimation recommendations included in our prior audit report.⁴ Corrective actions for three of the five previous audit recommendations were completed.

Cost and schedule estimation model calibrations

In our prior report, we recommended the Chief Information Officer (CIO) ensure the PRIME contractor documents the process for cost and schedule estimation model calibrations.⁵ The Federal Acquisition Regulation (FAR) states the Federal Government may use various cost analysis techniques and procedures to ensure a fair and reasonable price, given the circumstances of the acquisition.⁶ These techniques and procedures include the reasonableness of estimates generated by appropriately calibrated and validated models.

We determined the PRIME contractor developed procedures for calibrating cost and schedule estimation models, calibrated the Constructive Cost Model (COCOMO),⁷ and prepared a schedule showing when other models would be calibrated. For cost and schedule estimates prepared between December 2003 and October 2004, we determined all models were calibrated prior to being used to prepare estimates.

Effect of Program Changes: The PRIME contractor has disbanded the office that ensured cost and schedule estimation models were calibrated and scheduled future calibrations. Requirements to calibrate models will need to be communicated to each modernization project in the future.

⁴ *The Cost and Schedule Estimation Process for the Business Systems Modernization Program Has Been Improved, but Additional Actions Should Be Taken* (Reference Number 2003-20-219, dated September 2003).

⁵ Calibration involves reviewing and adjusting estimation models to ensure they represent the PRIME contractor's specific cost and product history.

⁶ FAR, 48 C.F.R. pt 15.404-1 (c)(2)(C) (2002).

⁷ The COCOMO refers to the COCOMO II estimation model, which is a tool used by the PRIME contractor for developing estimates. The model is updated with actual data from completed projects and then used to develop estimates for similar projects in the PRIME contractor environment.



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Cost and schedule estimate review trends

In our prior report, we recommended the CIO ensure the BSMO updates draft procedures to include guidance on trending estimate review results. According to Software Engineering Institute (SEI)⁸ guidance, the estimating capability of an organization should be quantified, tracked, and evaluated. Evidence of maturity in this area includes management tracking and reviewing the effectiveness of its estimation processes.

We determined the BSMO was conducting cost and schedule estimate reviews and had begun trending the results. As of December 2004, eight estimate reviews were trended, and the results show the PRIME contractor has made very little improvement in compliance with estimation procedures.⁹ As mentioned previously, the IRS has begun taking over program-level responsibility for cost and schedule estimation from the PRIME contractor.

Effect of Program Changes: The PRIME contractor has disbanded the office that performed quality reviews of cost and schedule estimates before they were provided to the IRS for review. The effect on the quality of estimates will not be known until future cost and schedule estimates are received.

Process updates

In our prior report, we recommended the CIO ensure the PRIME contractor revises the cost and schedule estimation guidebook and applicable Enterprise Life Cycle (ELC)¹⁰ references to provide details of what specific documentation is required to support estimates. In addition, we recommended the CIO ensure the BSMO updates draft procedures to include guidance on providing the cost and schedule estimation system validation and estimate review reports to the Office of Procurement.

We determined the PRIME contractor updated its PRIME Estimation Guidebook to include the documentation modernization contractors should provide to support estimate proposals. However, we noted the requirements for using a second estimation method to validate estimation results were not clearly presented in the Guidebook, and estimate proposals did not contain the

⁸ The SEI is a Federally Funded Research and Development Center whose purpose is to help others make measured improvements in their software engineering capabilities.

⁹ See Appendix IV for the BSMO's trending results.

¹⁰ See Appendix V for an overview of the ELC.



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required supporting documentation.¹¹ We also determined the Office of Procurement had received the IRS PRIME Validation Report.

Effect of Program Changes: The BSMO staff advised us the PRIME Estimation Guidebook would not be used in the estimation process the IRS is developing. As a result, the BSMO will need to institute controls in a different manner to ensure modernization contractors submit estimate proposals that are supported with proper documentation.

Corrective Actions for Two Previous Audit Recommendations Were Not Completed by the Original Due Dates and Will Be Affected by Program Changes

Corrective actions for two of the five previous audit recommendations were not timely completed. The due dates for both recommendations were extended during our audit work. Both of these corrective actions will be affected by the IRS taking over program-level cost and schedule estimation duties from the PRIME contractor.

Cost and schedule estimation processes for all modernization contractors

In our prior report, we recommended the CIO ensure all contractors working on BSM projects follow the PRIME contractor's policies and procedures for preparing cost and schedule estimates and provide data for inclusion in the historical database. We determined that, without specific requirements for all modernization contractors to follow established policies and procedures, there would not be consistency in the estimation process. The historical database was needed to provide a solid historical measurement basis for more accurate estimates.

We determined the BSMO developed solicitation language¹² to require all modernization contractors to adhere to the PRIME contractor's cost and schedule estimation procedures. However, at the time of our review, the solicitation language was being reviewed by the Office of Procurement and had not been implemented.

The PRIME contractor also updated the PRIME Estimation Guidebook for use by all contractors working on modernization projects. However, our review of the updated Guidebook determined

¹¹ See the Cost and Schedule Estimation Processes Have Not Always Been Followed section later in this report for additional information on this topic.

¹² Solicitation language or contract language can be defined as a document containing special clauses and provisions that have been identified as essential for the acquisition of a specific type of supply or service that is acquired repetitively.



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it contained too many PRIME contractor-specific requirements to be effectively used by non-PRIME modernization contractors.

In addition, the PRIME contractor database of historical cost and schedule estimation information had not been completed. The delay was due to unresolved concerns over how to protect non-PRIME modernization contractors' proprietary data.¹³

Effect of Program Changes: The PRIME Estimation Guidebook will no longer be used in the estimation process. At the conclusion of our review, the BSMO was proposing to issue guidance on cost and schedule estimation to all contractors as part of the solicitation process. The BSMO does not have a centralized database of historical estimation information. If the BSMO wants to create its own historical database, it will need to develop a method to request this information and build a database to house the data.

Independent review of the cost and schedule estimation process

In our prior report, we recommended the CIO ensure the SEI is requested to conduct an independent review of the cost and schedule estimation system once the initial validation is complete and policies and procedures are fully implemented. The BSMO had not contracted with the SEI to perform an independent review of the estimating system because several processes were still maturing. Based on our evaluation, we agree the estimation program is not ready for an independent review.

For example, we noted solicitation language had not been implemented and the risk adjustment process for preparing estimates was not well understood. In addition, we determined the PRIME contractor had not been effective in performing the estimation processes already in place.¹⁴

Management Action: After our review was completed, the CIO requested the corrective action regarding contracting with the SEI be revised to "analyze methods and present recommendation(s) for [an] alternative way to further improve the cost estimation process and procedures for the BSM program." In light of the significant changes in program direction, we agreed to this revision.

¹³ Proprietary refers to any information a contractor has designated as owned by the contractor that must be protected from unauthorized disclosure, according to the FAR.

¹⁴ See the Cost and Schedule Estimation Processes Have Not Always Been Followed section later in this report for additional information on this topic.



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Recommendation

Recommendation 1: To ensure cost and schedule estimate reviews can be conducted effectively in the absence of the PRIME Estimation Guidebook, the CIO should ensure all modernization systems development contractors provide consistent cost and schedule estimation data.

Management's Response: The CIO agreed with this recommendation. The IRS is developing a revised Basis of Estimate (BOE)¹⁵ guidance document which outlines expectations for substantiating cost and schedule estimates. The IRS will conduct a 6 month trial implementation period, after which the IRS will determine the impact of the revised guidance on contract costs and assess the cost effectiveness of implementing the guidance across the entire BSM program.

Cost and Schedule Estimation Processes Have Not Always Been Followed

The PRIME Estimation Guidebook describes the framework for the processes used to produce cost and schedule estimates associated with PRIME contractor task order proposals. The Guidebook requires cost and schedule estimate proposals to be thoroughly documented in a BOE template. The BOE should be complete and present an auditable trail of steps that can be reproduced by BSMO reviewers and contain justification for the estimating approach.

Our review of the Guidebook, the BOE procedures, and three PRIME contractor cost and schedule estimate proposals submitted to the BSMO for review identified the following concerns:

- Estimate review documentation did not explain the results of using a second cost and schedule estimation method.
- The PRIME Estimation Guidebook did not clearly present the requirements to use a second cost and schedule estimation method.
- Cost and schedule estimate proposals submitted for review did not contain the supporting documentation required to determine the validity and reliability of the estimates.

¹⁵ A BOE template is a tool used to estimate all task order proposals. It includes specific sections that must be documented to justify the estimate proposal, such as what work will be performed, the schedule estimate, and the staffing summary.



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- Issues identified during estimation activities were not input to the Item Tracking Reporting and Control (ITRAC)¹⁶ system.

Estimate review documentation did not explain the results of using a second cost and schedule estimation method

The SEI requires the differences in results from using multiple methods to be analyzed and explained in estimate review documentation when more than one estimating approach is used. None of the cost and schedule estimate documentation we reviewed included an explanation of the results of using a second estimation method. PRIME contractor personnel informed us they do use more than one estimation method when preparing estimates; however, they did not present information on the second method because they believed it would be confusing to the IRS estimate review team.

We requested example documentation of the use of a second method from the PRIME contractor and were provided with information for the Customer Account Data Engine (Release 1.2).¹⁷ In this case, the second method validated the cost estimate but indicated the schedule estimate was compressed. In fact, the second method indicated the schedule estimate could be 8 to 11 months longer than proposed.

Without information on the results of a second method, the IRS does not know whether the two methods produced comparable estimates and whether the proposed estimates are valid. With this information, the IRS could gain confidence in the submitted estimate or know when there are significant risks associated with the proposed estimates.

Effect of Program Changes: Since the PRIME Estimation Guidebook will no longer be used, the BSMO will need to develop an alternative method to ensure results of using a second method are provided to it for review.

The PRIME Estimation Guidebook did not clearly present the requirements to use a second cost and schedule estimation method

In our prior audit, we recommended the BSMO clarify when a second estimation method is needed. In response, the IRS commented that the use of multiple estimation methods was discussed in the June 30, 2003, PRIME Estimation Guidebook, which describes the processes

¹⁶ The BSM Risk Management Plan requires that all modernization organizations use the ITRAC database to record and update the status of issues.

¹⁷ See Appendix IX for a description of the Customer Account Data Engine project.



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and detailed steps for producing the estimates associated with PRIME contractor task order proposals.

Our review of the current Guidebook determined guidance on when to use a second cost and schedule estimation method could be made clearer. We also found certain terms needed to be defined. For example, the guidance includes terms such as “major projects,” “large segment,” and “large uncertainty” that were not defined and, thus, are open to interpretation. Without clear guidance, modernization contractors may not know when a second method is required and could submit invalid and unreliable estimate proposals.

Effect of Program Changes: The PRIME Estimation Guidebook will no longer be used. As such, the BSMO will need to develop an alternative method of providing modernization contractors with clear requirements on when to use a second cost and schedule estimation method in developing and submitting estimate proposals.

Cost and schedule estimate proposals submitted for review did not contain the supporting documentation required to determine the validity and reliability of the estimates

In our prior report, we recommended the CIO ensure the PRIME contractor revises the cost and schedule estimation guidebook to provide details of what specific documentation is required to support estimates. As mentioned previously, we determined the PRIME contractor had updated the PRIME Estimation Guidebook to include the documentation contractors should provide to support estimate proposals. However, our review of estimate proposals shows the PRIME contractor did not always follow its guidance.

The PRIME Estimation Guidebook requires estimate proposals to be thoroughly documented in a BOE that is complete and presents an auditable trail of steps that can be reproduced by BSMO reviewers. The primary elements of an estimate proposal generally consist of workload size, effort, and schedule. Workload size defines the work to be accomplished (services or products), effort is an estimate of the amount of resources required to produce the services or products, and schedule identifies the steps to be performed and when the work should be completed.

Our review of the results of three estimate proposals prepared between December 2003 and October 2004 showed estimates were submitted without required supporting documentation. The missing documentation, which is required by estimation guidelines, confirms the IRS PRIME Validation Report findings that lack of compliance with estimation procedures is a continuing problem.

During our review of the results from the three estimate proposals, we noted the BSMO review team documented numerous errors in calculating costing factors, such as staff hours and staff months. One of the review teams estimated the errors could be around 2,000 hours. To obtain a



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further understanding of what was missing in the contractor-provided cost and schedule estimates, we judgmentally selected 36 instances in which the BSMO reviewers commented the contractor's proposals were missing required supporting documentation.

- **Workload size and effort** – In 28 (77.8 percent) of the 36 instances, the workload size and the effort estimates were affected by the missing documentation. In some instances, the estimates did not include historical data to support the workload size and productivity figures. As a result, the BSMO review team concluded that, in the absence of historical data, the estimates needed to be supplemented to determine the reasonableness of the engineering judgments that underlie the assumptions, workload sizing, and productivity.
- **Previous estimation models** – In 3 (8.3 percent) of the 36 instances, the estimates did not include sufficient details about the previous estimation models used to produce the estimate under review.
- **Travel costs** – In 2 (5.6 percent) of the 36 instances, travel costs were either not mentioned or not justified by the support provided with the estimates.
- **Schedule and risk documentation** – In 2 (5.6 percent) of the 36 instances, the BSMO review team did not have enough information to determine how the schedule was developed, and a risk analysis had not been performed.
- **Audit trail** – In 1 (2.8 percent) of the 36 instances, the estimate lacked an audit trail to allow the reviewer to reproduce the estimate. In this instance, the BSMO review team stated the lack of an audit trail had been evidenced in all PRIME contractor estimate proposals they had reviewed.

PRIME contractor management did not ensure cost and schedule estimation procedures were followed. The IRS also stated it believed the lack of time to prepare estimates due to unstable requirements¹⁸ was a key contributing factor to the lack of completeness in PRIME contractor-submitted documentation. As a result, the IRS received estimate proposals that could not be verified by objective documentation and that can delay the contract negotiation process.

Effect of Program Changes: The PRIME Estimation Guidebook will no longer be used in the estimation process. At the conclusion of our review, the BSMO was proposing to issue guidance on cost and schedule estimation to all contractors as part of the solicitation process. In addition, the ACIO, BSM, wants to increase competition, which could lead to modernization contractors providing more complete estimate information.¹⁹

¹⁸ The IRS is creating a Requirements Management Office to address requirements stability.

¹⁹ See the Corrective Actions for Two Previous Audit Recommendations Were Not Completed by the Original Due Dates and Will Be Affected by Program Changes section earlier in this report for a recommendation related to this topic.



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Issues identified during estimation activities were not input to the ITRAC system

In our prior audit, we recommended procedures be updated to require that all issues identified in cost and schedule estimation reviews be included in the ITRAC system. The BSM Risk Management Plan requires that all modernization organizations use the ITRAC system to record and update the status of issues. Although the estimation procedures were revised to include a requirement to input risks and issues identified during cost and schedule estimation reviews in the ITRAC system, the risks and issues identified in the only estimate review accepted during our audit period were not input to the ITRAC system. However, we determined the BSMO review team uses a checklist as a compensating control, which ensures issues from estimate reviews are tracked until they are resolved.

In our prior report, we also recommended procedures be updated to require that all issues identified in the IRS PRIME Validation Report be included in the ITRAC system. We determined the estimation procedures were not updated to include the issues identified in the IRS PRIME Validation Report in the ITRAC system. A BSMO official informed us the BSMO intended to place issues in the ITRAC; however, program changes (due to budget restrictions) required the IRS to adopt alternative approaches to managing cost and schedule estimation issues. Without including issues from the IRS PRIME Validation Report in the BSM issues tracking system, BSMO management has less assurance the risks and issues contained in the Report's action plan have been satisfactorily resolved or proper mitigation actions planned.

Effect of Program Changes: Due to changes in program-level responsibility for cost and schedule estimation, all actions listed in the IRS PRIME Validation Report may not be valid. As we were completing our audit work, the BSMO was determining which actions were relevant in the new environment.

Recommendations

Recommendation 2: To ensure adequate documentation on the use of a second cost and schedule estimation method is received for review, the CIO should develop an alternative way to clearly inform modernization contractors when the use of a second estimation method is needed and issue clear guidance requiring the results of using multiple estimation methods to be explained in the documentation submitted with estimate proposals.

Management's Response: The CIO agreed with this recommendation. The IRS will obtain a second estimate through either an Independent Government Cost Estimate²⁰ or a

²⁰ The purpose of an Independent Government Cost Estimate is to provide an independent and realistic estimate that can be compared with the contractor's proposed cost.



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BOE. The BOE under development currently stipulates a modernization contractor must provide a description of each method used, along with an explanation of any significant variance in the results. Rationale for not validating estimates is also required to ensure the criteria are properly considered in the determination.

Recommendation 3: To ensure issues are formally tracked to closure, the CIO should determine if any remaining issues from the IRS PRIME Validation Report are relevant to the new environment. If any issues are determined to be relevant, these issues should be documented and tracked in the ITRAC system.

Management's Response: The CIO agreed with this recommendation. The IRS stated it has completed an assessment of the IRS PRIME validation report and, due to the program changes, determined no relevant issues remained. The IRS plans to produce a final report to identify the disposition of all validation report issues.

Cost and Schedule Estimates Show Signs of Improvement; However, Development and Deployment Variances Have Been Substantial

In October 2002, we reported BSM projects had experienced a \$75 million, or 24 percent, cost increase and were experiencing schedule delays of up to 13 months over initial estimates.²¹ At the time, BSMO forecasts were predicting future cost and schedule estimates would be much closer to the estimates detailed in the expenditure plans,²² and BSMO officials believed cost and schedule estimates would be more reliable as projects moved from the planning phases to the Development and Deployment phases of the ELC.

Leading up to our earlier report, both the Treasury Inspector General for Tax Administration (TIGTA) and the GAO were reporting key management controls, such as cost and schedule estimation, needed to be improved.²³ The GAO added risks associated with building systems without the requisite management controls were not as severe early in a project's life cycle when it is being planned, but they escalate as a project is developed.

To update our cost and schedule estimate trend analysis from October 2002, we reviewed information presented in all available BSM expenditure plans.²⁴ It is important to note the

²¹ *Analysis of Business Systems Modernization Cost, Schedule, and Functionality Performance* (Reference Number 2003-20-007, dated October 2002).

²² The BSMO provides Congress justification to release funds specifically set aside for the BSM effort by submitting BSM expenditure plans.

²³ *Modernization Project Teams Need to Follow Key Systems Development Processes* (Reference Number 2002-20-025, dated November 2001) and *Business Systems Modernization: IRS Needs to Better Balance Management Capacity with System Acquisition Workload* (GAO-02-356, dated February 2002).

²⁴ See Appendix VI for details of our methodology.



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information and conclusions we present are subject to change, as some projects are in progress. Our results were calculated based upon the latest BSM project estimates and may change if current estimates are revised in the future.

Cost estimates

Based on the justifications provided by the BSMO in expenditure plans, Congress has released approximately \$1.9 billion to fund contractor activities for the BSM program.²⁵ Overall, active and deployed BSM projects have varied from original cost estimates contained in the expenditure plans by over \$480 million. This equates to 78 percent more than the estimates originally provided to Congress.²⁶

To determine if cost variances are becoming more or less severe, we associated each cost variance on each BSM project segment²⁷ to the expenditure plan that included the original estimate, as shown in Figure 1.²⁸

²⁵ See Appendix VII for the BSM funding timeline.

²⁶ See Appendix VIII for a listing of cost variances by project.

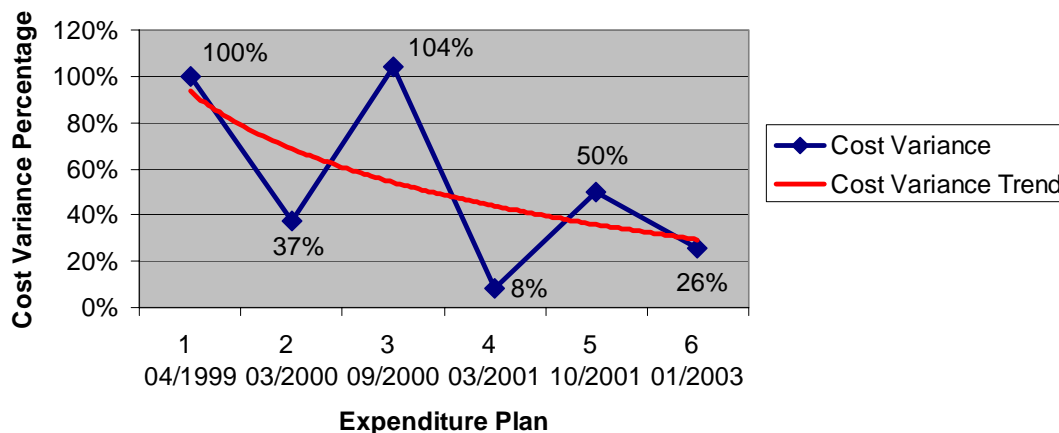
²⁷ BSM projects are funded in segments (e.g., by fiscal year, by milestone).

²⁸ During development, projects go through several milestones; therefore, some projects are compared several times.



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Figure 1: Total Cost Variance Percentage for Each Expenditure Plan Calculated by Comparing the Original Cost Estimates and the Latest Revised Cost Estimates



Source: TIGTA analysis of BSM expenditure plans.

As shown in Figure 1, cost variances are generally trending downward; however, the trend is not consistent. There are sharp spikes upward (Expenditure Plans 3 and 5) and downward (Expenditure Plans 4 and 6). To determine why the trend is not consistent, we reviewed the variances in Expenditure Plans 3 through 6 in detail.

We determined the inconsistency was due to the projects and their associated life cycle phases being funded in each expenditure plan. Generally, the expenditure plans that fund major systems moving into the later phases of the life cycle (Development and Deployment) have higher cost variances than those mainly funding projects that are early in the life cycle. For example, one of the first projects for which the IRS requested funds to move into the later life cycle phases was the Custodial Accounting Project (CAP). The Milestone 4 and 5 CAP variance accounted for approximately \$86 million (70 percent) of the \$124 million cost variance in Expenditure Plan 3. Another example is the e-Services project, which accounted for over one-half of the \$136 million cost variance in Expenditure Plan 5 as the project moved toward Milestones 4 and 5. Expenditure Plan 4, which had a cost variance of 8 percent, included requests for funds for 8 projects. Only one of the eight requests was for funds for the Development and Deployment phases. If the one project in its later stages is removed, the cost variance for Expenditure Plan 4 would have shown original estimates were more than revised estimates.



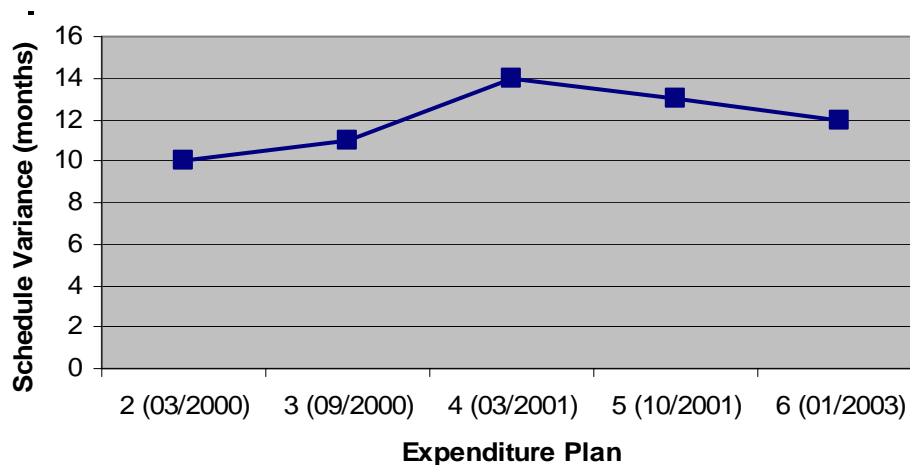
While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

Schedule estimates

BSM active and deployed projects have varied from original schedule estimates by an average of 18 months.²⁹

To determine if schedule variances are becoming more or less severe, we associated each schedule variance on each BSM project to the expenditure plan that included the original estimate. We determined schedule variances peaked at 14 months in 2001 (Expenditure Plan 4) and have averaged from 10 to 14 months per expenditure plan.

Figure 2: Schedule Variance by Expenditure Plan



Source: TIGTA analysis of BSM expenditure plans.

²⁹ See Appendix VIII for a listing of schedule variances by project.



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FY 2004 results

The IRS recently reported FY 2004 was a banner year for meeting cost and schedule estimates. In response to a recent GAO report,³⁰ the IRS Commissioner stated the IRS revised the cost and schedule estimates for each project in the fall/winter of 2003. The Commissioner further stated the IRS, with the exception of one project, had met all revised cost and schedule goals for 2004.

Our analysis of the rebaselined project deliveries confirmed the IRS' assessment that deployed project releases were generally within budget and on time, based on estimates from the May 2004 BSM Expenditure Plan (Plan 7). While the ability to meet short-term goals is a noteworthy accomplishment, the ability of the BSM program to sustain its FY 2004 accomplishments with projects in earlier phases of the life cycle remains to be seen. Therefore, we remain cautious about looking forward based on FY 2004 results, due to uncertainties related to BSM roles and responsibilities and the challenges facing the IRS that could affect future accomplishments.

Management Actions: The IRS has recently taken steps to limit cost increases and schedule delays.

Contract and requirements management

We recently reported the IRS has increased use of combined full and partial firm fixed-price task orders.³¹ In addition, the IRS is establishing a Requirements Management Office to help avoid the recurring issues that have negatively affected the BSM program and contributed to additional project costs and delays.³²

BSM Challenges Plan

In response to continuing cost increases and schedule delays, the IRS and the PRIME contractor initiated four studies in mid-2003 to help identify the root causes of the problems hindering the BSM effort. To address the results of these studies, the IRS and the PRIME contractor

³⁰ *Business Systems Modernization: IRS's Fiscal Year 2004 Expenditure Plan* (GAO-05-46, dated November 2004).

³¹ *While Many Improvements Have Been Made, Continued Focus Is Needed to Improve Contract Negotiations and Fully Realize the Potential of Performance-Based Contracting* (Reference Number 2005-20-083, dated May 2005).

³² *The Modernization Program Is Establishing a Requirements Management Office to Address Requirements Development and Management Problems* (Reference Number 2005-20-023, dated January 2005).



While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

developed a 48-point action plan (known as the BSM Challenges Plan)³³ designed to address the BSM-related study recommendations. As part of the BSM Challenges Plan, the ACIO, BSM, reported the IRS has hired three executives from outside the IRS that have a proven record of successfully managing and delivering large, complex projects and systems.

In 2004, the ACIO, Modernization Management,³⁴ met with and interviewed a number of individuals in the IRS business units, the TIGTA, the GAO, and the Office of Management and Budget and reviewed the studies, as well as various reports prepared by the TIGTA and the GAO. As a result, the ACIO, Modernization Management, determined the key barriers to success in the BSM program and created a plan to address these barriers. This plan includes high-level key focus areas and detailed high-priority initiatives to deal with the root causes that are creating the barriers. The highest priority initiatives include actions to develop the right set of required project management skills, including schedule and earned value management³⁵ analysis.

Expenditure plan changes

At the beginning of our review, the Deputy ACIO, Business Integration, asked us to ensure our variances were consistent with the variances agreed to by the GAO and the BSMO in FY 2004. The methodology we used was very similar to the methodology used by the GAO.³⁶

After our review was complete, BSMO officials stated they had shifted from a concern about GAO and TIGTA methodologies being consistent to a concern that the prevailing variance methodology did not accurately depict variances within the BSM program. The BSMO stated it had been in discussions with the GAO to revise its methodology for computing variances³⁷ and would be revising future expenditure plans to clarify the difference between estimates and the amount budgeted for a project segment.

The analysis presented in this report was based on the prevailing methodology for calculating variances, as agreed to at the beginning of our review.³⁸ We agreed we would take part in future

³³ The BSM Challenges Plan originally consisted of 46 action items. The IRS added two action items based on the results of an IRS Oversight Board report: *Independent Analysis of IRS Business Systems Modernization*, dated December 2003.

³⁴ In the fall of 2004, the ACIO, Modernization Management, became the new ACIO, BSM.

³⁵ Earned value management involves measuring actual cost and work accomplished against the budgeted cost and planned work scheduled. Variances are analyzed for decision making.

³⁶ See Appendix VI for details on our methodology.

³⁷ Areas of concern include project risk adjustments, filing season changes, baseline changes, and accounting for carryover funds. The filing season is the period from January through mid-April when most individual income tax returns are filed.

³⁸ See Appendix VI, which shows our analysis is, with minor exceptions, very similar to the analysis the GAO conducts.



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discussions concerning how best to measure the health of the BSM program. As changes are made, these results will be reflected in future audit reports.

As a result of these and other actions being taken by the IRS, we are making no additional recommendations at this time to reduce cost and schedule variances.



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Appendix I

Detailed Objectives, Scope, and Methodology

The overall objective of this review was to determine the status and effectiveness of corrective actions implemented in response to our prior audit report¹ on the cost and schedule estimating process for the Business Systems Modernization (BSM) program. In addition, we followed up on another prior report² to update trends in the BSM program's accomplishments against initial cost and schedule estimates.

To accomplish our objectives, we:

- I. Determined whether corrective actions had been implemented based on recommendations in our prior report on the cost and schedule estimation process.
 - A. Determined whether the Internal Revenue Service (IRS) had ensured all contractors followed PRIME contractor³ procedures for preparing cost and schedule estimates and provided data for inclusion in the historical database.
 - B. Determined whether the PRIME contractor documented the process for cost and schedule estimation model calibrations.⁴
 - C. Determined whether the PRIME contractor revised the cost and schedule estimation guidebook and applicable Enterprise Life Cycle⁵ references to provide details of specific documentation required to support estimates and whether the BSM Office (BSMO) ensured guidance was clarified regarding when a second method is required for preparing estimates.
 1. Determined whether the guidance in the PRIME Estimation Guidebook was clear as to when a second estimation method was required and whether the Guidebook stated what documentation was required to support estimates.

¹ *The Cost and Schedule Estimation Process for the Business Systems Modernization Program Has Been Improved, but Additional Actions Should Be Taken* (Reference Number 2003-20-219, dated September 2003).

² *Analysis of Business Systems Modernization Cost, Schedule, and Functionality Performance* (Reference Number 2003-20-007, dated October 2002).

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.

⁴ Calibration involves reviewing and adjusting estimation models to ensure they represent the PRIME contractor's specific cost and product history.

⁵ See Appendix V for an overview of the Enterprise Life Cycle.



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2. For the 3 estimate proposal reviews completed between December 2003 and October 2004, we judgmentally selected and reviewed 36 (24 percent) of the 151 comments the BSMO review teams made to determine what documentation was noted as missing. We used a judgmental sample because we did not plan to project the results.
- D. Determined whether the IRS had ensured the Software Engineering Institute⁶ would conduct an independent review of the cost and schedule estimation system once the initial validation was completed and policies and procedures were fully implemented.
- E. Determined whether the BSMO had ensured draft procedures were updated to include guidance on:
 1. Including all issues identified during the cost and schedule estimation system validation and estimate reviews in the Item Tracking Reporting and Control (ITRAC)⁷ system.
 2. Providing cost and schedule estimation system validation and estimate review reports to the IRS Office of Procurement.
 3. Trending estimate review results.
- II. Determined the trends in the BSM program's ability to meet initial cost and schedule estimates.
 - A. Obtained and analyzed all expenditure plans.
 - B. Obtained revised estimates for all the identified projects and program-level initiatives in the expenditure plans.
 - C. Compared the information in Steps II.A. and B. to identify the variances between the initial and revised estimates for each project and program-level initiative.
 - D. Performed analyses of information developed in Step II.C.

⁶ This is a Federally Funded Research and Development Center whose purpose is to help others make measured improvements in their software engineering capabilities.

⁷ The BSM Risk Management Plan requires that all modernization organizations use the ITRAC database to record and update the status of issues.



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Appendix II

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Appendix III

Report Distribution List

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Manager, Program Oversight Office OS:CIO:SM:PO



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Appendix IV

Business Systems Modernization Office Cost and Schedule Estimate Review Trends

The Business Systems Modernization Office (BSMO) reviews cost and schedule estimates and associated documentation received from modernization contractors against the Software Engineering Institute's (SEI)¹ requirements for reliable estimating processes. As recommended in a prior Treasury Inspector General for Tax Administration report,² the BSMO trends this information to determine if compliance against cost and schedule estimation procedures is improving.

Figure 1 shows trends from the BSMO's reviews of modernization contractor cost and schedule estimates. Estimates with a score of 0 thru 2 generally were not in compliance with SEI requirements. Trends show no score higher than 2.80, indicating very little sign of improvement in compliance with procedures and processes over the 2-year period ending December 2004. In January 2005, program-level cost and schedule estimation processes became the responsibility of the BSMO, instead of the PRIME contractor.³

¹ The SEI is a Federally Funded Research and Development Center whose purpose is to help others make measured improvements in their software engineering capabilities.

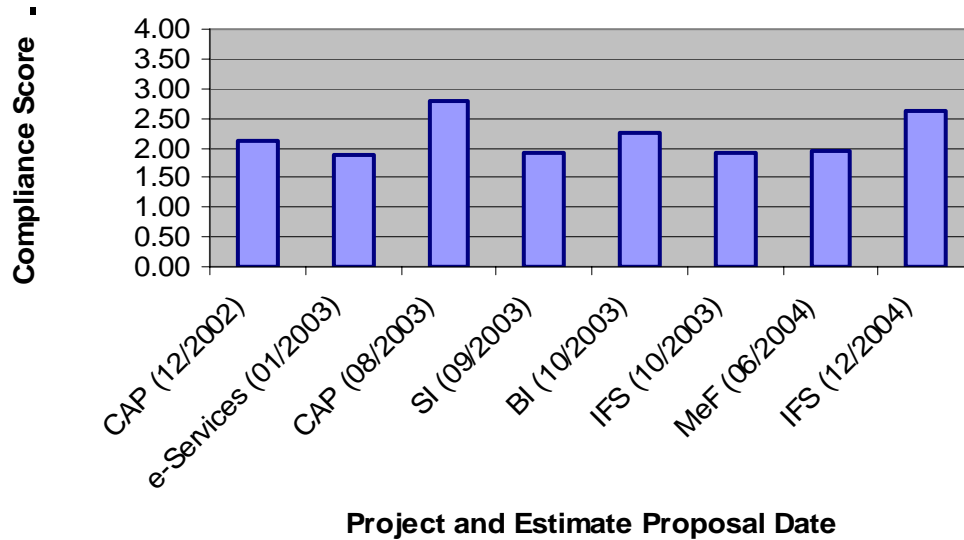
² *The Cost and Schedule Estimation Process for the Business Systems Modernization Program Has Been Improved, but Additional Actions Should Be Taken* (Reference Number 2003-20-219, dated September 2003).

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



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Figure 1: Trends in Contractor Estimates Provided to the BSMO for Review



Source: BSMO trending of modernization contractor cost and schedule estimates from December 2002 through December 2004. See Appendix IX for full project names and descriptions. SI and BI stand for Systems Integration and Business Integration, respectively. Both are program-level (nonproject) efforts.



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Appendix V

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:

Life-Cycle Processes, which are organized into phases and subphases and address all domains of business change.

Management Processes, which are organized into management areas and operate across the entire life cycle.

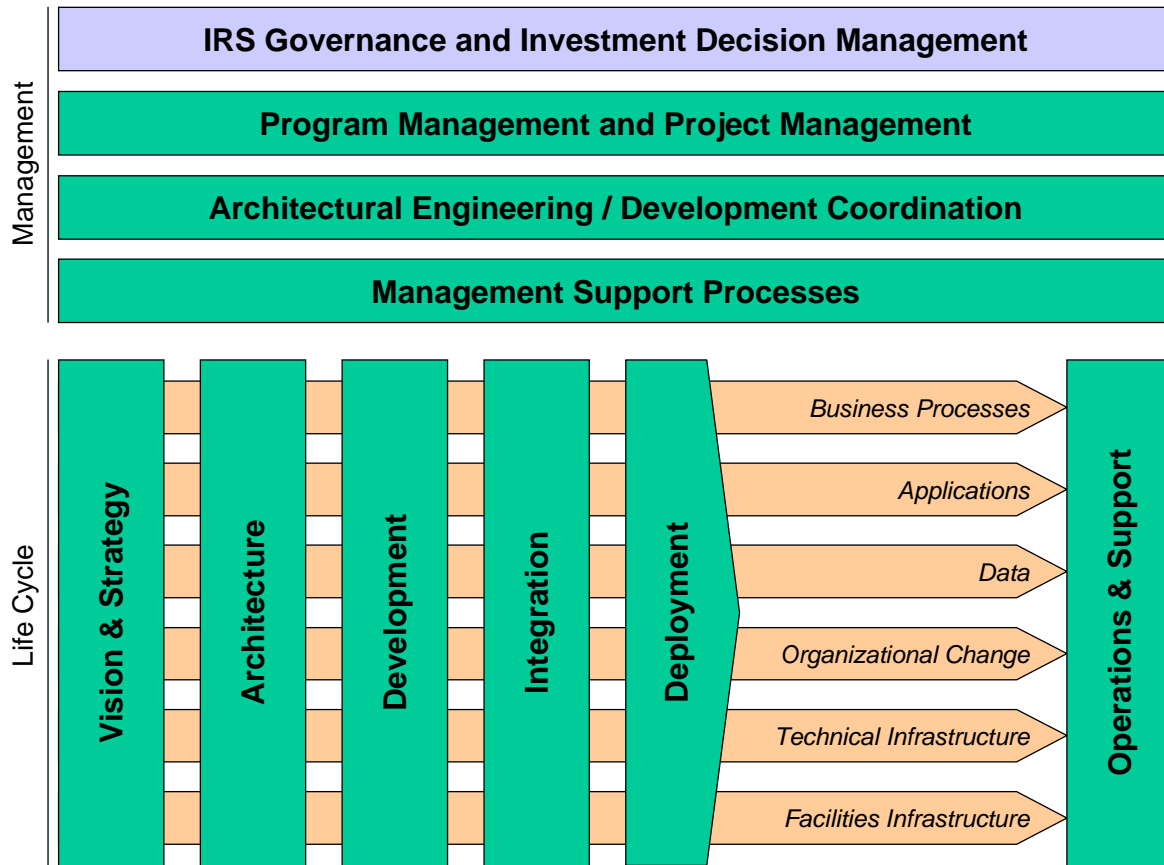
¹ The PRIME contractor is the Computer Sciences Corporation (CSC), which heads an alliance of leading technology companies brought together to assist with the IRS' efforts to modernize its computer systems and related information technology.

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 CSC 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.



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- **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.
- **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 if 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



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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.
- **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 system 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 system 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.



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- **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.
- **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 VI

Treasury Inspector General for Tax Administration Cost and Schedule Variance Methodology

To determine how the Internal Revenue Service (IRS) and its contractors have performed against original cost and schedule estimates included in expenditure plans, we compared the original cost and schedule estimates listed in expenditure plans to actual or revised cost and schedule estimates included in the Automated Financial System (AFS)¹ or future expenditure plans. For example, if the IRS estimates it will cost \$10 million for a project to exit a particular milestone and later revises the estimate to \$15 million, we would report this as a \$5 million cost variance. Similarly, if the IRS estimates it will exit a particular milestone in March 2003 and later revises the estimate to September 2003, we would report this as a 6-month schedule variance.

At the beginning of our review, the Deputy Associate Chief Information Officer, Business Integration, asked that we ensure our cost variances were consistent with cost variances agreed to by the Government Accountability Office (GAO) and the Business Systems Modernization Office (BSMO) in Fiscal Year 2004. We reviewed the agreed upon variances and found the GAO used a methodology very similar to ours. However, there were some slight deviations between our methodologies. In some cases, we revised our analysis to match GAO analyses. In other cases, we decided to use our own methodology. In summary, we determined the differences to be minimal. Figure 1 provides a listing of differences between the GAO/BSMO agreed upon cost variances and the cost variances we calculated. An explanation of the reason for each difference is provided following Figure 1.

¹ The AFS is a computer-based financial accounting system used by the IRS to track appropriations and expenditures.



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Figure 1: Listing of Differences Between GAO/BSMO Agreed Upon Cost Variances and Treasury Inspector General for Tax Administration (TIGTA) Cost Variances

Project Name ²	GAO/BSMO Agreed Upon Cost Variance	TIGTA Cost Variance	Explanation Code ³
CADE BRMS ⁴	\$11,902,000	\$11,903,000	1
CADE Release 1	\$118,129,000	\$114,728,912	1 and 2
CAP Release 1	\$91,789,000	\$91,309,097	2
CC01	\$14,562,000	\$14,024,163	2
CRM (Exam)	(\$721,000)	\$79,821	2
e-Services	\$102,271,000	\$102,468,647	2
HR-Connect	\$200,000	(\$145,810)	2
STIR	\$8,450,000	\$21,551,788	2 and 3

Source: Document provided by the Deputy Associate Chief Information Officer, Business Integration, showing GAO/BSMO agreed upon cost variances and TIGTA analysis.

Explanation Codes

- 1. Immaterial amount** – No explanation was obtained for amounts of an immaterial nature.
- 2. Use of the AFS to capture actual results** – Expenditure Plan 2 did not report detailed results of spending against Expenditure Plan 1. Therefore, we requested the BSMO to provide us with the actual expenditures from the AFS. The GAO used information from an interim expenditure plan request in late 1999. As the figures we obtained depicted actual costs, we decided to use the actual AFS figures in our analysis. The net effect is negligible.
- 3. Capture of fiscal year activities** – The GAO/BSMO agreed upon cost variances did not track STIR project variances when the STIR project went from requesting funds based on milestones to requesting funds based on fiscal year.⁵ The IRS initially requested funding for the STIR project on a milestone basis. However, the IRS later revised its position and requested funding for the STIR project on a fiscal year basis.

² See Appendix IX for full project names and descriptions.

³ Full explanations of the reasons for differences between GAO/BSMO cost variances and TIGTA calculated cost variances follow the end of this Figure.

⁴ The Business Rules Management Solution (BRMS) is a key factor required to facilitate the success of the Customer Account Data Engine (CADE).

⁵ See Appendix V for an overview of the Enterprise Life Cycle.



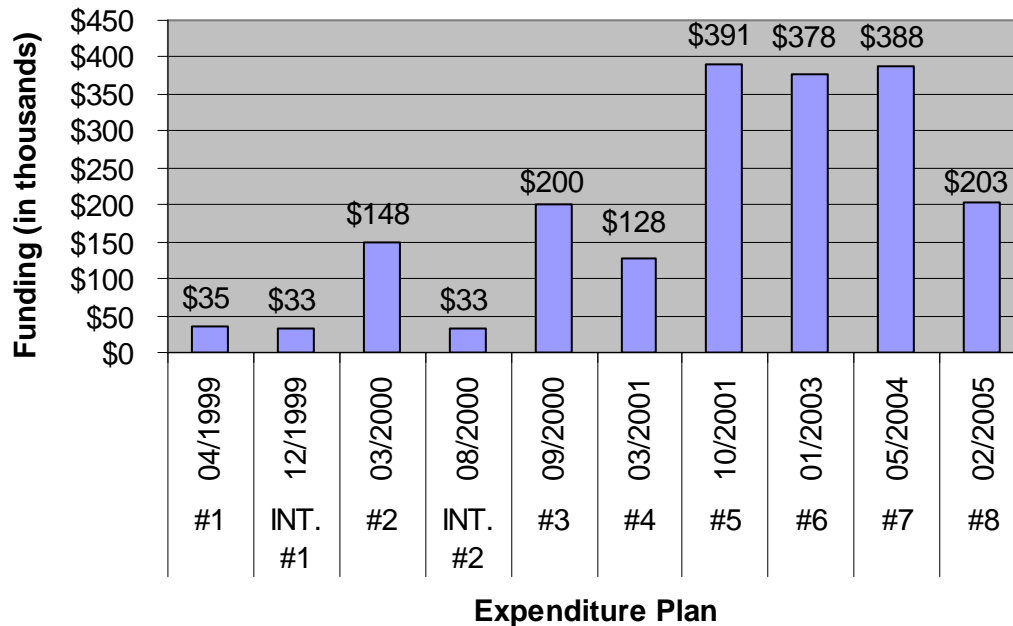
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Appendix VII

Business Systems Modernization Funding Timeline

Figures 1 and 2 provide a graphical and tabular depiction of the funding requested by the Internal Revenue Service Business Systems Modernization (BSM) program through expenditure plans.

Figure 1: BSM Program Funding Timeline Graph



Source: BSM expenditure plans. NOTE: INT. stands for interim.



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Figure 2: BSM Program Funding Timeline Table

EXPENDITURE PLAN	DATE	PLAN AMOUNT
EXPENDITURE PLAN #1	April 1999	\$ 35 million
INTERIM PLAN #1	December 1999	\$ 33 million
EXPENDITURE PLAN #2	March 2000	\$148 million
INTERIM PLAN #2	August 2000	\$ 33 million
EXPENDITURE PLAN #3	September 2000	\$200 million
EXPENDITURE PLAN #4	March 2001	\$128 million
EXPENDITURE PLAN #5	October 2001	\$391 million
EXPENDITURE PLAN #6 (Initial and Revised Versions)	October 2002 and January 2003	\$378 million
EXPENDITURE PLAN #7 (Initial and Revised Versions)	September 2003 and May 2004	\$388 million
EXPENDITURE PLAN #8	February 2005	\$203 million
TOTAL AMOUNT		\$1.937 billion

Source: BSM expenditure plans.



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Appendix VIII

Business Systems Modernization Project Cost and Schedule Variances

Figure 1 presents a summation of cost and schedule variances reported in Business Systems Modernization (BSM) Expenditure Plans 1 through 7 by project release for active or deployed projects.¹

**Figure 1: Active or Deployed Projects -
BSM Cost and Schedule Variances by Project Release**

Project ²	Release	Planned Cost	Actual/ Revised Cost	Cost Variance	Schedule Variance (in months)
CADE	1	\$64,645,322	\$179,374,234	\$114,728,912	58
CADE	BRMS ³	\$26,200,000	\$38,103,000	\$11,903,000	18
CAP	1	\$47,640,903	\$138,950,000	\$91,309,097	36
CC01	1	\$46,199,934	\$60,224,097	14,024,163	26
CCS	1	\$20,000,000	\$20,000,000	\$0	15
CRM (Exam)	1	\$10,183,425	\$10,263,246	\$79,821	10
e-Services	1	\$46,548,537	\$149,017,184	\$102,468,647	28
ESM	1	\$24,558,042	\$32,753,327	\$8,195,285	19
F&PC	1	\$43,276,000	\$45,717,000	\$2,441,000	7
HR-Connect	1	\$10,579,130	\$10,433,320	(\$145,810)	0
IFS	1	\$99,870,000	\$173,580,000	\$73,710,000	30
IRFOF	1	\$16,509,000	\$30,558,000	\$14,049,000	36
MeF	1	\$29,246,000	\$50,303,000	\$21,057,000	7
MeF	2	\$16,325,000	\$16,325,000	\$0	6
MeF	3	\$21,875,000	\$27,175,000	\$5,300,000	2
MeF	4	\$8,000,000	\$8,000,000	\$0	9

¹ See Appendix VI for the methodology we used to compute variances.

² See Appendix IX for full project names and descriptions.

³ The Business Rules Management Solution (BRMS) is a key factor required to facilitate the success of the Customer Account Data Engine (CADE).



While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

Project ²	Release	Planned Cost	Actual/ Revised Cost	Cost Variance	Schedule Variance (in months)
STIR	1	\$80,924,133	\$102,475,921	\$21,551,788	6
Totals:		\$612,580,426	\$1,093,252,329	\$480,671,903	
Total Cost Variance Percentage:				78%	
Average Schedule Variance:					18

Source: Treasury Inspector General for Tax Administration (TIGTA) analysis of BSM expenditure plans.

Figure 2 presents a summation of cost and schedule variances reported in BSM Expenditure Plans 1 through 7 by project release for cancelled or deferred projects.⁴

Figure 2: Cancelled or Deferred Projects - BSM Cost Variances by Project Release

Project ⁵	Release	Planned Cost	Actual/ Revised Cost	Cost Variance
CADDI	1	\$870,425	\$2,361,823	\$1,491,398
CADE	2	\$38,400,000	\$26,450,000	(\$11,950,000)
CADE	3	\$9,779,000	\$0	(\$9,779,000)
CAM	1	\$36,629,000	\$15,452,000	(\$21,177,000)
CAP	2	\$34,200,000	\$8,277,000	(\$25,923,000)
CRM (Core)	1	\$870,425	\$2,216,401	\$1,345,976
EDW	2	\$8,500,000	\$6,950,000	(\$1,550,000)
RC	1	\$6,022,000	\$0	(\$6,022,000)
TE	1	\$2,517,000	\$0	(\$2,517,000)
TESP	1	\$16,763,070	\$16,391,173	(\$371,897)
WM	1	\$2,461,000	\$1,130,000	(\$1,331,000)
Totals:		\$157,011,920	\$79,228,397	(\$77,783,523)
Total Cost Variance Percentage:				-50%

Source: TIGTA analysis of BSM expenditure plans.

⁴ See Appendix VI for the methodology we used to compute variances.

⁵ See Appendix IX for full project names and descriptions.



While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

Figure 3 presents a summation of cost and schedule variances reported in BSM Expenditure Plans 1 through 7 by project release for projects funded on a Fiscal Year basis.⁶

**Figure 3: Fiscal Year Projects -
BSM Cost Variances by Project Release**

Project ⁷	Release	Planned Cost	Actual/ Revised Cost	Cost Variance
DITE	1	\$58,803,000	\$64,622,000	\$5,819,000
EITE	1	\$6,051,000	\$3,282,000	(\$2,769,000)
ISS	1	\$245,477,000	\$245,496,000	\$19,000
MDA	1	\$3,000,000	\$3,000,000	\$0
SDL	1	\$5,520,000	\$3,698,965	(\$1,821,035)
VDE	1	\$12,795,000	\$16,947,456	\$4,152,456
Totals:		\$331,646,000	\$337,046,421	\$5,400,421
Total Cost Variance Percentage:				2%

Source: TIGTA analysis of BSM expenditure plans.

⁶ See Appendix VI for the methodology we used to compute variances.

⁷ See Appendix IX for full project names and descriptions.



While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

Appendix IX

Business Systems Modernization Project Descriptions

The following is a list of Business Systems Modernization projects.¹

Correspondence and Document on Demand Imaging (CADDI) – The CADDI was to image taxpayer paper correspondence to provide more efficient customer service and case management.

Collection Contract Support (CCS) – The CCS will provide support to enable private collection agencies to supplement the Internal Revenue Service’s (IRS) internal collection staff. The CCS project is now part of the Filing and Payment Compliance project.

Custodial Accounting Project (CAP) – The CAP will be a single, integrated data repository of taxpayer account information, integrated with the general ledger² and accessible for management analysis and reporting. The first release of the CAP will extract taxpayer account data from the Individual Master File (IMF) for the Taxpayer Account Subledger.³

Customer Account Data Engine (CADE) – The CADE is the foundation for managing taxpayer accounts in the IRS modernization plan. It will consist of databases and related applications that will replace the IRS’ existing Master File processing systems and will include applications for daily posting, settlement, maintenance, refund processing, and issue detection for taxpayer tax account and return data.

Customer Account Management (CAM) – The CAM will deliver an enterprise solution to support access to tax account data, contact management, case management, outbound correspondence management, and workflow management.

Customer Communications (CC) – The CC project has improved customer service by increasing the capacity of the toll-free telephone system and providing the ability to route taxpayers’ calls to the appropriate IRS employees.

Customer Relationship Management (CRM) Core – The CRM (Core) project was to provide central, shared, electronic case folders for case management.

¹ See Appendix VIII for the current status of each project (active or deployed, cancelled or deferred, or fiscal year project).

² A general ledger is a set of accounts used to summarize an organization’s financial transactions by transaction type (e.g., cash receipts, accounts receivable, or rental expenses).

³ The IMF is the IRS database that maintains transactions or records of individual tax accounts. The Taxpayer Account Subledger will be an integrated data repository of taxpayer account information containing detailed taxpayer account history and unpaid assessment information.



While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

Customer Relationship Management (CRM) Exam – The CRM Exam project provides a commercial off-the-shelf software solution to Large and Mid-Size Business Division revenue agents, which will allow them to accurately compute complex corporate transactions.

Development, Integration, and Testing Environments (DITE) – The DITE is a consolidated administrative and oversight function for three related BSM infrastructure support environments: the Solutions Development Laboratory, Virtual Development Environment, and Enterprise Integration and Test Environment.

e-Services – The e-Services project provides a set of web-based business products as incentives to third parties to increase electronic filing, in addition to providing electronic customer account management capabilities to all businesses, individuals, and other customers.

Enterprise Integration and Test Environment (EITE) – The EITE provides a comprehensive integration and testing environment to support integration and testing of components from multiple projects.

Enterprise Data Warehouse (EDW) – The EDW will provide the single, integrated data repository of payment/deposit, taxpayer account/return and case information, fully integrated with the general ledger.

Enterprise Systems Management (ESM) – The ESM project was designed to improve the availability and performance of IRS modernized information technology by providing management capabilities for the computer systems and networks.⁴ These capabilities include monitoring of all IRS computer systems and networks to ensure they are consistently available to the employees relying on them and the consolidation of 19 help desks throughout the IRS into a single help desk to better serve the users of the systems and networks.

Filing and Payment Compliance (F&PC) – The F&PC project will provide support for detecting, scoring, and working nonfiler cases (filing compliance) and delinquency cases (payment compliance).

Human Resources (HR)-Connect – The HR-Connect system provides the IRS with a single, integrated source of workforce data.

Infrastructure Shared Services (ISS) – The ISS program's goal is to deliver a fully integrated shared information technology infrastructure to include hardware, software, shared applications, data, telecommunications, security, and an enterprise approach to systems and operations management.

Integrated Financial System (IFS) – The IFS is intended to address administrative financial management weaknesses. The first release of the IFS will include the Accounts Payable, Accounts Receivable, General Ledger, Budget Execution, Cost Management, and Financial

⁴ The ESM project is now a part of the Infrastructure Shared Services program.



While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

Reporting activities. A future IFS release will be needed to fully resolve all administrative financial management weaknesses.

Internet Refund/Fact of Filing (IRFOF) – The IRFOF project improves customer self-service by providing instant refund status information and instructions for resolving refund problems to taxpayers with Internet access.

Modernized Data Access (MDA) – The MDA provides a single integrated approach and software for accessing current processing environment data across the IRS and builds key data infrastructure components for all modernization projects to share.

Modernized e-File (MeF) – The MeF project develops the modernized, web-based platform for filing approximately 330 IRS forms electronically, beginning with the U.S. Corporation Income Tax Return (Form 1120), U.S. Income Tax Return for an S Corporation (Form 1120S), and Return of Organization Exempt From Income Tax (Form 990). The project serves to streamline filing processes and reduce the costs associated with a paper-based process.

Reporting Compliance (RC) – The RC project was to provide all applicable employees with expanded functionality, including accurate and consistent tax computations to support reporting compliance activities across all taxpayer segments and the necessary forms and reports generation.

Security and Technology Infrastructure Release (STIR) – The STIR project is designed to provide a secure technical infrastructure to support and enable the delivery of the IRS' modernized business systems.⁵

Solutions Development Laboratory (SDL) – The SDL provides an environment that permits the rapid installation and configuration of proposed or potential systems solutions and provides the flexibility to scale and respond to multiple, concurrent projects.

Taxpayer Education (TE) – The TE project was to integrate and leverage third-party resources, such as practitioners and professional organizations, to deliver targeted education material designed to improve compliance and understanding of tax laws.

Telecommunications Enterprise Strategic Program (TESP) – The TESP was to define modernization telecommunications requirements and coordinate to meet those requirements.

Virtual Development Environment (VDE) – The VDE provides a software development environment enabling geographically distributed projects and developers access to standardized tools, information, and services.

⁵ The STIR is now a part of the Infrastructure Shared Services program.



While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

Work Management (WM) – The WM project will select and integrate software applications to improve the IRS’ ability to allocate staffing resources and track workload more effectively.



While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

Appendix X

Management's Response to the Draft Report



CHIEF INFORMATION OFFICER

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

September 30, 2005

RECEIVED

SEP 30 2005

MEMORANDUM FOR DEPUTY INSPECTOR GENERAL FOR AUDIT

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

SUBJECT: Draft Audit Report – While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned (Audit #200520004) – (I-Trak #2005-03433)

We read your draft audit report acknowledging that while improvements have been made, Business Systems Modernization (BSM) cost and schedule estimation processes have not always been followed, and major changes are planned. We appreciate the additional meetings we had with your audit team to discuss some of our observations during the discussion draft phase of the audit. As a result of these meetings, some of our suggested changes were incorporated into the draft report.

We understand the difficulties incurred by your audit team during this audit, because of the ongoing changes in critical program level roles that were previously performed by the PRIME contractor, that are now being performed by IRS personnel. We appreciate your audit team recognizing that these changes were due to the decreased funding of the BSM program, and that your team aligned their observations and findings consistent with these program changes.

We are pleased your report acknowledges that the BSM office has made progress in implementing the cost and schedule estimation recommendations resulting from a previous TIGTA audit report. And, we appreciate that your audit team recognized that the BSM office has established a Requirements Management Office, which is helping to deliver modernization projects on time and within budget. We also acknowledge and appreciate the audit team's advice on ways to further improve the cost and schedule estimation processes.

We agree with the three recommendations reflected in the audit report. As such, we have included our corrective actions for these recommendations in the attachment.

Thank you for your continued support and the valuable assistance and guidance that your team provides. If you have any questions, please contact me at (202) 622-6800, or members of your staff may contact Judy Mills, Director of Program Oversight, at (202) 283-4915.

Attachment



While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

Attachment

Draft Audit Report - While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned (Audit # 200520004)

CORRECTIVE ACTIONS FROM TWO PREVIOUS AUDIT RECOMMENDATIONS WERE NOT COMPLETED BY THE ORIGINAL DUE DATES AND WILL BE AFFECTED BY PROGRAM CHANGES.

RECOMMENDATION #1: To ensure cost and schedule estimate reviews can be conducted effectively in the absence of the PRIME Estimation Guidebook, the CIO should ensure all modernization systems development contractors provide consistent cost and schedule estimation data.

CORRECTIVE ACTION #1: We agree with this recommendation. A revised Basis of Estimate (BOE) guidance document which outlines expectations for substantiating cost and schedule estimates is pending final review and implementation. The template is scalable for tailoring documentation requirements consistent with the varying size, complexity, and degree of uncertainty in system development estimates. To help manage the administrative burden, the BOE guidance provides flexibility for contractors to use established practices and templates, provided the information is comparable. Procurement is in the process of obtaining supplier comments on the guidance. A six month trial implementation period will be performed after supplier issues are satisfactorily addressed. We will also determine the impact of the revised guidance on contract costs, and assess the cost effectiveness of implementing the guidance across all BSM contracts.

IMPLEMENTATION DATE: June 1, 2006

RESPONSIBLE OFFICIAL: Deputy Associate CIO of Business Integration

CORRECTIVE ACTION MONITORING PLAN: The BOE guidance document outlining expectations for substantiating cost and schedule estimates is being reviewed by Procurement. Once finalized, the BOE requirements will be included as part of the proposal preparation instructions. The Management Acquisition and Estimation Support Services organization will conduct periodic reviews of contract proposals to ensure adherence to the guidance.

COST AND SCHEDULE ESTIMATION PROCESSES HAVE NOT ALWAYS BEEN FOLLOWED.

RECOMMENDATION #2: To ensure adequate documentation on the use of a second cost and schedule estimation method is received for review, the CIO should develop an alternative way to clearly inform modernization contractors when the use of a second estimation method is needed, and issue clear guidance requiring the results of using multiple estimation methods to be explained in the documentation submitted with estimate proposals.



While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned

Attachment

Draft Audit Report - While Improvements Have Been Made, Business Systems Modernization Cost and Schedule Estimation Processes Have Not Always Been Followed and Major Changes Are Planned (Audit # 200520004)

CORRECTIVE ACTION #2: We agree with this recommendation as clarified by your office that an Independent Government Cost Estimate (IGCE) is an acceptable alternative to obtaining a contractor generated second estimate. The BOE currently stipulates that estimates with high dollar impact, and high uncertainty, must be validated using a second method. A modernization contractor must provide a description of each method used, along with an explanation of any significant variance in the results. Rationale for not validating estimates is also required to ensure the criteria are properly considered in the determination. We will obtain a second estimate through either an IGCE or BOE. Procurement is in the process of obtaining supplier comments on the guidance. A six month trial implementation period will be performed after supplier issues are satisfactorily addressed. We will also determine the impact of the revised guidance on contract costs, and assess the cost effectiveness of implementing the guidance across all BSM contracts.

IMPLEMENTATION DATE: June 1, 2006

RESPONSIBLE OFFICIAL: Deputy Associate CIO of Business Integration

CORRECTIVE ACTION MONITORING PLAN: The BOE guidance document outlining expectations for substantiating cost and schedule estimates is being reviewed by Procurement. Once finalized, the BOE requirements will be included as part of the proposal preparation instructions. The Management Acquisition and Estimation Support Services organization will conduct periodic reviews of contract proposals to ensure adherence to the guidance.

RECOMMENDATION #3: To ensure issues are formally tracked to closure, the CIO should determine if any remaining issues from the IRS PRIME validation report are relevant to the new environment. If any issues are determined to be relevant, these issues should be documented and tracked in the ITRAC system.

CORRECTIVE ACTION #3: We agree with this recommendation. Program changes necessitated the transitioning of primary responsibility for enhancing cost and schedule estimating capability from the PRIME to the IRS, and these transition activities were documented and tracked in the ITRAC system. We assessed the IRS PRIME validation report and due to the program changes we determined that no relevant issues remained. A final report is to be produced that will identify the disposition of all validation report issues.

IMPLEMENTATION DATE: November 1, 2005

RESPONSIBLE OFFICIAL: Deputy Associate CIO of Business Integration

CORRECTIVE ACTION MONITORING PLAN: A final report is to be produced that will identify the disposition of all validation report issues by the Management Acquisition and Estimation Support Services organization.