**Analysis of Business Systems Modernization
Cost, Schedule, and Functionality
Performance**

October 2002

Reference Number: 2003-20-007

INSPECTOR GENERAL
for TAX
ADMINISTRATION

October 31, 2002

MEMORANDUM FOR DEPUTY COMMISSIONER FOR MODERNIZATION &
                             CHIEF INFORMATION OFFICER

FROM: Pamela J. Gardiner
                              Acting Inspector General

SUBJECT: Final Audit Report - Analysis of Business Systems Modernization
                              Cost, Schedule, and Functionality Performance
                              (Audit # 200220037)

This report presents the results of our review of the cost, schedule, and functionality performance of the Business Systems Modernization (BSM) program. The overall objective of this review was to determine how well the Business Systems Modernization Office (BSMO) and modernization contractors were performing against cost, schedule, and near-term functionality goals for developing BSM projects. The BSM program is one of the most complex and expensive efforts ever undertaken by the Internal Revenue Service (IRS). The BSM program is a very high-risk effort, but one that is essential if the IRS is to meet the reforms mandated by the Congress and taxpayers, such as improved customer service and increased productivity.

In summary, we found that beginning in 2001, the BSM program has delivered business results by deploying projects and learning valuable lessons that should help improve future projects. Deployed projects have increased the capacity of the IRS' telephone system, improved the ability to receive, route, and respond to taxpayer telephone calls, and provided refund information via the Internet. However, as reported in previous Treasury Inspector General for Tax Administration and General Accounting Office reports,[1] the BSM program has been experiencing difficulties meeting the original cost,

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[1] See Appendix XII for a listing of previous audit reports.

schedule, and functionality estimates included in the BSM Spending Plans[2] submitted to the Congress.

While the BSM projects have cost more, taken longer, and delivered less functionality than originally estimated, our analysis shows that cost and schedule performance is improving. The BSMO forecasts that project costs and schedules should be coming in closer to the estimates, and the majority of the originally planned functionality is still scheduled for delivery in the future. It is not uncommon for organizations that are attempting to modernize their computer systems to experience cost increases and schedule delays. According to a study performed by the Standish Group, only 9 percent of large companies complete computer modernization projects within cost and schedule budgets.[3] However, because the IRS hired an experienced contractor to lead the development and integration efforts for BSM, we would have expected the cost and schedule estimates to have been more accurate.

So far, the 8 BSM projects that are currently being developed and deployed have experienced cost increases of 26 percent and delays averaging 13 months over initial estimates. The majority of the cost increases and delays occurred during the planning and design phases of these projects, where cost increases were approximately 89 percent over original estimates. The BSMO forecasts that future project costs and schedules will be much closer to the estimates detailed in BSM Spending Plans. Although the anticipated costs and schedules are expected to be closer to the estimates provided to the Congress, actual costs and schedules could still vary significantly from the estimates.

Since the purpose of this review was to identify and analyze the cost, schedule, and functionality performance compared to the original project estimates, we do not make any recommendations in this report. However, we believe the information provided in this report can be helpful to the BSMO in its efforts to improve the management and delivery of BSM projects and benefits.

Management's Response: The Deputy Commissioner for Modernization & Chief Information Officer agreed with our assessment and provided comments on how the IRS is making improvements to further reduce cost increases and schedule delays. Management's complete response to the draft report is included as Appendix XIV.

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

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[2] The BSMO provides the Congress justification to release funds specifically set aside for the BSM effort by submitting BSM Spending Plans.
[3] The Standish Group Report entitled "CHAOS" written in 1995 and reprinted by the Carleton University School of Computer Science for academic purposes with written permission by the Standish Group. See Appendix XI for more information.

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| **Background** | The Internal Revenue Service (IRS) is challenged with modernizing its computer systems and business processes and practices. This effort, known as the Business Systems Modernization (BSM), is projected to last up to 15 years. The BSM program is one of the most complex and expensive efforts ever undertaken by the IRS. The BSM program is a very high-risk effort, but one that is essential if the IRS is to meet the reforms mandated by the Congress and taxpayers, such as improved customer service and increased productivity. |

The IRS hired the Computer Science Corporation (known as the PRIME contractor) as the lead integrator for BSM. The PRIME contractor heads up several leading technology and management companies that form the PRIME Alliance. The IRS established the Business Systems Modernization Office (BSMO) to manage the BSM program and to provide oversight of the PRIME contractor. Executives with a wide range of experience in the private sector as well as seasoned IRS executives were brought in to manage the BSMO.

The BSMO provides the Congress justification to release funds specifically set aside for the BSM effort by submitting spending plans. These BSM Spending Plans contain the estimated costs to deliver set features for each project within a scheduled period of time. There have been 5 BSM Spending Plans and 2 interim BSM Spending Plans requesting a total of $968 million between April 1999 and December 2001. See Appendix IV for a timeline with details on the BSM Spending Plans.

Beginning in 2001, the BSM program has delivered results through projects such as the Customer Relationship Management Exam, Customer Communications, Enterprise Systems Management, and Security and Technology Infrastructure Release.[1] For example, it installed an upgraded telephone communications system that improved the IRS' ability to receive, route, and respond to the more than 150 million taxpayer telephone calls each year. It also deployed an application that allows taxpayers to check on the status of their refunds via the Internet.

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[1] See Appendix XIII for descriptions of these BSM projects.

Based on these early projects, the BSM program has and continues to learn valuable lessons in order to improve its processes and deliver timely, quality results. However, as reported in previous Treasury Inspector General for Tax Administration and General Accounting Office reports,[2] the majority of BSM projects require spending more money and time to deliver fewer features than originally planned.

The objective of this review was to determine how well the BSMO and modernization contractors were performing against cost, schedule, and near-term functionality goals. Our review consisted of analyzing 20 BSM projects, which are presented and grouped throughout this report according to their current developmental status. A detailed description of the methodology and analyses of the data used to provide the reported results is included in Appendix V, and a listing of the projects reviewed is provided in Appendix VI.

It is important to note that the information and conclusions we present in this report are subject to change due to the types of data used during our analyses. Since none of the 20 BSM projects were fully completed, a majority of the results were calculated based upon BSMO forecasted data. Forecasted data are estimates to complete each phase of the 20 projects based upon the BSMO's estimation processes. Therefore, the information presented in this report may change as projects mature and actual figures become available for future analyses or as the BSMO revises its forecasted data. A detailed breakdown on the availability of actual cost and schedule data versus BSMO forecasted cost and schedule data is available in Appendix VII.

To accomplish our objective, we obtained and reviewed documentation and conducted interviews with individuals from the BSMO. We relied on information accumulated by the BSMO as of February 2002 but did not verify the accuracy of the information. The audit was conducted at the IRS' National Headquarters Office and the BSMO facilities in New Carrollton, Maryland, between January 2002 and June 2002 in accordance with *Government Auditing Standards*. Detailed information on our audit objective,

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[2] See Appendix XII for a listing of previous audit reports.

scope, and methodology is presented in Appendix I. Major contributors to the report are listed in Appendix II.

Projects Are Costing More and Taking Longer Than Originally Estimated, but Current Forecasts Indicate That Performance Is Improving

We analyzed the BSM projects' actual and forecasted cost and schedule data and found that the projects were costing more and taking longer than originally estimated. However, based on the BSMO forecasts for estimated time and costs to complete the projects, the cost increases and schedule delays are decreasing over time.

To provide further insight, we analyzed the cost increases and schedule delays by BSM Spending Plan and development phase. The majority of cost increases and schedule delays have occurred in the planning and design phases, while more limited cost increases and schedule delays are forecasted for the development and deployment phases. Also, cost increases are trending significantly downward and schedule delays are trending slightly downward between Spending Plans 1 and 4.

Cost analysis by BSM Spending Plan and development phase

Based on BSMO actual and forecasted cost data, the BSM program has experienced a $75 million or 24 percent cost increase for the 20 projects that have been initiated since 1999, as shown in the summary table below. Detailed data on the cost increases are provided in Appendix VIII.

Table 1: Cost Performance Results to Date

BSM Projects By Current Developmental Status	Cost Increase (Cumulative)	Percentage Increase
8 in Development and Deployment	$62.56 million	25.60%
5 in Planning and Design	$ 8.16 million	27.10%
3 Cancelled	$ 2.47 million	13.35%
3 Testing Laboratories[3]	$ 1.57 million	6.93%
1 Delayed	N/A	N/A
▮▮▮▮▮▮▮▮▮▮	$74.76 million	23.69%

Source: Data summarized from Appendix VIII.

[3] Laboratories support the development and testing of other projects and are funded by fiscal year rather than by life cycle phase.

The projects' cost increases are decreasing by Spending Plan, with the majority of cost increases occurring during the planning and design phases. While the trends are encouraging, they could change in the future since cost results from the later BSM Spending Plans contain only forecasted data.[4] The accuracy of the forecasts will affect the trend results shown in the following graph.

Graph 1: Trending of Cost Variance Percentages by Spending Plan
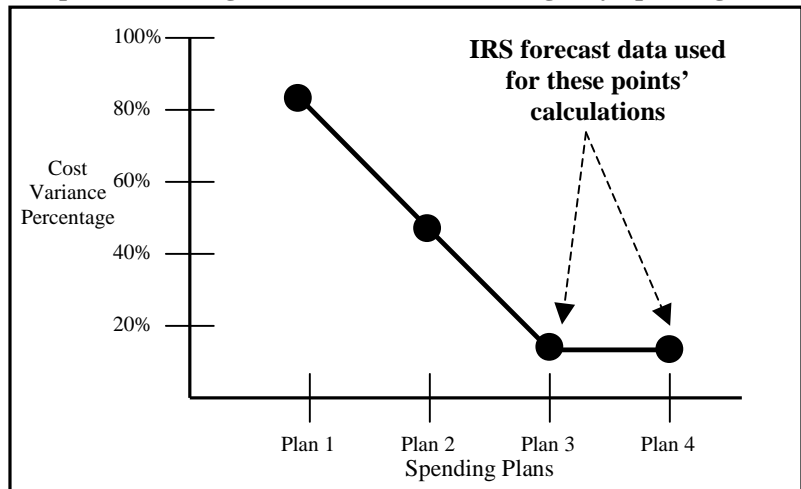
Source: Costs provided by the IRS from the Automated Financial System or the BSMO's current forecasts. The "y" axis represents the original cost estimate contained in the BSM Spending Plans divided by the greater of the actual or forecasted amount.

Cost increases in the first 2 BSM Spending Plans were significant (83 and 47 percent, respectively). However, current BSMO forecasts show that cost increases are less than 15 percent for the fourth BSM Spending Plan. While the current trend line is encouraging, it may be unrealistic to expect such a sharply declining trend will continue. We expect that the cost trend will be less dramatic once actual cost figures are obtained, although we are optimistic that the downward trend for cost increases will continue.

The 8 projects that have completed the planning and design phases experienced an approximately 89 percent cost increase ($52 million) during those phases. This equates to the majority of the cost increases that have been incurred on

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[4] A breakdown of available cost data is provided in Appendix VII.

these projects to date. BSMO officials state that the reliability of costs estimates for the development and deployment phases is much greater than that for the planning and design phases.

It is not uncommon for organizations that are attempting to modernize their computer systems to experience cost increases and schedule delays. According to a study performed by the Standish Group, only 9 percent of large companies complete computer modernization projects within cost and schedule budgets.[5] However, because the IRS hired an experienced contractor to lead the development and integration efforts for BSM, we would have expected the cost and schedule estimates to have been more accurate. Both the BSMO and PRIME contractor may have underestimated the enormous size and complexity of the BSM effort. According to the Standish Group study, the average cost of a computer system development project for a 'large' company is $2.3 million. The BSM program has already requested approximately $1 billion for its projects, and it is expected that about $2.5 billion will be needed over the next 5 years.[6]

Schedule analysis by BSM Spending Plan and development phase

Based on BSM actual and forecasted schedule data, the projects are experiencing schedule delays of 6 to 13 months, as shown in the following table.

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[5] The Standish Group Report entitled "CHAOS" written in 1995 and reprinted by the Carleton University School of Computer Science for academic purposes with written permission by the Standish Group. See Appendix XI for more information.
[6] *Continued Progress Modernizing IRS Depends on Managing Risks* (GAO-02-715T, dated May 2002).

Table 2: Schedule Performance by Project Groupings

BSM Project Groupings[7]	Avg. Delay per Project
8 projects currently in Development and Deployment Phase	13 months[8]
Planning and Design Phase	7.7 months
Development and Deployment Phase	5.5 months
5 projects currently in Planning and Design Phase	6 months

Source: Comparison of the originally scheduled completion dates in the BSM Spending Plans to actual or forecasted completion dates provided by the IRS.

The projects currently in the development and deployment phases are experiencing an average delay of 13 months. However, 7.7 months of this delay occurred during the planning and design phases compared to the 5.5 months delay to date for the development and deployment phases. BSMO officials state that the reliability of schedule estimates for the development and deployment phases is much greater than that for the planning and design phases.

Our analysis shows that schedule delays are declining slightly by BSM Spending Plan, with more delays occurring during the planning and design phases. For the first 2 BSM Spending Plans, the projects were experiencing an average schedule delay of approximately 9 months. For BSM Spending Plans 3 and 4, the average schedule delay is between 5 and 6 months. While this trend is also encouraging, we again do not expect the trend to continue at the same rate. The schedule figures for BSM Spending Plans 3 and 4 contain mainly forecasted data, and the accuracy of the forecasts will affect the trend results. In addition, the IRS Commissioner has stressed the need for

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[7] The other projects were not included within the analysis because data were not available for them. See Appendix IX for further details.
[8] Although eight projects are in this group, only seven were used to determine the average by project figure. See Appendix IX for further details.

quality deliverables versus schedule accuracy.[9] Additional detailed information on schedule analysis is provided in Appendix IX.

The Majority of Originally Planned Near-Term Functionality Is Still Planned for Future Delivery

While faced with many challenges, the BSM program was able to deliver business features from projects such as Customer Relationship Management (CRM) Exam, Customer Communications (CC), Security and Technology Infrastructure Release (STIR), and Enterprise Systems Management (ESM).[10] Several projects were planned for delivery in the 2001 and 2002 Filing Seasons; however, only the CRM Exam project has delivered 100 percent of its originally planned functionality. A listing of the projects that were planned for delivery in the 2001 and 2002 Filing Seasons is provided in Appendix X.

The CC project was one of the first to be deployed. The project delivered features such as Internet[11] and telephone access to refund and filing information. The CC project also increased the capacity of the IRS' existing telephone system. However, not all originally planned features have been delivered. For instance, systems management, administrative, and management information systems capabilities have all been delayed for possible future delivery.

As shown in the following table, for all the projects that were planned for completion by the 2002 Filing Season, only 46 percent of their features have been either fully or partially delivered. Fourteen percent of the features have been suspended, while the remaining almost 40 percent are still in progress. According to the BSMO, a majority of the functionality originally envisioned is still planned for future delivery in Fiscal Years 2002 and 2003. A listing of the current projects' planned delivery and their projected future delivery dates is provided in Appendix X.

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[9] *Prepared Testimony of Commissioner of Internal Revenue Charles O. Rossotti Before the Annual Joint Review: Progress Report on the IRS Restructuring and Reform Act of 1998* (dated May 14, 2002).

[10] See Appendix XIII for descriptions of these modernization projects.

[11] The Internet refund portion was delivered by a project called Internet Refund Fact of Filing, which was originally planned to be part of the CC project.

Table 3: Planned Functionality Delivered

Project	Total Planned	Full	Partial	Suspended	In Progress
CADE	1	0	0	0	1
CRM Exam	1	1	0	0	0
CC	10	4	2	4	0
e-Services	5	0	0	0	5
ESM	4	0	2	0	2
STIR	7	4	0	0	3
TOTAL	**28**	**9**	**4**	**4**	**11**
PERCENT	**100%**	**32.1%**	**14.3%**	**14.3%**	**39.3%**

Source: This table includes a comparison of major functionality listed in the BSM Spending Plans (see Appendix X) to actual delivery as confirmed by the IRS.

Overall Observation on Business Systems Modernization Performance

The BSMO has identified cost and schedule estimation as 1 of the 12 processes needing improvement during 2002. As process improvements are implemented, cost increases and schedule delays could be reduced as the BSM program matures. However, risks associated with building systems (such as complexity and integration) significantly increase as projects progress through their life cycle (from the planning and design phases to the development and deployment phases). The majority of the BSM projects are entering or currently in the high-risk phases. As project risks increase, the probability of cost overruns and schedule delays will also increase.

Because the BSM program is still maturing, it is difficult to determine whether improvements to processes have occurred until the projects are completed and actual cost and schedule data are available. If the BSMO and PRIME contractor successfully implement process improvements, we would expect to see the BSM program make significant strides to deliver quality products within a reasonable amount of time and money. Alternately, if the BSMO and PRIME contractor are not successful in implementing process improvements, the BSM program will continue to be plagued with cost increases and schedule delays that prevent it from effectively and efficiently delivering the modernized technology that the IRS needs to improve service to taxpayers.

Management's Response: The Deputy Commissioner for Modernization & Chief Information Officer agreed with our assessment and provided comments on how the IRS is making improvements to further reduce cost increases and schedule delays. Management's complete response to the draft report is included as Appendix XIV.

Detailed Objective, Scope, and Methodology

The overall objective of this review was to determine how well the Business Systems Modernization Office and modernization contractors were performing against cost, schedule, and near-term functionality goals. To accomplish our objective, we:

I.   Determined the percentage of modernization projects that were over/under or on target with budgeted amounts with respect to dollar cost.

    A. Identified and documented the planned dollar amounts for each project by milestone or time period.

    B. Identified and documented the actual dollar amounts that had been spent for each project by milestone.

    C. Processed the information that had been collected and performed variance analyses.

    D. Verified all analyses with appropriate Internal Revenue Service (IRS) representatives.

II. Determined the schedule variances for each project with respect to its projected completion dates versus its actual completion dates.

    A. Identified and documented the planned completion dates for each project by spending plan.

    B. Identified and documented the actual completion dates for each project.

    C. Processed the information that had been collected and performed variance analyses.

    D. Verified all analyses with appropriate IRS representatives.

III. Determined the amount of unfulfilled tangible deliverables/benefits for near-term projects versus planned tangible deliverables/benefits.

    A. Identified and documented the estimated deliverables/benefits for each project originally planned to be delivered in Fiscal Year 2002 or earlier.

    B. Identified and documented the actual functionality and deliverables/benefits for each project originally planned to be delivered in Fiscal Year 2002 or earlier.

    C. Processed the information that had been collected and performed variance analyses.

    D. Verified all analyses with appropriate IRS representatives.

Major Contributors to This Report

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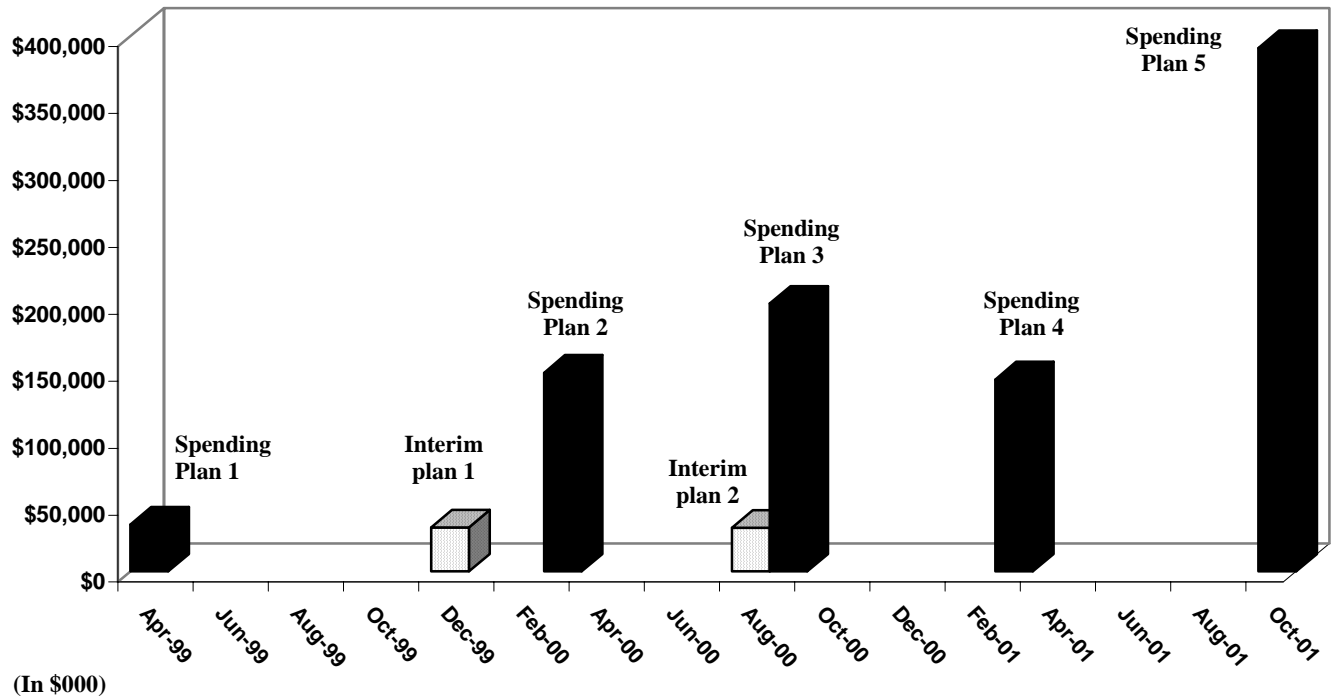Office of Management Controls N:CFO:F:M
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Time-Line and Details on Business Systems Modernization Spending Plans

(In $000)

SPENDING PLAN	DATE	PLAN AMOUNT
SPENDING PLAN #1	April 21, 1999	$ 35 million
INTERIM PLAN #1	December 14, 1999	$ 33 million
SPENDING PLAN #2	March 7, 2000	$148 million
INTERIM PLAN #2	August 15, 2000	$ 33 million
SPENDING PLAN #3	September 29, 2000	$200 million
SPENDING PLAN #4	March 14, 2001	$128 million
SPENDING PLAN #5 (*)	October 11, 2001	$391 million
TOTAL AMOUNT		**$968 million**

(*) We analyzed only the first four spending plans, since Spending Plan 5 was released just prior to the beginning of our review.

Background Details (Methodology)

There are many different ways to analyze and present the data provided by the Internal Revenue Service (IRS). Depending on the methodology used, the outcomes can be significantly skewed in support of or contrary to the IRS' results. The Treasury Inspector General for Tax Administration's (TIGTA) analytical methods attempt to report the results in a logical and impartial manner.

The TIGTA's methodology takes ***actual results*** for cost, schedule, and functionality and compares them to the ***originally planned*** cost, schedule, and functionality to determine if any variances exist. This methodology differs from the IRS' variance methodology performed within Business Systems Modernization (BSM) Spending Plans 3, 4, and 5.[1] It is not the TIGTA's intention to judge the IRS' methods of variance analysis but to present our perspective on the data. The difference in methodology is provided using a basic example of a cost variance analysis. Suppose the following data are available for analysis:

Example of Planned Data for Project A

Spending Plan	Amount Requested	For Project Phase
Plan 1	$10 Million	Planning Phase
Interim 1	$5 Million*	Planning Phase
Plan 2	$30 Million	Development Phase
Interim 2	$7 Million*	Planning Phase
Plan 3	$25 Million*	Development Phase
Plan 4	None	None
Plan 5	$5 Million*	Development Phase

* The IRS revises its originally planned amount and requests additional amounts to complete that particular project phase.

Example of Actual Data for Project A

Project Phase	Actual Amount
Planning Phase	$30 Million
Development Phase	$60 Million

Source: The data contained in this example are not actual data and are presented for illustrative purposes only.

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[1] According to the IRS, the variance methodology within the spending plans is prepared to assist the General Accounting Office with the audits it performs on each spending plan.

Based upon the example data presented above, we present the IRS and TIGTA methodologies
for comparison:

IRS Variance Analysis Methodology from Spending Plans:
Project A

Project Phase	Planned Amount	Actual Amount	Reported Variance
Planning Phase	$22 Million	$30 Million	$8 Million Overage
Development Phase	$60 Million	$60 Million	$0 Million Variance
TOTAL	**$82 Million**	**$90 Million**	**$8 Million Overage**

TIGTA Variance Analysis Methodology:
Project A

Project Phase	Planned Amount	Actual Amount	Reported Variance
Planning Phase	$10 Million	$30 Million	$20 Million Overage
Development Phase	$30 Million	$60 Million	$30 Million Variance
TOTAL	**$40 Million**	**$90 Million**	**$50 Million Overage**

Source: The data contained in this example are not actual data and are presented for illustrative purposes only.

Forecasted Amounts

A majority of the analyzed projects had not yet been completed. Therefore, the actual amounts
for those projects were unavailable. However, the IRS had been forecasting each project's actual
amounts at completion within the BSM Spending Plans. When appropriate, we used the
forecasted amounts as the actual amounts during the analyses. Based on this fact, it is important
to know that the results within this report may change at any time due to the following reasons:

- Project phases come to completion and the actual amounts become available. This will
  replace the forecasted amounts with the actual amounts within the analyses causing the
  variance to increase or decrease based upon the new data.

- The IRS releases another BSM Spending Plan and revises its forecasted amounts for the
  projects. This will cause the current variance amounts to increase or decrease based upon the
  new forecasted amounts.

Using the IRS' forecasted cost amounts during the analysis may produce distorted results
because they are amounts derived by the IRS' estimation abilities. However, according to the
IRS, its estimation processes have matured and improved over time. With this in mind, the
forecasted cost amounts are the best available to perform these types of analyses. A detailed
breakdown of the availability of actual costs versus IRS forecasted costs used for the report is
provided in Appendix VII.

Background Details (Project Groupings)

A total of 20 projects have been funded through the Business Systems Modernization (BSM) Spending Plans. Projects start at different times and are currently at different phases of design and development. There are five basic phases that a project undergoes throughout its life cycle. These life cycle phases are called milestones and are defined as:

Planning and Design Phase
- Milestone 1: Strategic Plan
- Milestone 2: Concept Definition
- Milestone 3: System Design

Development and Deployment Phase
- Milestone 4: Enterprise Deployment
- Milestone 5: Post-Deployment Evaluation

In order to appropriately and accurately present the data analyses on the BSM projects, we grouped them according to their current phases. Project name abbreviations are defined on the next page.

[PROJECT GROUPINGS] | **[PROJECT NAMES]** | **[ANALYZED DATA]**

20 PROJECTS

8 – Projects Completed the Planning and Design Phases
- e-Services
- CADE
- CAP
- CRM Exam
- CC
- HR Connect
- STIR
- ESM

  → COST
  → SCHEDULE
  → FUNCTIONALITY

5 – Projects Currently in the Planning and Design Phases
- EDW
- IFS
- CAM
- FPC
- Reporting Compliance

  → COST
  → SCHEDULE

3 Laboratory Projects
- SDL
- VDE
- EITE

  → COST

3 Cancelled Projects
- TESP
- CRM Core
- CADDI

  → COST

1 Delayed Project
- Taxpayer Education

  → NONE

Analysis of Business Systems Modernization Cost, Schedule, and Functionality Performance

Project Name Abbreviation	Full Project Name
CADE	Customer Account Data Engine
CAP	Custodial Accounting Project
CRM Exam	Customer Relationship Management Examination
CC	Customer Communications
HR Connect	Human Resources Connect
STIR	Security and Technology Infrastructure Release
ESM	Enterprise Systems Management
EDW	Enterprise Data Warehouse
IFS	Integrated Financial System
CAM	Customer Account Management
FPC	Filing and Payment Compliance
SDL	Solutions Demonstration Laboratory
VDE	Virtual Development Environment
EITE	Enterprise Integration and Test Environment
TESP	Telecommunications Strategic Enterprise Program
CRM Core	Customer Relationship Management Core
CADDI	Correspondence and Document on Demand Imaging

Background Details (Cost and Schedule Data Breakdown)

We relied on information accumulated by the Internal Revenue Service (IRS) as of February 2002 and did not verify the accuracy of the information. The majority of the data consisted of forecasted cost amounts and completion dates since most of the projects were still in progress. Forecasted numbers and dates are based upon the IRS' estimation processes and those figures may be different from the actual amounts at completion.

The detailed breakdown of available actual versus forecasted cost amounts is shown in Figure A: *Cost Breakdown*. The detailed breakdown of available actual versus forecasted completion dates is shown in Figure B: *Schedule Breakdown*. These analyses provide a picture of where changes to cost and schedule results may occur due to the possibility of future changes to forecasted amounts and dates. The breakdown is shown based on data points. A data point is considered an originally planned figure (cost or schedule) compared to its actual or forecasted figure.

Figure A: *Cost Breakdown*
37 total data points

BSM Spending Plans 1 though 4 contain **37** data points for the analyses; **15** were compared to **actual cost amounts**, while the remaining **22** were compared to **IRS forecasted amounts**.
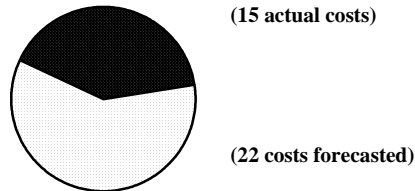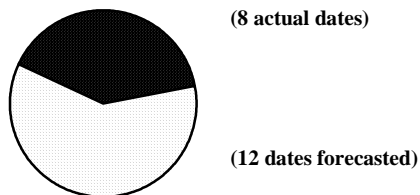
(15 actual costs)

(22 costs forecasted)

Figure B: *Schedule Breakdown*
20 total data points

BSM Spending Plans 1 though 4 contain **20** data points for the analyses; **8** were compared to **actual completion dates**, while the remaining **12** were compared to **IRS forecasted completion dates**.

(8 actual dates)

(12 dates forecasted)

Source: The IRS provided actual costs from the IRS' Automated Financial System. The IRS also provided actual completion dates, forecasted costs, and forecasted completion dates.

Cost Performance Details

Table 1: Cost Performance Details by Project Groupings

Business Systems Modernization (BSM) Projects Grouped According to Their Current Developmental Status	Requested Amount to Date	Actual/Forecasted Amount	Cost Increase Amount to Date	Cost Increase Percentage to Date
8 in Development and Deployment	$244.35 million	$306.91 million	$62.56 million	25.60%
5 in Planning and Design	$ 30.11 million	$ 38.27 million	$ 8.16 million	27.10%
3 Laboratories for System Testing	$ 22.67 million	$ 24.24 million	$ 1.57 million	6.93%
3 Cancelled	$ 18.50 million	$ 20.97 million	$ 2.47 million	13.35%
1 Delayed	N/A	N/A	N/A	N/A
	$315.63 million	$390.39 million	$74.76 million	23.69%

Source: The requested amount is the original cost estimate contained in the BSM Spending Plans. The Internal Revenue Service (IRS) provided the actual amounts from the IRS' Automated Financial System. The IRS also provided its current forecasted amounts.

Table 2: Breakdown Details of the Eight Projects Currently in the Development and Deployment Phases

Project Phase	Requested Amount	Actual/Forecasted Amount	Cost Increase Amount to Date	Cost Increase Percentage to Date
Planning and Design	$ 58.63 million	$110.68 million	$52.05 million	88.78%
Development and Deployment	$185.72 million	$196.23 million	$10.51 million	5.66%

Source: The requested amount is the original cost estimate contained in the BSM Spending Plans. The IRS provided the actual amounts from the IRS' Automated Financial System. The IRS also provided its current forecasted amounts.

Schedule Performance Details

Table 1: Schedule Performance Details by Project Groupings

Business Systems Modernization (BSM) Projects Grouped According to Their Current Developmental Status	Total Months Delay to Date	Average Months Delay per Project to Date
8 in Development and Deployment *	93 months	13 months*
5 in Planning and Design	29 months	6 months
3 Laboratories for System Testing	Data were not available for schedule performance.	
3 Cancelled	Cancelled projects will not be completed.	
1 Delayed	The project has not started; data not available.	

* The HR Connect project is one of the eight projects within the Development and Deployment grouping; however, it did not contribute any schedule data for the analysis. Therefore, it was excluded from the calculation and the 13 average months delay per project figure was derived based upon 7 projects instead of 8.

Graph 1: Schedule Variance Trend Analysis by Spending Plan
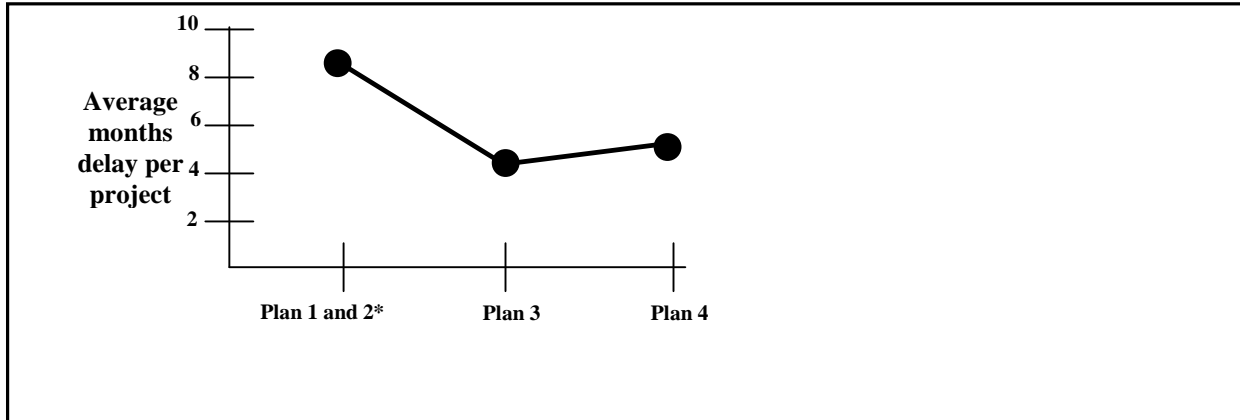
* Spending Plans 1 and 2 were combined because Spending Plan 1 contained very few planned completion dates.

Source: Comparison of the originally scheduled completion dates in the BSM Spending Plans to actual or forecasted completion dates provided by the IRS by BSM Spending Plan.

Functionality Performance Details

Table 1: Listing of Projects with Delivery Originally Planned for the 2001 and 2002 Filing Seasons

Customer Account Data Engine - CADE
1. Release 1 – Build a database that will process all formats of the 1040EZ return.

Customer Relationship Management (CRM) Exam
1. Provide a single commercial-off-the-shelf solution for computing complex taxes.

Customer Communications - CC
1. Telephone Automated Self-Service Application for Refund Inquiries 2. Enhance Automated Call Distributors 3. Install Voice Response Units 4. Add calls to Intelligent Call Routing 5. Telephone Automated Self-Service Application for Fact of Filing 6. Centralize National Call Management 7. Centralize Systems Management and Administration Capabilities 8. Management Information Systems for Call Management 9. Internet Automated Self-Service Applications for Refund and Fact of Filing 10. Intelligent Call Routing

e-Services
1. Electronic Application for Third Party Registration 2. Electronic Transcript Delivery 3. Disclosure Authorization 4. Taxpayer Identification Number Matching 5. Electronic Account Resolution

Enterprise Systems Management - ESM
1. Inventory Controls 2. Software Distribution/Environment Monitoring 3. Management Information Statistics 4. Enterprise Help Desk

Security and Technology Infrastructure Release - STIR
1. Employee Portal 2. Hardware/system Software 3. Message Switching 4. Registered-User Internet Portal 5. Security Audit and Analysis System 6. e-Services Functionality 7. Custodial Accounting Project Services

Table 2: Planned Functionality Delivered Summary

Project	Total Planned	Full Delivery	Partial Delivery	Suspended Delivery	Delivery in Progress
CADE	1	0	0	0	1
CRM Exam	1	1	0	0	0
CC	10	4	2	4	0
e-Services	5	0	0	0	5
ESM	4	0	2	0	2
STIR	7	4	0	0	3
TOTAL	**28**	**9**	**4**	**4**	**11**
PERCENT	**100%**	**32.1%**	**14.3%**	**14.3%**	**39.3%**

Source: This table includes a comparison of major functionality listed in the Business Systems Modernization (BSM) Spending Plans (see Table 1) to actual delivery as confirmed by the Internal Revenue Service (IRS).

Table 3: Planned Delivery of Functionality

PROJECT	PLANNED FILING SEASON (FS) DELIVERY	PROJECTED FISCAL YEAR (FY) DELIVERY
CADE	2002 FS	FY 2003
CRM Exam	2002 FS	FY 2002
CC	2001 and 2002 FSs	FY 2002
e-Services	2002 FS	FY 2003
ESM	2002 FS	FY 2003
STIR	2002 FS	FY 2003

Source: This table includes a comparison of major functionality listed in the BSM Spending Plans (see Table 1) to actual delivery as confirmed by the IRS.

Industry Performance Statistics

From the Standish Group:[1]

- Only 16 percent of projects in the United States are considered successful.

- Only 9 percent of large companies complete projects on schedule and on budget.

- Fifty-three percent of all projects cost 189 percent over original estimates.

- Average schedule overrun for projects in trouble was 222 percent.

- Delivered products contained only 61 percent of originally specified features.

- Thirty-one percent of all projects are cancelled.

From the Parsons Group:[2]

- Fifty percent of finished projects contain less than 70 percent of their planned functionality.

- Sixty to 80 percent of Enterprise Resource Planning (ERP)[3] systems will either fail or not meet expectations.

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[1] The Standish Group offers information technology advice and conducts research through focus groups, in-depth surveys, and extensive interviews. The statistics presented were obtained from the following two sources: www.Billingworld.com article entitled *So You're Thinking About a New Software Package? Selection, Implementation, and Pitfalls* (dated September 1998, Deborah Strong and Shailendra Jain) and www.seir.sei.com.edu article entitled *The Software Crisis is Still With Us!* (dated September 1998).

[2] The Parsons Group is a national consulting firm specializing in finance, accounting, and business systems. The statistics presented were obtained from the following source: ERP Life Cycle presentation to the Institute of Internal Auditors (dated March 25, 2002).

[3] ERP packages are computer systems that encompass and serve a wide range of business functions within one system.

Previous Audit Reports

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

IRS Needs to Better Balance Management Capacity with Systems Acquisition Workload (GAO-02-356, dated February 2002).

The Business Systems Modernization Office Needs to Strengthen Its Processes for Overseeing the Work of the PRIME Contractor (Reference Number 2002-20-059, dated March 2002).

Continued Progress Modernizing IRS Depends on Managing Risks (GAO-02-715T, dated May 2002).

Selected Modernization Project Descriptions

Customer Relationship Management (CRM) Exam – The CRM Exam project is a software package that computes complex taxes.

Customer Communications (CC) – The CC project increased the capacity of the Internal Revenue Service's (IRS) existing telephone system. The project also delivered features such as Internet and telephone access to refund and filing information. The Internet refund portion was delivered by a project called Internet Refund Fact of Filing, which was originally planned to be part of the CC project.

Enterprise Systems Management (ESM) – The ESM project will help the IRS monitor all IRS computer systems and networks to ensure they are consistently available to the employees relying on them. The project also provides for the consolidation of 19 help desks throughout the IRS into a single help desk to better serve the users of the systems and networks.

Security and Technology Infrastructure Release (STIR) – The STIR project will provide the secure technical infrastructure to support and enable the delivery of the IRS' modernized business systems.
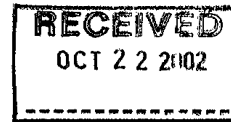
Management's Response to the Draft Report

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

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DEPUTY COMMISSIONER

October 16, 2002

MEMORANDUM FOR TREASURY INSPECTOR GENERAL FOR TAX
ADMINISTRATION

FROM: John C. Reece
                 Deputy Commissioner for Modernization &
                 Chief Information Officer

Subject: Draft Audit Report – Analysis of Business Systems
                 Modernization Cost, Schedule and Functionality
                 Performance (Audit # 20020037)

The Business Systems Modernization (BSM) Program is one of the largest and most complex modernization efforts ever undertaken by the Federal government. However, our confidence in the practicality of our modernization program continues to strengthen as we deliver key building blocks for the future.

The BSM program will fundamentally transform the way we manage information and deliver service. Some BSM projects, such as Customer Communication 01, Customer Relationship Management (CRM) – Examination, and Internet Refund Fact of Filing (IRFOF), are already delivering tangible and meaningful benefits to taxpayers. We have deployed the first release of the common integrated technical infrastructure, the Security and Technology Infrastructure Release (STIR) project, and it is working well. This modernized infrastructure provides standardized operations and a single security and enterprise systems management framework. It also enables us to deploy modernized systems that are fully integrated with our current processing environment. In addition, we have established a long-term vision and enterprise architecture that serve as living blueprint for all business and technology improvement programs.

Moreover, we have successfully delivered the first three sub-releases of the Enterprise Systems Management (ESM); one ahead of its scheduled date. ESM allows us to improve our technology infrastructure and better manage its performance. It also provides automated trouble ticketing. ESM will support reduced system downtime, create a single point for assistance, and improve quality of service to taxpayers.

Your report does not require a formal response because you made no recommendations. However, we want to reaffirm our full commitment to the

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strategic course of modernization and to the implementation of key management processes. We agree with your report's general assessment that the projects are costing more and taking longer to implement than we originally estimated. However, we are very encouraged by your recognition of the improvements we have made in our cost and schedule performance.

We are taking steps to reduce cost increases and schedule delays by further developing our management capabilities and internal effectiveness. One of these management capabilities, which we previously discussed with you, is procedures for independently reviewing contractor-provided cost and schedule estimates. These procedures will allow us to quickly and accurately substantiate all numbers concerning drivers, rates, timeframes, necessary personnel, and other information that the PRIME submits.

We are aware that even with these improvements, our modernization plan for FY 2003 and beyond is very challenging. It will require all our commitment, dedication, and requested funding to continue to deliver the modernized systems of the future.

If you have any questions, please call me at (202) 622-6800 or Fred Forman, Associate Commissioner for Business Systems Modernization, at (202) 622-3378.