United States General Accounting Office

GAO

Report to Congressional Committees

January 2001

TAX SYSTEMS MODERNIZATION

Results of Review of IRS' Third Expenditure Plan

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Accountability * Integrity * Reliability

GAO-01-227

Contents

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United States General Accounting Office
Washington, D.C. 20548

January 22, 2001

The Honorable Ben Nighthorse Campbell
Chairman
The Honorable Byron L. Dorgan
Ranking Minority Member
Subcommittee on Treasury and General Government
Committee on Appropriations
United States Senate

The Honorable Jim Kolbe
Chairman
The Honorable Steny H. Hoyer
Ranking Minority Member
Subcommittee on Treasury,
Postal Service and General Government
Committee on Appropriations
House of Representatives

Pursuant to the Department of Treasury's fiscal year 1998 and 1999 appropriations acts,[1] the Internal Revenue Service (IRS) submitted to the Congress in October 2000 its third expenditure plan, requesting $200 million from its systems modernization appropriations account, referred to as the Information Technology Investments Account (ITIA). As required by the acts, we reviewed the plan. Our objectives were to (1) determine whether the third plan satisfied the conditions specified in the acts;[2] (2) determine IRS progress in response to the subcommittees'

[1]The fiscal year 1998 Treasury and General Government Appropriations Act (Public Law 105-61) and the fiscal year 1999 Omnibus Consolidated and Emergency Supplemental Appropriations Act (Public Law 105-277).

[2]Per the acts, ITIA funds are unavailable until IRS submits to the Congress for approval a modernization expenditure plan that (1) implements IRS' Modernization Blueprint (IRS' enterprise architecture); (2) meets the Office of Management and Budget's (OMB) system investment guidelines; (3) meets IRS life-cycle management requirements; (4) is reviewed and approved by IRS, Treasury, and OMB, and is reviewed by GAO; and (5) meets federal acquisition requirements and management practices.

September 28, 2000, direction on the Custodial Accounting Project[3] (CAP) and the Security and Technology Infrastructure Release (STIR) project;[4] and (3) provide any other observations about the third plan and the systems modernization program.

On November 9, 2000, we briefed your offices on the results of our review. This report transmits our November 9, 2000, briefing and reiterates our recommendations to the Commissioner of Internal Revenue that were specified in the briefing. The full briefing, including our scope and methodology, is reprinted in appendix I. In summary, we made four major points:

- First, IRS' third expenditure plan satisfied the conditions specified in the appropriation acts, and IRS was making progress towards satisfying the subcommittees' direction on the CAP and STIR projects.
- Second, IRS was still making important progress in establishing effective modernization management capability, but important and challenging work remained. For example, IRS had defined its system life-cycle methodology, which IRS refers to as its Enterprise Life Cycle, and planned to have it implemented by early 2001. IRS had also created a modernization management program office and planned to have it fully functional by early 2001. In addition, IRS had developed a draft enterprise architecture but still needed to resolve significant issues concerning its completeness and accuracy. Until these and other modernization management weaknesses were fully addressed, we concluded, key modernization controls would be missing, putting IRS at risk of building systems that might not perform as intended, might cost more, and might take longer to complete.
- Third, five modernization initiatives experienced schedule delays and/or cost increases, each of which IRS disclosed in the third plan. However, the third plan did not address whether projects' prior commitments for delivery of promised systems capabilities (requirements) and benefit/business value were being met.

[3]CAP is one of a collection of systems that make up IRS' Integrated Financial System Project. CAP is designed to provide tax receipt and receivable analysis and reporting. Standard general ledger and other financial and administrative reporting as required by federal management directives are to be provided by other future projects.

[4] STIR is the common integrated infrastructure to support and enable modernized business systems applications. As designed, it consists of a combination of custom and commercial-off-the-shelf software, hardware, and security solutions, integrated to form the technical foundation upon which modernized business systems applications will operate.

- Last, IRS used contractor-provided “rough order-of-magnitude” estimates in preparing its third expenditure plan. However, consistent with its established practice, IRS planned to validate the third plan’s estimates as part of its negotiating and definitizing contract task orders. For IRS’ second expenditure plan, this process resulted in finalized contract costs that were $9 million under the “rough order-of-magnitude” estimates in the plan.

Recommendations for Executive Action

To ensure that IRS fully responds to congressional direction and addresses modernization management weaknesses, we recommend that the Commissioner of Internal Revenue

- follow through on plans to satisfy IRS appropriations subcommittees’ direction on CAP and STIR;
- expedite the completion of IRS’ enterprise architecture releases and implementation of other missing modernization management controls;
- not approve and fund detailed design and development activities for any system before the requisite enterprise architecture definition is completed;
- report immediately to IRS’ appropriations subcommittees on any changes to commitments made in IRS’ second plan concerning system requirements/capabilities to be delivered and the associated benefits to be realized, and continue to report such performance measures in future expenditure plans; and
- report to IRS’ appropriations subcommittees on any variance from cost estimates in its third plan of 10 percent or more that result from definitization of contract task orders.

Agency Comments

In commenting on a draft of this report, the Commissioner of Internal Revenue agreed with our findings and recommendations. The Commissioner’s comments are reprinted in appendix II.

We are sending copies of this report to Senator Max Baucus, Senator Robert C. Byrd, Senator Orrin G. Hatch, Senator Joseph I. Lieberman, Senator Ted Stevens, and Senator Fred Thompson, and to Representative Dan Burton, Representative William J. Coyne, Representative Amo Houghton, Representative David R. Obey, Representative Charles B. Rangel, Representative Jim Turner, Representative Henry A. Waxman, and

Representative C.W. Bill Young, in their capacities as Chairmen or Ranking Minority Members of Senate and House Committees and Subcommittees. We are also sending copies to the Commissioner of Internal Revenue; the Secretary of the Treasury; the Chairman of the IRS Oversight Board; and the Director of the Office of Management and Budget. Copies will also be made available to others upon request.

Should you or your staff have any questions on matters discussed in this report, please contact me at (202) 512-3439. I can also be reached by e-mail at *hiter@gao.gov.* Key contributors to this report are listed in appendix III.

Randolph C. Hite
Director, Information Technology
Systems Issues

Briefing Slides From November 9, 2000, Briefing of Senate and House Appropriations Subcommittee Staff

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Information Technology

Results of Review of IRS' Third ITIA Expenditure Plan

Briefing to Staffs of
the Senate Committee on Appropriations,
Subcommittee on Treasury and General Government
and
the House Committee on Appropriations,
Subcommittee on Treasury, Postal Service,
and General Government

November 9, 2000

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Briefing Overview

- Introduction
- Objectives
- Scope and Methodology
- Results in Brief
- Background
- Results
- Conclusions
- Recommendations

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Introduction

- Per IRS' FY 1998 and 1999 appropriations acts, Information Technology Investment Account (ITIA) funds are unavailable until IRS submits to the Congress for approval, a modernization expenditure plan that:
  - Implements IRS' Modernization Blueprint (IRS' enterprise architecture);
  - Meets OMB IT investment guidelines;
  - Meets IRS life cycle management requirements;[1]
  - Is reviewed and approved by IRS, Treasury, and OMB, and is reviewed by GAO; and
  - Meets federal acquisition requirements and management practices.

[1] IRS refers to its life cycle management program as the Enterprise Life Cycle (ELC), which is graphically depicted in appendix I.

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Introduction

- To date, about $506 million has been appropriated for ITIA, and $249 million has been released.
- IRS plans to submit a series of expenditure plans over the life of the modernization requesting release of ITIA appropriated funds. On October 10, 2000, IRS submitted its third expenditure plan. IRS plans to submit another plan in March 2001.

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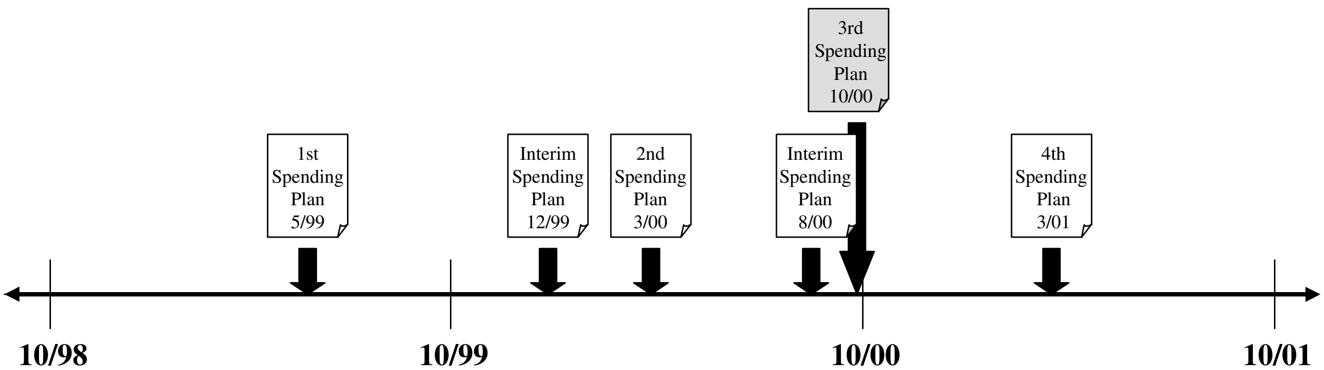
Introduction



ITIA Funds Requested For Release (millions)	**$35**	**$33**	**$176**	**$33**	**$200**	**?**
ITIA Funds Released Per Plan (millions)	**$35**	**$33**	**$148**	**$33**	**?**	**?**
Cumulative Release of ITIA Funds (millions)	**$35**	**$68**	**$216**	**$249**	**?**	**?**

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Objectives

- As agreed, our objectives were to
  - determine whether the third plan satisfies the legislative conditions;
  - determine IRS progress in response to the subcommittees' September 28, 2000, direction on the Custodial Accounting Project (CAP) and the Security and Technology Infrastructure Release (STIR) project; and
  - provide any other observations about the third plan and the systems modernization program.

- We agreed to provide our results to the subcommittee by November 9, 2000.

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Scope and Methodology

- To accomplish our objectives, we
  - Reviewed the third expenditure plan and met with IRS program officials to understand the scope and content of the plan;
  - Analyzed the plan against the legislative conditions to identify variances;
  - Assessed IRS' progress and plans for responding to congressional direction on CAP and STIR;
  - Reviewed program and project management reports and briefings;
  - Observed modernization executive steering committee and subcommittee meetings; and
  - Interviewed program and project management officials.

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Scope and Methodology

- Analyzed available evidence on recent efforts to address modernization management weaknesses. Specifically, we analyzed progress and plans for
  - Business Systems Modernization Office (BSMO) implementation,
  - enterprise architecture definition,
  - ELC definition and implementation,
  - investment management definition and implementation, and
  - software acquisition maturity, as defined by the Software Engineering Institute's (SEI) acquisition model. This model was developed by the SEI at Carnegie Mellon University to evaluate an organization's software acquisition capability.

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Scope and Methodology

- Collaborated with the Treasury Inspector General for Tax Administration (TIGTA) to avoid duplication of effort in reviewing program and project initiatives and incorporated TIGTA's results in this briefing where appropriate. Initiatives addressed by TIGTA included the Customer Communications and e-Services projects, ELC, BSMO, and enterprise architecture.
- To meet our agreed upon report date, we did not independently validate planned initiatives' cost estimates or confirm, through system and project management documentation, the validity of IRS-provided information on the initiatives' content and progress.

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Scope and Methodology

- We provided a draft of this briefing on November 8, 2000, to IRS' Chief Information Officer (CIO), BSMO Director, and other executives and have incorporated their comments where appropriate.
- We performed our work from October through November 2000 in accordance with generally accepted government auditing standards.

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Results in Brief

Objective 1: IRS' third plan satisfies the legislative conditions.

Legislative Conditions	Satisfies	Does Not Satisfy
1. Implements IRS' modernization blueprint.	✓	
2. Meets the requirements of IRS' life cycle program.	✓	
3. Meets OMB information systems investment guidelines.	✓	
4. Reviewed and approved by IRS, Treasury's IRS Management Board, and OMB, and reviewed by GAO.	✓	
5. Complies with federal acquisition requirements and management practices.[2]	✓	

Objective 2: IRS is making progress in responding to congressional direction on CAP and STIR.

Congressional Direction	Completed	In Progress (planned completion date)
CAP		
▪ CIO and CFO must certify that a compelling business case has been established for treating CAP as a near-term priority		✓ (Nov. 2000)
▪ CIO and CFO must certify that risks associated with post-milestone III development are being effectively mitigated		✓ (Nov. 2000)
STIR		
▪ Complete security risk assessment (SRA)		✓ (Nov. 2000)
▪ Validate project requirements against SRA results		✓ (Nov. 2000)
▪ Commissioner must certify SRA is complete and results have been applied to the project		✓ (Nov. 2000)

[2] These acquisition requirements and practices are intended to establish acquisition management rigor and discipline, such as those defined in the Software Engineering Institute's acquisition model. Our analysis of the plan focused on satisfaction of this model's tenets.

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Results in Brief

- **Objective 3: Other Observations**
  - *Observation 1*
    - IRS continues to make important progress in establishing effective modernization management capability, but important and challenging work remains.

Commitments Made in August 2000 Plan to Address Weaknesses	Progressing On Schedule	Progress Made But Slippage
Mature software acquisition capabilities	✓	
IRS and contractor roles and responsibilities	✓	
ELC definition and implementation	✓	
Enterprise architecture completion and use		✓
BSMO implementation	✓	
Portfolio investment management	✓	

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Results in Brief

- One important and challenging task for IRS is completing and implementing its enterprise architecture (EA).
  - IRS is developing its EA in 3 releases (1.0, 1.1, and 2.0). Each release is intended to provide incrementally more architectural definition. For example, 1.0 is to provide infrastructure level definition, and 1.1 is to provide application level definition, including a sequencing plan for strategic acquisition of modern business process applications.
  - Thus far, IRS has developed a draft of EA 1.0. However, it still needs to resolve significant issues concerning EA 1.0's completeness and accuracy. For example, the draft does not include all planned EA products and does not fully address how security and privacy needs will be met.

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Results in Brief

- IRS then needs to have EA 1.0 independently verified and validated. IRS planned to have EA 1.0 completed by September 2000, then slipped the date to November 2000, and currently plans to approve and issue it in December 2000. This slippage will also delay completing EA versions 1.1 and 2.0, but revised issuance dates have not yet been established for either.

- These delays in issuing IRS' EA are significant because IRS' third plan calls for beginning detailed design and development (ELC Milestone III) on certain projects before requisite EA definition is completed. For example, the E-Services projects are scheduled to pass ELC milestone III in November 2000 and February 2001, respectively. However, EA 1.1, which is to provide the necessary business process application architectural definition, was not scheduled for completion until March 2001, and this date will slip.

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Results in Brief

- *Observation 2*
  - Five initiatives have experienced schedule delays and/or cost increases, each of which IRS reported in the plan. For example,
    - Tax Vision and Strategy (TAVS) project has slipped 3 months and estimated cost has increased $6.2 million (27 percent).
    - E-Services estimated cost increased $1.4 million (26 percent).
  - The plan did not, however, address whether these five and other projects' prior commitments for systems capabilities (requirements) and benefit delivery have also been delayed or reduced. This is not consistent with our recommendation for IRS to report progress against all prior commitments in each plan.[3]

[3] *Tax Systems Modernization: Results of Review of IRS' Initial Expenditure Plan* (GAO/AIMD-99-206, June 15, 1999).

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Results in Brief

- *Observation 3*
  - Costs in the third plan are contractor-provided "rough order-of-magnitude" estimates.
  - Consistent with IRS' recent actions to address prior subcommittee direction on this issue, IRS plans to validate the third plan's estimates as part of its contract/task order definitization process. Under this process, IRS assesses contractor task order proposals, develops independent cost estimates for each, and negotiates a task order cost.
  - For IRS' second expenditure plan, this process resulted in cumulative contract costs that were $9 million under estimates in the second plan (5 percent), although individual project variances exceeded 10 percent.
- We are making recommendations to address our observations. In commenting on a draft of this briefing, IRS' CIO agreed with our recommendations and plans to implement them.

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Background

- The third plan seeks approval to obligate about $200 million for both program-level and project-specific activities.[4]

Third ITIA Expenditure Plan	($000)
Program Level Activities	
PRIME Program Management Office	$21,856
Federally Funded Research and Development Center (MITRE)	$18,750
ELC, Quality Assurance, and Configuration Management	$7,394
Architecture Engineering Office	$17,570
Vision and Strategy - Tax Administration	$6,200
Management Reserve	$15,000
Subtotal	***$86,770***
Project Level and Infrastructure Activities	
Customer Services Capabilities	$11,663
Custodial Accounting Project	$44,130
Core Financial System	$3,449
Security and Technology Infrastructure Release	$25,185
Other Enabling Infrastructure	$28,849
Subtotal	***$113,276***
Total Requested Release	**$200,046**

[4] See appendix II for a detailed summary of planned activities.

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Background

- The third plan continues ongoing initiatives and establishes 3 new efforts:
  - BSMO Quality Assurance contractor support;
  - Core Financial System; and
  - a management reserve.

- Like its previous plans, IRS' third expenditure plan covers contractor costs such as the Prime Systems Integration Support (PRIME) contractor and the Federally Funded Research and Development Center (MITRE), and not IRS internal costs, such as IRS BSMO staff costs.

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Background

- To date, GAO has reviewed and reported on 2 expenditure plans and 2 “stopgap” spending measures supporting requests for ITIA funding releases.

Spending Plan	Results of GAO Review
1st Spending Plan (May 1999) ($35 million request)	• The plan satisfied the legislative conditions for the use of ITIA funds and was consistent with our open recommendations. • The plan was an appropriate first step, but the key to success would be effective implementation of the plan. • Future plans should specify progress against prior plan commitments, and the next plan should clarify IRS/contractor roles and responsibilities.
1st Interim Spending Plan (Dec 1999) ($33 million request)	• The plan raised concerns about projects that were scheduled to begin detailed design and software development before, among other things, the enteprise architecture was completed and the ELC was defined and implemented. • IRS should expedite completion of the architecture and implementation of the ELC. • Future plans should explain how IRS plans to manage the risk of performing detailed design or development work if the architecture is not sufficiently completed or the ELC is not sufficiently implemented.

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Background

Spending Plan	Results of GAO Review
2nd Spending Plan (Mar 2000) ($176 million request)	• IRS met relatively few commitments in its $35 million first ITIA spending plan, even though the Service later received an additional $33 million and nearly 5 months of extra time to accomplish the goals set forth in the first plan. • The plan satisfied the legislative conditions for the use of ITIA funds, and was generally consistent with recommendations contained in our earlier reports. • The key to success would be whether IRS effectively implements the plan. • Until IRS completes its initiated actions to redirect and restructure its modernization effort, it would continue to lack key modernization and technical controls.
2nd Interim Spending Plan (Aug 2000) ($33 million request)	• IRS had not adhered to the approved and funded March 7, 2000, spending plan. • On selected initiatives, IRS had not met cost and schedule commitments made in its March 7, 2000 spending plan. • Most modernization initiatives had nevertheless made important progress since March 2000. IRS fully addressed two of its modernization management capability weaknesses, and it was making progress in addressing others. • One project, Custodial Accounting Project (CAP), had been approved for product development without sufficient definition and without a compelling business case. Further investment in CAP should be limited until IRS demonstrates sufficient business value and reports to the House and Senate committees on risk mitigation. • Another project, Security and Technology Infrastructure Release (STIR), was being preliminarily designed without sufficient requirements definition and economic justification. The STIR project should be directed to complete a security risk assessment as soon as possible, and ensure that STIR requirements and the proposed design solution are economically justified through a business case.

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Results

Objective 1: Determine whether the third plan satisfies the conditions in IRS' FY 1998 and 1999 appropriations acts.

Legislative Conditions	Expenditure Plan Provisions
1. Implements IRS' Modernization Blueprint, its enterprise architecture.	The third plan provides $17.6 million for the Architecture Engineering Office to continue definition and implementation of the enterprise architecture. For example, it provides for ▪ completing EA release 1.0; ▪ issuing EA release 1.1 to incorporate tax administration vision and strategy efforts and a migration strategy describing the sequence of how projects are to be deployed over the next 3-5 years; and ▪ updating release 1.1 to reflect internal management vision and strategy efforts (release 2.0).
2. Meets the requirements of IRS' life cycle program.	The plan provides $3.7 million for meeting the requirements in IRS' life cycle management program. Specifically, the plan calls for ▪ incorporating enhancements to and maintaining the ELC, ▪ updating and implementing configuration management processes, ▪ completing each BSMO group's ELC tasks, roles, and responsibilities, ▪ developing training plans for each function and individual, ▪ delivering and completing training by January 2001.

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Legislative Conditions	Expenditure Plan Provisions
3. Meets OMB investment guidelines.	▪ IRS' expenditure plan provides for meeting OMB IT investment guidelines. As we reported in our September 2000 briefing and subsequent report, IRS has defined IT investment processes and is in the process of incorporating them into the ELC. ▪ It also provides for implementation of IT investment processes.
4. Reviewed and approved by IRS, Treasury's IRS Management Board, and OMB, and reviewed by GAO.	▪ IRS--September 29, 2000 ▪ Treasury's IRS Management Board—September 28, 2000 ▪ OMB—October 10, 2000 ▪ GAO—November 9, 2000
5. Complies with federal acquisition requirements and management practices.	▪ As part of the ELC, IRS has defined processes, roles, responsibilities, etc. for implementing selected Software Engineering Institute (SEI) Software Acquisition Capability Maturity Model™ level 2 key process areas.[4] If implemented effectively, these processes should meet federal acquisition requirements and management practices. ▪ More specifically, IRS' plan provides for, among other things, - training staff in these key process areas and having all projects following them by January 2001, - having an independent assessor determine compliance with SEI's level 2 requirements by September 2001, - continuing the use of performance-based task orders, - using Monthly Program Management Reviews and an integrated master schedule to track projects' schedules and interdependencies to increase acquisition discipline.

[5] These are Acquisition Planning, Solicitation, Requirements Development and Management, Project Management, Contract Tracking and Oversight, Evaluation, and Transition to Support.

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Results

Objective 2: Determine IRS progress responding to congressional direction on CAP and STIR

CAP		
GAO Findings	**Congressional Direction**	**IRS Response**
In our September 2000 briefing and subsequent report, we stated that IRS had prematurely passed milestone III without a compelling business case to justify the decision. In addition, IRS had not demonstrated that CAP was integrated with other modernization projects.	The subcommittees directed that no CAP funds be expended until IRS' CIO and CFO certify and report to the Subcommittees that a compelling business case had been established for treating CAP as a near-term priority and that the risks associated with post-milestone III development and the lack of program controls were being effectively mitigated.	In response, IRS: - is revising the business case with the intent of showing compelling business value benefits that will be derived from developing CAP, plans to have the business case certified by the CIO and CFO once it is completed, and intends to report to the subcommittees in November 2000. - incorporated CAP into the Integrated Master Schedule; - moved CAP under the Program Management Process, with formal participation beginning in November 2000; According to IRS officials, no CAP funds from the August 2000 funding release have or will be used for post-milestone III work until it has fulfilled congressional direction.

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Results

GAO Findings	Congressional Direction	IRS Response

In our September 2000 briefing and subsequent report, we stated that IRS did not have adequate assurance that it was properly designing STIR because it had not assessed the project's security threats and vulnerabilities, analyzed the resulting risks in terms of probability and impact, and used this security risk assessment (SRA) to develop and justify cost effective countermeasures.	The subcommittees directed IRS to complete an SRA, validate STIR project requirements against the results of the SRA, and have the results certified by the Commissioner. The subcommittees also directed that the STIR funds approved for release should only be used for the risk assessment until the Commissioner certifies the assessment is complete and the results applied to the project.	In response, IRS:
		- accelerated development of and completed an SRA and identified new risks:
		  - web interface vulnerabilities
		  - outsourcing internet service provider;
		- engaged IRS' security office and Federally Funded Research and Development (FFRDC) contractor (MITRE) to verify that the SRA is complete and consistent with IRS' ELC guidance, draft EA 1.0, and its Technology Model View logical design;
		- is currently mapping the results of the SRA to the STIR project requirements to ensure that the system requirements document is complete and the baseline business case is cost effective;
		- plans to obtain the Commissioner's certification of the completed SRA in November 2000.
		
		According to IRS officials, no STIR funds from the August 2000 funding release have or will be used for post-milestone III work until it has fulfilled Congressional direction.

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Results

Objective 3: Other observations about IRS' third plan and its systems modernization program

Observation 1: Progress Occurring on Management Weaknesses, But Important and Challenging Work Remains

- Since our September briefing and subsequent report[6] on IRS' last plan, IRS has continued to make important progress in addressing its remaining management weaknesses, and is on schedule for meeting most of its commitments for correcting these weaknesses by January 2000 (e.g., having a fully functional BSMO). However, commitments made in this last plan for addressing lack of an enterprise architecture have slipped.

[6] *Tax Systems Modernization: Results of Review of IRS' August 2000 Interim Spending Plan* (GAO-01-91, November 8, 2000).

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Results

Commitments Made in August 2000 Plan to Address Weaknesses	Completed	Progress On Schedule	Progress Made But Slippage
Mature software acquisition capabilities			
▪ Train staff in SA CMM level 2 key process areas and have all projects follow them by January 2001.		✓	
▪ Have an evaluation performed by independent assessor in September 2001 to ensure compliance with SEI's level 2 requirements.		✓	
IRS and contractor roles and responsibilities			
▪ Implement defined IRS-PRIME roles and responsibilities by December 2000.	✓		
▪ Define roles and responsibilities of other modernization support contractors vis-à-vis those of the PRIME contractor.		✓	
ELC definition and implementation			
▪ Develop/finalize parts of the ELC, including ▪ program control policies and procedures ▪ 75-80 change requests ▪ legacy system impact supplement ▪ enterprise architecture management supplement		✓	
▪ Provide training on ELC processes and procedures by January 2001.		✓	
▪ Incorporate IT investment management controls into the ELC.	✓		

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Commitments Made in August 2000 Plan to Address Weaknesses	Completed	Progress On Schedule	Progress Made But Slippage
Enterprise architecture completion and use			
▪ Complete remaining 14 (out of 23) key concepts by mid-November 2000.		✓	
▪ Submit the enterprise architecture products comprising release 1.0 for review to IRS business and other stakeholders by October 1, 2000.	✓		
▪ Have the PRIME complete review of the quality of architecture products.			✓
▪ Have MITRE complete an assessment of release 1.0 completeness and adequacy.			✓
▪ Obtain Core Business Systems Executive Systems Committee's approval of EA 1.0 in early November 2000.			✓
BSMO implementation			
▪ Develop charters for the 8 units within BSMO.		✓	
▪ Complete training on BSMO roles, responsibilities, policies, procedures by January 2001.		✓	
▪ Fill vacant positions, including hiring contractor to support BSMO quality assurance.		✓	
Portfolio investment management			
▪ Develop, analyze and prioritize project hypotheses.		✓	
▪ Determine project formation.		✓	
▪ Prioritize, sequence and revise portfolio.		✓	
▪ Create project cases for action.		✓	

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Results

- As noted in the prior table, one important and challenging task that remains, and for which commitments have slipped, is issuing the EA 1.0.

    - IRS is developing its EA in 3 releases (1.0, 1.1, and 2.0). Each release is intended to provide incrementally more architectural definition. As shown in the following table, EA 1.0 is to provide infrastructure level definition, and 1.1 is to provide application level definition, including a sequencing plan for strategic acquisition of modern business process applications.

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Results

Enterprise Architecture Being Developed in Phases

Enterprise Architecture 1.0	Enterprise Architecture 1.1	Enterprise Architecture 2.0

• Builds on and updates Blueprint 97
• Foundation for incrementally defined, incrementally delivered enterprise
• Rich in Technical Infrastructure and Applications Infrastructure (lower pyramid)
• Lean in business process applications (top of pyramid)
• Provides structural framework for future Enterprise Architecture releases
• Captures and conveys critical high-level requirements
• Business processes fit together from pre-filing to post-filing
• All systems, applications, data and interfaces derived from business processes
• Includes business processes for 2002 projects
• Subsystem descriptions from Blueprint 97 are accounted for
• IMVS input limited to custodial accounting
• High-level data warehouse strategy
• Each project scoped by business systems
• Directed by Key Concepts on location, portals, systems framework, TRM, data
	• Builds on Enterprise Architecture 1.0
	• Rich in business-specific processes
	• Mid- and Long-Term Enterprise Transition Strategy
	• Includes TAVS migration strategy transition specificity
	• Includes IMVS content not included in Enterprise Architecture 1.0
	• Complete Data Warehouse strategy
	• Key Concept updates
	  • Knowledge Management
	  • Systems Management
	  • Software Development
	  • Networks
	  • Data
	  • Business Rules Engines
	• Business processes around Knowledge Management
	• Deals with Enterprise Architecture 1.0 issues/conditionals
		• Builds on Enterprise Architecture 1.1
		• Includes IMVS migration strategy transition specificity
		• Shared Services at same level as TAVS 1.0
		• Knowledge Management components incorporated into architecture, requirements, transition strategy
		• Incorporates other vision and strategy results and updates as needed

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Results

- IRS has developed a draft of EA 1.0 and circulated it internally for comment (see appendix III for description of framework being used to develop the EA).
- IRS obtained about 950 issues (159 of which IRS reports it has resolved). Some of the remaining issues are significant.
- Once these issues are resolved, IRS still needs to have MITRE assess EA 1.0 completeness and correctness. We reviewed MITRE's planned assessment method and found it to be reasonable.
- IRS then needs to obtain modernization steering committee approval of EA 1.0.
- IRS' revised date for issuing EA 1.0 is December 18, 2000. According to IRS, EA 1.0 slippage will delay EA 1.1 and 2.0.

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Results

Area of Comment	Summary of Comments	Proposed Resolution
Security	• Lacks a comprehensive security overview. • Security needs are not fully reflected in the business process descriptions.	• Develop a security overview that incorporates key concepts and identifies security points throughout the architecture. • Add security needs to business process definitions.
Privacy	• No explicit privacy principles, constraints and assumptions. • Lacks a comprehensive privacy view.	• Clarify/add privacy principles, constraints and assumptions to enterprise architecture. • Create a key concept for privacy. • Map security functions to privacy needs. • Consider adding Enterprise Requirement(s) for privacy.
Business Processes	• Tax Administration and Vision Strategy (TAVS) and enterprise architecture use different process models. • Excludes differences among Business Operating Division business processes.	• Incorporate TAVS operating models into enterprise architecture concept of operations. • Assess need to incorporate Business Operating Division-specific tailoring. • Tailor Business Architecture work products where needed.
Data	• Lack of breadth, depth, and accuracy in conceptual data model. • Mapping of data to business processes incomplete. • Security not reflected in the conceptual data model.	• Extend conceptual data model to address scope of near-term projects. • Complete mapping of data to business processes. • Add security details to conceptual data model.
Business Systems	• Lacks complete definition of business systems. • Interface definitions are incomplete. • Mapping of systems to business processes incomplete.	• Complete descriptions of business systems assigned to near-term projects. • Complete descriptions of all business systems. • Add interface descriptions for business systems assigned to near-term projects. • Complete mapping of systems to business processes.
Enterprise Requirements	• Lacks clear traceability to architecture.	• No action planned because direct traceability not intended.
EA Consistency	• Products not consistent with each other, key concepts, and Technical Reference Model.	• Rework products to reflect Technical Reference Model structure and intent, reflect key concepts, and agree with each other.
EA Completeness	• Many work products are incomplete.	• Complete key work products to the extent necessary to support near-term projects and to resolve major issues impacting approval.
Traceability from Blueprint 97	• Elements of Blueprint 97 are not all traced to Enterprise Architecture.	• Complete accountability tracing of Blueprint 97 elements into Enterprise Architecture.

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- As shown in the following graphic, IRS' third plan calls for beginning detailed design and development (i.e., building) on selected projects in advance of planned EA version releases. It is important that IRS ensure that the relevant and important architectural definition that is planned for each version be completed and used on affected systems before IRS begins building these systems. If it does not, IRS risks building systems that are not architecturally compliant, which could sub-optimize agencywide mission performance.

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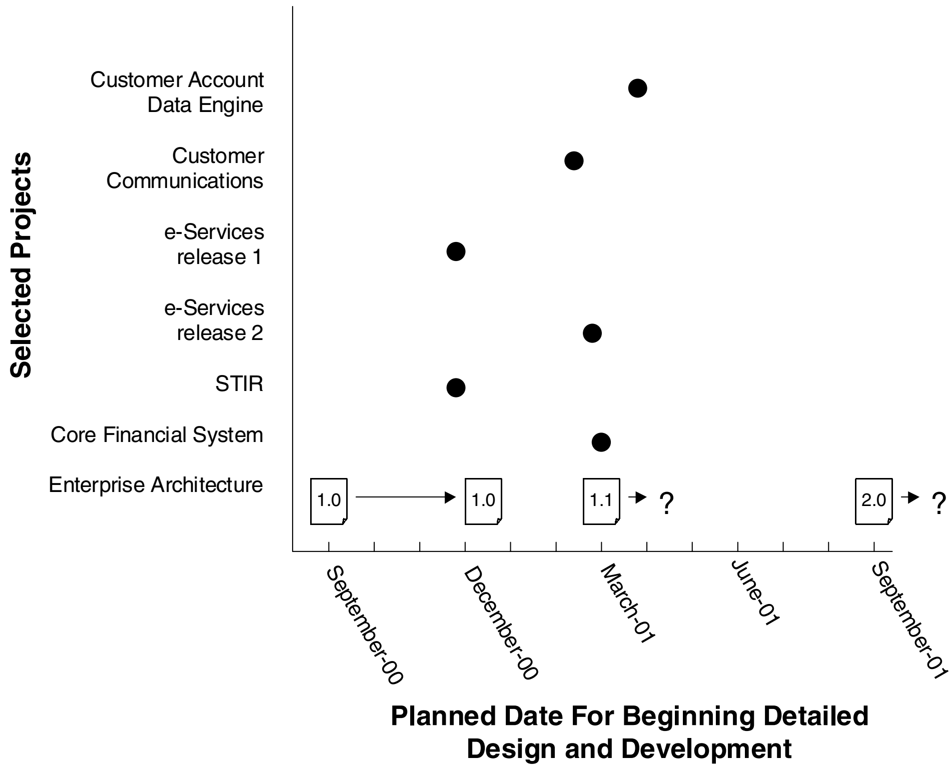

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Observation 2: Third Plan Discloses Project Cost and Schedule Changes, But Does Not Report Any Changes to Promised System Capabilities and Benefits

- Five projects have experienced cost increases and/or schedule delays against commitments made in prior plan. IRS reported such changes in its third plan.

Program/ Project Management Initiative	8/2000 Commitment Date and Funding ($000)	Revised Commitment Date and Funding ($000)	Change (%)
TAVS Milestone 1	12/31/00 $22,695	3/31/01 $28,895	+3 months $6,200 (27%)
CRM Exam Milestone 3	11/07/00 $2,426	12/18/01 $2,426	+1.5 months $0
E-Services Milestone 3	2/28/01 $5,480	2/28/01 $6,918	0 months $1,438 (26%)
Enterprise Systems Management Milestone 3	1/31/01 $5,431	2/28/01 $6,894	+1 month $1,463 (27%)
Customer Communications Milestone 3 (release 2002)	11/30/00 $3,509	2/28/01 $3,509	+3 months $0

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Results

- In our June 1999 report on IRS' first plan,[7] we recommended that IRS, in future expenditure plans, report progress against incremental project commitments.
- However, the third plan does not address whether program and project initiatives' scopes (e.g., system requirements sets, benefit expectations) have changed. Such disclosure is critical to understanding progress against incremental project commitments.

[7] *Tax Systems Modernization: Results of Review of IRS' Initial Expenditure Plan* (GAO/AIMD-99-206, June 15, 1999).

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Observation 3: Plan Is Based on Contractor Estimates That Have Not Been Validated by IRS

- The cost estimates in IRS' third plan are contractor-provided, "rough order of magnitude" estimates, and are not based on detailed work breakdown structures of tasks and deliverables.
- Consistent with IRS' recent practice established to address a similar concern we raised with IRS' second plan, IRS plans to validate these estimates as part of its task order definitization process with its PRIME and other contractors. Under this process, the contractor submits task order proposals that include costs, IRS assesses the proposals and develops independent cost estimates, and IRS negotiates a final task order cost.
- For IRS' second plan, this process resulted in some project negotiated costs being more than 10 percent above or below plan estimates. Cumulative negotiated costs were $9 million less than plan estimates (5 percent).

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Conclusions

- IRS' third plan satisfies the legislative conditions, and IRS is in the process of satisfying its appropriations subcommittees' recent direction for the CAP and STIR projects. By doing so, IRS will be better positioned to make informed decisions about when or how to move forward with these two investments.

- IRS continues to make important progress in correcting modernization management weaknesses, such as implementing the ELC, making the BSMO fully functional, and developing an EA. However, until these weaknesses are fully addressed, key modernization controls will continue to be missing, putting IRS at risk of building systems that may not perform as intended, and/or cost more and take longer to complete.

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Conclusions

- As we have consistently reported, these risks are not as severe early in projects' life cycles when they are being planned (project definition and preliminary system design), but escalate as projects are built (detailed design and development). In the case of IRS and its ELC, this point of risk escalation is ELC milestone III. Consequently, we will remain concerned about projects that proceed beyond milestone III before these weaknesses are fully addressed.

- Given that IRS' third plan calls for several projects to pass ELC milestone III within the next several months, it is important for IRS to continue to make implementation of these program management controls a top priority. In particular, completing the EA releases relevant to these projects, fully implementing its ELC, and making its BSMO fully functional, are essential.

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Conclusions

- While IRS is reporting on performance in meeting project cost and schedule commitments made in prior years, it is not disclosing whether projects' scope and expected benefit commitments have changed. Such information is critical to fully disclosing IRS modernization management performance and establishing accountability.

- The estimates in IRS' plan are contractor provided estimates that have yet to be subjected to government validation. IRS' established process for introducing such validation occurs as part of its contract task order definitization process. This process control is reasonable, but can result in project costs that are significantly different from what IRS' appropriations subcommittees are asked to approve.

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Recommendations for Executive Action

We recommend that the Commissioner of Internal Revenue:

- follow through on plans to satisfy IRS appropriations subcommittees' direction on CAP and STIR;
- expedite the completion of IRS' EA releases and implementation of other missing modernization management controls;
- do not approve and fund post-Milestone III detailed design and development activities for any system prior to completing requisite EA definition;

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Recommendations for Executive Action

- report immediately to IRS' appropriations subcommittees on any changes to commitments made in IRS' second plan concerning system requirements/capabilities to be delivered and the associated benefits to be realized, and continue to report such performance measures in future expenditure plans; and
- report to IRS' appropriations subcommittees on any variance from cost estimates in its third plan of 10 percent or more that result from definitization of contract task orders.

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Agency Comments

- In commenting on a draft of this briefing, IRS' CIO agreed with our conclusions and recommendations and stated IRS plans to:
  - satisfy the subcommittees' direction on CAP and STIR with reports on these projects to the subcommittees during November 2000.
  - complete the EA 1.0 and expedite the full implementation of modernization management controls. EA 1.0 is to be completed and approved during December 2000. All other recommended management controls will be implemented as rapidly as possible.
  - approve projects to move into detailed design (beyond milestone 3) only with the requisite EA definition. Project designs will be reviewed for EA compliance and approved by the Director of Architecture and Engineering before exiting milestone 3.
  - report in November 2000 on any changes to the requirements/capabilities/benefits of projects from the baseline of the March 7, 2000, expenditure plan, and
  - report any variance of 10 percent or more due to the definitization of task orders. These reports will be issued quarterly starting in January 2001.

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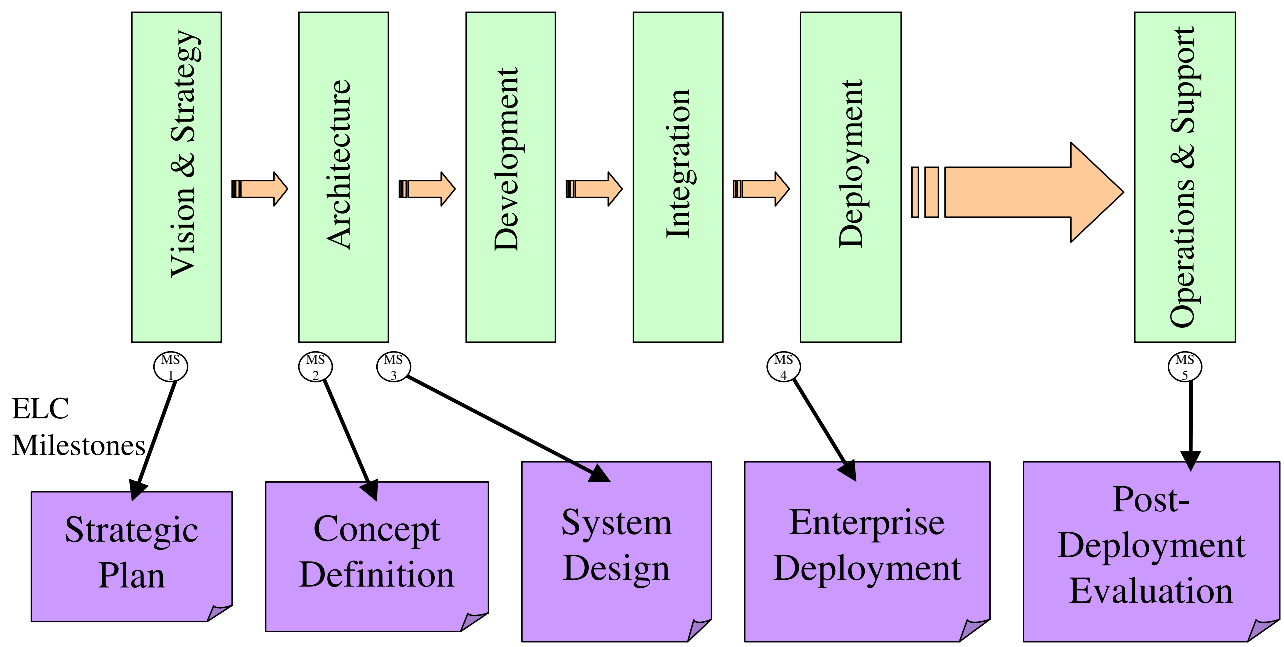
Appendix I: Enterprise Life Cycle



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Appendix II: IRS' Expenditure Plan

Business Systems Modernization - ITIA Spending Plan FY 2001 ($000)

Proposed Modernization Initiatives	*Milestone*	*Milestone Date*	*Amount Requested*
Program Level Activities			
BSMO Quality Assurance	FY	Sep-01	$1,800
PRIME Program Management Office	FY	Sep-01	$21,856
ELC Enhancements and Maintenance	FY	Sep-01	$3,686
FFRDC (MITRE)	FY	Sep-01	$18,750
Architecture Engineering Office	FY	Sep-01	$17,570
Configuration Management	FY	Sep-01	$1,908
Vision and Strategy - Tax Administration	MS1	Mar-01	$6,200
Management Reserve	FY	Sep-01	$15,000
			$86,770
Business Systems Projects			
CRM Exam (1120 Replacement) FS2001	MS4	Sep-01	$9,917
e-Services (Window A)	MS4	Oct-01	$1,746
Custodial Accounting Project / Taxpayer Account Subledger	MS4	Jan-03	$44,130
Core Financial System (CFS)	MS2	Dec-00	$2,829
	MS3	Mar-01	$620
			$59,242

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Appendix II: IRS' Expenditure Plan

Infrastructure Projects

Security and Technology Infrastructure Release (STIR)	MS4	Aug-01	$25,185
Enterprise Systems Management (ESM)	MS3	Feb-01	$6,894
	MS4	Nov-01	$9,184
Solutions Demonstration Lab (SDL)	FY	Sep-01	$1,759
Virtual Development Environment (VDE)	FY	Sep-01	$6,310
Enterprise Integration and Test Environment (EITE)	FY	Sep-01	$4,702
			$54,034

Total Business Systems Modernization Program	**$200,046**

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Appendix III: EA Work Products

Enterprise Business Direction Model View
- 01-Enterprise Business Direction Model
- 02-Enterprise Context Diagrams
- 03-Enterprise Business Concept of Operations

Location Model View
- 12-Location PCAs
- 13-Location-Type Definitions
- 14-Process Location-Type Matrix

Organization Model View
- 09-Organization Direction Model
- 10-Role Definitions
- 11-Process Role Matrix

System Engineering Model View
- 15-Systems Development PCAs
- 16-Taxonomy of Tools
- 17-Taxonomy of Enterprise Standards and Conventions
- 18-Enterprise Standards
- 19-Enterprise Conventions
- 20-Service Level PCAs
- 21-Taxonomy of Service Levels
- 22-Taxonomy of Interface Types
- 23-Reuse Strategy
- 24-Definition of Business Systems
- 25-Solution Design Patterns
- 26-Process/Systems Matrix

Applications Model View
- 32-Application PCAs
- 33-Taxonomy of Application Types
- 34-Enterprise Application Matrix
- 35-Process/ Application Matrix
- 36-Enterprise API Definitions

Data Model View
- 27-Data PCAs
- 28-Taxonomy of Data
- 29-Data Management Approach
- 30-Enterprise Conceptual Data Model
- 31-Process Data Matrix

Business Process Model View
- 04-Business Process Principles, Constraints, and Assumptions (PCAs)
- 05-Enterprise Process Hierarchy
- 06-Business Process Flows
- 07-Business Process Definitions
- 08-Process Thread Performance Models

Infrastructure Model
- 45-Infrastructure PCAs
- 46-Taxonomy of Infrastructure Elements
- 47-Infrastructure Strategy
- 48-Infrastructure Concept of Operations

Technology Model View
- 37-Technology PCAs
- 38-Taxonomy of Technology Capabilities
- 39-Technology Insertion Strategy
- 40-Process/Technology Capability Matrix

Enterprise Requirements
- 53-Taxonomy of Requirements
- 54-Requirements Statements and Traceability Linkage

Security and Privacy Model View
- 41-Security and Privacy PCAs
- 42-Taxonomy of Security and Privacy Functions
- 43-Verification and Compliance
- 44-Security Function Matrix

Enterprise Transition Strategy
- 55-System Assignments to Projects
- 56-Interface Assignments to Projects
- 57-Current Production Environment Description
- 58-Near-Term Sequencing and Release Plan (1 - 3 years)
- 59-Medium-Term Sequencing and Release Plan (4 - 6 years)
- 60-Long-Term Sequencing and Release Plan (7+ years)

Management and Other Work Products
- 49-Completeness and Adequacy Assessment Approach
- 50-Completeness and Adequacy Assessment
- 51-Taxonomy of Baseline Content
- 52-Enterprise Architecture Risk Management Plan

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Comments From the Internal Revenue Service

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

COMMISSIONER

December 21, 2000

Randolph C. Hite
Director, Information Technology Issues
U. S. General Accounting Office
441 G Street NW – Room 4T21
Washington, D.C. 20548

Dear Mr. Hite:

Thank you for the opportunity to provide our comments to your draft report of January 2000: *Tax Systems Modernization, Results of Review of IRS' Third Expenditure Plan.* We agree with your findings and we will address your recommendations fully.

Your report outlined five recommendations to IRS to ensure that we respond to congressional direction and meet modernization weaknesses. Please allow me to comment on each.

Recommendations

1) Follow through on plans to satisfy IRS appropriations subcommittees' direction on CAP and STIR.

The Custodial Accounting Project (CAP) documentation, including the business case was sent to the Congress on November 14, 2000. A letter addressing the Security Technology Infrastructure Release (STIR) was sent to the Congress on November 20, 2000.

2) Expedite the completion of IRS' Enterprise Architecture releases and implementation of other missing modernization management controls.

We agree with your recommendation and plan to release IRS Business Systems Enterprise Architecture, version 1.0, in the next few weeks. We anticipate that there will be continuing enhancements and therefore new versions as we move to a target of an annual release within the next year. We are also continuing the ongoing process of fully implementing the IRS Enterprise Life Cycle (ELC) as it matures with continued use during life cycle. We are also ensuring that management processes of the Business Systems Modernization Office (BSMO) mature to a Capability Maturity Model (CMM) level 2.

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3) Not approve and fund detailed design and development activities for any system before the requisite Enterprise Architecture definition is completed.

I have required that any project requesting milestone 3 exit approval from the Core Business Systems Executive Steering Committee must first receive a certification from the Chief Information Officer that the project complies with the enterprise architecture.

4) Report immediately to IRS' Appropriations Subcommittees on any changes to commitments made in IRS' second plan concerning system requirements/ capabilities to be delivered and the associated benefits to be realized, and continue to report such performance measures in future expenditure plans.

The IRS will report in the next expenditure plan, and all subsequent plans, the impact of the cost increases and schedule delays on the scope of the project and related projects.

5) Report to IRS' Appropriations Subcommittees on any variance from cost estimates in its third plan of 10 percent or more that result from definitization of contract task orders.

The Subcommittees have asked that IRS propose threshold levels be applied for reporting purposes. We anticipate that we will employ the 10 percent or more threshold. Any variance in excess of the threshold will be subject to the prior approval of the Core Business Systems Executive Steering Committee. The IRS will report on any variances to the Spending Plan, including what we have committed and what we are planning to commit.

We thank you for your recommendations and, once again, I extend my appreciation for the valuable guidance that we have received from your staff.

Sincerely,

Charles Rossotti

Charles O. Rossotti

GAO Contacts and Staff Acknowledgments

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Acknowledgments

In addition to those named above, other key contributors were Bernard Anderson, Nancy DeFrancesco, Timothy Hopkins, Larry Korb, Sabine Paul, Jay Pelkofer, Karlin Richardson, Sherrie Russ, Tuyet Quan Thai, Aaron Thorne, and Teresa Tucker.

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