



*The Modernized e-File Project Can Improve  
Its Management of Requirements*

**July 9, 2007**

**Reference Number: 2007-20-099**

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

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TREASURY INSPECTOR GENERAL  
FOR TAX ADMINISTRATION

DEPARTMENT OF THE TREASURY  
WASHINGTON, D.C. 20220

July 9, 2007

**MEMORANDUM FOR CHIEF INFORMATION OFFICER**

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

**SUBJECT:** Final Audit Report – The Modernized e-File Project Can Improve Its  
Management of Requirements (Audit # 200720002)

This report presents the results of our review of the Modernized e-File Project (hereafter referred to as the Project).<sup>1</sup> The overall objectives of this review were to assess the accuracy and completeness of data processed by the Modernized e-File system and to review project development practices to ensure the Project is providing the intended benefits to the Internal Revenue Service (IRS) and taxpayers. This review was part of our Fiscal Year 2006 audit plan for reviews of the IRS' Business Systems Modernization efforts.

*Impact on the Taxpayer*

The Project's goal is to replace the IRS' current tax return filing technology with a modernized, Internet-based electronic filing platform. The Project's management of requirements development and testing activities can be improved to assure the requirements expected and approved to be deployed are the requirements that are actually deployed. Providing the planned requirements will help to streamline filing processes and reduce the costs associated with the paper-based IRS.

*Synopsis*

The Modernized Tax Return Database is the legal repository for original electronically filed returns received by the IRS through the Modernized e-File system. This repository allows for

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<sup>1</sup> See Appendix VIII for a Glossary of Terms.



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more efficient processing and analysis and ensures the availability of data for multiple inquiries about tax return information by the IRS.

We analyzed tax returns electronically filed using the Modernized e-File system from July 1 through September 31, 2006, and found the information received through the system and stored in the Modernized Tax Return Database properly matched the information stored in the IRS Business Master File for 98 percent of the 128,290 returns filed. Approximately 2 percent (2,724) of the returns filed during this period showed different tax return information on the Business Master File. We determined the return information had been changed by other IRS processing functions (e.g., the Error Resolution System, the Generalized Unpostable Framework). Changes are made by these functions when they determine the tax returns contain errors and omissions of required information, such as taxpayer filing status or mathematical calculations.

In addition, the Modernized e-File system experienced problems in its ability to handle the number of returns filed during the March 2006 peak tax return filing period. Subsequently, the Project team developed lessons learned to address these problems and to prevent similar occurrences in the September 2006 peak filing period and future filing periods. Our review of the status and actions taken on 51 of the lessons learned found that adequate actions were planned or taken to address these items.

However, additional actions are needed to adequately complete requirements traceability for the Project. The Enterprise Life Cycle<sup>2</sup> directs project teams to verify that the contractor is maintaining the traceability of project requirements for applications developed throughout the project life cycle, including ensuring each requirement is mapped to its higher level requirement. The Software Engineering Institute's Capability Maturity Model Integration provides that a project should maintain bidirectional traceability between source requirements and all product requirements.

In a previous report,<sup>3</sup> we recommended requirements be traced between the System Requirements Report and the requirements traceability verification matrices to ensure project teams follow the Enterprise Life Cycle provisions for managing requirements. The IRS' corrective action provided that tracing of the requirements would be completed starting with Release 4 of the Project. In March 2006, the Chief Information Officer closed the corrective action by adding columns to the System Requirements Report to link the Report's requirements to the requirements traceability verification matrices for Release 4.

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<sup>2</sup> Appendix V presents an overview of the Enterprise Life Cycle.

<sup>3</sup> *Controls Need to Be Strengthened to Ensure the Modernized e-File Project Meets Its Expectations* (Reference Number 2005-20-103, dated September 2005).



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During this review, the Project team took steps to improve bidirectional traceability by performing further requirements tracing between the System Requirements Report and the Release 4 requirements traceability verification matrices. However, the Release 4 requirements traceability verification matrices did not provide complete bidirectional traceability.

***A System Requirements Report is the primary reference for all project requirements needed to complete design and development of a business system.***

### *Recommendations*

To complete the previous corrective action, the Chief Information Officer should ensure the Modernized e-File System Requirements Report and Release 4 requirements traceability verification matrices are updated to include traceability to valid requirement identification numbers. Further, the Chief Information Officer should ensure the detailed guidance currently being developed by the IRS Business Rules and Requirements Management office includes specifics about how projects should maintain and report bidirectional traceability, to ensure traceability is complete and consistent for all projects.

### *Response*

The Chief Information Officer agreed with the recommendations and plans for the IRS to complete the traceability of the requirements for Releases 4 and 5 using the System Requirements Report manual process that is currently in place. Full bidirectional traceability will not be possible until the Project is able to consolidate all requirements, change requests, work requests, test cases, and defects into one related system. For Release 6, the Project team is working with the Business Rules and Requirements Management office to implement a full bidirectional traceability model. Further, the Business Rules and Requirements Management office will review its guidance to ensure proper information is included to help projects understand how to perform bidirectional traceability. Management's complete response to the draft report is included as Appendix IX.

### *Office of Audit Comment*

As stated above and in our September 2005 report, bidirectional traceability is an Enterprise Life Cycle requirement. We identified noncompliance with this requirement in the development of Release 3.2, and the IRS' planned corrective action was to implement this control for Release 4 and subsequent releases. The IRS now indicates that full bidirectional traceability will not be possible until the Project is able to consolidate all requirements, change requests, work requests, test cases, and defects into one related system. During our review, we were able to perform bidirectional traceability through the manual processes used by the Project team. Delaying



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implementation of bidirectional traceability until 2009 increases the risk that requirements may not be properly developed, tested, and deployed. Therefore, we continue to believe the IRS could implement bidirectional traceability using existing manual processes.

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



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*Abbreviations*

IRS	Internal Revenue Service
MeF; Project	Modernized e-File Project



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## *Background*

The Modernized e-File Project's (hereafter referred to as the Project)<sup>1</sup> goal is to replace the Internal Revenue Service's (IRS) current tax return filing technology with a modernized, Internet-based electronic filing platform. Providing this capability for filing 330 tax forms through the Modernized e-File system supports and facilitates the IRS' commitment to achieve the IRS Restructuring and Reform Act of 1998<sup>2</sup> goal of receiving at least 80 percent of all tax returns in electronic form. This Project also serves to streamline filing processes and reduce the costs associated with the paper-based IRS.

***Development of the Modernized e-File system aims to increase electronic tax return filing through a system that is efficient and easy to access, use, and maintain.***

The IRS has completed a total of five Modernized e-File system releases and subreleases. These releases developed the infrastructure, application base, and support for forms filed by corporations and exempt organizations. In February 2004, the IRS deployed the initial Modernized e-File system release, which provides an option for Internet-based filing of the U.S. Corporation Income Tax Return (Form 1120), the U.S. Income Tax Return for an S Corporation (Form 1120S), and the Return of Organization Exempt From Income Tax (Form 990).

Subsequently, the Modernized e-File system added forms associated with corporations, the public disclosure capabilities required by the Tax Exempt and Government Entities Division, and the ability to file extensions for Forms 1120 and 1120S. The Modernized e-File system also developed the Federal/State Single Point Filing System platform and the Federal/State components for Forms 1120 and 990. Release 4 went into production in January 2007 and added the U.S. Return of Partnership Income (Form 1065) and the U.S. Return of Income for Electing Large Partnerships (Form 1065-B) as well as Federal/State Single Point Filing System access for partnership returns.

This review was performed at the Modernization and Information Technology Services organization's facilities in New Carrollton, Maryland, and in the Laguna Niguel, California, office of the Treasury Inspector General for Tax Administration during the period October 2006 through March 2007. The audit was conducted in accordance with *Government Auditing Standards*. Detailed information on our audit objectives, scope, and methodology is presented in Appendix I. Major contributors to the report are listed in Appendix II.

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<sup>1</sup> See Appendix VIII for a Glossary of Terms.

<sup>2</sup> Pub. L. No. 105-206, 112 Stat. 685 (codified as amended in scattered sections of 2 U.S.C., 5 U.S.C. app., 16 U.S.C., 19 U.S.C., 22 U.S.C., 23 U.S.C., 26 U.S.C., 31 U.S.C., 38 U.S.C., and 49 U.S.C.).



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## *Results of Review*

### ***The Modernized e-File System Provides Appropriate Tax Return Information for the Internal Revenue Service's Processing Operations***

The Modernized Tax Return Database is the legal repository for original electronically filed returns received by the IRS through the Modernized e-File system. This repository allows for more efficient processing and analysis and ensures the availability of data for multiple inquiries about tax return information by the IRS.

***The Modernized e-File system supplies tax return information to IRS systems, such as the Business Master File, to process taxpayer accounts.***

We analyzed tax returns electronically filed using the Modernized e-File system from July 1 through September 31, 2006, and found the information received through the system and stored in the Modernized Tax Return Database properly matched the information stored in the IRS Business Master File for 98 percent of the 128,290 returns filed. Approximately 2 percent (2,724) of the returns filed during this period showed different tax return information on the Business Master File. Our review of a sample of 113 of the 2,724 tax returns with differences showed the return information had been changed by other IRS processing functions (e.g., the Error Resolution System, the Generalized Unpostable Framework). Changes are made by these functions when they determine the tax returns contain errors and omissions of required information, such as taxpayer filing status or mathematical calculations. We provided this information to the Treasury Inspector General for Tax Administration Small Business and Corporate Programs audit staff for use in future submission processing audits.

In addition, the Modernized e-File system experienced problems in its ability to handle the number of returns filed during the March 2006 peak tax return filing period. Subsequently, the Project team developed 88 lessons learned to address these problems and to prevent similar occurrences in the September 2006 peak filing period and future filing periods. Our review of the status and actions taken on the lessons learned as documented in the "Modernized e-File March 2006 Peak Lessons Learned" spreadsheet showed the Project team contracted for reviews of the application programming for 28 of the lessons learned; the team plans to implement the recommendations from these reviews by July 2008. Our review of 23 other lessons learned, for which the Project team initially planned to implement corrective actions by the end of January 2007, found that adequate actions were planned or taken to address these items. We did not review the remaining 37 lessons learned because planned corrective actions had not yet been established or were scheduled for implementation in future Modernized e-File system releases.



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The IRS advised us the actions taken from the March 2006 lessons learned have helped in the deployment of subsequent Modernized e-File system releases.

***Additional Actions Should Be Taken to Adequately Complete  
Requirements Traceability for the Project***

A System Requirements Report documents a feasible, quantified, verifiable set of requirements that define and scope the business system being developed by a project. These requirements form the basis for the business system design, development, integration, and deployment.

***A System Requirements Report  
is the primary reference for all  
project requirements needed to  
complete design and  
development of a business  
system.***

The requirements traceability verification matrix captures all business system requirements and their bidirectional traceability. Also, it provides the project team with a status of how each requirement is being satisfied as it gets designed and implemented, as well as how the test components are developed, to verify the successful operation of each requirement.

The Software Engineering Institute's Capability Maturity Model Integration provides that a project should maintain bidirectional traceability between source requirements and all product requirements. The Enterprise Life Cycle<sup>3</sup> directs project teams to verify that the contractor is maintaining the traceability of project requirements for applications developed throughout the project life cycle, including ensuring each requirement is mapped to its higher level requirement.

In a previous report,<sup>4</sup> we recommended requirements be traced between the System Requirements Report and the requirements traceability verification matrices to ensure project teams follow the Enterprise Life Cycle provisions for managing requirements. The IRS' corrective action provided that tracing of the requirements would be completed starting with Release 4 of the Project. In March 2006, the Chief Information Officer closed the corrective action by adding columns to the System Requirements Report form to link the Report's requirements to the requirements traceability verification matrices for Release 4.

During this review, we determined the additional columns in the System Requirements Report and requirements traceability verification matrices did not provide complete bidirectional traceability because the requirements were not always properly traced. On November 22, 2006, we issued a memorandum<sup>5</sup> to the Chief Information Officer because the IRS incorrectly reported

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<sup>3</sup> Appendix V presents an overview of the Enterprise Life Cycle.

<sup>4</sup> *Controls Need to Be Strengthened to Ensure the Modernized e-File Project Meets Its Expectations* (Reference Number 2005-20-103, dated September 2005).

<sup>5</sup> See Appendix VI.



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it had completed the corrective action for tracing the Release 4 requirements. On December 4, 2006, the Project team responded that it concurred with the memorandum.<sup>6</sup>

In January and February 2007, the Project team provided updated versions of these documents. The Project team took steps to improve the bidirectional traceability of requirements by performing further requirements tracing between the System Requirements Report and the Release 4 requirements traceability verification matrices. However, these updated versions still did not provide complete bidirectional traceability.

This traceability of requirements should be completed prior to the beginning of testing. Complete tracing of the requirements provides some assurance that critical capabilities and requirements will be tested before deployment. System Integration and Testing for Release 4 began in July 2006; however, based on our review of the requirements documents, bidirectional traceability was still not completed as of February 2007. Appendix IV presents an analysis of Release 4 requirements not included in testing documentation.

When we discussed the absence of traceability with Project team members, they advised us the requirements were not adequately traced because:

- The requirements were tested during development of a previous release.
- The requirements were deferred from Release 3.2, so they were not part of the Release 4 set of requirements needing testing.

The Project team did not complete bidirectional traceability of the Release 4 requirements because they did not have adequate guidance about how to complete the tracing. Without complete bidirectional traceability, it is difficult for the IRS to assess the adequacy of requirements development and testing activities. In addition, there is no assurance the requirements expected and approved to be deployed are the requirements that are actually deployed.

### ***Recommendations***

***Recommendation 1:*** To complete the previous corrective action, the Chief Information Officer should ensure the Modernized e-File System Requirements Report and Release 4 requirements traceability verification matrices are updated to include traceability to valid requirement numbers, to meet the Enterprise Life Cycle provisions for managing requirements. This control will provide assurance about the development of all approved requirements.

***Management's Response:*** The Chief Information Officer agreed with this recommendation and plans for the IRS to complete the traceability of the requirements for Releases 4 and 5 using the System Requirements Report manual process that is

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<sup>6</sup> See Appendix VII.



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currently in place. Full bidirectional traceability will not be possible until the Project is able to consolidate all requirements, change requests, work requests, test cases, and defects into one related system. For Release 6, the Project team is working with the Business Rules and Requirements Management office to implement a full bidirectional traceability model. The Project's use of the Business Rules and Requirements Management office is consistent with the Government Accountability Office's 2006 recommendations related to strengthening requirements standards.

**Office of Audit Comment:** As stated above and in our September 2005 report, bidirectional traceability is an Enterprise Life Cycle requirement. We identified noncompliance with this requirement in the development of Release 3.2, and the IRS' planned corrective action was to implement this control for Release 4 and subsequent releases. The IRS now indicates that full bidirectional traceability will not be possible until the Project is able to consolidate all requirements, change requests, work requests, test cases, and defects into one related system. During our review, we were able to perform bidirectional traceability through the manual processes used by the Project team. Delaying implementation of bidirectional traceability until 2009 increases the risk that requirements may not be properly developed, tested, and deployed. Therefore, we continue to believe the IRS could implement bidirectional traceability using existing manual processes.

**Recommendation 2:** The Chief Information Officer should ensure the detailed guidance<sup>7</sup> currently being developed by the IRS Business Rules and Requirements Management office includes specifics about how projects should maintain and report bidirectional traceability, to ensure traceability is complete and consistent for all projects.

**Management's Response:** The Chief Information Officer agreed with this recommendation and plans for the Business Rules and Requirements Management office to review the guidance developed as a part of Highest Priority Initiative-55 and in response to the Government Accountability Office's audit to ensure proper information is included to help projects understand how to perform bidirectional traceability. The Business Rules and Requirements Management office will document its findings from this review.

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<sup>7</sup> Applications Development/Enterprise Services organizations' Highest Priority Initiative-55, *Implement Best Practices for Requirements Development and Management*, dated March 7, 2007.



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## Appendix I

### *Detailed Objectives, Scope, and Methodology*

The overall objectives of this review were to assess the accuracy and completeness of data processed by the Modernized e-File system and to review project development practices to ensure the Modernized e-File Project (hereafter referred to as the Project)<sup>1</sup> is providing the intended benefits to the IRS and taxpayers. This review was part of our Fiscal Year 2006 audit plan for reviews of the IRS' Business Systems Modernization efforts. To accomplish these objectives, we:

- I. Determined whether the information received by the Modernized e-File system Modernized Tax Return Database was properly reflected in the tax return information in the IRS Business Master File.
  - A. Compared the tax return information from the electronically filed tax returns received by the system during the period July 1 through September 30, 2006, and maintained in the Modernized Tax Return Database to the return data posted to the Business Master File.
    1. Obtained information for 128,290 tax returns electronically filed using the Modernized e-File system and identified 2,724 tax returns with differences.
    2. Using a random interval selection process, selected from the 2,724 returns a sample of 113 corporate and tax-exempt electronically filed returns and analyzed the status of the return information as of March 27, 2007. We used random sampling to ensure each account had an equal chance of being selected, which enabled us to obtain sufficient evidence to support our results.
  - B. Interviewed staff from the Project, the Electronic Tax Administration office, and the Tax Exempt and Government Entities Division to determine why there were differences in data posted to the Modernized Tax Return Database and the information recorded in the Business Master File.
- II. Determined whether Project management documents have been updated to provide complete requirements traceability (i.e., tracing of a source requirement to its lower level requirements and from the lower level requirements to their source).
  - A. Reviewed the Modernized e-File Release 4 System Integration and Test Plan requirements traceability verification matrices to determine whether they provided

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<sup>1</sup> See Appendix VIII for a Glossary of Terms.



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- traceability from the test cases to the low-level requirements and to the high-level requirements in the System Requirements Report.
- B. Determined how many Modernized e-File Release 4 low- and high-level requirements were not adequately traced in the requirements documentation.
- III. Determined the status of the lessons learned issues that resulted from the problems identified during the March 2006 peak processing period.
- A. Identified the status of the 88 lessons learned listed in the “Modernized e-File March 2006 Peak Lessons Learned” spreadsheet.
    - 1. Reviewed actions taken concerning the 28 lessons learned for which the Project team contracted for reviews of the application programming.
    - 2. Reviewed actions taken concerning the 23 lessons learned that the Project team initially planned to implement by the end of January 2007.
  - B. Reviewed documentation to support the closure of corrective actions for the lessons learned. We did not review the remaining 37 of 88 lessons learned because planned corrective actions had not yet been established or were scheduled for implementation in future Modernized e-File system releases.

**Validity and reliability of data from computer-based systems**

We obtained corporate and tax-exempt organization tax return data processed by the Modernized e-File system and stored on the Modernized Tax Return Database. We compared these data to information processed and stored in the Business Master File. We used the tax return identification number, called the document locator number, as the control to validate the accuracy of the matching of the tax return information stored on the Modernized Tax Return Database and the Business Master File. Our reviews found the data were sufficiently reliable to perform our audit analyses.



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**Appendix II**

*Major Contributors to This Report*

Margaret E. Begg, Assistant Inspector General for Audit (Information Systems Programs)  
Gary V. Hinkle, Director  
Edward A. Neuwirth, Audit Manager  
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Arlene Feskanich, Senior Information Technology Specialist



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**Appendix III**

*Report Distribution List*

Acting Commissioner C  
Office of the Commissioner – Attn: Chief of Staff C  
Deputy Commissioner for Operations Support OS  
Associate Chief Information Officer, Applications Development OS:CIO:AD  
Associate Chief Information Officer, Enterprise Services OS:CIO:ES  
Director, Stakeholder Management OS:CIO:SM  
Deputy Associate Chief Information Officer, Applications Development OS:CIO:AD  
Deputy Associate Chief Information Officer, Business Integration OS:CIO:ES:BI  
Deputy Associate Chief Information Officer, Systems Integration OS:CIO:ES:SI  
Director, Test, Assurance, and Documentation OS:CIO:AD:TAD  
Chief Counsel CC  
National Taxpayer Advocate TA  
Director, Office of Legislative Affairs CL:LA  
Director, Office of Program Evaluation and Risk Analysis RAS:O  
Office of Internal Control OS:CFO:CPIC:IC  
Audit Liaisons:  
    Associate Chief Information Officer, Applications Development OS:CIO:AD  
    Director, Program Oversight OS:CIO:SM:PO



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**Appendix IV**

*Modernized e-File System Release 4 Requirements  
Not Included in Testing Documentation*

Table 1 provides the Modernized e-File System Requirements Report Release 4 high-level requirements not included in the requirements traceability verification matrices used for Release 4 testing activities.

***Table 1: Modernized e-File System Requirements Report High-Level Release 4 Requirements Not Included in the Requirements Traceability Verification Matrices***

	<b>System Requirements Report Requirement Number</b>	<b>Requirement Text</b>	<b>Test Case Numbers Provided by the Modernized e-File Project Team</b>
1.	MeFB4.12	Browse all Partner's Share of Income, Deductions, Credits, etc. (Schedule K-1) associated with a U.S. Return of Partnership Income (Form 1065) or U.S. Return of Income for Electing Large Partnerships (Form 1065-B) when the number of Schedules K-1 exceeds the threshold available for display.	UC30_MeF_2006
2.	MeFB4.13	While in browse mode, provide functionality of a next and previous button to view all Schedules K-1.	UC30_MeF_2006
3.	MeFB4.3.1	The Modernized e-File System shall accept Forms 1065 and 1065-B and all associated forms and schedules from external stakeholders.	UC1_MTRDB_2006
4.	MeFB4.3.14	The Modernized e-File system shall provide to the authorized return, request, or display user all functionality for Forms 1065 and 1065-B that are available for the U.S. Corporation Income Tax Return (Form 1120) and U.S. Income Tax Return for an S Corporation (Form 1120S).	UC33_MTRDB_2006, UC34_MTRDB_2006, UC30_MeF_2006
5.	MeFB4.3.18	The Modernized e-File system shall provide Forms 1065 and 1065-B and all associated forms and schedules with the same functionality for Interface, Data Reliability, Security, Maintainability, Capacity, Availability, Performance, and Testability currently used by Forms 1120 and 1120S.	UC8_MeF_2006, UC12_MeF_2006
6.	MeFB4.3.4	The Modernized e-File system shall create and return to the transmitter Acknowledgment Files that contain records with the status (acceptance or rejection) of transmissions and returns for Forms 1065 and 1065-B.	UC2_MTRDB_2006



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	<b>System Requirements Report Requirement Number</b>	<b>Requirement Text</b>	<b>Test Case Numbers Provided by the Modernized e-File Project Team</b>
7.	MeFB4.3.5	The Modernized e-File system shall provide validation against incoming external interfaces.	UC3_MTRDB_2006
8.	MeFB4.3.7	The Modernized e-File system shall generate codes for all accepted Forms 1065 and 1065-B based on rules provided.	UC6_MTRDB_2006
9.	MeFB4.3.8	The Modernized e-File system shall output data on all accepted Forms 1065 and 1065-B for Generalized Mainline Framework, end-of-day, and Electronic Federal Tax Payment System processing.	UC8_MeF_2006, UC12_MeF_2006

*Source: Modernized e-File Release 4 System Requirements Report, Requirements Traceability Verification Matrices, and responses provided by the Project team. MTRDB = Modernized Tax Return Database.*



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## **Appendix V**

### *Enterprise Life Cycle Overview*

The Enterprise Life Cycle is the IRS' standard approach to business change and information systems initiatives. It is a collection of program and project management best practices designed to manage business change in a successful and repeatable manner. The Enterprise Life Cycle addresses large and small projects developed internally and by contractors.

The Enterprise Life Cycle includes such requirements as:

- Development of and conformance to an enterprise architecture.
- Improving business processes prior to automation.
- Use of prototyping and commercial software, where possible.
- Obtaining early benefit by implementing solutions in multiple releases.
- Financial justification, budgeting, and reporting of project status.

In addition, the Enterprise Life Cycle improves the IRS' ability to manage changes to the enterprise; estimate the cost of changes; and engineer, develop, and maintain systems effectively. Figure 1 provides an overview of the layers, paths, phases, and milestones (shown as "MS" in Figure 1) within the Enterprise Life Cycle Framework.



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Figure 1: Enterprise Life Cycle Framework

Management Layer	Acquisition Management									
	Program Management									
	Implementation Project Management									
Governance Layer	<div style="display: flex; justify-content: space-around; align-items: center;"> <span>MS0</span> <span>MS1</span> <span>MS2</span> <span>MS3</span> <span>MS4A</span> <span>MS4B</span> <span>MS5</span> </div>									
Solution Life Cycle Layer	Large Custom Path	Vision and Strategy / Enterprise Architecture Phase	Project Initiation Phase	Domain Architecture Phase	Preliminary Design Phase	Detailed Design Phase	System Development Phase	System Deployment Phase	Operations and Maintenance Phase	
	Small Custom Path									
	Commercial-Off-the-Shelf Path									
	Joint Application Development / Rapid Application Development Path									
	Iterative Custom Path									
Solution Layer	Various Work Products and Reviews	Various Work Products and Reviews	Various Work Products and Reviews	Various Work Products and Reviews	Various Work Products and Reviews	Various Work Products and Reviews	Various Work Products and Reviews	Various Work Products and Reviews		
Methodology Layer	Developer's Business Change or System Change Methodology									
Specialty Areas Layer	Enterprise Integration, Test, and Evaluation									
	Business Rules Harvesting and Management									
	Transition Management									
	Enterprise Architecture									
	Capital Planning and Investment Control									
	Security and Privacy									
Requirements Development and Management										

Source: Graphical representation of the Enterprise Life Cycle Framework modified from the Enterprise Life Cycle Guide.

## Enterprise Life Cycle Layers

The Enterprise Life Cycle is a framework for organizing and using IRS directives, processes, procedures, templates, and standards to accomplish business change. It is organized as a set of six interacting layers.

- The **Management Layer** specifies how to plan and control business change programs, projects, acquisitions, and solutions throughout the Enterprise Life Cycle.
- The **Governance Layer** specifies additional controls imposed from outside the project or program.
- The **Solution Life Cycle Layer** specifies what should be done but not how to do it.
- The **Solution Layer** manages the solution as it is produced, including providing standards for consistent solution specification and formal review of solution content. This Layer provides control over work products that may be produced by multiple internal and external developers using differing methodologies.



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- The **Methodology Layer** details how to do the work and specifies a unique set of work products to be produced. Specific methodologies are not part of the Enterprise Life Cycle Framework.
- The **Specialty Areas Layer** provides additional guidance for areas of particular importance within the IRS. These areas include Enterprise Integration, Test, and Evaluation; Business Rules Harvesting and Management; Transition Management; Enterprise Architecture; Capital Planning and Investment Control; Security and Privacy; Requirements Development and Management.

### ***Enterprise Life Cycle Paths***

A path specifies a unique “philosophy” or orientation for performing the work. Although the Enterprise Life Cycle specifies a standard for the work required to produce and operate business change solutions, there are multiple ways to approach and accomplish the required work. Paths are like alternate roads, each of which crosses different terrain, but all of which lead to the same destination. The Enterprise Life Cycle provides five distinct paths or approaches to developing systems:

- The **Large Custom Path** is for large projects.
- The **Small Custom Path** is for small projects.
- The **Commercial-Off-the-Shelf Path** is a commercial software-based approach.
- The **Joint Application Development/Rapid Application Development Path** is a highly accelerated, prototyping-based approach for very small, standalone solutions or solution components.
- The **Iterative Custom Path** is a hybrid approach that combines elements of the other approaches.

### ***Enterprise Life Cycle Phases and Milestones***

A phase is a broad segment of work encompassing activities of similar scope, nature, and detail and providing a natural breakpoint in the life cycle. Each phase begins with a kickoff meeting and ends with an executive management decision point (called a milestone) at which IRS executives make “go/no-go” decisions for continuation of a project. Development project funding decisions are often associated with milestones.



*The Modernized e-File Project Can Improve Its Management of Requirements*

**Figure 2: Enterprise Life Cycle Phases and Milestones**

Phase	General Nature of Work	Concluding Milestone
Vision and Strategy/ Enterprise Architecture Phase	High-level direction setting. This is the only phase for enterprise planning projects.	0
Project Initiation Phase	Startup of development projects.	1
Domain Architecture Phase	Specification of the operating concept, requirements, and structure of the solution.	2
Preliminary Design Phase	Preliminary design of all solution components.	3
Detailed Design Phase	Detailed design of solution components.	4A
System Development Phase	Coding, integration, testing, and certification of solutions.	4B
System Deployment Phase	Expanding availability of the solution to all target users. This is usually the last phase for development projects.	5
Operations and Maintenance Phase	Ongoing management of operational systems.	System Retirement

Source: *The Enterprise Life Cycle Guide*.



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**Appendix VI**

*Memorandum #1: Additional Actions Should Be  
Taken to Adequately Complete Requirements  
Traceability for the Modernized e-File Project*



INSPECTOR GENERAL  
for TAX  
ADMINISTRATION

DEPARTMENT OF THE TREASURY  
WASHINGTON, D.C. 20220

November 22, 2006

Response Date:  
December 1, 2006

MEMORANDUM FOR CHIEF INFORMATION OFFICER

FROM:   
Margaret E. Begg  
Assistant Inspector General for Audit (Information  
Systems Programs)

SUBJECT: Additional Actions Should Be Taken to Adequately  
Complete Requirements Traceability for the Modernized  
e-File Project (Audit #200720002)

The purpose of this memorandum is to provide the results of our evaluation on the adequacy of the Modernized e-File (MeF) Project's Release 4 requirements traceability. In the Treasury Inspector General for Tax Administration report, *Controls Need to Be Strengthened to Ensure the Modernized e-File Project Meets Its Expectations* (Reference Number 2005-20-103, dated September 2005), we recommended that requirements be traced between the System Requirements Report and the requirements traceability verification matrices. The corrective action provided that the tracing of the requirements would be completed starting with MeF Release 4.

The System Requirements Report documents a feasible, quantified, verifiable set of requirements that define and scope the business system being developed by the project. These requirements form the basis for the business system design, development, integration, and deployment. The project System Requirements Report is the primary reference for all project requirements needed to complete design and development of the business system.

The Enterprise Life Cycle directs project teams to verify the project requirements have been baselined, are accounted for, and are consistent among requirement source databases and documents. Further, the Enterprise Life Cycle directs project teams to verify the contractor is maintaining the traceability of project requirements for applications developed throughout the project life cycle.

On March 1, 2006, the Internal Revenue Service reported it had completed the corrective action for tracing the MeF Release 4 requirements. The closure narrative reported that columns were added to the System Requirements Report and requirement traceability verification matrices to link the requirements between the documents for Release 4.



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On October 6, 2006, we received the MeF Release 4 System Integration and Test Plan requirement traceability verification matrices which document the specific test cases and test results for each requirement. The requirement traceability verification matrices included the System Requirements Report column. However, the Infrastructure Shared Services Requirement Traceability Verification Matrix did not include any entry in this column.

We compared the System Requirements Report with the System Integration and Testing plan's requirement traceability verification matrices to determine the completeness of the requirement traceability. Based on our comparison, we conclude that the corrective action was not adequately completed because 41 percent of the requirements in the System Requirements Report are not adequately traced for testing as shown below:

- 5 percent (17 of 375) of the requirements in the System Requirements Report are not traced to the requirement traceability verification matrices.
- 36 percent (134 of 375) of the requirements in the System Requirements Report are traced to requirements that are not included in the requirement traceability verification matrices.

In addition, 50 of the 375 requirements were deferred from MeF Release 3.2 to be completed in Release 4. Of these 50 requirements, 72 percent (36 of 50) are not traced to requirements in the requirement traceability verification matrices and, therefore, will not be tested.

Further, 33 percent (115 of 344) of the requirements in the requirement traceability verification matrices are not included in the System Requirements Report. Without adequate tracing of the requirements in the requirement traceability verification matrices, the MeF Project team may be developing and testing requirements that were not approved. If this occurs, the Internal Revenue Service may be paying for requirements that are not included in the approved System Requirements Report.

The MeF Project team did not complete bi-directional traceability of the MeF Release 4 requirements as required by the Enterprise Life Cycle and as recommended in our previous report. Without complete bi-directional traceability, the adequacy of requirements development and testing activities will be difficult to assess. In addition, there will be no assurance the requirements expected and approved to be deployed are the requirements that are actually deployed.

This memorandum is intended to apprise you of issues we plan to include in our upcoming audit report. **At this time, we are seeking only your concurrence with the facts, which can be provided informally.** If we do not receive any further comments before the response date, we will proceed in completing our



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audit work and preparing the audit report. Any official comments you wish to provide will be requested when we issue the draft report. Please contact me at (202) 622-8510 if you have questions or Gary Hinkle, Director, Systems Modernization and Operations, at (202) 927-7291.



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**Appendix VII**

*Management's Response to Memorandum #1*

**From:** DeMarino Frank [mailto:Frank.DeMarino@irs.gov]  
**Sent:** Monday, December 04, 2006 5:54 AM  
**To:** Hinkle Gary V TIGTA; Neuwirth Edward A TIGTA  
**Cc:** Nesbit Sr Kenneth W; Mullins Carol M  
**Subject:** TIGTA memo Dated November 22, 2006

The MeF Project Management concurs with the memo "Additional Actions Should Be Taken to Adequately Complete Requirements Traceability for the Modernized e-File Project (Audit #200720002)" dated November 22, 2006.

Thank you for your consideration of this matter.  
Frank DeMarino  
Program Oversight and Coordination Office  
OS:CIO:SM:PO  
B7-133  
202-283-5761



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**Appendix VIII**

*Glossary of Terms*

<b>Term</b>	<b>Definition</b>
Bidirectional Traceability	Bidirectional traceability of requirements can be established from the source requirement to its lower level requirements and from the lower level requirements back to their source. Such bidirectional traceability helps determine that all source requirements have been completely addressed and that all lower level requirements can be traced to a valid source.
Business Master File	The Business Master File is the IRS database that consists of Federal tax-related transactions and accounts for businesses. These include employment taxes, income taxes on businesses, and excise taxes.
Business Systems Modernization	The Business Systems Modernization program, which began in 1999, is a complex effort to modernize the IRS' technology and related business processes.
Deferral	A deferral is an approved request for verification of a requirement or set of requirements to be moved to another phase of testing.
Electronic Federal Tax Payment System	The Electronic Federal Tax Payment System was designed to process Federal tax deposits and all other types of business and individual payments.



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<b>Term</b>	<b>Definition</b>
Electronic Management System	The Electronic Management System provides telecommunication structure, security, and data management support for electronic commerce, including electronic filing of tax returns.
Enterprise Life Cycle	The Enterprise Life Cycle is a structured business systems development method that requires the preparation of specific work products during different phases of the development process.
Error Resolution System	The Error Resolution System application provides for the correction of errors associated with input submissions. The error inventory is managed on an Error Resolution System database, and corrected documents are validated by the Generalized Mainline Framework system.
Federal/State Single Point Filing System	The Federal/State Single Point Filing System permits tax return transmitters to submit multiple Federal and State tax return types within one transmission and to receive acknowledgement of the transmission from the IRS.
Generalized Mainline Framework	The Generalized Mainline Framework system validates and perfects data from a variety of input sources (e.g., tax returns, remittances, information returns, and adjustments) and controls, validates, and corrects updated transactions.
Generalized Unpostable Framework	The Generalized Unpostable Framework application consists of a group of batch programs and real-time command codes used to correct transactions that do not meet Master File posting criteria. It controls, validates, and corrects transactions through the Generalized Mainline Framework system.



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<b>Term</b>	<b>Definition</b>
Information Technology Modernization Vision and Strategy	The Information Technology Modernization Vision and Strategy establishes a 5-year plan that drives investment decisions; addresses the priorities around modernizing front-line tax administration and supporting technical capabilities; and leverages existing systems (where possible) and new development (where necessary) to optimize capacity, manage program costs, and deliver business value on a more incremental and frequent basis.
Master File	The Master File is the IRS database that stores various types of taxpayer account information. This database includes individual, business, and employee plans and exempt organizations data.
Milestone	A milestone provides for “go/no-go” decision points in a project and is sometimes associated with funding approval to proceed.
Modernized e-File Project	The Modernized e-File Project develops the modernized, web-based platform for the filing of approximately 330 IRS forms electronically, beginning with the U.S. Corporation Income Tax Return (Form 1120), U.S. Income Tax Return for an S Corporation (Form 1120S), and Return of Organization Exempt From Income Tax (Form 990). The Project serves to streamline filing processes and reduce the costs associated with a paper-based process.
Modernized Tax Return Database	The Modernized Tax Return Database is the legal repository for original electronically filed returns received by the IRS through the Modernized e-File system.



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<b>Term</b>	<b>Definition</b>
Platform	A platform is a computer system on which application programs can run.
Release	A release is a specific edition of software.
Requirement	A requirement is a formalization of a need and is the statement of a capability or condition that a system, subsystem, or system component must have or meet to satisfy a contract, standard, or specification.
Software Engineering Institute's Capability Maturity Model Integration	The Software Engineering Institute's Capability Maturity Model Integration is a process improvement approach that provides organizations with the essential elements of effective processes.
System Integration and Testing	System Integration and Testing verifies that each individual work product (such as application software, technical infrastructure, facility, documentation, or training material) still meets requirements when integrated with the rest of the release and the business system.



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**Appendix IX**

*Management's Response to the Draft Report*



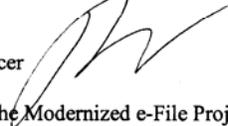
CHIEF INFORMATION OFFICER

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

RECEIVED  
JUN 15 2007

June 15, 2007

MEMORANDUM FOR DEPUTY INSPECTOR GENERAL FOR AUDIT

FROM: Richard A. Spires  
Chief Information Officer 

SUBJECT: Draft Audit Report – The Modernized e-File Project Can Improve Its  
Management of Requirements (Audit #200720002) (i-trak #2007-24703)

Thank you for the opportunity to review the subject draft audit report and meet with the audit team to discuss earlier draft report observations. As a result of our meetings, the audit team has incorporated some of our suggestions into the draft report.

We appreciate your acknowledgement that the Modernized e-File system stored and properly matched 98 percent of the 128,290 tax returns electronically filed during the period of July 1 through September 31, 2006. Thank you for your further clarifying that the two percent of tax returns that did not match were actually changed by other IRS functions in the course of their operations; thus providing a complete and clear analysis of the system's effectiveness.

We also appreciate the audit team's advice on ways to further improve the process to effectively manage and monitor business requirements. We fully agree with the recommendations reflected in the report and the attachment to this memo details our planned actions to implement your suggestions.

Thank you for your continued support and the valuable assistance and guidance that your team provides. We look forward to working with your staff throughout the year to develop appropriate measures. If you have any questions, please contact me at (202) 622-6800. Members of your staff may also contact Perry Robinett, Director of Program Oversight, at (202) 283-6283.

Attachment



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## *The Modernized e-File Project Can Improve Its Management of Requirements*

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Draft Audit Report – The Modernized e-File Project Can Improve Its Management of Requirements (Audit #200720002) (i-trak #2007-24703)

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**RECOMMENDATION #1:** To complete the previous corrective action, the Chief Information Officer should ensure the Modernized e-File System Requirements Report and Release 4 requirements traceability verification matrices are updated to include traceability to valid requirement numbers to meet the Enterprise Life Cycle provisions for managing requirements. This control will provide assurance about the development of all approved requirements.

**CORRECTIVE ACTION #1:** We agree with this recommendation. The IRS will complete the traceability of the requirements for Modernized e-File (MeF) Releases 4 and 5 using the System Requirement Report manual process that is currently in place. Full bidirectional traceability will not be possible until the project is able to consolidate all requirements, change requests, work requests, test cases, and defects into one related system. For Release 6, the MeF project is working with the Business Rules and Requirements Management (BRRM) office to implement a full bidirectional traceability model. The MeF project's use of the BRRM office is consistent with the Government Accountability Office's (GAO) 2006 recommendations related to strengthening requirements standards.

**IMPLEMENTATION DATE:** February 1, 2009

**RESPONSIBLE OFFICIAL:** Director, Submissions Processing Domain

**CORRECTIVE ACTION MONITORING PLAN:** We enter accepted corrective actions into the Joint Audit Management Enterprise System (JAMES). These corrective actions are monitored on a monthly basis until completion.

**RECOMMENDATION # 2:** The Chief Information Officer should ensure the detailed guidance<sup>1</sup> currently being developed by the IRS Business Rules and Requirements Management office includes specifics about how projects should maintain and report bidirectional traceability to ensure traceability is complete and consistent for all projects.

**CORRECTIVE ACTION #2:** We agree with this recommendation. The BRRM office will review the guidance developed as a part of HPI-55<sup>1</sup> and in response to the GAO-310-06 audit to ensure that proper information is included to help projects understand how to perform bidirectional traceability. The BRRM office will document their findings from this review.

**IMPLEMENTATION DATE:** August 1, 2007

**RESPONSIBLE OFFICIAL:** Director, Business Rules and Requirements Management

**CORRECTIVE ACTION MONITORING PLAN:** We enter accepted corrective actions into the Joint Audit Management Enterprise System (JAMES). These corrective actions are monitored on a monthly basis until completion.

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<sup>1</sup>Applications Development/Enterprise Service organizations' Highest Priority Initiative-55, *Implement Best Practices for Requirements Development and Management*, dated March 7, 2007.