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TREASURY INSPECTOR GENERAL FOR TAX ADMINISTRATION



*Increased Support Is Needed to Ensure the Effectiveness of the Final Integration Test*

**September 15, 2014**

**Reference Number: 2014-20-085**

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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## HIGHLIGHTS

### **INCREASED SUPPORT IS NEEDED TO ENSURE THE EFFECTIVENESS OF THE FINAL INTEGRATION TEST**

## Highlights

**Final Report issued on  
September 15, 2014**

Highlights of Reference Number: 2014-20-085 to the Internal Revenue Service Chief Technology Officer.

### **IMPACT ON TAXPAYERS**

The Final Integration Test (FIT) is a critical part of the IRS's preparation for each filing season. If tax processing systems are not properly integrated to deliver filing season functionality, taxpayers may be unable to timely file returns, receive refunds, or obtain timely, accurate customer service.

### **WHY TIGTA DID THE AUDIT**

The IRS will be making significant changes to its tax processing system to implement legislative changes, including provisions of the Affordable Care Act. These changes will result in increased workload and challenges for the FIT program. TIGTA conducted this audit to help ensure the effectiveness of the FIT program in testing the integration of an increasingly complex tax processing system.

### **WHAT TIGTA FOUND**

The Applications Development organization delivered programming changes in mid-December 2013, one month after the planned start of FIT execution. There were numerous programming errors identified which required FIT program resources to report and resolve. However, support from the Enterprise Operations organization and the Wage and Investment Division was withdrawn from the FIT program prior to the completion of the test execution process to support the filing season. The early loss of support resulted in unplanned deviations from the FIT Test Plan, as not all tests could be completed as planned.

TIGTA also found that the IRS does not have a formal process to evaluate, compare, and synchronize the FIT and filing season environments, and that the Integrated Customer Communications Environment was not available for testing. In addition, the FIT program has not established performance metrics to compare actual performance with expected performance.

Finally, TIGTA found that there were problems with test analysts accessing the Employee User Portal and the Integrated Enterprise Portal, which caused interruptions in the performance of the Processing Year 2014 FIT.

### **WHAT TIGTA RECOMMENDED**

TIGTA recommended that the Chief Technology Officer: 1) ensure that an analysis of the problem tickets is performed to identify root causes that can be addressed to reduce the burden on the FIT program and Information Technology organization resources; 2) provide the necessary level of business unit support to the FIT; 3) ensure that the Integrated Customer Communications Environment is included in the FIT; 4) establish performance goals and metrics for the annual FIT program; 5) establish a process to determine the reason FIT test tax returns go to the Error Resolution System and use those results to identify training opportunities or operational improvements; and 6) implement the environment comparison and synchronization process between the FIT program's environment and the filing season environment.

IRS management agreed with all of the recommendations. The IRS plans to analyze FIT problem tickets; obtain additional support; develop costing plans to implement the Integrated Customer Communications Environment application in the FIT; identify goals, measures, and a reporting process; conduct training and report Error Resolution System fallout results; and complete a gap analysis and synchronize the FIT environment.

However, the IRS also commented that implementation of most of the recommendations is contingent upon overall budget constraints and prioritization of essential taxpaying operations.



TREASURY INSPECTOR GENERAL  
FOR TAX ADMINISTRATION

DEPARTMENT OF THE TREASURY  
WASHINGTON, D.C. 20220

September 15, 2014

**MEMORANDUM FOR CHIEF TECHNOLOGY OFFICER**

**FROM:** Michael E. McKenney  
Deputy Inspector General for Audit

**SUBJECT:** Final Audit Report – Increased Support Is Needed to Ensure the Effectiveness of the Final Integration Test (Audit # 201320018)

This report presents the results of our review to evaluate the Execution phase of the Processing Year 2014 Final Integration Test process. This review is included in the Treasury Inspector General for Tax Administration's Fiscal Year 2014 Annual Audit Plan and addresses the major management challenge of Modernization.

Management's complete response to the draft report is included as Appendix V.

Copies of this report are also being sent to the IRS managers affected by the report recommendations. If you have any questions, please contact me or Danny Verneuille, Acting Assistant Inspector General for Audit (Security and Information Technology Services).



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## *Abbreviations*

ACA	Affordable Care Act
ACS	Automated Collection System
AD	Applications Development
EOPs	Enterprise Operations
ERS	Error Resolution System
EST	Enterprise Systems Testing
FIT	Final Integration Test
ICCE	Integrated Customer Communications Environment
IRS	Internal Revenue Service
IT	Information Technology
KISAM	Knowledge Incident/Problem Service Asset Management
MeF	Modernized e-File
PY	Processing Year



## *Increased Support Is Needed to Ensure the Effectiveness of the Final Integration Test*

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### *Background*

The Internal Revenue Service (IRS) defines the Final Integration Test (FIT) program as the integrated end-to-end testing of multiple systems which support the high-level business requirements of the IRS. Each year, the IRS incorporates system improvements and changes to the tax law into the tax processing system. The tax processing system consists of hundreds of applications operating on many unique hardware and software platforms. The FIT is performed from the perspective that all IRS applications are subsystems of the overall system. The FIT is the final step of the application software testing effort designed to ensure that revisions to IRS computer applications interoperate correctly prior to the tax return filing season<sup>1</sup> (hereafter referred to as filing season). Each FIT performed consists of a series of tests designed to ensure that essential IRS applications will perform correctly when deployed. To accomplish this objective, the IRS aims to create a FIT environment that emulates, as closely as possible, the filing season environment. Using copies of filing season data, FIT personnel verify that data are transferred correctly between the applications within the tax processing system.

The IRS manages the FIT program as a year-round program out of the Enterprise Systems Testing (EST) Division within the Enterprise Services organization of the Information Technology (IT) organization. While the overall responsibility for the FIT program lies with the EST Division, the FIT program requires the participation and support of several other organizations, including the Applications Development (AD) organization, the Enterprise Operations (EOps) organization, the business units, and contractors. The FIT program receives funding from the Modernized e-File (MeF), Customer Account Data Engine 2, and Affordable Care Act (ACA)<sup>2</sup> program offices. In July 2013, the IRS restructured its IT organization, moving the EST Division from the AD organization to the Enterprise Services organization to consolidate all testing activities and obtain increased consistency, efficiency, and accountability. The EST Division's mission is to work in partnership with its customers to improve the quality of IRS applications, products, and services. To accomplish its mission, the EST Division plans, develops, schedules, and conducts the FIT from the perspective of the end-user, *e.g.*, the taxpayer.

The FIT is conducted in four process steps: Planning, Preparation, Execution, and Closeout. Each of the four process steps contains stated requirements for entry criteria, process activities, output, and exit criteria. While the FIT program provides support for IRS activities throughout

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<sup>1</sup> See Appendix IV for a glossary of terms.

<sup>2</sup> The Patient Protection and Affordable Care Act of 2010, Pub. L. No. 111-148, 124 Stat. 119 (2010) (codified as amended in scattered sections of the U.S. Code), as amended by the Health Care and Education Reconciliation Act of 2010, Pub. L. No. 111-152, 124 Stat. 1029.



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the year, the primary emphasis, and the focus of this audit report, is the Processing Year (PY) 2014 annual FIT Execution process, prior to production.

For the PY 2014 annual FIT, the IRS conducted test execution between November 2013 and March 2014. Processing is triggered by the input of a taxpayer form, an Integrated Data Retrieval System Command Code, a taxpayer request for information on an IRS application website, or a telephone call, which will ultimately produce a refund, notice, or letter as output back to the taxpayer. This type of testing is called Results Oriented Transaction Processing. The transaction is the input form and the result is the refund, notice, or letter. Results Oriented Transaction Processing is conducted by executing the processing identified in thread diagrams and scenario text. These are triggered by test case data specially designed to generate predetermined results.

In addition to verifying that accurate products are provided to taxpayers and other external trading partners, the FIT program is required to verify that data are transferred correctly between applications. For PY 2014, 48 tax processing systems were included in the FIT. FIT test analysts and operations support staff execute runs associated with selected threads and scenarios. Following the threads and scenarios execution, the FIT analysts compare the actual results with the predetermined results. Once the FIT analyst determines there is a problem, that is not a test process/procedure or data problem, the analyst submits a helpdesk ticket in the Knowledge Incident/Problem Service Asset Management (KISAM) system for an application correction.

This review was performed at the IRS FIT program office in New Carrollton, Maryland, during the period December 2013 through June 2014. We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. Detailed information on our audit objective, scope, and methodology is presented in Appendix I. Major contributors to the report are listed in Appendix II.



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## *Results of Review*

### **Support for the Annual Final Integration Test From Internal Revenue Service Organizations Needs Improvement**

The EST Division has overall responsibility for the FIT program execution. The FIT program also requires the participation and support of several IRS organizations including the AD organization, the EOps organization, and the business units to successfully accomplish its mission. The FIT Concept of Operations document states that the completion of the tasks and activities of all of the participating organizations is crucial to the successful execution of the FIT. The document describes the following roles and responsibilities:

- EST Division: Is responsible for identifying the hardware, software, and telecommunications test bed components required for the FIT. In the event the required resources cannot be located at IRS sites, EST Division personnel coordinate the effort to procure these items.
- EOps organization: Provides system software support, operates equipment, schedules jobs, ensures integrity of databases and master files, monitors/corrects execution problems during all FIT test phases, submits problem tickets into the KISAM system, and reviews the status of open problem tickets.
- AD organization: Is responsible for the maintenance and upgrade of applications software and documentation. AD organization personnel also provide corrective action support during testing in response to problems reported in the KISAM system.
- Business Unit Personnel: The Wage and Investment Division provides the expertise of experienced personnel. Tax examiners assist with the preparation of individual and business test returns and with researching and correcting errors on test tax returns that fail validation and go to the Error Resolution System (ERS).

Each year the FIT program makes a significant contribution to the success of the filing season. For PY 2014, the FIT program developed a test plan including more than 2,300 test cases for 48 tax processing systems. The PY 2014 FIT program identified more than 500 problems that could have resulted in the failure of individual and business tax returns to be properly processed. When testing was completed, the FIT program produced an End of Test Report<sup>3</sup> that reported problems uncovered during the PY 2014 FIT. Although the FIT program successfully identified

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<sup>3</sup> IRS, *End of Test Report For Final Integration Test (FIT) Annual Test Processing Year (PY 2014) Final Version 1.1*, p. 8 (March 24, 2014).



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problems that could have resulted in the failure of tax returns to be properly processed, support for the FIT program from IRS organizations could be improved or extended.

**AD organization programming support needs improvement**

Deviations from predetermined FIT results are reported as problem tickets in the KISAM system. Problem tickets are assigned a priority based on the severity of the problem. There were 528 priority one, two, and three problem tickets created during the PY 2014 FIT. Figure 1 presents the definitions of problem ticket priorities one through three and the total number of tickets by priority for the PY 2014 FIT.

**Figure 1: PY 2014 FIT Problem Tickets by Priority**

<b>Problem Ticket Priority</b>	<b>Definition</b>	<b>Number of Tickets</b>	<b>Percentage of Tickets</b>
Priority One – Critical	Causes a work stoppage and has a critical impact on test processes and schedules.	82	16%
Priority Two – High	Impacts test processes but the test can continue.	404	76%
Priority Three – Average	Assigned if the problem has no major impact on test processes or schedules.	42	8%
Total Problem Tickets		528	100%

*Source: Final FIT 2014 KISAM Daily Status Report, March 18, 2014.*

Of the 528 priority one, two, and three problem tickets created during the PY 2014 FIT, as presented in Figure 2 on page 9, 436 (83 percent) were programming errors. An additional 53 tickets (10 percent) were related to programming requirements not being sent to the MeF contractor. Together, these two categories account for 93 percent of the problem tickets identified during the PY 2014 FIT. Opening, working, and resolving problem tickets take resources away from the FIT program and other IT organizations. Programming errors also result in time being spent resolving the errors and the potential reduction of the amount of FIT testing completed. Errors not identified during testing could result in problems processing tax returns during the filing season. Application programming errors will be more critical in PY 2015 as greater demands will be placed on FIT program resources to address significant system changes as a result of implementing provisions of the ACA and other applications planned to deploy during PY 2015. The FIT program will increase the number of test cases to accommodate testing of ACA applications, ACA tax forms, and other applications deploying during PY 2015.



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In addition, IRS organizations did not timely deliver final MeF programming changes to the FIT program. Final MeF programming changes for the PY 2014 FIT were not received until mid-December 2013, nearly one month following the planned start of MeF test execution. The MeF system is a critical component of the FIT and filing season. During PY 2013, more than 80 percent of individual tax returns were filed electronically. The FIT program develops test cases for the MeF system, including tests of any programming changes made to the system since the prior FIT. The FIT program could not complete development of test cases for the MeF application until the programming changes were known. The delay in delivery of MeF programming changes is significant because more than 31 percent of all test cases are related to MeF tests. The late receipt of the programming changes resulted in a later than ideal start and completion of the MeF testing. As a result of the late receipt of MeF programming changes at the start of the PY 2014 Filing Season, only 24 percent of the MeF testing was completed. The remaining MeF test cases were not completed until March 2014. Earlier receipt of MeF program changes is needed to ensure that MeF test cases are completed before the start of the filing season.

In addition, the late receipt of programming changes, for systems other than MeF, resulted in errors occurring during the filing season. We reviewed nearly 3,000 filing season problem tickets and found 12 tickets for errors in several systems that should have been identified and corrected during the FIT, but were not because program changes were received too late for the FIT program to encounter the problem and correct it prior to the filing season. Eleven of the 12 filing season problem tickets were assigned a priority two, or a high level of impact.

The FIT program needs to receive programming changes timely to complete testing and identify problems before the start of the filing season. After the start of the filing season, the test execution phase continued and the FIT identified five additional priority one and 66 priority two problems until test execution was completed in March 2014. It is critical that the FIT program receive all application programming changes earlier than in the past in order to plan for and complete all testing before the start of the PY 2015 Filing Season.

**EOps organization and Wage and Investment Division support should be improved**

The EOps organization provides operational information technology support to the annual FIT program. EOps organization personnel support the FIT program in many ways based on their knowledge and experience of operations. For example, EOps organization personnel manage and execute operating system jobs for the FIT program as they normally do during the filing season. EOps organization personnel also manage the program schedule, make sure jobs are running, and copy and transfer files as needed. However, in December 2013, EOps organization support was withdrawn from the PY 2014 FIT program prior to the completion of the test execution process to support the filing season.

Tax examiners from the Wage and Investment Division also lend support to the annual FIT program. Each year, FIT program management request the assistance of experienced tax



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examiners to help create test tax returns. The tax examiners' assistance is also needed throughout test execution to analyze and provide insight into the reasons test tax returns go to the ERS during processing. The ERS is an application that provides for the correction of errors associated with tax returns submitted for processing. During the PY 2014 FIT, a test analyst observed that tax examiner support was not provided to the FIT program for a sufficient period of time to research and resolve ERS returns.

No formal agreement is in place between the EST Division and the EOps organization and Wage and Investment Division regarding the specific support that each will provide to the FIT program, including the duration of the support. To obtain tax examiner support for the PY 2014 FIT, the EST Division issued a memorandum to the Wage and Investment Division detailing and requesting the support required. During initial planning, the EST Division requested support through December 20, 2013. However, this end date was too early to assist in resolving returns that continued to go to the ERS as test execution continued into March 2014. The resources were not available to the FIT program to continue beyond December 20, 2013.

The early loss of EOps organization support from the PY 2014 FIT program resulted in unplanned deviations from the FIT Test Plan as not all tests could be completed as planned. Tests for the Automated Collection System (ACS), the Notice Review Processing System, and the Notice Conversion System were begun but not completed due to the redirection of EOps organization support from the FIT program to support the filing season. The PY 2014 End of Test Report details ACS and Notice Review Processing System tests that were not executed because of the timing of the end of EOps organization support. The early release of EOps organization support also occurred during the PY 2013 FIT. The PY 2013 End of Test Report stated that the majority of ACS processing had been completed. In contrast, the PY 2014 report indicates a more significant impact stating that the majority of the ACS processing was not completed.

Our review of nearly 3,000 problem tickets opened for the 2014 Filing Season, as of March 6, 2014, identified five priority two errors or problems that occurred during the filing season due to the incomplete testing of the ACS and the Notice Review Processing System during the FIT. These errors could have been identified and corrected during the PY 2014 FIT with the appropriate level of EOps organization support to complete the ACS and Notice Review Processing System testing.

**Support for the FIT environment needs improvement**

The FIT program requires a production-like environment to effectively test the interoperability of all of the tax processing systems. The FIT program's information technology environment consists of all of the systems, applications, databases, and hardware needed to match the filing season environment as closely as possible. For some systems, the FIT program's environment does not fully replicate the filing season environment due to constraints on test equipment and system resources. The PY 2014 FIT tested 48 of the IRS's 99 essential tax processing systems.



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While the IRS has begun a process to ensure that IRS test environments match the filing season environment, the new process has not been applied to the FIT program's environment.

The FIT program's environment could more closely mirror the filing season environment by including the Integrated Customer Communications Environment (ICCE). Inclusion of the ICCE in the FIT program's environment allows customer service applications such as "*Where's My Refund?*" to be tested. For the PY 2014 FIT, the Systems Acceptability Testing organization did not have the resources to support the ICCE test environment; therefore, the ICCE was not included in the PY 2014 FIT. When the ICCE is not included in the FIT environment, there is an increased risk that customer service application problems may not be identified and corrected prior to the start of the filing season. Problems with applications during the filing season could undermine the IRS's mission to provide top quality customer service to taxpayers. Taxpayers could also be inconvenienced and frustrated trying to resolve tax account issues or obtain tax information such as the status of their refund. The importance of including the ICCE in the FIT was demonstrated in PY 2013, when the ICCE was included in the FIT. The testing revealed a problem that would have affected a significant number of taxpayers using the "*Where's My Refund?*" application. In Fiscal Year 2012, the "*Where's My Refund?*" application was accessed 132 million times.

In addition, problem tickets for the PY 2014 FIT show a need for improvement of the FIT program's information technology environment. Twenty-one (4 percent) of the 528 problem tickets opened during the PY 2014 FIT were related to the information technology environment *i.e.*, portal, that the FIT program uses to carry out its testing responsibilities. For example, the Employee User Portal and the Integrated Enterprise Portal allow FIT program personnel to access IRS data and systems to carry out their FIT program responsibilities. The problems with the portals reported in the KISAM system ranged from the critical level, such as not being able to connect to the portals, to high-level problems, such as not being able to see tax forms or other errors. When the portals are not available or are not performing as expected, interruptions and delays in the FIT occur. Portal problems continued to be identified and reported during the filing season. However, the portal problem tickets created during the FIT and during the filing season are not analyzed by EST Division management or used to identify and correct the underlying problems.

### ***Recommendations***

To ensure that the FIT program is provided with the necessary resources and support, the Chief Technology Officer should:

**Recommendation 1:** Ensure that an analysis of the problem tickets is performed to determine if there are any root causes that can be addressed to reduce the burden on the FIT program and IT organization resources.



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**Management's Response:** The IRS agreed with this recommendation. The EST Division will develop a plan to engage AD organization partners and define a process to conduct analysis of FIT problem tickets to be implemented annually as part of test closeout activities beginning with the Filing Season 2015 FIT test. Ongoing management and support of the root cause analysis activities will require additional resources and is contingent on additional funding or re-prioritization of other activities.

**Recommendation 2:** Identify and provide the resources needed to ensure the necessary level of EOps organization and Wage and Investment Division support to the FIT program.

**Management's Response:** The IRS agreed with this recommendation, to the extent funding is available. The EST Division will submit a Memorandum of Understanding to the EOps organization for support for all FIT activities and will extend the duration of Wage and Investment Division field support resources.

**Recommendation 3:** Ensure that the ICCE is included in the FIT program's environment.

**Management's Response:** The IRS agreed with this recommendation. Costing plans are in progress to implement the ICCE application in the FIT in support of Filing Season 2015 testing. The 2015 Annual FIT effort is moving forward with test planning and preparation to include the ICCE in its Filing Season 2015 scope contingent upon overall budgets and prioritization of essential taxpaying operations.

### ***Management Oversight Should Include the Use of Performance Metrics to Monitor Final Integration Test Effectiveness***

The Office of Management and Budget, Circular No. A-123, *Management's Responsibility for Internal Control*,<sup>4</sup> provides guidance to Federal managers on improving the accountability and effectiveness of Federal programs and operations. The Circular states that internal or management control is an integral component of an organization's management that provides reasonable assurance of the effectiveness and efficiency of operations. In addition, the Government Accountability Office established the *Standards for Internal Control in the Federal Government*.<sup>5</sup> The standards state that activities need to be established to monitor performance measures and indicators and that managers need to compare actual performance to planned or expected results.

During the FIT, as in the filing season, tax returns that fail validation while in process are sent to the ERS. Each return in the ERS must be manually researched and the condition causing the return to be routed to the ERS must be corrected for processing to continue. The FIT program's

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<sup>4</sup> Office of Management and Budget, *Circular No. A-123 Revised, Management's Responsibility for Internal Control*, p. 4 (December 2004).

<sup>5</sup> Government Accountability Office, GAO/AIMD-00-21.3.1, *Standards for Internal Control in the Federal Government*, p.1 (November 1999).



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Standard Operating Procedures<sup>6</sup> do not require FIT program management to analyze the test tax returns that are routed to the ERS. However, the ERS is a source of information that can help measure the effectiveness of the annual FIT program and can help to identify opportunities to improve the FIT program. For example, a FIT analyst determined that many of the FIT test tax returns went to the ERS due to errors on the returns caused by the lack of training on properly preparing valid test tax returns. This condition was not identified in the PY 2013 FIT and may not have been identified in PY 2014 if a FIT program analyst had not included this in the FIT program’s PY 2014 Lessons Learned document. FIT program management was unable to provide the Treasury Inspector General for Tax Administration with information reports or statistics about the test tax returns that failed validation and were sent to the ERS.

The FIT program closeout activities are conducted to learn from the FIT process and apply lessons learned to improve subsequent integration tests. On a daily basis, the FIT program tracks and reports on the progress of FIT problem tickets. Progress in resolving problem tickets and newly created problem tickets are also discussed at daily status meetings. However, the FIT program’s Standard Operating Procedures do not require FIT program management to analyze the problem tickets created during the FIT and the filing season to identify trends or areas for additional support or focus. At the Treasury Inspector General for Tax Administration’s request, FIT program management provided us with a breakdown of all 528 problem tickets by type of problem for the PY 2014 FIT. Figure 2 presents the 528 problem tickets grouped by type of problem.

**Figure 2: PY 2014 FIT Problem Tickets by Type**

PY 2014 FIT Issue Type	Number of Tickets	Percentage of Tickets
Hardware	12	2%
Portal	21	4%
Programming	436	83%
Programming requirements were not sent to the contractor to code.	53	10%
Services Needed: copy database schema, load data, etc.	6	1%
<b>Total</b>	<b>528</b>	<b>100%</b>

Source: IRS FIT project manager, March 21, 2014.

<sup>6</sup> IRS, *Final Integration Test (FIT) Standard Operating Procedures – SOP Version 1*, p. 1 (Feb. 2013).



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The FIT program has not established performance metrics to compare actual performance with expected performance. Without this type of management reporting, FIT program management does not have an established process for measuring performance and identifying areas for improvement. In addition, analysis of problem tickets created during the FIT and filing season processing, and the analysis of ERS test tax returns, are not required FIT program activities. While FIT program management participates in the filing season meetings that include a discussion of the problem tickets, they do not perform a formal analysis of the problem tickets to help identify opportunities to improve the FIT program.

Researching and resolving test tax returns in the ERS takes time and resources away from other FIT program responsibilities. Without information about the types of problems encountered during the annual FIT and problems occurring in the filing season that should have been identified and corrected during the FIT, management does not have the information needed to request additional resources and support or to identify areas of operations that need improvement.

### ***Recommendations***

To ensure that the FIT results are used to improve the FIT program, the Chief Technology Officer should:

**Recommendation 4:** Establish performance goals and metrics for the annual FIT program and establish procedures for reporting on the progress in meeting those goals and metrics.

**Management's Response:** The IRS agreed with this recommendation. A plan will be submitted identifying goals, measures, and a reporting process by September 2015. The EST Division will require additional resources to implement, manage, and support the identification and reporting of performance metrics. Implementation will begin to the extent overall budgets and prioritization of essential taxpaying operations allows.

**Recommendation 5:** Establish a process to determine the reason FIT test tax returns go to the ERS and use those results to identify training opportunities or operational improvements.

**Management's Response:** The IRS agreed with this recommendation. The EST Division is taking steps to implement this recommendation and has initiated ERS training sessions to address common fallout errors. The EST Division will continue to leverage the current test-tracking tool, Rational Quality Manager, to document, track, and report ERS data results. Further, modifications to existing test-tracking tools have been initiated to document, collect, and report the ERS fallout results for the Filing Season 2015 effort.



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## ***A Formal Process Has Not Been Established to Compare and Synchronize the Final Integration Test and Filing Season Environments***

According to the FIT program's Standard Operating Procedures, the FIT is the integrated end-to-end testing of multiple systems which support the high-level business requirements of the IRS. It is designed to ensure that IRS systems interoperate correctly during the filing season by utilizing copies of data in a simulated filing season environment.

The IRS does not have a formal process to evaluate and compare the FIT program's environment against the filing season environment. The IRS has taken steps to improve its knowledge, documentation, and management of the various environments with the implementation of a new function called Environment Management under the EOps organization. This new group is responsible for establishing environment baselines. In addition, this group has started to perform environment comparison and synchronization work, capturing data on target production servers and then on alternate environment servers for the purpose of conducting a gap analysis. The IRS first used this new approach with the implementation of the ACA Information System Release 3.0 in October 2013. However, the IRS has not implemented this new process for the FIT program's environment. Furthermore, at the present time, the IRS does not have any scheduled plan to implement the process to compare and synchronize the FIT program's environment with the filing season environment.

In lieu of a formal process to compare and synchronize the FIT program's environment to the filing season environment, the FIT program monitors upcoming changes that are scheduled to be implemented as a result of Unified Work Requests or Change Requests. A Unified Work Request is a formal notification from an IRS business or functional operating division to an information technology supplier organization of a business need for information technology products or services. The Unified Work Request documents the information technology services or products required and includes changes to current or planned IRS systems, applications, or infrastructure. The Unified Work Request process focuses on collecting requests for information technology products and services from the IT organization into a single, flexible system using a common set of processes and procedures. In comparison, a Change Request is the medium for requesting approval to change a baseline product. FIT program personnel conduct biweekly meetings and attend working-group meetings that focus on specific projects, *e.g.*, the MeF and the Electronic Fraud Detection System, to evaluate the impact of filing season changes that would affect the FIT program's environment. Because there is more than one Change Request system, FIT program management stated that it is a challenge to keep abreast of all the upcoming filing season changes.

While the Information Technology Software Test Process and Procedures, Internal Revenue Manual 2.127.2, governing the FIT program states that the test environment should simulate the filing season environment, it does not include specific steps for completing this required activity.



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In addition, the IRS has not documented policies or procedures to compare and synchronize the FIT program's environment with the filing season environment.

Without a formal process to compare and synchronize the FIT program's environment to the filing season environment, there is increased risk that implemented programming changes will cause system errors that are not detected and addressed during the annual FIT.

***Recommendation***

To ensure that the FIT program's environment simulates the filing season environment as closely as possible, the Chief Technology Officer should:

**Recommendation 6:** Implement the environment comparison and synchronization process between the FIT program's environment and the filing season environment.

**Management's Response:** The IRS agreed with this recommendation. The EST Division will engage EOps organization environment owners to complete the gap analysis and synchronize the FIT environment in support of the 2016 Annual FIT to the extent overall budgets and prioritization of essential taxpaying operations allows.



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## **Appendix I**

### *Detailed Objective, Scope, and Methodology*

Our overall objective was to evaluate the Execution phase of the PY<sup>1</sup> 2014 FIT process. To accomplish our objective, we:

- I. Identified the requirements and criteria applicable to the PY 2014 FIT.
- II. Determined if the IRS completed the required exit criteria for the Planning and Preparation phases.
  - A. Determined if the following exit criteria were met to demonstrate the completion of the Planning phase: requirements baselined, test environment(s) established, test plan created, repository established, and project folder established.
  - B. Determined if the following exit criteria were met to demonstrate the completion of the Preparation phase: Test Readiness Review completed, Test Plan finalized and issued, test cases/scripts/data developed, and environments verified.
  - C. Determined if the IRS ensured that the test environment adequately mirrors the production environment.
  - D. Obtained test scripts and test cases for systems participating in FIT testing.
  - E. Determined if the IRS adequately assessed the impact of the Federal Government shutdown of October 1, 2013, through October 16, 2013, on the PY 2014 FIT. We documented the impact and assessed the actions taken to ensure that the shutdown did not negatively impact the effectiveness of the PY 2014 FIT.
- III. Evaluated the effectiveness of the Execution phase activities.
  - A. Observed execution of test cases and test scripts.
  - B. Determined if test results were adequately reported and documented.
  - C. Determined if the following execution outputs were produced: test status report(s); test case waiver or deferral, if applicable; and problem tickets, if applicable.
  - D. Determined if the following exit criteria were met to demonstrate completion of the Execution phase: Test cases updated to reflect status, *i.e.*, Passed/Failed/Waived/Deferred, defect status updated, *i.e.*, Closed/Open, repository updated with test results, and test status reports updated to reflect results.

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<sup>1</sup> See Appendix IV for a glossary of terms.



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**Internal controls methodology**

Internal controls relate to management's plans, methods, and procedures used to meet their mission, goals, and objectives. Internal controls include the processes and procedures for planning, organizing, directing, and controlling program operations. They include the systems for measuring, reporting, and monitoring program performance. We determined that the following internal controls were relevant to our audit objective: the IRS's software testing standards and procedures. We evaluated these controls by interviewing management and reviewing IRS documentation supporting the completion of exit criteria for the Planning, Preparation, and Execution phases of the PY 2014 FIT.



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**Appendix II**

*Major Contributors to This Report*

Alan R. Duncan, Assistant Inspector General for Audit (Security and Information Technology Services)  
Danny Verneuille, Director  
John Ledford, Audit Manager  
Mike Mohrman, Lead Auditor  
Joan Bonomi, Senior Auditor  
Ashley Weaver, Auditor



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**Appendix III**

*Report Distribution List*

Commissioner C  
Office of the Commissioner – Attn: Chief of Staff C  
Deputy Commissioner for Operations Support OS  
Commissioner, Wage and Investment Division SE:W  
Deputy Chief Information Officer for Operations OS:CTO  
Associate Chief Information Officer, Applications Development OS:CTO:AD  
Associate Chief Information Officer, Enterprise Operations OS:CTO:EO  
Associate Chief Information Officer, Enterprise Services OS:CTO:ES  
Director, Enterprise Systems Testing, Enterprise Services OS:CTO:ES:EST  
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 Liaison: Director, Risk Management Division OS:CTO:SP:RM



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**Appendix IV**

*Glossary of Terms*

<b>Term</b>	<b>Definition</b>
Affordable Care Act Information System	A suite of applications, hardware, and software to support the Patient Protection and Affordable Care Act <sup>1</sup> (enacted on March 23, 2010).
Applications Development Organization	A part of the IRS IT organization responsible for building, testing, delivering, and maintaining integrated information technology applications to support modernized systems and the filing season environment.
Change Request	The medium for requesting approval to change a baseline product or other controlled item.
Command Code	A five-character abbreviation for a particular inquiry or action requested through the Integrated Data Retrieval System. Each command code is used for a specific purpose.
Customer Account Data Engine 2	An IRS application that will replace the existing Individual Master File and Customer Account Data Engine applications. It is designed to provide state-of-the art individual taxpayer account processing and technologies to improve customer service to taxpayers and enhance tax administration.
Employee User Portal	The internal IRS portal that allows IRS employee users to access IRS data and systems, such as tax administration processing systems, financial information systems, and other data and applications, including mission-critical applications.
Enterprise Operations Organization	A part of the IRS IT organization that provides server and mainframe computing services for all IRS business entities and taxpayers.
Enterprise Services Organization	A part of the IRS IT organization that designs and tests enterprise solutions. It includes the EST Division responsible for the FIT.

<sup>1</sup> Pub. L. No. 111-148, 124 Stat. 119 (2010) (codified as amended in scattered sections of the U.S. Code), as amended by the Health Care and Education Reconciliation Act of 2010, Pub. L. No. 111-152, 124 Stat. 1029.



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Term	Definition
Error Resolution System	An application that provides for the correction of errors associated with input submissions. The error inventory is managed on a database, and corrected documents are validated by the Generalized Mainline Framework system.
External Trading Partner	External organizations that receive data from or provide data to the IRS. External organizations sharing data with the IRS include State and local governments, banks, other Federal agencies, and foreign governments.
Filing Season	The period from January through mid-April when most individual income tax returns are filed.
Final Integration Test Concept of Operations	A document that provides an overview of the methodology for planning and executing the FIT of software systems before deployment to the current filing season environment.
Final Integration Test Execution	The purpose of this process step is to outline the activities required to execute software tests within the IRS.
Government Accountability Office	An independent, nonpartisan agency that works for Congress. The Office reports to Congress on how well Government programs and policies are meeting their objectives. It advises Congress and the heads of executive agencies about ways to make the Government more efficient, effective, ethical, equitable, and responsive.
Information Technology Organization	The IRS organization responsible for delivering information technology services and solutions that drive effective tax administration to ensure public confidence.
Integrated Customer Communications Environment	An automated self-help system that provides customer service applications through toll-free telephone service and the Internet. The toll-free telephone service provides automated self-service applications that allow taxpayers to help themselves, as well as providing avenues to route taxpayers to live customer service representatives. The Internet component of the ICCE allows taxpayers to check their refund status.
Integrated Data Retrieval System	IRS computer system capable of retrieving or updating stored information. It works in conjunction with a taxpayer's account records.



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Term	Definition
Integrated Enterprise Portal	Allows registered individuals, third-party users, and self-authenticated individual taxpayers access to selected specific tax information and other sensitive applications and data. It supports the exchange of bulk files of information with the IRS.
Job	A collection of specific tasks constituting a unit of work for a computer.
Knowledge Incident/Problem Service Asset Management System	An IRS application that maintains the complete inventory of information technology and non-information technology assets, computer hardware, and software. It is also the reporting tool for problem management with all IRS-developed applications.
Modernized e-File	The IRS's electronic filing system that enables real-time processing of tax returns while improving error detection, standardizing business rules, and expediting acknowledgements to taxpayers. The system serves to streamline filing processes and reduce the costs associated with a paper-based process.
Office of Management and Budget	The largest component of the Executive Office of the President. The management side oversees and coordinates the Federal procurement policy, performance and personnel management, information technology, and financial management. In this capacity, it oversees agency management of programs and resources to achieve legislative goals and administration policy.
Portal	The web-based infrastructure (hardware and software) that serves as the entry point for web access to IRS applications and data.
Processing Year	The calendar year in which the tax return or document is processed by the IRS.
Results Oriented Transaction Processing	Processing triggered by the input of a taxpayer form, an Integrated Data Retrieval System Command Code, taxpayer request for information on an IRS application website, or a telephone call which will ultimately produce a refund, notice, or letter as output back to the taxpayer.



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<b>Term</b>	<b>Definition</b>
Scenario	It is comprised of the event, <i>i.e.</i> , type of input data which results in an action, the entry point into the system, <i>e.g.</i> , Integrated Data Retrieval System, Integrated Submission and Remittance Processing, <i>etc.</i> , the action, and the expected result. There may be several scenarios per thread.
Test Case	The foundation of a test. A test case references specific test data and the expected results associated with specific program criteria. It is used to verify a specific process in the application software and to test system requirements.
Thread	The data flow of a test execution path through the IRS filing season process. Threads depict which runs will be executed and contain an overall view of the system through which the data are processed.
Unified Work Request	Gives the detailed business requirements for data requests so that the IRS can properly review, assign, analyze, and respond (approve/deny) to the request and can also cost and schedule the request for the implementation and delivery of any agreed-upon information technology products or services.
Wage and Investment Division	A part of the IRS organization responsible for serving taxpayers filing a Form 1040, <i>U.S. Individual Income Tax Return</i> , with no accompanying Schedule C, <i>Profit or Loss From Business</i> , Schedule E, <i>Supplemental Income and Loss</i> , Schedule F, <i>Profit or Loss From Farming</i> , or Form 2106, <i>Employee Business Expenses</i> , and no international activity. Annually, the Wage and Investment Division serves more than 123 million customers, accounting for about 94 million individual tax returns.



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**Appendix V**

*Management's Response to the Draft Report*

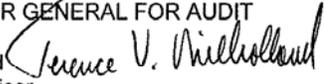


CHIEF TECHNOLOGY OFFICER

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

**AUG 28 2014**

MEMORANDUM FOR DEPUTY INSPECTOR GENERAL FOR AUDIT

FROM: Terence V. Milholland   
Chief Technology Officer

SUBJECT: Increased Support is Needed to Ensure the Effectiveness of the Final Integration Test (Audit # 201320018)(e-trak #2014-58232)

Thank you for the opportunity to review your draft audit report and to discuss earlier draft report observations with the audit team. As you observe in your report, the Final Integration Test (FIT) is a critical element in ensuring the quality of our tax processing systems as we start a new tax filing season.

I am encouraged that your audit has not found any fundamental weaknesses in the overall execution of the FIT. From that strong foundation, we strive to make continual improvement. TIGTA's findings and recommendations are consistent with the direction we are taking to improve FIT test operations and they validate actions the FIT team is already focused on to improve test practices. Accordingly, the IRS is in agreement with all recommendations. We will work to implement the recommendations expeditiously, contingent upon overall budget constraints and prioritization of essential taxpaying operations.

I am committed to continuously improving IRS information technology systems and processes. We value your continued support, and the assistance and guidance your team provides. Our corrective action plan for the recommendations is attached. If you have any questions, please contact me at (240) 613-9373, or a member of your staff may contact Lisa Starr, Program Oversight Coordination Manager, at (240) 613-4219.

Attachment



*Increased Support Is Needed to Ensure the Effectiveness of the Final Integration Test*

Attachment

Draft Audit Report - Increased Support is Needed to Ensure the Effectiveness of the Final Integration Test (Audit # 201320018) (e-trak# 2014-58232)

**RECOMMENDATION #1:** The Chief Technology Officer should ensure that an analysis of the problem tickets is performed to determine if there are any root causes that can be addressed to reduce the burden on the FIT program and IT organization resources.

**CORRECTIVE ACTION #1:** The IRS agrees that an analysis of FIT problem tickets should be performed to improve overall quality of software development and FIT testing. EST will develop a plan to engage Application Development partners and define a process to conduct analysis of FIT problem tickets to be implemented annually as part of test close out activities beginning with the Filing Season 2015 FIT test. Ongoing management and support of the root cause analysis activities will require additional resources and is contingent on additional funding or re-prioritization of other activities.

**IMPLEMENTATION DATE:** June 25, 2015

**RESPONSIBLE OFFICIAL:** The Associate Chief Information Officer, Enterprise Services

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

**RECOMMENDATION #2:** The Chief Technology Officer should identify and provide the resources needed to ensure the necessary level of EOps organization and Wage and Investment Division support to the FIT program.

**CORRECTIVE ACTION #2:** To the extent funding is available, the IRS agrees to ensure the necessary level of EOps & W&I resources are in place in support of the annual FIT. EST will submit a MOU to EOps for support for all FIT activities and will extend the duration of W&I field support resources.

**IMPLEMENTATION DATE:** October 25, 2014

**RESPONSIBLE OFFICIAL:** The Associate Chief Information Officer, Enterprise Services

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

**RECOMMENDATION #3:** The Chief Technology Officer should ensure that the ICCE is included in the FIT program's environment.

**CORRECTIVE ACTION #3:** The IRS agrees to include the ICCE application in the FIT environment. Costing plans are in progress to implement the ICCE application in FIT in support of Filing Season 2015



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Attachment

Draft Audit Report - Increased Support is Needed to Ensure the Effectiveness of the Final Integration Test (Audit # 201320018) (e-trak# 2014-58232)

testing. Applications Development, Customer Service Domain, has submitted UWR#115436 to gather cost estimates and EST has submitted UWR#88996 as a formal request for an ICCE environment. The 2015 Annual FIT effort is moving forward with test planning and preparation to include ICCE in its Filing Season 2015 scope contingent upon overall budgets and prioritization of essential taxpaying operations.

**IMPLEMENTATION DATE:** November 25, 2014

**RESPONSIBLE OFFICIAL:** The Associate Chief Information Officer, Enterprise Services

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

**RECOMMENDATION #4:** The Chief Technology Officer should establish performance goals and metrics for the annual FIT program and establish procedures for reporting on the progress in meeting those goals and metrics.

**CORRECTIVE ACTION #4:** The IRS agrees that the FIT program establish performance goals and a process for monitoring and reporting of FIT performance. A plan will be submitted identifying goals, measures and reporting process by September 2015. EST will require additional resources to implement, manage and support the identification and reporting of performance metrics. Implementation will begin to the extent overall budgets and prioritization of essential taxpaying operations allows.

**IMPLEMENTATION DATE:** September 25, 2015

**RESPONSIBLE OFFICIAL:** The Associate Chief Information Officer, Enterprise Services

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

**RECOMMENDATION #5:** The Chief Technology Officer should establish a process to determine the reason FIT test tax returns go to the ERS and use those results to identify training opportunities or operational improvements.

**CORRECTIVE ACTION #5:** The IRS agrees that further ERS training is required to reduce the ERS fallout during the Annual FIT. EST is taking steps to implement this recommendation and has initiated ERS training sessions to address common fallout errors. EST will continue to leverage the current test tracking tool, Rational Quality Manager (RQM), to document, track and report ERS data results. Further, modifications to existing test tracking tools have been initiated to document, collect and report out ERS fallout results for the Filing Season 2015 effort. The collection and analysis of this data will support Recommendation # 4 and provide insight to ERS processing performance goals.



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**IMPLEMENTATION DATE:** June 25, 2015

**RESPONSIBLE OFFICIAL:** The Associate Chief Information Officer, Enterprise Services

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

**RECOMMENDATION #6:** The Chief Technology Officer should implement the environment comparison and synchronization process between the FIT program's environment and the filing season environment.

**CORRECTIVE ACTION #6:** The IRS agrees to implement an environment synchronization process between the Filing Season and FIT environments. EST will engage EOps environment owners to complete the gap analysis and synchronize the FIT environment in support of 2016 Annual FIT to the extent overall budgets and prioritization of essential taxpaying operations allows.

**IMPLEMENTATION DATE:** September 25, 2015

**RESPONSIBLE OFFICIAL:** The Associate Chief Information Officer, Enterprise Services

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