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Report to the Chairman, Subcommittee on Oversight, Committee on Ways and Means, House of Representatives

October 1999

YEAR 2000 COMPUTING CHALLENGE

Financial Management Service Has Established Effective Year 2000 Testing Controls

GAO/AIMD-00-24

Contents

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

Accounting and Information
Management Division

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October 29, 1999

The Honorable Amo Houghton
Chairman, Subcommittee on Oversight
Committee on Ways and Means
House of Representatives

Dear Mr. Chairman:

The Treasury Department's Financial Management Service (FMS) annually disburses social benefit and other payments and collects revenue which in the aggregate is now about $2.7 trillion. FMS also manages and oversees the federal government's central accounting and reporting systems that generate vital financial information used by congressional and executive agency decisionmakers. Consequently, it is essential for FMS' mission-critical computer systems to operate correctly at and beyond January 1, 2000.

At your request, we reviewed FMS' Year 2000 program to determine whether FMS is (1) effectively managing its Year 2000 testing and (2) taking adequate steps to mitigate the Year 2000 risks associated with four mission-critical systems that were not implemented by the Office of Management and Budget's (OMB) March 1999 deadline. On September 22, 1999, we briefed FMS' Chief Information Officer (CIO) on our work results and later obtained FMS' comments on this report. The CIO agreed with our results and conclusions. On October 4, 1999, we provided this briefing to your office. This report summarizes the information presented at that briefing. The briefing slides are included in appendix I and details of our scope and methodology are in appendix II. Our work was performed from February 1999 through October 1999, in accordance with generally accepted government auditing standards.

Results in Brief

FMS has established effective Year 2000 test management controls for its six most mission-critical systems. For instance, FMS developed test guidance, defined compliance criteria, and defined test roles and responsibilities. Together, these and other controls provided the infrastructure needed for planning, executing and reporting Year 2000 test activities, including system acceptance and end-to-end testing.

In line with our Year 2000 test guide,[1] which is widely accepted and used in government and private industry, FMS also engaged an Independent Verification and Validation (IV&V) contractor to ensure that testing was complete and thorough. We reviewed this contractor's work and found that (1) its scope was consistent with our Year 2000 test guide and (2) the contractor identified no material problems with system acceptance testing of five of FMS' six most critical systems.[2] We also found that although the IV&V contractor did not review the sixth system,[3] FMS took steps to gain reasonable assurance that Year 2000 testing for this system was effectively managed.

Further, FMS has established effective management controls in performing its portion of selected Year 2000 end-to-end tests. Specifically, FMS satisfied the end-to-end testing key processes defined in our guidance for three critical test events. These events focused on three of FMS' most important core business functions–Social Security payments, Supplemental Security Income (SSI) payments, and IRS tax refund payments. The tests included FMS processing payment files from the Social Security Administration (SSA) and Internal Revenue Service (IRS), printing checks, and transmitting electronic payment files to Federal Reserve Banks.

As of October 1, 1999, FMS reported that it had implemented two of the four systems[4] that did not meet the March 31, 1999, OMB-imposed deadline for implementation. For the remaining two, FMS reported that it has (1) renovated and tested both, (2) implemented both at two of five sites, and (3) plans to complete implementation in early November 1999. In addition, FMS has prepared and plans to test system contingency plans for these late systems as well as its other mission-critical systems.

[1] *Year 2000 Computing Crisis: A Testing Guide* (GAO/AIMD-10.1.21, issued as an exposure draft in June 1998; issued in final in November 1998).

[2] Social Security Administration (SSA) Payments, Supplemental Security Income (SSI) Payments, Internal Revenue Service (IRS) Payments, STAR, and Government On-line Accounting Link System (GOALS).

[3] Electronic Federal Tax Payment System (EFTPS).

[4] None of the four were among FMS' six most mission-critical systems. Instead, FMS ranked the four to be lower priority mission-critical systems.

Background

FMS, a bureau of the Department of the Treasury, is the federal government's financial manager. In this capacity, FMS has three primary functions: disburser, collector, and accountant of financial information.

As a disburser for most federal agencies, FMS processed in fiscal year 1998 over 860 million disbursements totaling over $1 trillion. These covered a wide variety of expenses, including social security and veterans benefit payments, IRS tax refunds, federal employee salaries, and vendor billings.

As a collections agent, FMS is responsible for administering the world's largest collections system. In fiscal year 1998, the government collected over $1.7 trillion from individual and corporate income tax deposits, customs duties, loan repayments, fines, and proceeds from leases, among other sources. FMS relies on a network of about 11,000 financial institutions to help collect these revenues.

As an accountant, FMS operates and maintains the federal government's central accounting and reporting systems to reconcile and keep track of the federal government's assets, liabilities, receipts, and disbursements. Financial and budget execution information from these central systems is used by FMS to publish financial reports that are used by the Congress, OMB, and others who make financial decisions on behalf of the U.S. government.

To accomplish many of these functions, FMS relies on six systems it considers its most mission critical:

- The Social Security Administration (SSA) Payments system validates payment certification against payment file totals, performs edit checking, and generates and releases old-age and survivor social security payments.
- The Supplemental Security Income (SSI) Payments system validates payment certification against payment file totals, performs edit checking, and generates and releases SSI payments.
- The Internal Revenue Service (IRS) Payments system validates payment certification against payment file totals, performs edit checking, and generates and releases IRS tax refund payments.
- The Electronic Federal Tax Payment System (EFTPS) collects, deposits, and accounts for taxes withheld by employers from individuals' wages.
- The Government On-line Accounting Link System (GOALS) is a commercial timesharing service comprised of 18 subsystems that

collect, edit, and communicate accounting and financial data to and from federal program agency users.
- STAR maintains the Treasury's central accounting system by aggregating all transactions relating to the receipt and disbursement of government funds.

Because of FMS' heavy reliance on these systems, complete and thorough testing is essential to provide reasonable assurance that they process dates correctly and will not jeopardize FMS' ability to perform core business functions during and after transition to a Year 2000 computing environment. Our Year 2000 test guide describes a structured and disciplined approach for managing Year 2000 test activities.

FMS Established an Effective Year 2000 Testing Organizational Infrastructure

Establishing an effective organizational infrastructure for Year 2000 testing provides the foundation for planning, execution, and reporting on each incremental phase of Year 2000 testing activities, including system acceptance testing and end-to-end testing. FMS has established the 11 organizational infrastructure key processes that our test guide defines. For example, FMS (1) designated program- and project-level test managers for its mission-critical systems, (2) developed and issued organizational Year 2000 test guidance, (3) defined Year 2000 compliance criteria, (4) defined the test organization and its components' roles and responsibilities, (5) defined test facilities and Year 2000 reporting requirements, and (6) employed a process for ensuring the Year 2000 compliance of vendor-supported products and services.

In addition, FMS engaged an IV&V contractor to provide third-party assurance that its testing of 22 of its most mission-critical systems was performed effectively (i.e., that it met process and product standards). We found that the IV&V contractor's scope of work, as specified in the contract between FMS and the contractor, was consistent with our test guide and that the IV&V contractor performed according to the scope of work.

FMS Employed Effective Management Controls in Performing Systems Acceptance Testing

As specified in our test guide, system acceptance testing (SAT) verifies that the entire system performs as intended. To determine how well FMS managed SAT, we (1) selected the six mission-critical systems that FMS identified as being the most important to supporting FMS' central payment, collections, and accounting functions and (2) determined whether the selected systems' testing had been independently verified and validated and, if so, reviewed the results of the IV&V contractor's work.

FMS' IV&V contractor found no material problems with the SAT of five of these systems (SSA Payments, SSI Payments, IRS Payments, STAR, and GOALS) and concluded that FMS had effectively managed SAT. FMS did not subject EFTPS to IV&V because the two commercial banks that operate and maintain the system were subject to Year 2000 examinations by a federal banking regulator–the Office of the Comptroller of the Currency (OCC).

Nevertheless, FMS took other steps to ensure that SAT for EFTPS was managed effectively. For example, FMS reviewed the two banks' testing progress monthly. FMS also required the banks to submit documentation certifying the system's Year 2000 compliance. In addition, OCC agreed to review the banks' progress on EFTPS during the regulator's Year 2000 examinations and report any concerns to FMS. According to FMS, as of October 1, 1999, OCC had performed several on-site Year 2000 reviews at each bank, reported that both had made satisfactory progress, and raised no issues to FMS.[5]

FMS Employed Effective Management Controls in Performing Its Portion of End-to-End Test Events

End-to-end testing verifies that a set of interrelated systems, which collectively support an organizational core business area or function, interoperate properly in an operational environment. These interrelated systems include not only those owned and managed by the organization but also the external systems with which the organization interfaces, as well as the supporting telecommunications infrastructures.

[5]We reviewed the Year 2000 oversight efforts of OCC and the other federal depository institution regulators and found that they had developed and issued detailed Year 2000 guidelines for the institutions and performed extensive, periodic on-site examinations of banks' and other depository institutions' Year 2000 efforts (e.g., see *Year 2000 Computing Crisis: Federal Depository Institution Regulators Are Making Progress, But Challenges Remain* (GAO/T-AIMD-98-305, Sept. 17, 1998)).

In its management of its portion of end-to-end test events for three critical business functions (Social Security payments, SSI payments, and IRS tax refund payments), FMS satisfied the end-to-end testing key processes specified in our guide. For example, FMS worked with its test partners to define the boundaries of these end-to-end tests, secured the commitment of data exchange partners, used interorganizational test teams, prepared test procedures and data, defined the expected results of each test, and documented the test results. In addition, FMS confirmed the Year 2000 compliance of its vendor-supported telecommunications and infrastructure.

FMS Is Reporting Progress on Its Late Mission-Critical Systems

OMB's Year 2000 guidance, as amended in January 1998, requires that all mission-critical systems be renovated, tested, and implemented by March 31, 1999, in order to allow enough time for agencies to ensure that systems are running smoothly and to plan for unexpected failures. On that date, FMS reported that seven mission-critical systems had not yet been implemented. By June 1999, FMS reported that it had implemented three of these systems. As of October 1, 1999, FMS reported that it had implemented two of the four remaining systems. With respect to the remaining two systems, both of which FMS ranked as lower priority mission-critical systems, FMS reported that it had (1) renovated and tested both, (2) implemented both at two of five sites, and (3) planned to complete implementation in early November 1999. In addition, FMS reports that it had prepared and planned to test system contingency plans for these late systems as well as its other mission-critical systems.

Conclusion

FMS has effectively managed the Year 2000 testing of its most critical payment, collection, and accounting systems. While this does not guarantee that Year 2000-induced disruptions will not occur, it should significantly reduce FMS' risk of internal system failures.

We are sending copies of this report to Representative William Coyne, Ranking Minority Member of your Subcommittee; Representatives Bill Archer, Chairman, and Charles Rangel, Ranking Minority Member, House Committee on Ways and Means; Senators William Roth, Chairman, and Daniel P. Moynihan, Ranking Minority Member, Senate Committee on Finance; Senators Fred Thompson, Chairman, and Joseph Lieberman, Ranking Minority Member, Senate Committee on Governmental Affairs; Representatives Dan Burton, Chairman, and Henry Waxman, Ranking

Minority Member, House Committee on Government Reform; and Representatives Steven Horn, Chairman, and Jim Turner, Ranking Minority Member, Subcommittee on Government Management, Information and Technology, House Committee on Government Reform.

We are also sending copies to the Honorable Lawrence H. Summers, Secretary of the Treasury; the Honorable Richard Gregg, Commissioner, Financial Management Service; the Honorable Kenneth S. Apfel, Commissioner, Social Security Administration; the Honorable Charles O. Rossotti, Commissioner of Internal Revenue; the Honorable John Koskinen, Chair, the President's Council on Year 2000 Conversion; and the Honorable Jacob Lew, Director, Office of Management and Budget. We will send copies to others upon request.

If you have any questions, please contact me or Gary Mountjoy, Assistant Director, at (202) 512-6240 or via e-mail at *hiter.aimd@gao.gov* or *mountjoyg.aimd@gao.gov*. Other major contributors to this work were Bernard Anderson, Timothy Hopkins, Richard Hung, and Sabine Paul.

Sincerely yours,

Randolph C. Hite
Associate Director
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Information Systems

Briefing to House Committee on Ways and Means, Subcommittee on Oversight

Accounting and Information Management Division

Treasury Department's Financial Management Service (FMS) Has Established Effective Year 2000 Testing Controls

Briefing to House Committee on Ways and Means, Subcommittee on Oversight

October 4, 1999

1

Briefing Overview

- Objectives, Scope, and Methodology
- Results in Brief
- Background
- Key Findings
- Conclusions

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Objectives, Scope and Methodology

The Subcommittee asked us to determine whether

- FMS is effectively managing its Year 2000 testing. Specifically, has FMS
  - implemented an effective organizational infrastructure for Year 2000 testing,
  - employed effective management controls in performing system acceptance testing (SAT) of selected systems, and
  - employed effective management controls in performing selected end-to-end test events.
- FMS is adequately mitigating the Year 2000 risks associated with four mission-critical systems that did not meet OMB's 3/31/99, implementation deadline.

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Objectives, Scope and Methodology (cont'd)

To address the first objective, we used applicable criteria from our test guide, *Year 2000 Computing Crisis: A Testing Guide* (GAO/AIMD-10.1.21, November 1998):

Applicable GAO Year 2000 Testing Guide Criteria	
Testing Infrastructure	•Assign test management authority and responsibility; define compliance criteria; secure test resources; issue test guidance
System Acceptance Testing	•Schedule and plan tests; prepare test procedures and data; define exit criteria; execute tests and document results; correct defects
End-to-End Testing	•Define test boundaries; schedule and plan tests; prepare test procedures and data; define exit criteria; execute tests; document results; correct defects

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Objectives, Scope and Methodology (cont'd)

Objective 1(a): To assess FMS' Year 2000 testing organizational infrastructure, we

- analyzed the institutional management structures and controls (organizations, policies, guidance, standards) used by FMS to perform Year 2000 testing and
- compared them to the 11 key processes in our guide to identify any variances, their causes, and impacts.

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Objectives, Scope and Methodology (cont'd)

Objective 1(b): To evaluate the management of selected systems' testing, we

- determined whether the selected systems' testing had been independently verified and validated (IV&V) and, if so, we reviewed FMS' IV&V agent's plans and results.
- reviewed, for any selected system whose testing was not independently verified and validated, the management control and oversight steps that FMS took to assure itself that the system had been adequately tested.

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Objectives, Scope, and Methodology (cont'd)

- We selected the six mission-critical systems identified by FMS as being the most crucial to supporting FMS' central payment, collections, and accounting functions. Testing of all but one was reviewed by FMS' IV&V agent.

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Objectives, Scope, and Methodology (cont'd)

System	*Description*
SSA Payments	SSA Payments is used to issue over 500 million payments (roughly 60 percent of FMS' payments) representing about $336 billion annually. This system validates payment certification against payment file totals, performs edit checking, and generates and releases old age and survivor Social Security payments.
SSI Payments	SSI Payments is used to issue about 80 million payments (roughly 10 percent of FMS' payments) representing about $24 billion annually. This system validates payment certification against payment file totals, performs edit checking, and generates and releases supplemental security income (SSI) payments.
IRS Payments	In fiscal year 1998, IRS Payments was used to issue 91 million payments (about 10 percent of FMS' payments) totaling about $137 billion. This system validates payment certification against payment file totals, performs edit checking, and generates and releases IRS tax refund payments.
Electronic Federal Tax Payment System (EFTPS)	In fiscal year 1998, EFTPS was used to collect about $1.1 trillion or nearly 60% of the government's total collections. This system collects, deposits and accounts for taxes withheld by employers from individuals' wages. EFTPS is replacing the current manual paper-based Federal Tax Deposit/Treasury Tax & Loan System.
Government On-line Accounting Link System (GOALS)	GOALS is a commercial timesharing service comprised of 18 sub-systems that collect, edit and transmit data to and from Federal program agency (FPA) users. It supports the gathering of mandatory FPA accounting data that is utilized to satisfy statutory reporting requirements (e.g., Monthly Treasury Statement, United States Government Consolidated Financial Statement).
STAR	STAR is the automated system that maintains the Treasury's central accounting system by aggregating all transactions relating to the receipt and disbursement of government funds.

Objectives, Scope, and Methodology (cont'd)

Objective 1(c): To assess the management of selected end-to-end test events, we

- selected three completed test events (SSA Payments, SSI Payments, and IRS Payments) due to their impact on the public,
- analyzed the management structures and controls (organizations, policies, guidance, standards) used by FMS to manage and perform end-to-end testing for these events and compared them to the 11 key processes in our guide to identify any variances, their causes, and impacts, and

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Objectives, Scope, and Methodology (cont'd)

- did not analyze the management structures and controls used by the other end-to-end test participants (SSA, IRS, and FRB).

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Objectives, Scope, and Methodology (cont'd)

Objective 2: To assess risk mitigation efforts for the four systems that missed OMB's implementation milestone, we

- determined the current status of each system,
- determined each system's purpose and mission significance,
- analyzed plans and schedules for completing each system's outstanding Year 2000 activities, and
- analyzed FMS' plans and activities for identifying and managing each system's risks and assessed progress in implementing risk mitigation strategies.

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Objectives, Scope, and Methodology (cont'd)

- We coordinated our work with the Treasury IG, who is assessing the effectiveness of FMS' Year 2000 business continuity and contingency planning.
- We performed our work from February through September 1999 in accordance with generally accepted government auditing standards.

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Results in Brief

- Objective 1: FMS is effectively managing its Year 2000 testing for its most critical payment, collection, and accounting systems:
  - FMS has established the Year 2000 testing organizational infrastructure key processes specified in our test guide;
  - FMS has implemented an IV&V process which is consistent with our guide, and the IV&V agent followed this process in performing its work;
  - FMS' IV&V agent found no material problems with system acceptance testing of SSA Payments, SSI Payments, IRS Payments; STAR; and GOALS and concluded that this testing was managed effectively;
  - FMS took steps to provide itself assurance that Year 2000 testing for EFTPS had been effectively managed; and

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Results in Brief (cont'd)

  - FMS has satisfied our end-to-end testing key processes on three test events--Social Security payments, Supplemental Security Income payments, and IRS income tax refunds.

- Objective 2: As of September 1, 1999, FMS had implemented two of the four late systems. FMS had also (1) renovated and tested the remaining two late systems, (2) implemented them at two of five sites, and (3) planned to complete their implementation in October 1999. In addition, FMS prepared and planned to test system contingency plans for these late systems as well as its other mission-critical systems.

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Background

- The Financial Management Service, a bureau of the Treasury Department, is the federal government's financial manager.
- In this capacity, FMS has three primary functions:
  - central disburser,
  - collections agent, and
  - accountant/reporter of financial information.

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Background (cont'd)

- As a "central disburser," FMS makes disbursements for most federal agencies.
  - For fiscal year 1998, FMS reported processing over 860 million disbursements totaling over $1 trillion for a wide variety of expenses, including Social Security and veterans benefit payments, IRS tax refunds, federal employee salaries, and vendor billings.

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Background (cont'd)

- As a "collections agent," FMS is also responsible for administering the world's largest collections system.
  - In fiscal year 1998, the government collected over $1.7 trillion from sources such as individual and corporate income tax deposits, customs duties, loan repayments, fines, and proceeds from leases.
  - FMS relies on a network of about 11,000 financial institutions to help collect these revenues.

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Background (cont'd)

- As an "accountant," FMS operates and maintains the federal government's central accounting and reporting systems to reconcile and keep track of the federal government's assets, liabilities, receipts, and disbursements.
  - Financial and budget execution information from these central systems is used by FMS to publish financial reports that are used by the Congress, OMB, and others who make financial decisions on behalf of the U.S. government.

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Background (cont'd)

- To provide its services, FMS relies on a wide array of geographically dispersed information systems. For example,
  - FMS has data centers at six regional centers that support its payment functions.
  - FMS also uses a network of contractors and Federal Reserve Banks to help carry out its other financial management responsibilities.

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Objective 1(a): Test Organizational Infrastructure Key Processes Satisfied

GAO Key Processes	*Satisfied? (Y/N)*
1. Assign Year 2000 test management authority and responsibility	Y
2. Define Year 2000 compliance criteria	Y
3. Develop organizational Year 2000 test and evaluation master plan (TEMP)	Y
4. Engage the quality assurance/ verification and validation group	Y
5. Define and secure test budgets	Y
6. Establish new or augment existing test environments and schedule their use	Y
7. Develop and issue organizational Year 2000 test guidance	Y
8. Establish processes and information sources to support testers and activities	Y
9. Provide for ensuring Year 2000 compliance of vendor-supported products and services	Y
10. Establish processes and metrics for reporting test activity and progress	Y
11. Establish a library of test tools	Y

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Objective 1(a): Test Organizational Infrastructure Key Process 1 Satisfied

- Year 2000 test management authority, responsibility, and accountability should be assigned at both the program and project levels.

- FMS designated two test managers for its mission-critical IT systems. These managers are responsible for coordinating and overseeing testing across platforms to ensure critical testing is performed on a priority basis, as well as to manage the best use of available resources. Automated Information System Project Managers are responsible for testing at the project level.

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Objective 1(a): Test Organizational Infrastructure Key Process 2 Satisfied

- Year 2000 compliance criteria should be defined.
- FMS defined Year 2000 compliance criteria in its *Year 2000 Testing Guidance*. For example, according to the criteria,
  - "date-based functionality must behave consistently for dates prior to, during, and after Year 2000. Manipulations of date data need to be reliable/correct only over the range of dates that an application was designed to process."

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Objective 1(a): Test Organizational Infrastructure Key Process 3 Satisfied

- An organizational Year 2000 test and evaluation master plan should be developed.
- FMS defined its Year 2000 test and evaluation master plan in several documents. For example, FMS
  - defined the test organization and its components' roles and responsibilities in its *Year 2000 Compliance Methodology Document*;
  - developed a master schedule of high-level test activities for each system/project in its Schedule for Year 2000 Platform Availability
  - defined its test facilities and Year 2000 testing reporting requirements in its Year 2000 Testing Guide.

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Objective 1(a): Test Organizational Infrastructure Key Process 4 Satisfied

- The quality assurance/verification and validation group should be engaged.
- On August 24, 1998, FMS engaged a contractor to conduct IV&V. The contractor's scope included 22 high priority systems. The IV&V contractor's role was to
  - review and, if necessary, provide assistance in the development of test plans;
  - evaluate established test criteria, including systems acceptance tests (SAT) and associated test data, to ensure they are comprehensive;

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Objective 1(a): Test Organizational Infrastructure Key Process 4 Satisfied (cont'd)

- act as an independent observer during the test and certification processes; and
- evaluate and validate test results prior to certification.

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Objective 1(a): Test Organizational Infrastructure Key Process 5 Satisfied

- Test budgets should be defined and secured.
- FMS defined and secured a Year 2000 program budget through the century date change. FMS budgeted about $45 million to convert and test its systems from FY 1997 through FY 2000.

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Objective 1(a): Test Organizational Infrastructure Key Process 6 Satisfied

- New test environments should be established or existing ones should be augmented.
- FMS established two Year 2000 test environments for its mainframe systems--one in which HourGlass 2000 software is used to simulate advancement of the operating system date, and the other in which the operating system date is actually advanced. It also established test environments for its mid-level and personal computer systems.

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Objective 1(a): Test Organizational Infrastructure Key Process 7 Satisfied

- Organizational Year 2000 test guidance should be developed and issued.

- FMS developed and issued organizational Year 2000 test guidance via its March 1999 *Year 2000 Testing Guidance*. FMS used our testing guide to develop its guidance.

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Objective 1(a): Test Organizational Infrastructure Key Process 8 Satisfied

- Processes (e.g., configuration management, risk management, etc.) and information sources (e.g., intranet web site containing Year 2000 test requirements, lessons learned data base, etc.) to support testers and test activities should be established.

- FMS established processes and information sources for configuration management, Year 2000 certification, risk management, and quality assurance.

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Objective 1(a): Test Organizational Infrastructure Key Process 9 Satisfied

- Year 2000 compliance of vendor-supported products and services should be ensured.

- FMS ensured that vendors' products and services (including hardware, operating systems software and utilities, application software, telecommunications equipment and lines) for its internal systems were compliant by (1) obtaining vendor certification of its products' and services' Year 2000 compliance and (2) validating vendors' certifications through testing.

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Objective 1(a): Test Organizational Infrastructure Key Process 9 Satisfied

- For systems operated by contractors, FMS required the contractors to attest to the Year 2000 compliance of their vendors' products and services as part of their certification documentation.

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Objective 1(a): Test Organizational Infrastructure Key Process 10 Satisfied

- Processes and metrics for reporting test activity and progress should be established.

- FMS' Year 2000 Special Project Office established processes and metrics for reporting testing activity and progress. For example, project managers submit monthly reports to the project office that detail, among other things, whether system renovation, testing and implementation milestones have been completed and the number of lines of code tested.

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Objective 1(a): Test Organizational Infrastructure Key Process 11 Satisfied

- A library of test tools should be established.
- FMS established a library of test tools. It includes
  - HourGlass 2000 used to simulate advancement of the system operating date;
  - CA-Endevor for configuration management;
  - CA-Datamacs/II which assists in creating test data sets.

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Objective 1(b): IV&V Agent Found That Acceptance Testing on Five Systems Was Managed Effectively

- Our test guide recommends establishing IV&V for test activities as a key process for developing an effective testing infrastructure. Through IV&V of testing, an independent third party group generally reviews test plans and procedures, observes execution of the tests, and reviews test results to ensure that test criteria (guidance, plans, standards) are satisfied.

- FMS' *Year 2000 Testing Guidance* and its IV&V contract statement of work specify the contractor's responsibilities and define an IV&V process that is consistent with our guide.

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Objective 1(b): IV&V Agent Found That Acceptance Testing on Five Systems Was Managed Effectively

- FMS employed IV&V on five of our selected systems: SSA, SSI, and IRS Payments, GOALS, and STAR.*
- We found that the IV&V agent followed FMS' IV&V requirements and did not report material problems.
- The IV&V agent concluded that FMS had effectively managed acceptance testing, including testing of interfaces.

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*IV&V was also employed on 17 other FMS mission-critical systems.

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Objective 1(b): For EFTPS, FMS Took Other Steps to Ensure SAT Was Managed Effectively

- FMS did not select EFTPS for IV&V because the two financial agents (commercial banks) who operate and maintain the system are examined by a federal banking regulator (the Office of the Comptroller of the Currency (OCC)) pursuant to Federal Financial Institutions Examination Council Year 2000 guidance.

- Nevertheless, FMS obtained and reviewed the agents' testing progress via monthly meetings with the two banks.

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Objective 1(b): For EFTPS, FMS Took Other Steps to Ensure SAT Was Managed Effectively

- OCC agreed to review the agents' progress on EFTPS during the regulator's Year 2000 examinations and report any concerns to FMS. According to FMS, OCC has performed several on-site Year 2000 reviews, reported that both agents have made satisfactory progress, and has raised no issues to FMS.
- FMS also required the agents to complete FMS' process for certification. This process includes having bank senior executives attest in writing that EFTPS is Year 2000 compliant and was successfully and comprehensively tested.

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Objective 1(b): For EFTPS, FMS Took Other Steps to Ensure SAT Was Managed Effectively

- The banks submitted their certification documentation to FMS in March 1999, and it has been reviewed and approved by FMS.

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Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests

GAO Key Processes	*Satisfied? (Y/N)*
1. Define the system boundaries of the end-to-end test(s)	Y
2. Secure the commitment of key data exchange partners	Y
3. Establish an interorganizational end-to-end test team	Y
4. Confirm Year 2000 compliance of vendor-supported telecommunications and other infrastructure(s)	Y
5. Schedule and plan the end-to-end test(s)	Y
6. Prepare end-to-end test procedures and data	Y
7. Define end-to-end test exit criteria	Y
8. Execute end-to-end test(s)	Y
9. Document end-to-end test results	Y
10. Correct defects	Y
11. Ensure that end-to-end test exit criteria are met	Y

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Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 1

- The system boundaries of end-to-end tests should be defined.
- FMS worked with its test partners to define the boundaries of their end-to-end tests. For example,
  - for the SSA and SSI payment core business functions, the partners agreed that the test would encompass the following business subfunctions: (1) SSA transmitting payment requests to FMS, (2) FMS processing the requests and then printing checks with post-Jan. 1, 2000, dates or transmitting electronic payment files to the Federal Reserve Banks (FRBs), (3) for the latter, FRBs processing direct deposit files and transmitting them electronically to commercial banks; and (4) FMS transmitting its processing results to SSA.

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Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 1 (cont'd)

– for the IRS refund payment core business function, the partners agreed that the test would encompass the following business subfunctions: FMS (1) processing IRS payment requests and (2) transmitting electronic payment files to an FRB.*

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*This test did not include IRS' generation and transmission of payment request files to FMS. IRS officials stated that IRS plans to test this function with FMS but has not yet established a test date.

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Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 2

- Commitment of key data exchange partners should be secured.

- FMS secured SSA, IRS, and the Federal Reserve's commitment to participate in the end-to-end tests that were planned and successfully conducted.

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Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 3

- An interorganizational end-to-end test team should be established.

- FMS and other test participants (SSA, IRS, Federal Reserve) built upon their existing working relationships and interorganizational teams to assign and share roles and responsibilities for the planning, execution, and reporting of the end-to-end tests. Under this arrangement, each participant was responsible for, among other things, ensuring that exit criteria were met for its portion of the test.

43

Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 4

- Year 2000 compliance of vendor-supported telecommunications and other infrastructure should be confirmed.
- Consistent with the shared leadership approach, FMS confirmed Year 2000 compliance of its vendor-supported telecommunications and other infrastructure via FMS' certification process.

44

Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 5

- End-to-end tests should be scheduled and planned.
- For the three end-to-end test events, FMS defined and documented test schedules, data to be used, anticipated results, interfaces to be tested, roles and responsibilities for performing key tasks, etc.

45

Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 6

- End-to-end test procedures and data should be prepared.

- In addition to test plans, FMS developed test procedures or "scripts" that detailed the steps to be followed and the functions to be tested during the end-to-end test events. SSA and IRS prepared and provided the test data to FMS.

46

Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 7

- End-to-end test exit criteria should be defined.
- For each end-to-end test, FMS defined exit criteria as 100% success. FMS also documented the expected results of the test.

47

Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 8

- End-to-end tests should be executed.
- End-to-end tests for SSA, SSI, and IRS payments were conducted between June 1998 and December 1998 in accordance with the test plans.

48

Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 9

- End-to-end test results should be documented.
- FMS' *Year 2000 Testing Guidance* requires end-to-end test results to be documented and to be reported to management via monthly status reports. Accordingly, FMS documented the test results along with expected results.

49

Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 10

- Defects identified during tests should be corrected.
- No defects were identified during end-to-end tests for IRS Payments.
- Defects were identified and corrected during end-to-end tests for SSA and SSI Payments.

50

Objective 1(c): End-to-End Testing Key Processes Satisfied for FMS' Portion of the Tests--Key Process 11

- Organization should ensure end-to-end test exit criteria are met.

- According to FMS, it ensured exit criteria were met on its segments of the tests by having test participants verify whether FMS file formats, test results, and input/output data met exit criteria.

51

Objective 2: Two Remaining Late Systems Are to Be Implemented in October 1999

- OMB's guidance, as amended in January 1998, requires that agencies complete implementation of their mission-critical systems by March 31, 1999.
- As of March 31, 1999, FMS reported that seven mission-critical systems had not been implemented. At the time of the Subcommittee's request, FMS reported that it had implemented three of these systems, leaving four to be completed.

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Objective 2: Two Remaining Late Systems Are to Be Implemented in October 1999 (cont'd)

- As of September 1, 1999, FMS reported that it had implemented two of the four late systems. For the two remaining systems, FMS reported that it had (1) renovated and tested the systems, (2) implemented them at two of five sites, and (3) planned to complete their implementation in October 1999. In addition, FMS prepared and planned to test in the fall system contingency plans for these late systems as well as its other mission-critical systems .

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Conclusion

- FMS has effectively managed the Year 2000 testing of its most critical payment, collection, and accounting systems.

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Objectives, Scope, and Methodology

Our objectives were to determine whether FMS is (1) effectively managing its Year 2000 testing and (2) taking adequate steps to mitigate the Year 2000 risks associated with four mission-critical systems that were not implemented by OMB's March 1999 deadline.

To address the first objective, we assessed whether FMS had (1) implemented an effective organizational infrastructure for Year 2000 testing, (2) employed effective management controls in performing system acceptance testing of selected systems, and (3) employed effective management controls in performing selected end-to-end tests.

To assess organizational infrastructure, we analyzed FMS' institutional management structure and controls (organizations, policies, guidance, and standards) used to perform Year 2000 testing. We compared these structures and controls against the 11 key processes in our Year 2000 test guidance[1] to identify variances, their causes, and impacts.

To evaluate the management of the selected systems' acceptance testing, we first selected six key systems to review. These systems were selected because they are the most mission-critical systems that support FMS' three central functions (payments, collections, and accounting). For payments, we selected the three systems that process the largest dollar volume and process payment transactions related to public financial well-being.[2] For collections, we selected the system that collects the vast majority of the government's revenue.[3] For accounting, we selected the two systems that, among other things, are central to FMS meeting its statutory mandate of preparing an annual consolidated financial statement for the federal government.[4] FMS officials agreed that our selected systems were its most important systems.

[1] *Year 2000 Computing Crisis: A Testing Guide* (GAO/AIMD-10.1.21, issued as an exposure draft in June 1998; issued in final in November 1998).

[2] According to FMS, these systems–the Social Security Administration (SSA) Payments, Supplemental Security Income (SSI) Payments, and Internal Revenue Service (IRS) Payments systems–issue annual disbursements totaling about $497 billion.

[3] Electronic Federal Tax Payment System (EFTPS) processed the collection of tax receipts totaling about $1.1 trillion in 1998.

[4] These systems are the Government On-line Accounting Link System (GOALS) and STAR.

We then determined whether the selected systems' testing had been independently verified and validated and, if so, we compared the IV&V contractor's scope of work (as specified in the contract between FMS and the contractor) to our guidance and then compared the actual work to FMS' IV&V requirements to ensure that the contractor's work was complete and thorough. This was the case for SSA, SSI, and IRS payments; GOALS; and STAR. For the system whose testing was not independently verified and validated (EFTPS), we reviewed the management control and oversight steps that FMS took to assure itself that the system had been adequately tested.

To assess the management of selected end-to-end tests, we selected three completed test events (SSA payments, SSI payments, and IRS tax refunds) pertaining to FMS' core business functions that are essential to its ability to meet its mission goals. We then analyzed the management structures and controls that FMS used to manage and perform end-to-end testing for these events and compared them to the 11 key processes in our Year 2000 test guidance to identify any variances, their causes, and impacts. We did not analyze the management structures and controls used by the other end-to-end test participants (SSA, IRS, and the Federal Reserve).

To assess the risk mitigation efforts for the four mission-critical systems that missed OMB's March 31, 1999, implementation date, we (1) determined the current status of each system, (2) determined each system's purpose and mission significance, (3) analyzed FMS' plans and schedules for completing outstanding Year 2000 activities, and (4) analyzed FMS' plans and activities for identifying and managing each system's risks and assessed progress in implementing risk mitigation strategies.

We coordinated our work with the Department of the Treasury's Office of the Inspector General, which is conducting a concurrent review of FMS' Year 2000 business continuity and contingency planning.

We conducted our work at the Financial Management Service in Washington, D.C., and Hyattsville, Maryland. We performed our work from February 1999 through October 1999 in accordance with generally accepted government auditing standards.

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