



June 4, 2008

WALTER O'TORMEY
VICE PRESIDENT, ENGINEERING

SUBJECT: Audit Report – Flats Sequencing System: Production First
Article Testing Readiness and Quality (Report Number DA-AR-08-006)

This report presents the results of our self-initiated audit of the Flats Sequencing System (FSS) (Project Number 08YG007DA000). With a [REDACTED] budget, FSS is currently the largest Postal Service mail automation investment. FSS is expected to generate operational savings of between \$593 million and \$677 million annually. Our objectives were to assess progress towards statement of work (SOW) performance criteria and compliance with the SOW's Section M (Test & Quality) requirements. Based on the FSS program schedule, the U.S. Postal Service Office of Inspector General (OIG) is conducting the audit in three phases to cover readiness and quality leading to the production First Article Test (FAT); the outcome of the preproduction System Acceptance Test (SAT)¹; and production FAT. This audit report focuses on readiness and quality leading to production FAT.² Click [here](#) or go to Appendix A for additional information about this audit.

Conclusion

To enhance FSS program success, the Postal Service needs to focus greater attention on several areas to better prepare for production FAT and improve production quality. Specifically:

- Workload – Mail volumes and the number of mail zones processed at the FSS test site are below the assumptions made in the Decision Analysis Report (DAR). This prevents vigorous system testing, and increases the risk of system performance problems and financial returns lower than expected.
- FAT Schedule – The FSS program schedule does not allow time for the results of the in-plant FAT to be evaluated before field FAT begins.
- Critical Deliverables – Delays in the following SOW deliverables may affect system maintainability and performance.
 - Preliminary Production Baseline Technical Data Package (PPBTDP)

¹ SAT – The FSS preproduction SAT consists of a 2-week pretest period followed by 3 weeks of formal testing.

² FAT – Equipment purchased for the first time is placed and tested for functionality, quality, and compliance with contract specifications. After first article acceptance, the supplier begins production deployment.

- Maintenance Diagnostic and Support System (MDSS)
- Program Control System (PCS)
- Production Quality Control – The supplier’s production quality control needs improvement to ensure that systems are built to provide reliable and consistent performance.

Click [here](#) or go to Appendix B for a detailed analysis of these issues.

We recommend the Vice President, Engineering:

1. Ensure the Flats Sequencing System’s preproduction system can process seven mail zones for a reasonable period to meet volume requirements in the Decision Analysis Report before First Article Testing begins.
2. Reassess forecasted mail volumes at sites listed on the current deployment schedule. If mail volume is below expectations, identify the impact of lower mail volumes on savings projected in the Decision Analysis Report and reexamine the number of Flats Sequencing Systems currently scheduled for deployment.
3. Revise the First Article Test schedule to allow sufficient time to review in-plant test results before field First Article Testing begins. The additional time will allow implementation and testing of any design changes needed.
4. Develop a recovery schedule to ensure the Preliminary Production Baseline Technical Data Package will be available before the production First Article Test begins.
5. In coordination with the supplier, ensure that the initial Maintenance Diagnostic and Support System and the Program Control System functionalities are available for First Article Testing and develop a schedule for future design releases.
6. Validate the supplier’s ability to provide qualified personnel to support Flats Sequencing Systems on all mail processing tours, if the supplier is required to provide on-site support.
7. Ensure that the supplier follows the quality control plan and the configuration control process and validates that the first five production systems are built to the same drawing configuration.

Management's Comments

Management generally agreed with the findings and recommendations. Management stated, in general, they had previously identified the findings and are actively addressing them. However, management did not agree to revise the FAT schedule (recommendation 3). Management acknowledged that the finding is a good practice and one that their programs normally follow, but stated that in this case, their current schedule maximizes the opportunity to capture the savings identified in the DAR. Because of their actions to date, management considers recommendations 2 through 5 and 7 closed.

Click [here](#) or go to Appendix C for management's comments in their entirety.

Evaluation of Management's Comments

The OIG considers management's comments generally responsive to the recommendations, and the corrective actions should resolve the issues identified. However, the OIG will keep recommendations 4, 5, and 7 open until management's corrective actions are completed. Specifically:

- Recommendation 4.

Management stated the delay of the Integrated Tray Converter (ITC) will have an impact on the release of the PPBTDP, and they have taken actions to ensure its delivery prior to FAT. Because a large number of drawings for other FSS assemblies have not been approved, the OIG will keep recommendation 4 open until the program office has provided the supplier with written notification that the PPBTDP has been accepted.

- Recommendation 5.

Management stated that their plan includes the initial functionality for PCS and MDSS that will be available for the First Article In-Plant Test. The OIG will keep recommendation 5 open until the Postal Service tests and accepts the first editions of software for the PCS and MDSS during FAT testing.

- Recommendation 7.

Management stated that prior to acceptance of the first five systems, the Postal Service and the supplier will review each nonconforming item for each system and determine its disposition. The OIG will keep recommendation 7 open until the Postal Service provides written confirmation that all five production systems are built to the same drawing configuration.

The OIG considers recommendations 1, 4, 5, 6, and 7 significant, and therefore requires OIG concurrence before closure. Consequently, the OIG requests written confirmation

when corrective actions are completed. These recommendations should not be closed in the follow-up tracking system until the OIG provides written confirmation that the recommendations can be closed.

We appreciate the cooperation and courtesies provided by your staff. If you have any questions or need additional information, please contact Miguel Castillo, Director, Engineering, or me at (703) 248-2100.

E-Signed by Darrell E. Benjamin, 
VERIFY authenticity with ApproveIt

Darrell E. Benjamin, Jr.
Deputy Assistant Inspector General
for Support Operations

Attachments

cc: Brent Raney
Aron Sanchez
Don Crone
Katherine S. Banks

APPENDIX A: ADDITIONAL INFORMATION

BACKGROUND

In December 2006, the Postal Service approved a [REDACTED] to develop, purchase, and deploy 100 FSS machines at 33 sites. [REDACTED]

[REDACTED]. The mail processed by the FSS will arrive at the delivery unit in walk sequence order, ready for delivery by the carrier with no additional mail movement or manual sorting required. Savings should result when delivery units can eliminate the requirement for mail carriers to manually case flat mail. A small reduction in clerks' workhours at delivery units should also result, since employees would no longer need to move FSS-processed mail to the carrier casing areas.

OBJECTIVES, SCOPE, METHODOLOGY

Our audit objectives were to assess progress towards SOW performance criteria and compliance with the SOW's Section M (Test & Quality) requirements. This audit report focuses on production FAT readiness and production quality. To accomplish our objectives, we interviewed Postal Service officials and supplier personnel and reviewed the DAR program schedule and SOW performance requirements. We also attended the FSS monthly technical review meetings and visited the Dulles Processing and Distribution Center (P&DC) to observe the FSS preproduction system in operation.

We conducted this performance audit from February through June 2008 in accordance with generally accepted government auditing standards and included such tests of internal controls as we considered necessary under the circumstances. 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 objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. We discussed our observations and conclusions with management officials on April 29, 2008, and included their comments where appropriate.

PRIOR AUDIT COVERAGE

The OIG has issued one audit report related to FSS risk management, *Flat Sequencing System Risk Management* (Report Number DA-AR-07-003, dated July 31, 2007). The audit determined that Postal Service Engineering needed to focus greater attention on risk management standards to ensure that the significant risks associated with deployment of the FSS were adequately identified and managed.

³ Flats are mailpieces that exceed one of the maximum dimensions of letter-size mail. Large envelopes, newspapers, catalogs, circulars, and magazines are examples of flats.

APPENDIX B: DETAILED ANALYSIS

Workload

Flat mail volumes and the number of mail zones processed at the FSS test site⁴ were below DAR assumptions. Before preproduction testing began, the FSS test site was processing approximately 44,000 flat mailpieces daily for two of the seven mail zones. [REDACTED]

Because volumes had declined, the test site could not meet assumptions in the DAR for flat mail volumes. Smaller mail volumes than expected would reduce the forecasted DAR savings and would potentially impact the number of FSS machines needed. In addition, the test site could not process more than two mail zones because of technical problems in machine design. Specifically, the Integrated Tray Converter (ITC),⁵ a key component of the machine, performed below expectations. The production FSS should be tested using mail volumes and mail zones reasonably within the DAR assumptions to determine whether it can achieve the required results.

Table 1. Key Program Performance Criteria

Redacted

First Article Test Schedule

The FSS program schedule does not allow time for the results of the in-plant FAT to be evaluated before the field FAT begins. The Postal Service typically needs at least 2 weeks to implement and test any system design changes resulting from the in-plant FAT results. Because Postal Service management wanted to deploy the FSS equipment as quickly as possible to capture savings, they reduced the time to evaluate the in-plant FAT. This limits both the Postal Service's and the supplier's ability to make system design changes before beginning field FAT.

⁴ The FSS test site is located at the Dulles P&DC in the Capital Metro Area.

⁵ ITC – After first-pass processing, the ITC moves mail to feeder trays for delivery point processing (second pass).

Critical Deliverables

Other requirements in the SOW are also critical to the FSS program's success. For example, three key deliverables—acceptable PPBTDP,⁶ MDSS,⁷ and PCS⁸—are currently behind schedule. Recent projections indicate that the complete PPBTDP will not be available until summer 2008 because source data is unavailable for the ITC. In addition, the initial release of the MDSS and PCS may not be available for the start of production FAT because the Postal Service and the supplier have not agreed on the requirements definition for the first releases.

Delaying the PPBTDP and MDSS will postpone the release of the FSS Maintenance Handbook. The handbook is needed for training development and is the primary reference material that supports maintenance training. In addition, without a fully functional MDSS, the Postal Service may not be able to effectively maintain the FSS equipment and may need on-site support from the supplier. If this occurs, the Postal Service estimates that 50 on-site supplier technicians will be required to support early FSS deployments. Lastly, if PCS is delayed at the start of production, on-site personnel will have less opportunity to learn the PCS system before FSS machines are installed. PCS allows the test sites to balance incoming flat mail volume on multiple FSS machines.

Production Quality Control

The FSS production quality control needs improvement to ensure that systems provide reliable and consistent performance. During our audit, we performed a walk-through inspection of on-site assembled parts and reviewed the material open item log dated March 12, 2008. The item log documented the following issues:

- Missing parts.
- Assemblies built to unapproved (redline) drawings.
- Assemblies not always tested before shipment from the supplier's subcontractor.

In addition, changes to system drawings did not always incorporate current revision notices (RN).⁹ As of February 22, 2008, 958 RNs were not incorporated into the most current drawing, and 397 of the open RNs were at least 3 months old. These issues

⁶ The PPBTDP must define the complete system as supplied, from contract award leading up to the production stage. The PPBTDP must reflect, through updates, all supplier-prepared change documentation incorporated into the preliminary production system.

⁷ The MDSS allows the results of all diagnostic and troubleshooting utilities to be activated, deactivated, and displayed. The MDSS includes performance monitoring and diagnostics that gather and analyze performance indicators and provide warnings and error messages automatically and in real time. MDSS also supports condition-based maintenance and schedules preventive and corrective maintenance.

⁸ The PCS is a decision support and real-time planning tool that gives managers, supervisors, and planners the data and functionality they need to efficiently monitor, schedule, and manage the daily FSS operation. PCS also provides forecast values for throughput and incoming mail volume and performs workload planning, machine staffing, and data management.

⁹ Revision notices describe the change and state whether the equipment was effective.

occurred because the supplier did not follow the quality plan and configuration control management process.

When effective production quality controls are not in place, there is an increased risk that the Postal Service will accept production machines that do not consistently meet reliability and maintainability standards. Also, without an effective configuration control process, the first five production machines may not be built to the same drawing configuration.

APPENDIX C: MANAGEMENT'S COMMENTS

WALTER O'TORMEY
VICE PRESIDENT
ENGINEERING



May 27, 2008

Brian Newman
Acting Director, Audit Operations
1735 North Lynn Street
Arlington, VA 22209-2020

SUBJECT: Response to Draft Audit Report – Flats Sequencing System: Production First Article Testing Readiness and Quality (Report Number DA-AR-08-DRAFT)

USPS Engineering has reviewed OIG Report DA-AR-08-DRAFT and provides the requested written response herein. In general, USPS Engineering has previously identified the findings included in the report and is actively addressing the findings as outlined in our response. Please find below, our responses and closure plans as they relate to each of the recommendations provided in the subject report.

O.I.G. RECOMMENDATION #1

Ensure the Flats Sequencing System's preproduction system can process seven mail zones for a reasonable period to meet volume requirements in the Decision Analysis Report before First Article Testing begins.

USPS RESPONSE

USPS Engineering has previously identified this finding as a risk and has developed a plan to meet First Article Test mail volume requirements.

As a clarification, please note that the subject OIG report incorrectly refers to "seven mail zones". This should be correctly stated as seven sort plans, since some sort plans have multiple zones.

The FSS Pre-Production system will most likely not reach the required throughput to handle seven sort plans prior to the start of the FSS Production Field First Article Test. This is due to issues with the Integrated Tray Converter and the TOP 2000 software that currently limit the throughput capacity of the system. These issues are planned to be resolved in the production system and retrofitting the Pre-Production system before going to Field FAT would not be in the best interest of the Postal Service.

We are currently processing four sort plans on the Pre-Production system each day. The fifth sort plan will be running by May 28, and we plan to implement an additional sort plan for a total of six. When the Production FAT system is fully integrated at the Dulles, VA facility, we will load the seventh sort plan on to the Production FAT system. Once the Production FAT system is stable we will transfer the six sort plans from the Pre-Production system to the Production FAT system. Additional sort plans will then be loaded to the Pre-Production system to back-fill its capacity. See below for the list of sort plans and the expected time frames of their implementation.

8403 LEE HIGHWAY
MERRIFIELD VA 22082-8101
703-280-7001

Ramp-up of Sort Plans – Dulles Pre-Production system

1. Currently On-Line
 - a. Reston Annex
 - b. Fairfax
 - c. Sterling/Reston Main
 - d. McLean
2. Culpepper/Burke - 5/28/2008
3. Alexandria - 6/11/2008
4. Falls Church (Implemented on the Production FAT system) - Mid July 2008
5. Transfer sort plans from Pre-Production to Production FAT system August 1 – August 22, 2008

USPS CLOSURE PLAN

This issue will be closed when USPS Engineering documents that the FSS Production First Article system can successfully process seven sort plans in a normal processing day.

O.I.G. RECOMMENDATION #2

Reassess forecasted mail volumes at sites listed on the current deployment schedule. If mail volume is below expectations, identify the impact of lower mail volumes on savings projected in the Decision Analysis Report and reexamine the number of Flats Sequencing Systems currently scheduled for deployment.

USPS RESPONSE

USPS Engineering has previously identified this finding as a risk and efforts have been completed to ensure that all systems will meet the Decision Analysis Report volume expectation.

The Postal Service has reassessed projected mail volumes for Phase-1 FSS sites, and additional zones for flats sequencing have been identified to compensate for predicted volume decline across the initially selected zones. Note that, as a hedge against possible future volume decline, the number of systems targeted per FSS site during the Phase 1 planning process was intentionally set at a number lower than that necessary to support 100% of the candidate forecasted volume. The flat volume decline now being experienced has no impact on Phase-1 projected DAR savings. We continue to judge the number of Flats Sequencing Systems scheduled for deployment to be an appropriate quantity and scheduled for deployment in the right locations.

The process used to monitor volume forecasts utilizes a zone-based system capacity deployment model developed in the fall of 2006.

[REDACTED]

In December 2007, the model was updated with FY 2007 volume data. This information was shared with each Area, which was tasked to select additional zones and carrier routes to compensate for the decline in volume from FY 2006 to FY 2007.

[REDACTED]

Since mail volumes are not static, we will continue to monitor volume forecasts and makes adjustments if necessary.

USPS CLOSURE PLAN

USPS Engineering considers this recommendation closed.

O.I.G. RECOMMENDATION #3

Revise the First Article Test schedule to allow sufficient time to review in-plant test results before field First Article Testing begins. The additional time will allow implementation and testing of any design changes needed.

USPS RESPONSE

USPS Engineering disagrees with the finding.

USPS Engineering agrees that the finding is a good practice and one that our programs normally follow. In fact, the original FSS plan provided eight weeks between the end of the FSS In-Plant Test and the beginning of the Field First Article Test, with approximately six weeks of that time required for tear down and installation of the First Article system at the Dulles, VA facility.

In early 2008, it became apparent that the supplier was behind schedule and would not be able to meet the contract program schedule. Therefore, the Supplier and USPS jointly developed a new program schedule that delayed In-Plant and Field First Article testing but maintained the contract production deployment schedule.

This approach allows us to recover 6-8 weeks of the program delay since we eliminate the time required to tear down and re-install the First Article system. We acknowledge that the revised schedule minimizes our ability to analyze the In-Plant Test data prior to the field test and that the schedule has inherent risks.

In order to minimize the risk the following plans are in place.

1. Monitor the In-Plant Test results on a daily basis to ensure that critical issues are identified and resolved prior to the start of the Field First Article Test. USPS and the supplier are jointly developing the First Article In-Plant Test Plan documentation in a manner that permits near real time recording of the results by using pass/fail checklists.
2. The In-Plant Test will be performed during non-processing hours such that live mail runs can be performed during the In-Plant Test period. This approach will allow us to better evaluate the state of the system prior to the start of the field test. Additionally the Engineering Reference System, housed at the supplier's facility will be utilized to simultaneously conduct many of the Functional Engineering Tests (FETs).

In the event that the FSS fails to meet critical In-Plant test elements or fails to meet performance metrics during the In-Plant test period, the USPS will expeditiously evaluate the need to issue a stop notice, in which case the Field FAT will not begin until the issues are resolved.

USPS CLOSURE PLAN

USPS Engineering considers this recommendation closed.

O.I.G. RECOMMENDATION #4

Develop a recovery schedule to ensure the Preliminary Production Baseline Technical Data Package will be available before the production First Article Test begins.

USPS RESPONSE

USPS Engineering has previously identified this finding as a risk and has jointly developed a recovery schedule with the supplier.

The Integrated Tray Converter (ITC) is a major component of FSS. The ITC is one design cycle behind the rest of the FSS design and is the least mature component of FSS. The History of ITC follows:

1. FSS Prototype Indy – No ITC
2. FSS Pre-Production In-Plant Test – ITC Version 1.0
3. FSS Pre-Production Field Test (Dulles, VA) – ITC Version 2.0
4. FSS Production First Article system (Dulles, VA) – ITC Version 2.5
5. FSS Production system (Dulles, VA, 10/18/08) – ITC Version 3.0

Because the ITC design was behind the rest of the FSS design it was decided that it was in the best interest of the USPS to delay delivery of the FSS PPBTDP until the final ITC version 3.0 could be included and delivered. This approach provides a PPBTDP that accurately reflects the FSS design. The complete PPBTDP is expected to be delivered in August 2008 prior to the start of the Field First Article Test.

USPS CLOSURE PLAN

USPS Engineering considers this recommendation closed.

O.I.G. RECOMMENDATION #5

In coordination with the supplier, ensure that the initial Maintenance Diagnostic and Support System and the Program Control System functionalities are available for FAT testing and develop a schedule for future design releases.

USPS RESPONSE

USPS Engineering has previously identified this finding as a risk and has jointly developed a software build plan with the supplier that identifies specific PCS and MDSS functionality to be included in each software build.

The USPS and the supplier have developed work groups that generally meet on a weekly basis to fully develop the detailed design for the Production Control System (PCS) and the Maintenance Diagnostic and Support System (MDSS) components of FSS. The teams have jointly developed a plan that details the release schedule and associated functionality of MDSS and PCS that will be included within each release. The plan includes the initial functionality for PCS and MDSS that will be available for the First Article In-Plant Test.

Since the supplier will be maintaining the initial FSS systems, PCS and MDSS functionality is not critical until the spring of 2009 when USPS technicians complete training and return to their respective sites. The plan supports this philosophy and allows PCS and MDSS to be fully tested prior to release 6 planned for the spring of 2009. Enclosed is electronic attachment-2 (PCS and MDSS build release notes 2008-05-08.pdf), which provides an outline of the functionality that will be provided in each release for PCS and MDSS. Also enclosed is electronic attachment-3 (E-9 SW Project

Management Schedule 2008-05-07 Rev 3.zip), which is a copy of the detailed software plan that provides the schedule for each release.

USPS CLOSURE PLAN

USPS Engineering considers this recommendation closed.

O.I.G. RECOMMENDATION #6

Validate the supplier's ability to provide qualified personnel to support Flats Sequencing Systems on all mail processing tours, if the supplier is required to provide on-site support.

USPS RESPONSE

USPS Engineering has previously identified this finding as a risk and is working with the supplier to ensure they provide qualified technicians at USPS sites that require supplier on-site support.

The supplier is required to provide on-site maintenance support for FSS deployed systems that do not have a fully trained compliment of maintenance personnel. In order to provide this support, the suppler must hire and train personnel for this purpose. The supplier is developing a training package that focuses on system troubleshooting and system operations and uses the following three methods to conduct the training:

1. Formal Classroom Training
2. Lab Training on the FSS Logistics Reference System (LRS)
3. On-The-Job Training

The USPS will ensure the supplier validates this training.

USPS CLOSURE PLAN

USPS Engineering considers this recommendation closed when the supplier-provided training for the on-site maintenance support personnel is validated.

O.I.G. RECOMMENDATION #7

Ensure that the supplier follows the quality control plan and the configuration control process and validates that the first five production systems are built to the same drawing configuration.

USPS RESPONSE

USPS Engineering has previously identified this finding as a risk and is working with the supplier to ensure quality and configuration control processes are followed.



Prior to acceptance of the first five systems, the USPS and the supplier will review each non-conforming item for each system and determine its disposition.

██████████ the supplier will be required to strictly adhere to all quality and configuration control processes. These processes shall be in accordance with the supplier's approved Quality Plan and will be audited by the USPS Quality organization. Adherence to the Quality Plan will ensure the ██████████ systems are built to the same configuration.

USPS CLOSURE PLAN

USPS Engineering considers this recommendation closed.


Walter O'Tormey

- Attachment-1: FSS.Phase1.Zones_05.01.08.xls
- Attachment-2: PCS and MDSS build release notes 2008-05-08.pdf
- Attachment-3: E-9 SW Project Management Schedule 2008-05-07 Rev 3.zip