

June 18, 2003

THOMAS G. DAY
VICE PRESIDENT, ENGINEERING

SUBJECT: Audit Report – Wide Field of View Camera Program
(Report Number DA-AR-03-005)

This report presents the results of our self-initiated audit of the Wide Field of View Camera Program (Project Number 02BG024DA000).

Background

The Postal Service is developing the Wide Field of View Camera System to replace the current Wide Area Barcode Readers in use on all barcode sorting machines.¹ The Wide Area Barcode Readers will be phased out due to end-of-life issues and the inability to support market-driven initiatives. In October 2001, Engineering received approval for \$149 million to purchase Wide Field of View Camera Systems for Delivery Barcode Sorters and Carrier Sequence Barcode Sorters.

The potential benefits of the new camera system will be to provide improvements to current reader acceptance rates, enable current mail processing equipment to be integrated with evolving revenue protection technologies, reduce interruptions in operations due to unsupportable Wide Area Barcode Reader equipment, support information platform initiatives, and facilitate deployment of new letter mail sorting systems.

The Wide Field of View Camera System's specific performance requirements include improved read rate performance, overall system performance, system reliability and maintainability. Additionally, the systems will permit reading the Information Based Indicia² and other two dimensional codes on full height letter mail.

Objectives, Scope, and Methodology

The objectives of this audit were to obtain background information on the Wide Field of View Camera System and to identify potential audit issues and formulate detailed audit

¹ Mail Processing Barcode Sorters are not scheduled for Wide Area Barcode Reader replacement.

² Information Based Indicia is a two-dimensional barcode.

objectives, as appropriate. During the course of our review, we attended field First Article Testing, interviewed Postal Service officials, reviewed relevant documentation, and consulted with an Office of Inspector General (OIG) expert. We identified several benefits and areas of concern with the Wide Field of View Camera System. As a result, we are issuing this audit report. This audit was conducted from September 2002 through June 2003, in accordance with generally accepted government auditing standards and included such tests of internal controls as were considered necessary under the circumstances. We discussed our conclusions and observations with appropriate management officials and included their comments, where appropriate.

Prior Audit Coverage

We did not identify any prior audits or reviews related to the objective of this audit.

Results

The audit revealed there are several positive aspects of the new Wide Field of View Camera System. For example, during the field First Article Test the systems demonstrated the capability to read addresses on mailpieces that were previously difficult to process. Specifically, the system processed Postal Numeric Encoding Technique (POSTNET)³ barcodes, glossy windowed mailpieces and colored envelopes better than the Wide Area Barcode Readers. As a result of these improvements, the number of rejected mailpieces decreased.

However, during our review, the OIG identified two areas of concern. First, there were system reliability issues. Second, Engineering did not adequately perform testing of Information Based Indicia. Management's comments, in their entirety, are included in the appendix of this report.

Reliability of the Wide Field of View Camera

Our review found the Wide Field of View Camera System experienced reliability issues during the field First Article Test. Specifically, there were ten occurrences of camera offline conditions and two computer installation failures. During the test period, if extensive corrective maintenance by the vendor was performed, the test may have been terminated.⁴ Consequently, the vendor did not attempt to resolve the reliability issues at that time in order to complete field First Article Testing.⁵ Subsequently, in order to pinpoint why the reliability issues occurred, Engineering postponed the national deployment of the Wide Field of View Camera System. The vendor determined the

³ POSTNET barcodes, are used to encode ZIP Codes on mail.

⁴ If corrective maintenance exceeds 60 minutes, it would be considered a remove and replace event. If more than one Wide Field of View Camera System is recorded as a remove and replace event during testing, the field First Article Test may be terminated.

⁵ Engineering completed testing on November 23, 2002, with a conditional acceptance letter issued on January 9, 2003.

camera offline conditions occurred due to human and software errors. In addition, the vendor could not determine why some computers failed after installation. As a result, the vendor created an updated software version to correct the reliability issues.⁶

Engineering officials stated Software Process management plans to follow the Software Development Life Cycle test procedures to ensure the reliability issues will be resolved in updated software versions.⁷ If the Wide Field of View Camera System is deployed without correcting these issues and documenting results, productivity in mail processing facilities may decrease.

Recommendation

We recommend the vice president, Engineering:

1. Continue to monitor and report on the Wide Field of View Camera System's reliability issues.

Management's Comments

Management agreed with our recommendation stating that Engineering continues to monitor the reliability issues of the Wide Field of View Camera Systems deployed nationwide.

Evaluation of Management's Comments

Management's actions taken or planned should correct the issues identified in the report.

Testing of Information Based Indicia

Engineering performed inadequate testing of the Wide Field of View Camera System's ability to read Information Based Indicia. The field First Article Test plan stated a test objective was to measure the system's read and missort performance concerning Information Based Indicia.

During field First Article Testing, the test team collected data using mailpieces marked with POSTNET and Information Based Indicia. The Delivery Bar Code Sorter processed mailpieces by POSTNET barcodes only. The test team did not examine data for the Information Based Indicia read rates. Engineering officials indicated mail was not sorted according to the Information Based Indicia barcodes because a sort plan had not been developed. They did not have the necessary requirements in order to develop

⁶The software changes are represented in version 2.2.

⁷ The Software Development Life Cycle includes Alpha, Pre-Beta, and Beta testing.

a sort plan for decoding and sorting Information Based Indicia in an operational environment.⁸

Consequently, Engineering cannot ensure the system will read Information Based Indicia under normal operating conditions. A functional system, which properly reads and sorts Information Based Indicia, will give the intended flexibility in addressing and managing customers' mailing requirements.

Recommendations

We recommend the vice president, Engineering:

2. Ensure that adequate requirements are developed for testing Information Based Indicia functionality.
3. Test the ability of the latest version of the Wide Field of View Camera System to decode and sort Information Based Indicia correctly in an operational environment.

Management's Comments

Management agreed with recommendations 2 and 3 stating that Engineering plans to have detailed requirements for testing the Information Based Indicia functionality by July 2003. Engineering is also developing test decks that will enable them to measure the system's ability to decode new Information Based Indicia formats that have been released. They plan on performing extensive testing using all test decks in an operational environment by August 2003.

Evaluation of Management's Comments

Management's comments are responsive to recommendations 2 and 3 and the actions taken and planned should correct issues identified in the report.

⁸ The marketing organization is responsible for developing Information Based Indicia requirements to be used by Engineering. These requirements include various types of Information Based Indicia formats.

We appreciate the cooperation and courtesies provided by your staff. If you have any questions or need additional information, please contact Tracy A. LaPoint, director, Developmental, at (703) 248-2100 or me at (703) 248-2300.

Ronald D. Merryman
Deputy Assistant Inspector General
for Technology/Oversight

Attachment

cc: John A. Rapp
John Keegan
Susan M. Duchek

APPENDIX. MANAGEMENT'S COMMENTS

THOMAS G. DAY
VICE PRESIDENT
ENGINEERING



May 30, 2003

RONALD D. MERRYMAN
DEPUTY ASSISTANT INSPECTOR GENERAL
FOR TECHNOLOGY OVERSIGHT

SUBJECT: Response to Draft Audit Report Wide Field of View Camera Program
(Report Number DA-AR-03-DRAFT)

The following is a revised response to Engineering's letter of May 8, 2003 regarding the OIG's Draft Audit Report on the Wide Field of View Program.

We offer the following comments to the items listed in the report:

Reliability of the Wide Field of View Camera System

OIG Recommendation

1. Continue to monitor and report on the Wide Field of View Camera System's reliability issues.

Response:

We concur with the recommendation. In fact, Engineering continues to monitor the reliability issues of the WFOV systems deployed nationwide. The WFOV system experienced several camera "offline" conditions during field first article testing. A simple diagnostic event was all that was needed to restore the system to an "online" state. We noted it in the conditional acceptance letter to the vendor and demanded a plan to correct this deficiency before going forward with a full scale deployment. As stated in the draft report, the software change that corrects for camera offline condition was implemented in version 2.2 which is now being deployed to the field. We have not had any camera offline cases reported to us since the version 2.2 release (completed in April 2003).

Regarding the two computer installation failures, mentioned in the report, we are still monitoring these occurrences and have found that the problem still requires attention. Lockheed Martin presented the forward plan to fix the problem on April 25, 2003. The plan includes an extensive investigation process that categorizes each of the reasons for failure and includes a new software release to correct the problem by September 2003. The frequency of the repairs is not high enough to disrupt normal operations. We will continue to monitor any reliability issues throughout the program's deployment period.

Testing of Information Based Indicia

OIG Recommendation

2. Ensure that adequate requirements are developed for testing information based indicia functionality.

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

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Response:

We concur with this recommendation. Engineering thoroughly tested the camera's ability to read IBI mail during a functional test prior to the First Article. We demonstrated that if the IBI codes are printed to approved specifications, the system will read them and store the information in log files that are kept for twenty-eight days on each individual WFOV system. Test decks used in the competitive test and subsequently in the in-plant First Article were very limited in scope, but verified that the system had the scan resolution and the capability to read/decode IBI mail.

Our objective as outlined in the statement of work was to procure a system with the resolution sufficient to adequately recognize the image pattern and the decoding algorithm necessary to read it. Engineering plans to have detailed requirements for testing the IBI functionality by July 2003.

OIG Recommendation

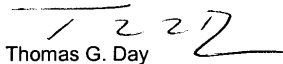
3. Test the ability of the latest version of the Wide Field of View System to decode and sort Information Based Indicia correctly in an operational environment.

Response:

Engineering concurs with this recommendation. We are in the process of developing more extensive IBI test decks for characterizing the Wide Field Of View camera system ability to decode IBI. The First Article Test plan mentioned in error that we would also test the sorting capabilities of the IBI. It was never a requirement to sort a mail piece based on the information in the IBI. The new test deck will have different types of printers with a wide spectrum of resolutions. The information contained in the symbols will be unique for each piece to facilitate analysis of the decode results. Since the original statement of work was released, several different IBI formats have been released. We have given those formats to the vendor and asked them to incorporate into the software for further processing. Engineering is developing test decks that will enable us to measure the system's ability to decode these new formats. We plan on performing extensive testing using all test decks in an operational environment by August 2003.

Conclusion

In general, we agree with your findings and have already taken measures to ensure that the camera continues to provide outstanding results. The program performance has exceeded the original expectations on read and error rates. Currently over 3,000 units have been deployed and sites are realizing the benefits from the reduction of rejected pieces. Engineering will continue to demand acceptable reliability and IBI read rates from the system designer. If you would like any further information, please contact John Keegan at 703-280-7230 or Ed Kuebert at 703-280-7259.


Thomas G. Day

cc: John A. Rapp
Susan Duchek
Thomas Shipe
Aron Sanchez