

M E M O R A N D U M

Final Contract Audit Report with Recommendations

Contract Audit No. 08-053



Subject: Review of Issues and Concerns on
Cubic Contract

Date: February 19, 2008

From: OIG – Helen Lew /s/

**In Reply
Refer To:**

To: CFO – H. Charles Woodruff, II

This **Final Audit Report**, entitled *Review of Issues and Concerns on Cubic Contract*, presents the results of our audit. The objectives of our audit are to (1) identify the contract issues and concerns that have arisen with Cubic Transportation Systems and, (2) evaluate what happened, why it happened, the current status of the contract, and what can be learned from these issues/concerns.

Background

As a result of the Regional Mobility Panel's 1997¹ recommendations, the transit agencies in the greater Washington/Baltimore region embarked on a regional fare collection program, using WMATA's SmarTrip[®] smart card. The purpose of expanding SmarTrip[®] throughout the Washington/Baltimore region (Region) was to achieve a seamless, regional integration in fare payment and to improve passenger convenience.

WMATA awarded three contracts to achieve this objective. The first contract (FJ5872) was awarded to Cubic Transportation Systems (Cubic) for the replacement of Washington Metropolitan Area Transit Authority (WMATA) bus fare boxes with fare boxes that would accept cash and SmarTrip[®] cards. A second contract (C44444) was awarded to Cubic for hardware and software to upgrade the SmarTrip[®] Card and fare collection equipment to enable additional customer and business features. Cubic contract C44444 is the subject of this report. A third contract (CO5034) was awarded to ERG, Inc. for the

**Washington
Metropolitan Area
Transit Authority**

¹ The Regional Mobility Panel was appointed by the WMATA Board of Directors in January 1997 and charged with addressing concerns expressed by the Congress about the rising costs and fragmentation of regional bus services. The Panel's report was accepted for implementation in cooperation with the local jurisdictions of the Washington, DC metropolitan area by the WMATA Board of Directors on October 9, 1997.

Operation of the Regional Customer Service Center (RCSC). A review of the ERG contract is the subject of a separate audit report.

In November 1999, the Department of Planning, Development, Engineering and Construction requested that the WMATA Board Budget Committee approve a contract initiation and award action to replace the existing Metrobus fare boxes with multi-function equipment designed to support inter-modal and inter-agency customer travel. In January 2001, the Department of Transit Systems Development requested Board of Directors approval to award Contract FJ5872 to Cubic for the replacement of WMATA bus fare boxes with fare boxes that would accept cash and SmarTrip[®] cards.

To facilitate the regional fare collection program, specific language was included in the contract with Cubic to allow the Regional Partners² to separately contract with the same supplier for functionally compatible equipment. The WMATA contract provided expediency and ease of funding and contract management for the Regional Partners' fare box purchases. There are seven individual contracts between the Regional Partners and Cubic to provide Automatic Fare Collection systems, including hardware, software, consumables and services as defined in the contracts.

In April 2001, the Department of Communications requested that the Board of Directors approve the initiation of a contract for the development and deployment of a RCSC to perform integrated customer service for the region. During the development of the scope-of-work for the RCSC, it was determined by WMATA that there was an immediate need to modify and expand the existing fare collection hardware and software to support additional customer features and Point-of-Sale Devices. In December 2002, the Department of Communications requested Board of Directors approval of a sole source contract with Cubic to modify the existing system.

The Cubic contract for hardware and software upgrades was awarded on July 31, 2003 in the amount of \$11,952,429. The contract provided for Cubic to deliver the Point-of-Sale Devices, a Data Network Concentrator, and Upgrades to the Regional Automatic Fare

² The Regional partners include the Washington Metropolitan Area Transit Authority, Maryland Transit Administration, Montgomery County, Prince Georges County, City of Alexandria, City of Fairfax, Loudoun County, Fairfax County, Arlington County, City of Falls Church and the Northern Virginia Transportation Commission.

Collection System in October 2004 with final acceptance on January 21, 2005. The contract also required Cubic to make the necessary modifications to WMATA's existing rail and parking software systems to assure compatibility with the software systems of WMATA's Regional Partners.

Upgrades to the system include pass functionality and the capability to handle up to 256 passes. This upgrade will provide the Region with the ability to configure passes in any number of ways, and provide the ability to consolidate companion passes from two or more Regional partners. For example, the Virginia Railway Express Transit Link Pass provides the passenger with unlimited rides on the Virginia Railway Express and Metrorail for one calendar month. According to the Office of SmarTrip® Operations, once they have configured additional passes, this type of pass can be moved to a smartcard.

Contract C44444 required Cubic to deliver to WMATA Point-of-Sale equipment. It was anticipated in the base contract that the Point-of-Sale devices would be available by January 21, 2005 for implementation by ERG through the Regional Customer Service Center. According to the Office of SmarTrip® Operations, the Point-of-Sale devices were expected to be a standard off-the shelf product. Instead, this turned out to be a customized product which Cubic had to develop.

As of August 31, 2007, four modifications have been processed totaling \$11,836,898, doubling the total contract value to \$23,789,327.

Audit Results

We determined that WMATA has not realized the full functionality of the Automatic Fare Collection system that it expected when it awarded the contract to Cubic in July 2003. Further, delays in implementing the system impacted EGR's ability to implement the RCSC, resulting in WMATA paying \$1.4 Million in delay claims to ERG. We identified the following two issues of concern relating to the Cubic Contract:

- The Automatic Fare Collection System Upgrades and development of the Point-of-Sale devices are incomplete, and
- A formal coordination mechanism between the Regional Partners has not been established

These issues, specifically, what happened, why did this happen, and the current status are discussed below.

In the Chief Financial Officer's February 11, 2008, response to a draft of this report, he concurred with our findings and recommendations. The complete text of the response is included as Attachment 1 to this report.

Finding 1- The Automatic Fare Collection System Upgrades and development of the Point-of-Sale devices are incomplete

Our review showed that the Automatic Fare Collection System Upgrades, including the auto load feature, hot card list improvements and the ability to program additional rail and bus passes and Point-of-Sale devices have not been delivered by the contractor. These deliverables were initially scheduled to be completed in October 2004 with final acceptance in January 2005. The current schedule provides for the completion of these deliverables in October 2008. Some of the delays may have been avoided if a risk mitigation plan had been developed to address contract-related risks. The mitigation plan should have contained a comprehensive project plan that included milestones and measurable goals. Mitigation plans also help ensure accurate results are delivered on time and within projected costs.

In September 2003, two months after contract award, Cubic informed WMATA that the work to be performed used out-of-date software (OS2 Platform) that would no longer be supported by Cubic. It provided WMATA with an unsolicited proposal recommending the use of its NextFare4 family of products, which were under development at the time.

By upgrading the existing software WMATA would be able to operate in the Regional SmarTrip[®] System, but this would require additional customized software. In addition, the upgraded software would not have been as robust and flexible as the software installed at the Regional SmarTrip[®] partners. WMATA eventually determined that if the newer technology was not implemented, the WMATA System would lag behind advancements in the smart card fare collection technology. The industry is moving toward a standard architecture and the use of standardized smart cards. Further, the Regional Partners had

already contracted for the purchase of SmarTrip[®] capable bus fare boxes with a newer version of the software.

Cubic's decision to withdraw support for WMATA's existing fare collection system shortly after the contract was awarded delayed the implementation process. Cubic representatives informed us that they believed their proposal to use NextFare4 distracted WMATA's project team. As a result, Cubic effectively stopped work on the Automatic Fare Collection System Upgrade, awaiting WMATA's decision on what to do. In March 2005, Cubic sent a letter to WMATA confirming its understanding of what took place between WMATA and Cubic in a March 1, 2005, meeting. In that meeting *"the parties recognize that Cubic must cease work relative to the Rail Upgrade³ under the subject contract until WMATA advises Cubic if it will incorporate the Tri-Reader II⁴ into its system."*

We asked Cubic representatives why they did not propose using the NextFare4/Single Platform rather than upgrading WMATA's existing fare collection system for the Regional System during contract negotiations. Cubic representatives informed us that the Point-of-Sale/Data Network Concentrator and Rail Upgrade discussions began prior to January 2002 and ended with a contract in July 2003. During this time interval, fare collection technology changed, and new tools were being developed. Cubic management also changed their corporate strategy during that time to move towards a standardized modular system rather than custom systems. Cubic representatives stated that their proposed use of NextFare4/Single Platform and Tri-Reader II's would bring WMATA's system technology current and provide for lower cost in future expansion.

WMATA's delay in deciding whether to implement Cubic's proposed NextFare4/Single Platform solution and subsequent changes required to the Automatic Fare Collection System Upgrades adversely affected the delivery schedules. Negotiations between WMATA and Cubic to reach agreement on the NextFare4/Single Platform solution took approximately three years. Because the NextFare4 family of products was still a conceptual plan at the time of Cubic's proposal, WMATA conducted a thorough design

³ Rail upgrades under the base contract included upgrade of the WMATA Automatic Fare Collection System to support additional smartcard products and increase the configurability of these products to make the rail system compatible with the increased capability of the bus system.

⁴ Tri-Reader 2's were recommended by Cubic to replace the existing Go-Card targets at the fare gates (rail, bus, vendors and parking) which according to Cubic would provide an upgrade path to a common card format.

review to ensure that WMATA staff understood the proposal. Once this was understood, the new system had to be customized to ensure that the functionality of the existing fare collection system could be maintained.

The Department of Planning, Development and Construction requested approval for a contract modification to implement the NextFare4 family of products from the WMATA Board Budget Committee in November 2005. The Committee deferred the proposal until a Regional Software Maintenance Agreement could be reached between WMATA and Cubic. The WMATA Board of Directors approved Contract Modification No. 003 on February 16, 2006. Modification No. 003 added the NextFare4/Single Platform Solution to the contract effective August 23, 2006.

A review of the General Provisions of contract C44444 revealed that it did not include liquidated damages in the event of delays. To ensure the NextFare4/Single Platform is completed, fully functional, and ready for use by the public and WMATA, an \$8.5 million escrow account was established as part of the modification. This amount is payable to the contractor only after a working system is delivered. To guarantee on-time performance, a liquidated damages clause was added to the contract modification for the first time providing that Cubic would pay WMATA \$3,000 per day if the work is not completed within the agreed time frame of 26 months from the Notice-to-Proceed which was issued in August 2006.

According to the Office of SmarTrip® Operations, the benefits of modifying the contract outweighed the benefits of proceeding with the original contract plan. However, there was a significant delay in making the decision to implement the NextFare4/Single Platform model. This delay impacted completion of deliverables by Cubic to upgrade the regional Automatic Fare Collection System required in the base contract, namely the auto load feature, hot card list and point-of-sale devices.

The autoloading modification impacts customer convenience. The customer cannot establish a prearranged amount to be automatically applied to their SmarTrip® card when it falls below a certain level. The customer must go to a Fare Vending Machine or Bus Fare Box to add more monetary value to their SmarTrip® card.

The hot card list functionality within the Automatic Fare Collection System has the ability to store 100,000 card numbers at a given time. It provides the Regional Partners with the ability to turn off lost or stolen cards in an effort to protect their customers. When a smartcard is on the hot card list, the system automatically disables the card the next time the card holder attempts to use it. The current process for deleting smartcards from the hot card list is manual. On a monthly basis or when the list is full, the Office of Treasury reviews the previous three month's activity and removes a card if it has not been used. The upgrade of the hot card list functionality will make deletion of cards from the list automatic by checking for a specific length of time that a card has been inactive and deleting it from the list. Implementation of this function will provide for automatic removal of cards from the hot card list and free up staff time for other functions.

Because of the delays in deploying the Point-of-Sale network, the customer has fewer options on where to purchase and reload SmarTrip[®] cards. While smartcards can be purchased through the internet, mail, WMATA rail stations, sales outlets, and the Commuter Stores, the cards can only be reloaded using one of WMATA's fare vending machines in the rail stations. There is currently no convenient way for a bus only rider to reload a smartcard.

In addition, delays in implementing the Automatic Fare collection System impacted ERG's ability to implement the full functionality of the RCSC, resulting in WMATA paying \$1.4 million in delay claims to ERG.

According to section 501 of WMATA's Procurement Policy (Liquidated Damages), a liquidated damages provision should be included in any Authority contract for supplies, services, and construction, where the Authority is likely to incur direct or indirect economic loss if completion of the contract is delayed.

The U.S. Government Accountability Office (GAO) prescribes *Standards for Internal Control in the Federal Government*. These standards can also be applied by other levels of government. One of the five standards relates to control activities. "Internal control activities help ensure that management's directives are carried out. . . . Control activities are the policies, procedures, techniques, and mechanisms that enforce management's directives. . . . They help ensure that actions are taken to address risks."

Recommendation

We recommend that the Chief Financial Officer direct the Office of SmarTrip® Operations to develop a plan to mitigate the effect of future delays in the development of the Automatic Fare Collection System, reducing risk of implementing obsolete technology, and reducing the timeline in the decision making process. The plan should also address contractor on-time performance and deliverables and the associated damages.

Management Comments

The Chief Financial Officer agreed with our recommendation and listed the following actions they will take to address our recommendation.

They will undertake a risk assessment of this contract and examine the impacts of prior decisions, and staging issues between contractors with key programmatic milestones which have been delayed. Furthermore, their assessment will outline the level of risk on key issues and outline certain lessons-learned since the inception of this program.

They will examine all mitigation measures available to Metro to ensure on-time performance including assessing remedies available to Metro under the terms of the contract, e.g., liquidated damages and withholding escrow payments. Further, their plan will examine alternative pathways to achieve key functionality by the required deadlines.

A specialized system integration consultant (ITSolutions, Inc.) has been engaged to assist WMATA in determining the status of the program and developed an approach to simplify the system architecture and interface issues between Cubic and ERG which should result in fewer delays and better interface.

Finding 2 – A formal coordination mechanism between the Regional Partners has not been established

Although regular meetings between the Regional Partners have occurred, we noted that no one has assumed the role of regional integrator on the cubic project, and the individual Partner's roles and responsibilities are not clearly defined.

In a project this size, a formal process should be established to ensure all parties are coordinating their efforts to avoid conflicts between the systems during development and installation. Some of the delays in implementing the Automatic Fare Collection system might have been avoided if WMATA had developed a business plan with processes for integration of systems and assigning a dedicated resource to coordinate these integrations.

Officials in the Office of SmarTrip[®] Operations explained that there are benefits to WMATA and the Regional Partners having a regional integrator. Also, a designated third party integrator may have provided a timely and specific decision to purchase and implement the NextFare4/Single Platform solution. To fill the void resulting from the lack of a designated regional integrator, WMATA staff had to work with the Regional Partners to implement their systems.

According to the Office of SmarTrip[®] Operations, the Regional Partners expected Cubic to serve as the regional integrator of the system. However, Cubic officials told us that systems integration was not included in their scope of work. They also believe it would be inappropriate for the developer to act as the system integrator. Cubic acting as both developer and system integrator would have created a situation where there was a lack of segregation of duties.

The Office of SmarTrip® Operations informed us that Automatic Fare Collection technology is moving forward at a rapid pace, and the Washington Metropolitan Region is attempting to keep up with these changes. However, it is difficult for a regional group this large and with as many different fare collection requirements to react quickly and efficiently in dealing with changes and conflicts. This project would benefit from the Regional Partners providing a more direct method of reporting to foster higher level decision making and to provide a formal process for such action.

The U.S. Government Accountability Office (GAO) prescribes *Standards for Internal Control in the Federal Government*. These standards can also be applied by other levels of government. The standards address general and application controls for information systems. Effective communication is included in those controls. "Effective communication should occur in a broad sense with information flowing down, across, and up the organization. In addition to internal communications, management should ensure there are adequate means of communicating with and obtaining information from, stakeholders that may have a significant impact on the agency achieving its goals." The standards also address Control Activities which include Segregation of Duties. "Key duties and responsibilities need to be divided or segregated among different people to reduce the risk of error or fraud."

Recommendation

We recommend that the Chief Financial Officer work with the Regional Partners to establish a more formal process for integration of the systems and identify a regional integrator to coordinate the interface between WMATA and the RCSC systems. The integrator should ensure there is coordination between the various Regional partners.

Management Comments

The Chief Financial Officer agreed with our recommendation and listed the following actions taken to address our recommendation.

On September 13, 2007, they engaged the services of ITSolutions, Inc., a systems integration and architecture consultant to guide and advise WMATA through the complexities of Cubic's system. Their chief role is to advise WMATA on simplifying the system architecture and minimizing complex integration risks as the program advances.

They will examine options to bring a specialized systems integrator to assist WMATA through the completion of the program. Use of an integrator services would bring more highly-skilled resources to the program and can bring temporary resources on to meet specific and challenging needs.

Scope and Objectives

The objectives of our audit are to (1) identify the contract issues and concerns that have arisen on WMATA's contract with Cubic Transportation Systems and, (2) evaluate what happened, why it happened, the current status of the contract, and what can be learned from these issues/concerns.

We began our field work on December 1, 2006, and concluded our initial interviews on May 8, 2007. We interviewed WMATA staff from the Offices of SmarTrip[®] Operations, Chief Engineer Systems and Information Technology. We also interviewed Cubic officials. We conducted follow-up discussions to clarify specific issues with WMATA staff through August 28, 2007. We reviewed the documentation pertaining to WMATA Board of Directors actions, contract award, contract modifications, and contract performance. We also reviewed overall project management, quality assurance issues, time and budget information, and issues/concerns identified on the contract pertaining to Contractor performance.

We held an exit conference with the Director of SmarTrip[®] Operations on December 10, 2007.

Administrative Matters

Corrective actions proposed (resolution phase) and implemented (closure phase) by your office will be monitored and tracked through the Office of Inspector General's Audit Accountability and Resolution Tracking System. Department policy requires that you develop a final corrective action plan (CAP) for our review and entry into the automated system within 30 days of the issuance of this report. The CAP should set forth the specific action items, and targeted completion dates necessary to implement corrective actions on the findings and recommendations contained in this report.

If you have any questions pertaining to this Report, please contact Andrew Clemmons, Assistant Inspector General Audits on (202) 962-1014, or me on (202) 962-2515.

/s/

Helen Lew
Inspector General

Attachment

cc: CFO - Greg Garback
CHOS – Shiva Pant
COUN – Carol O’Keeffe
CSAC – Sara Wilson

M E M O R A N D U M



SUBJECT: Draft OIG Report; Review of
Issues and Concerns on Cubic
Contract

DATE: February 11, 2008

FROM: CFO - H. Charles Woodruff, II

TO: OIG - Helen Lew

This memorandum is in response to the draft audit report dated December 14, 2007 entitled "Review of Issues and Concerns on Cubic Contract." In the body of the draft report, there are two findings with follow-on recommendations offered and our comments are outlined below.

Finding 1 - The Automatic Fare Collection System Upgrades and development of the point-of-sale devices are incomplete. **Recommendation:** We recommend that the Chief Financial Officer direct the Office of SmarTrip Operations to develop a plan to mitigate the effect of future delays in the development of the automatic fare collection system, reducing risk of implementing obsolete technology, and reducing the time-line in the decision making process. The plan should also address contractor on-time performance and deliverables and the associated damages. **Response:** We concur with the recommendation.

We will undertake a risk assessment of this contract and examine the impacts of prior decisions, and staging issues between contractors with key programmatic milestones which have been delayed. Furthermore, our assessment will outline the level of risk on key issues and outline certain lessons-learned since the inception of this program.

We will examine all mitigation measures available to Metro to ensure on-time performance including assessing remedies available to us under the terms of the contract, e.g., liquidated damages and withholding escrow payments. Further, our plan will examine alternative pathways to achieve key functionality by the required deadlines.

A specialized system integration consultant (ITSolutions, Inc.) has been engaged to assist us in determining the status of the program and developed an approach to simplify the system architecture and interface issues between Cubic and ERG which should result in fewer delays and better interface.

Finding 2 - A formal coordination mechanism between the regional partners has not been established. **Recommendation:** We recommend that the Chief Financial Officer work with the regional partners to establish a more formal process for integration of the systems and identify a regional integrator to coordinate the interface between WMATA and the RCSC systems. The integrator should ensure there is coordination between the various regional partners. **Response:** We concur with your recommendation.

Today, we have engaged the services of ITSolutions, Inc. a systems integration and architecture consultant to guide and advise WMATA through the complexities of Cubic's system. Their chief role is to advise WMATA on simplifying the system architecture and minimizing complex integration risks as the program advances.

Furthermore, we will examine our options to bring a specialized systems integrator to assist us through the completion of the program. Use of integrator services would bring more highly-skilled resources to the program and can bring temporary resources on to meet specific and challenging needs.

Again, thank you for taking the opportunity to review this very complex program with its challenging contracts and we value your review. Further, thank you for the extension granted for our reply to the draft report. We expect to have the corrective action plan developed within thirty days.

Copies to:
Shiva Pant
Carol O'Keeffe