

**The HOUSTON METRO “Q CARD”
Moving A City from Magnetics to Microprocessors
By: Richard J. Lobron – LCL Advisors, Inc.**

The Agency - Houston, Texas is the fourth largest city in the United States. Located near the Gulf of Mexico in Southeastern Texas, the city is home to Two Million residents and is at the heart of Harris County, Texas, a 440,000 hectare (1,700 square mile) governmental unit of Texas, one of 254 counties in the second largest state of the Union.

The mass transit provider for this region is the Metropolitan Transit Authority of Harris County, known as Houston METRO. Approximately 150,000 customers are served each day by METRO, with total passenger boardings of approximately 120 million in 2005. The Authority operates approximately 1,200 buses on 137 routes from seven bus operating facilities located throughout the county.

In addition, since 2004, METRO has operated a 12 kilometer (7.5 mile) light rail line serving sixteen stations in the center of the city. METRO is in the process of developing and constructing a \$2 Billion, € 1.6 Billion rail expansion program, which will encompass approximately 160 additional kilometers (100 miles) of service routing when completed in 2014. The introduction of the light rail line in 2004 and the coming rail expansions are a major impetus for exploring the use of microprocessor “Smart Card” technology for revenue collection on the system.

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Current Fare System - Historically, METRO has relied on magnetic stripe fare instruments for all transit revenue transactions. Each bus farebox has the capability to produce, read and write magnetic instruments. Over 1 million magnetic transfer instruments and “Daypasses” are produced on the buses each year. In addition, through one hundred eighty sales outlets, METRO sells approximately 1.9 million magnetic stripe period passes of 1, 7, 30 and 365 day validity and stored value instruments to the public each year. The validity period of all period passes is initialized by the farebox.

Need for Change - The existing fare system is focused on collection of fares at the bus farebox. With the arrival of rail, the Authority needs a method to provide instruments that can be collected on bus AND rail.

The sixteen rail stations are constructed as open access, street level platforms, without faregates or other barrier systems. The Authority uses “Proof of Payment” collection for the rail system, relying on periodic inspections by METRO Police officers to ensure passenger payment for travel. Unfortunately, this inspection process provides no method to initialize the validity period of magnetic stripe period passes, thereby the period passes can not be used for rail travel unless previously used on a bus.

In addition, the rail stations are serviced by Ticket Vending Machines that cannot properly charge a Stored Value instrument for rail travel. Another problem for interoperability is the fact that instruments produced by the TVMs are not readable on the bus fareboxes, due to the different forms of encoding used by the various manufacturers.

This inability to properly collect fares from holders of magnetic stripe instruments demands a movement to a new fare collection technology.

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Reasons for Conversion to “Smart Cards” The need for an integrated bus – rail fare system was the primary cause for METRO beginning the process of converting its revenue operations and the payment experiences of the Houston riding public from magnetics to microprocessors. In 2002, the Authority began its efforts to move aggressively towards the installation of a “Smart Card” system. The introduction of “Smart Cards,” will provide METRO patrons with a single type of fare instrument that is usable on both rail and bus, while providing a reliable method for the “Proof of Payment” rail inspectors to confirm the validation of the fare media by rail passengers.

Through use of “Smart Card” technology, METRO will significantly reduce its reliance on farebox equipment. The transmission of revenue transaction data from the bus will no longer rely on the manual “probing” of each farebox, but will instead be processed through wireless telecommunication between the bus and garage computers, without the need for human intervention. Such wireless processing will dramatically reduce the cost and time of processing revenue at the bus.

Smart Cards are also expected to provide a dramatic improvement on bus dwell times, as patrons became reliant on the extremely fast processing of smart cards for revenue transactions, replacing the arduous attempts to feed paper currency and magnetic stripe instruments into the farebox for each boarding. The Authority also plans to use the Smart Card to modify its complicated fare policy, by replacing the plethora of discount instruments with a single product. Smart cards can be used to offer loyalty programs and other types of fare products, without the need to produce more types of instruments. Through modification of its complex fare policy, in concert with the introduction of a smart card, METRO hopes to dramatically improve its farebox recovery ratio from 14%.

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Another reason for considering the “Smart Card” is a desire to provide patrons with a tool that could be used for payments for other services, such as street parking or retail uses.

REASONS FOR CONVERSION TO SMART CARDS

- Rail – Bus Fare Integration
- Simplify Fare Structure
- Remove drivers from Revenue Transactions
- Speed Revenue Processing at Bus
- Reduce dwell time
- Reduce Farebox Maintenance Costs
- Provide means for retail payments

Vendor Selection - For a variety of reasons, the “smart card” project suffered a number of unfortunate delays in its initial efforts. However, in 2005, LCL Advisors, Inc, a firm experienced in assisting private and public companies with project implementation services, especially related to revenue management, was asked to help METRO identify methods for accomplishing its “Smart Card” system in a timely manner.

It was determined by METRO that the key requirement for a successful vendor selection was demonstration of a real contactless smart card system, service-proven in a mass transit environment. Following a worldwide search of the vendor community, which included tours of numerous operating smart card sites throughout the United States, Europe and Asia, the Authority selected Ascom Transport Systems, Inc. of Valance, France and Norcross, Georgia as the provider of the systems. Coincident with METRO’s contracting with Ascom in November 2005; that firm was acquired by ACS Transport Solutions, another exceptionally experienced provider of revenue management systems to the highway, parking and transit industries.

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ACS / Ascom’s worldwide experience in producing operating smart card systems was a primary factor in making the selection. Other factors in the selection included the use of open architecture, minimal use of proprietary technologies and pricing. METRO representatives visited ACS / Ascom operations in Paris and Lyon, France and in Newark, New Jersey in the US, to observe the systems at work and to discuss the operations and the vendor performance with transit Authority management in those cities.

Project Implementation - Since November 2005, with METRO project direction provided by LCL Advisors, ACS has worked extensively to deliver a complete smart card system to Houston, Texas in record time.

A wireless data transmission system was developed in conjunction with INIT, provider of the METRO vehicle management system. The system was completed and successfully tested by March 2006.

By May 2006, six months following the contract, a smart card system was installed at the Authority. The system included the installation of Bus Card Readers on each of the Authority’s 1,200 buses with full consideration to driver line-of-sight safety issues and patron ease of use. The vendor also installed Platform Validators at each of the rail platforms for use by patrons in validating payment for rail service, without the need to interface with the existing ticket vending equipment. The devices used for Platform Validators are identical to those used on the buses, thereby avoiding patron confusion and additional maintenance support issues.

In addition, ACS produced 450 Retail Point of Sale units for placement in METRO sales locations, and installed a Revenue System Server, which serves as the central processing unit for the system. The firm is also providing Cashless Point of Sale devices, Ticket

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Vending Machines, a Bulk Encoder for use in encoding large volumes of cards, as well as Agency Point of Sale devices that provide the means to create photo identification cards for users of discount services, such as senior citizens, disabled patrons and students.

COMPONENTS OF METRO Q CARD SYSTEM

- Bus Validators with Garage Concentrators
- Retail Point of Sale Devices
- Agency Point of Sale Devices
- Handheld Inspection and Add-Value Terminals
- Ticket Vending Machines
- Cashless Point of Sale Devices
- Bulk Encoding Equipment
- Revenue System Servers

Moving the City - METRO has pursued a variety of initiatives to successfully move the City of Houston from Magnetics to Microprocessors. The key aspects of a successful conversion are Awareness, Promotion and Accessibility of the new fare instruments.

The Authority has named the “Smart Card” device as the “Q Card” - Q for Quick and Quality, and a variety of other words to be used in an extensive marketing initiative.

METRO has contracted with ACS to develop a marketing and public education campaign aimed at attracting the Houston population to the Q-Card. Through its subcontractor, Ilium Associates, ACS, with guidance from LCL Advisors, has crafted a comprehensive marketing presence, established a “Help Desk” operation to assist the public on smart card related issues and is serving as the primary distributor of the smart card instruments to all METRO sales outlets.

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Extensive efforts have begun to meet with the public to present the Q Card device and the benefits associated with its use. Meetings with community leaders, civic groups, members of the press and public officials are being used to make the public fully aware of the Q Card.

Promotional efforts are underway, as well. Street and building banners, media advertising, notices on buses and rail vehicles and many other forms of communicating the new method for paying transit fares are underway.

A key feature of a successful conversion effort is the provision of numerous sites where patrons can obtain cards and add-value onto their cards. METRO has incentivized ACS and Ilium to create 1,000 sales outlets throughout the service region through which patrons can add-value to cards as well as purchase pre-encoded disposable cards for use on METRO services.

To date, the ACS / Ilium effort has generated enormous response, with outlets being established at numerous sites such as large and small grocery stores, gas / petrol stations, money centers and a variety of sites where patrons live and work each day. Of course, patrons will also be able to perform smart card transactions at the Cashless Point of Sale devices and newly developed Ticket Vending Machines throughout the city. The Q Card will be ubiquitous throughout the region. The Authority plans distribution of 500,000 reusable Mifare 1K cards as well as millions of disposable Mifare UL cards with system implementation.

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In addition, METRO will provide access to card transactions through the telephone, mail and the Internet. The ACS system will perform transactions through the Internet – allowing patrons and corporations to perform “Smart Card” transactions over the Internet, with value added to their cards on the next day, when then present their card to any validator. In addition, patrons and corporations will be able to establish “subscription” accounts, through which the system will automatically charge credit card accounts for add-value transactions and place the new value on the cards, when a card’s balance reaches a pre-defined level. The provision of these capabilities to corporations as well as individuals is important to METRO since a large number of companies provide transit instruments to their employees.

Potential Additional Card Access Sites - The Authority is also exploring some additional methods of providing Add-Value services to the customers. In discussions with the City Parking department, METRO is considering placing the Q Card operation into the city’s electronic parking meters. In this way, patrons would be able to add value to their cards with cash or credit cards at the meters. They would also be able to use their cards to pay for parking at the meter – the first non-transit application on the card.

Another means of providing many sites for adding value to cards in installation of equipment in the back of each bus, where a patron would insert paper currency to receive additional value on their Q Cards. METRO is exploring the operational impacts of such devices.

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Impact of Fare Policies – While the Q Card system is in the final stages of development, METRO has recognized the need to more aggressively adjust its problematic fare policies to maximize the benefits available for the Q Card. LCL Advisors has proposed a method through which METRO can dramatically simplify its fare policies and products – improving revenue without raising fares. The Authority is currently in the process of finalizing the restructuring of its fare policies - with the Q Card being a prime component of the changes. In fact, although the entire Q Card system has been technically positioned for service for several months, the smart card system will be placed into full revenue service only in conjunction with the Authority’s new fare policies in late 2006. In this manner, the Q Card will be presented to the public as the provider of a much simplified, faster, more efficient method of using public transit, while delivering the expected benefits to the METRO operations

Conclusion - The need to provide multiple uses, numerous sales points and better transit service as a result of the Q Card are important goals of the METRO organization. The conversion of the public to the new technology is seen as essential to the Authority’s forward progress. The Q Card will be a key factor in providing the population of Houston with a recognizable tool for use on all METRO operations – present and future.

Through continued assistance and support from ACS, Ilium and LCL Advisors, METRO will accomplish its goals to move Houston calmly and effectively from Magnetics to Microprocessors. It is fully expected that the Q Card will become an indispensable utensil for all Houstonians over the course of the next few months. This conversion will clearly provide METRO with numerous benefits and a strong platform for future programs in Houston and in other US cities.