



**OPERATIONS COMMITTEE  
JANUARY 15, 2004**

**SUBJECT: UNIVERSAL FARE SYSTEM NEW TECHNOLOGY IMPROVEMENTS**

**ACTION: RECEIVE AND FILE**

**RECOMMENDATION**

Receive and file the report on new technology options for the Universal Fare System.

**ISSUE**

In August 2003 staff presented the Quarterly UFS Update to the MTA Operations Committee depicting new electronic fare collection equipment that was not available two years ago when the UFS base contract was awarded. The devices included:

1. Heavy Rail “virtual gates”
2. Driver Control Unit (DCU) with paper printer and smart card validator
3. Bus rear door “light validators”
4. Paper, or “low value” smart cards

Staff reported that “rough order magnitude” (ROM) costs would be obtained for recommended devices, and reported back to the Board for appropriate consideration.

Recently, transit agencies in Atlanta and San Diego, etc. have purchased these enhancements for deployment of their new automated electronic fare systems. The evolution in this industry will allow MTA to benefit from features that will potentially improve efficiencies in operations and promote greater customer satisfaction.

**Additional New UFS Rail Equipment for Consideration**

<b>Device and Functional Purpose</b>	<b>Benefits to MTA</b>	<b>Benefits to Customer</b>	<b>Special Considerations</b>
<p><b>“Virtual Gates” for Heavy Rail</b></p> <ol style="list-style-type: none"> <li>1. Validates smart card transactions</li> <li>2. Allows organized ingress and egress from non-paid to paid areas of heavy rail stations</li> <li>3. Validators on both ends allow flexibility to control pedestrian traffic in either direction.</li> </ol>	<p><b>Improves safety, security &amp; fare enforcement by inspectors:</b></p> <ul style="list-style-type: none"> <li>▪ Ensures orderly patron through-put for entering and existing riders</li> <li>▪ Assists Law Enforcement officers with visible and audible patron validations</li> </ul> <p>Improves ridership and data collection:</p> <ul style="list-style-type: none"> <li>▪ Device includes automated passenger counters to capture and tally patrons</li> </ul> <p><b>Equipment Maintenance:</b></p> <ul style="list-style-type: none"> <li>▪ Reduces patron usage of ticket vending machines (TVMs)</li> <li>▪ Can be upgraded at a later date to a full-gated system, if required.</li> <li>▪ Can be considered for MRT and new light rail stations</li> </ul>	<p><b>Improves safety and security:</b></p> <ul style="list-style-type: none"> <li>▪ Reduces pedestrian collisions particularly during “peak” hours with a more orderly ingress into stations</li> <li>▪ Avoids “queuing” at TVMs that would result from Smart Card patrons attempting to validate their trip</li> </ul>	<p><b>Equipment does not detect fare evasion</b></p> <ul style="list-style-type: none"> <li>▪ Virtual Gates will not send an alarm signal for fare evaders (patrons without a smartcard);</li> <li>▪ Will alert fare inspectors to patrons with inadequate smartcard value (below \$1.25)</li> <li>▪ Will require 1-2 fare inspectors at each station, for fixed post fare inspection assignments. This may result in more fare inspectors than currently utilized today on the Metro Red Line.</li> </ul>

**ESTIMATED COST OF VIRTUAL GATES: Rough Order of Magnitude Costs - \$5 million**

## Additional New UFS Bus Equipment for Consideration

Device and Functional Purpose	Benefits to MTA	Benefits to Customer	Special Considerations
<p><b>On-Board printer and smart card validator with Enhanced Driver Control Unit (DCU)</b></p> <ul style="list-style-type: none"> <li>▪ Classifies rides taken on buses</li> <li>▪ Prints paper day passes, transfers to Munis &amp; line continuation transfers</li> <li>▪ Provides a second validator for smart cards</li> </ul>	<p><b>Improves logistical and auditing complications associated with paper fare media</b></p> <ul style="list-style-type: none"> <li>▪ Eliminates need for bus operator to carry fare media– no pre-printed media required to be sold on board vehicles</li> <li>▪ Also eliminates need to carry separate zone-check tickets, etc. All products can be printed from the device</li> </ul> <p><b>Reduces potential for counterfeiting</b></p> <ul style="list-style-type: none"> <li>▪ Prints anti-counterfeiting logos, can be controlled remotely and changed daily from the back-office.</li> </ul> <p><b>Replaces Day Pass &amp; Associated Costs</b></p> <ul style="list-style-type: none"> <li>▪ Offsets cost of printing Day Passes and associated distribution, accounting and reconciliation expenses. Results in an estimated savings of over \$1 million</li> </ul> <p><b>Improves “on street” performance:</b></p> <ul style="list-style-type: none"> <li>▪ Provides superior printer capability and speed than “fare box” printer – typical “ticket” takes 1 second to print on board a bus</li> <li>▪ Provides a separate Smart Card validator from the fare box. This device allows “dual stream” patron boardings of cash and smart card riders which can reduce dwell time</li> <li>▪ Allows multiple ticket types, zone-checks and Muni transfers to all be printed from one device.</li> </ul> <p><b>Reduces and improves maintenance</b> The new Cubic printer has minimal moving parts whereas the “trim”, or farebox printer is a feeder, encoder and printer that is designed to pull card stock through the device and has 10 times more “moving parts”</p>	<p><b>Improves patron through-put:</b></p> <ul style="list-style-type: none"> <li>▪ Avoids “queuing” complications and reduces bus stop dwell time by allowing Smart Card riders to validate their trip while another passenger is purchasing a fare and blocking the fare box</li> <li>▪ Facilitates a quicker transaction by providing the printing of fare media separate from the fare box (average 1 second)</li> </ul>	<ul style="list-style-type: none"> <li>• While this printer has far fewer moving parts than the standard “trim” or farebox Printer used by some Municipal operators today, there will still be an added cost associated with the maintenance of the printer.</li> <li>• The “queuing” benefits of the second validator may be less pronounced on the high-floor bus design due to the steps and the space constraints</li> <li>• This change order will result in a minimum 6-month delay in the UFS schedule</li> </ul>

**ESTIMATED COST OF ON-BOARD PRINTER/DCU: Rough Order of Magnitude Costs - \$13 million**

**Increase Equipment Quantities for Fare Enforcement Devices  
To accommodate Fare Inspectors & System Growth and Expansion**

At UFS contract award, MTA's law enforcement contracts had fewer aggregate personnel for fare enforcement, and did not include non-sworn staff deployed strictly for fare inspection. Subsequently, MTA has experienced both increase in fare enforcement personnel, plus systems expansions in rail and the creation of bus sectors each with law enforcement support.

- Retention of 50 new civilian fare inspectors to augment sworn Los Angeles County Sheriffs
- Law enforcement support of (5) Service Sectors
- Growth and expansion in MTA rail systems - Pasadena Gold Line plus San Fernando Valley MRT (summer 2005)

These needs call for additional equipment not included in the base UFS contract.

**Fare Enforcement Devices include:**

- Hand held validators
- Synchronization cradles
- Sub-station computers for report generation
- Supporting telecomm infrastructure

**Functionality of the equipment:**

- Quickly analyzes smart cards for validity
- Provides audible tones with visible green and red lights for fare evasion detection
- Hot lists bad cards
- Holds Repeat Offenders List
- Tracks and monitors inspections performed by officer, by shift and by line
- Allows officers to move from rail car to station platform, from patrol car to bus vehicle without need to re-synchronize or exchange devices by mode or location

**Rationale to increase equipment quantities:**

- Additional officers and inspectors require additional quantities
- UFS is intended to improve fare evasion and the ability to capture better evasion data than is currently available.

These devices augment and enhance "virtual gate" monitoring and enforcement

**ESTIMATED COST OF FARE ENFORCEMENT DEVICES: Rough Order Magnitude Costs - \$1 million**

## New Devices Investigated but NOT Considered At This Time

<p><b>Rear Door Validator</b></p> <ul style="list-style-type: none"> <li>▪ Allows smart card validation from rear door boardings.</li> <li>▪ Operates with the Enhanced Driver Control Unit</li> </ul>	<p><b>Rationale for Reconsideration:</b></p> <ul style="list-style-type: none"> <li>▪ Inability to prevent fare evaders from entering from rear doors</li> <li>▪ Absence of regular fare inspection enforcement currently on buses</li> </ul> <p>(This device is intended to operate with the new Driver Control Unit. A rear door validator has potential benefit for future MRT services, with rail type fare inspectors enforcing fare payment and validation.)</p>
<p><b>Low Value Smart Cards</b></p> <ul style="list-style-type: none"> <li>▪ Alternative, 'short term' smart cards</li> </ul>	<p><b>Rationale for Reconsideration</b></p> <ul style="list-style-type: none"> <li>▪ MTA will be pilot-testing "paper smart" on the system, however the pricing of this media (\$.30/card) makes it a "cost prohibitive" alternative for paper day passes, Muni transfers, zone checks, etc.</li> <li>▪ As the technology matures and pricing becomes more competitive, staff will reconsider this recommendation.</li> <li>▪ The UFS system is being engineered to allow migration to paper smart cards over time.</li> </ul>

### FINANCIAL IMPACT

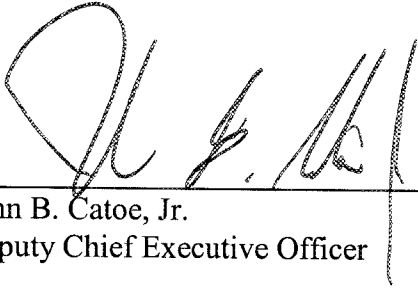
This report is presented for information purposes and therefore does not result in a financial impact to the MTA. If the options discussed in the report are adopted at a later date, they would result in increased costs for the UFS project. Funding options will be presented to the Board at that time.

### NEXT STEPS

Return in February 2004 with a revised UFS Project Schedule with new Life of Project budget including funding recommendations for:

- Virtual Gates and Fare Enforcement Devices
- On-Board Printer/Validator and Enhanced Driver Control Unit

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