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JUNE 17, 2005

TO: BOARD OF DIRECTORS

THROUGH: ROGER SNOBLE
CHIEF EXECUTIVE OFFICER

FROM: JOHN B. CATOE, JR.
DEPUTY CHIEF EXECUTIVE OFFICER

SUBJECT: UNIVERSAL FARE SYSTEM (UFS) / TRANSIT ACCESS PASS (TAP)
REAR DOOR VALIDATORS AND
LINKED TRIP REPORTING

ISSUE

Director John Fasana requested information on rear door smart card enabled validators as a means to capture passengers alighting Metro vehicles. In addition, several Board members were interested in the attributes of the UFS/TAP system that provide regional "linked trip" reporting capabilities.

DISCUSSION

The UFS Technical Oversight Consultants, Booz Allen Hamilton have provided the features and utility of rear-door validators on the Regional Metro and Muni TAP system including a Rough Order Magnitude cost of implementing this system. Please see attached document (Attachment A).

In addition, inclusive in this report are the attributes of the current TAP solicitation that require Linked Trip and Origin/Destination (O/D) Reports which will enhance regional ridership data and transit service planning.

ATTACHMENT

A. TAP Rear Door Validators and Linked Trip Reporting Powerpoint

TAP Rear Door Validators & Linked Trip Reporting

Los Angeles, California
March, 2005



The Board has posed questions on the advanced data collection and reporting features of the TAP system...

- ▶ What is the utility of providing rear-door TAP readers on MTA buses?
- ▶ Can TAP provide “linked trips”?
- ▶ Can TAP provide Origin/Destination pairs and round trip data?

The objective of this paper is to respond to these questions



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What is the utility of rear-door validators on buses?

- ▶ A rear door validator is a smart card reader mounted near the rear door(s) of buses that allows patrons to tap when entering or existing the bus.
- ▶ Smart card transactions are electronically stamped with
 - Date and time of entry
 - Location (fixed for rail or latitude/longitude for bus)
 - Card serial number
 - Fare product
- ▶ TAP equipment currently being installed system wide includes all entry devices (i.e., bus fare boxes, rail stand-alone validators and Ticket Vending Machines).
 - No exit devices are provided on bus or rail vehicles
 - Validators at entry to rail stations **could** be used for exit validation
- ▶ Since most trips are round trips, the Origin/Destination (O/D) pair can be inferred by looking at card history.

Rear door TAP readers can provide a number of advantages...

- ▶ Alighting data
 - Since UFS is linked to ATMS, all transactions are tagged with location. When alighting passengers tap their card, Metro gets a record of the O/D pair.
 - Using system entry and exit data, trips can be linked between routes, modes, and agencies
- ▶ Could support distance-based fares
 - Maximum fare deducted from card when boarding
 - Unused balance restored when alighting
- ▶ Provides alternate bus entry to expedite TAP riders at busy stops



The advantages are balanced by significant cost...

▶ Increased Capital Cost:

- Costs are estimated at \$17M for Metro-only equipment and systems integration
- Additional costs would be required to equip Municipal Operator fleet with validators and systems integration in order to obtain discrete data for regional Origin/Destination pairs.
 - Integration of non-farebox “stand beside” devices for some Munis will be more costly
- Additional Stand Alone Validators for rail lines requires modifications to station infrastructure at increased capital cost
- Additional hand-held fare inspection devices and systems integration will also be required to cover both bus and rail fare enforcement
- Total rough-order magnitude additional capital costs will likely exceed \$30M with 2005 “snap shot” of regional bus and rail fleet (excludes Eastside LR and Expo expansions)

▶ Increased Maintenance and Operating Costs

- Rear door validation requires “proof of payment” fare enforcement on board buses
- Expansion of fare enforcement / inspectors across Metro and Muni bus operations will increase operating costs
- Additional equipment increases maintenance costs



Other operating issues must be considered

- ▶ Without fare incentives, it is difficult to enforce passengers to “tap-off”.
- ▶ Bus operator cannot effectively monitor the rear door fare payments
 - The validators are too far from driver (25’) to enforce payment from the front of the bus
 - Bus operators cannot see rear boardings or alightings especially with standing passengers that block access, view and communication
 - Requires “Proof Of Payment” enforcement on board buses
- ▶ In a distance based system, there is a potential for passengers to fraudulently tap-off immediately after boarding and remain on the bus, thereby receiving a reduced fare
- ▶ Some rail stations may be space constrained for additional on-platform equipment

May be appropriate for BRT or Metro Rapid if on-board POP inspection is provided, *a la* light rail.

Can TAP provide “Linked Trip” reporting without Rear Door Validators?

- ▶ Most fare collection systems (as well as Metro’s Automatic Passenger Counters) can provide “unlinked” trips or boardings.)
- ▶ TAP is linked to ATMS, so provides location, reported as latitude and longitude, at which fares were paid.
- ▶ TAP cards collect a “history” of rides in order to properly calculate day-pass and interagency transfer fares.
- ▶ Linked interagency trips (Metro to/from Munis) requires implementation of the Regional Central Data Collection System as the data warehouse, to be operated by the TAP Services Provider.
- ▶ This is mirrored in the back-office computer. Capturing linked trip information will enable Metro transit planners to better match transit service provided with actual demands for service.

Can TAP provide Origin/Destination (O/D) pairs?

- ▶ Without providing a “tap-off” reader and requiring passengers to use it, the system cannot provide direct information on Origin/Destination (O/D) pairs.
- ▶ However, O/D can be inferred from the ride history mirrored from card data. E.g., look at an entire day’s travel history for selected cards ... next journey’s boarding was probably the destination of the last journey.
- ▶ Such information would normally be provided to planners in response to specific, *ad hoc* inquiries developed as they review the effectiveness of particular routes and services.
- ▶ TAP rider data can reveal patterns of travel demand, matching origins to destinations, patterns by time of day, specific routings being used, demographics, etc.

Features of Regional TAP System regarding “Linked Trip” Reports

- ▶ Linked Trip Reports are a requirement in the Cubic Regional Central Data Collection System (Regional CDCS) contract:
 - Linked Trip shall be provided from the Regional CDCS report data store using all data received prior to end-of-day processing
 - A Linked Trip can involve one or more transit agency’s routes and vehicles and shall depict a single TAP card holder’s use of more than one vehicle to reach a destination
 - The Linked Trip may recognize a short pedestrian walk (1 – 2 blocks) to move from one transit agency’s route to another.
 - The time between each leg must suggest an attempt to make a contiguous journey.
- ▶ TAP Card Trip Origin and Destination Reports are a requirement in the TAP RFP solicitation:
 - The contractor shall provide daily, monthly, and annual reports on origins and destinations, including intra-trip transfers, or trips taken with all TAP cards
 - The reports shall be created from the Regional CDCS Data Warehouse and made available to all TAP participants.