



Task 1.9

Regional Fare Policy White Paper

DRAFT

By:

Manuel Padron & Associates, Inc.

July 25, 2003



TABLE OF CONTENTS

1.0	INTRODUCTION	1-1
2.0	FARE POLICY GOALS AND strategies.....	2-1
2.1	Fare Policy Goals	2-1
2.2	Fare Strategy.....	2-3
2.3	Deep Discount pricing.....	2-5
2.4	Transfer Pricing and policy	2-7
	Regional or Inter-operator Issues.....	2-7
2.5	Other Requirements	2-9
	Reduced Fares	2-9
	ADA Paratransit Fares.....	2-9
3.0	FARE STRUCTURE.....	3-1
4.0	TECHNOLOGY	4-1
4.1	Smart Card Capabilities.....	4-1
4.2	Review of Smart Card Implementation.....	4-2
	MARTA.....	4-2
	Washington, D.C.....	4-2
	Los Angeles.....	4-3
	San Diego.....	4-5
	San Francisco.....	4-7
	Seattle	4-9
	Chicago	4-10
	New York City.....	4-12
4.3	RTAP Fare Policy Team	4-13
5.0	INTERIM APPROACH FOR EXPRESS SERVICE.....	5-1
5.1	Los Angeles Regional EZ Transit Pass.....	5-1
	Background	5-1
	Structure and Pricing	5-1
	Implementation Highlights.....	5-2
5.2	Seattle Region Pugetpass	5-4
5.3	Proposed RTAP Express Fare Structure	5-5
5.4	Proposed Interagency Fare Policy Agreement.....	5-7

1.0 INTRODUCTION

Fare policy, in the general sense, applies to all aspects of fare structure development, pricing, and selection of fare collection and payment methods. Fare policy directly affects ridership and revenue. If transit agencies are to increase ridership and improve service over time, they must establish effective pricing structures.

The Regional Transit Action Plan (RTAP) includes a task to analyze regional fare policies. It is anticipated that smart cards, which are included in the Metropolitan Atlanta Regional Transit Authority's (MARTA) current procurement of a new fare collection system, will be the long-term basis for an integrated regional fare structure. However, the new MARTA fare collection system will not be implemented until late 2005. Therefore, the development of regional fare policies must not only address the longer term needs to support the implementation a universal smart card fare collection system throughout the region, but must also design interim fare strategies and collection/payment methods for the RTAP express bus system which will begin operation in 2004.

Four fundamental parameters are related to fare decisions: fare policy, fare strategy, fare structure, and fare payment technology and equipment.

- A fare policy should identify goals and priorities that will guide GRTA and its regional partners in setting and collecting fares.
- Fare strategy refers to a general fare collection and payment structure approach; possible approaches include flat fare, differential pricing (by distance traveled, time of day, or type of service), market-based or discounted payment options, and transfer pricing.
- The fare structure is the combination of one or more fare strategies with specific fare levels.
- Fare payment technology and equipment refers to the type of fare payment media (i.e., cash, token, paper ticket, stored value cards) and the specific fare collection equipment required to distribute and collect a system's various fare media.

Section 2 describes fare policy goals and strategies that GRTA could consider. Section 3 reviews fare structures and pricing levels (with the focus on express service fares) of 14 peer transit agencies. Section 4 discusses the status of smart card technology implementation in the U.S. and identifies the technical, institutional, and organizational steps that will need to be undertaken in order to implement smart cards in the Atlanta region. Section 5 proposes a short-term regional pass approach and interagency agreement that would support the express bus system in the interim period.

2.0 FARE POLICY GOALS AND STRATEGIES

Fare policy decision-making for the metropolitan Atlanta area will be driven by both technology and service considerations. That is, technology considerations should attempt to maximize compatibility with the technical requirements of existing fare collection approaches (e.g., the MARTA rail faregates) and the recent MARTA decision to implement smart card technology. The decisions are also service driven in that the GRTA is introducing a new mode metrowide with the RTAP express bus system.

Fare strategy refers to the general fare collection and payment approaches. This section discusses the various fare collection and payment options, as well as transfer issues. Each fare strategy presents certain advantages and disadvantages; however, these options are not mutually exclusive and, in fact, two or three are often combined within a single fare structure.

2.1 FARE POLICY GOALS

The following are some goals that are widely used in setting fare policies. For new service such as the RTAP express bus system, GRTA may want to emphasize customer-related goals that relate to how the fare structure and system are perceived and used by riders, with an aim of attracting new riders who may have limited experience with transit.

Customer-related goals:

- ✓ Increase ridership. This goal seeks to maximize ridership subject to a maximum acceptable reduction in revenue.
- ✓ Maximize social equity. This goal concerns an agency's ability to ensure equivalent levels of mobility for equivalent fares, as well as ensuring that those riders most in need of the service – and with the least ability to pay – are not adversely affected by the fare structure (or a future change in it). The first point can be addressed by setting fares on the basis of either the costs of the service or on the benefit received. The second point can be addressed by offering discounted fare instruments with a low overall purchase price.
- ✓ Increase ease of use. This goal relates to the convenience of using the system. For instance, does the pricing structure have an “inconvenient” cash fare (e.g., \$2.20) and require the payment of exact fare? Are prepaid options available? How easy is it to use the fare equipment? Does the system require a high frequency of fare media purchase transactions?

- ✓ Increase fare options. This goal is to improve the ability of customers to choose a fare option that best meets their needs. This is addressed by offering a range of options (e.g., prepaid and discounted options).
- ✓ Reduce complexity. This goal emphasizes making the fare system (policy, pricing, and equipment) simpler and easily understood and utilized by customers.

Financial goals:

- ✓ Increase revenue. This goal seeks to maximize revenue – or to obtain a specific revenue target – while minimizing the accompanying ridership loss.
- ✓ Reduce fare collection costs. These costs include those of selling prepaid fare media and those of collecting and counting farebox revenues. Reducing the use of cash can reduce collecting and counting costs. However, actions to provide a wide range of prepaid fare options often increase the costs of fare collection.
- ✓ Reduce fare abuse/ evasion; improve revenue control. This goal supports increased revenue by making it more difficult for riders to underpay the fare or not pay the fare at all. Increased revenue and agency accountability are supported by improved revenue controls and security features to reduce employee fraud, theft, and the mishandling of fare revenue.

Institutional goals:

- ✓ Improve modal and regional connectivity. This goal emphasizes improving connections between different modes in a system (e.g., local bus, express bus, rail) and different transit providers in the region – GRTA, MARTA, Cobb Community Transit (CCT), Gwinnett County Transit (GCT), Clayton County Transit (C-Tran) – to promote seamless transit travel.
- ✓ Maximize ease of implementation. This goal relates to the difficulty in introducing the new fare system (in terms of complexity of the fare structure and equipment and acceptance by the general public and elected officials). This goal also relates to how adaptable the fare system is to future fare increases, technology upgrades, etc.
- ✓ Achieve farebox recovery ratio goal or requirement. Achieve an acceptable level of cost-effectiveness as measured by the farebox recovery ratio (passenger revenue ÷ operating costs). This policy could be a goal or a legislatively mandated requirement.

Many fare policy goals are in competition with each other. For example, a fare strategy that maximizes ridership tends to reduce revenue and cost-effectiveness. Similarly, it is impossible to increase fare options and reduce complexity simultaneously. Establishing fare policy is a balancing act – the goals must be prioritized if the policy is to lead to a useful fare structure.

After the policy goals are defined, the next step in fare development and evaluation is to establish appropriate evaluation criteria. These criteria facilitate the assessment of the

relative merit of each option under consideration. In general, evaluation criteria are derived from the policy goals of and constraints facing the agency.

Various constraints may influence a transit agency's fare-related decision making and, thus, must be addressed in developing evaluation criteria. These constraints may be legal (e.g., the existence of a legislatively mandated farebox recovery ratio), funding-related (e.g., lack of sufficient capital or operating funds), or related to service or operational requirements (e.g., the need to address multi-jurisdictional issues). Constraints also may be political in nature (e.g., the agency Board may have mandated that a certain fare option be retained or introduced or that the base fare not exceed a certain level). Table 2-1 presents a suggested set of evaluation criteria and evaluation measures for the individual policy goals.

2.2 FARE STRATEGY

Fare strategies generally fall into two basic categories: flat and differentiated. The different types are summarized as follows:

- Flat fare – The simplest and most common fare strategy is the flat fare. Riders are charged the same fare, regardless of the length of the trip, time of day, or speed or quality of service. The flat fare is easy to administer and easy to understand. Disadvantages are that flat fares place an inequitable burden on those making short trips, and fare increases may cause a great loss of riders. To mitigate these effects the flat fare strategy often is combined with prepaid fare options. All of the transit agencies within the Atlanta region have flat fares for each major category of service (local or express).
- Service based differential – Differentiating fares by mode or by speed (i.e., a higher fare for express service than for local service) is often considered as a means to reflect the higher level of service provided and the higher operating costs of providing express service, which typically has longer trips and only peak period service. Advantages are that this strategy is relatively easy to understand and is considered equitable in that higher quality service has higher cost. Disadvantages are that the strategy may be unpopular among users of the higher cost service and complicates transfers (e.g., may require payment of an “upgrade” fare in transferring from local to express). Nearly all U.S. transit agencies offering express suburban commuter services include an express bus differential in their fare policy. Examples here are CCT and GCT; nationally are Dallas, Phoenix, and Tampa.
- Distance-based or zonal pricing – Distance based fares (zonal charges or surcharges beyond a certain distance) are often considered on the basis that riders should pay more for longer trips. Advantages are that this strategy should produce the greatest revenue and is considered equitable since a longer trip has a higher cost. As for disadvantages, this structure is typically the most complicated for both the rider and the transit agency, increases costs for low-income people making long trips such as reverse commute trips to suburban job opportunities, and requires additional equipment to administer.

**Table 2-1
Evaluation Criteria and Measures for Fare Policy Goals**

Policy Goal	Evaluation Criteria	Evaluation Measures
Customer-related		
Increase ridership	Ability to produce an increase in ridership – or minimize ridership loss	Predicted change in total ridership
Maximize social equity	Ability to ensure equal levels of mobility for equivalent costs (fares)	Predicted trip shares and avg. fare paid by key market groups
Increase ease of use	Convenience/ ease of use	Qualitative assessment of system usage requirements; availability of prepaid options
Increase fare options	Number and types of fare options available	Qualitative assessment of the nature and variety of options
Reduce complexity	Ease of understanding	Qualitative assessment of the simplicity of the fare structure
Financial		
Increase revenue	Impact on fare revenue	Predicted change in fare revenue
Reduce fare collection costs	Ability to minimize administrative and operational costs associated with a fare strategy; includes effect on staffing requirements, equipment, facilities, materials, and supplies	Estimated change in fare collection costs
Reduce fare abuse/ evasion; improve revenue control	Ability to minimize fare abuse/ evasion by riders; ability to improve revenue accountability/ security and reduce employee theft	Assessment of ease of abuse or evasion possible with a particular strategy; assessment of security features and monitoring capabilities
Institutional		
Improve modal and regional connectivity	Related to actual pricing of options and transfer policy.	Assessment of compatibility of fare media and equipment flexibility; cost to make multimodal/ regional trips
Maximize ease of implementation	Difficulty the agency can expect to face in implementing new fare structure or pricing change	Qualitative assessment of the level of effort required by various departments/ agencies
Achieve farebox recovery ratio goal or requirement	Related to actual pricing of options	Predicted change in revenue.

About one-third of U.S. transit agencies (including bus only and bus/rail) include distance or zonal based strategies in their fare policy. Examples include Washington D.C. (WMATA) and San Francisco (BART) rail distance fares, and Seattle and Los Angeles express bus zone fares. Nearly all commuter rail operations employ distance based fare structures. In a rail operation with a proof of payment fare collection approach, the distance-based strategy can be administered without undue difficulty.

- Time based differential – A time based (e.g., peak/ off-peak) method of charging is often considered because: 1) the peak period market is generally less sensitive to price and has a greater ability to pay for fare increases; and 2) the costs of providing service and accommodating additional riders are significantly higher in peak hours than in off-peak hours. This strategy may increase ridership by encouraging more usage during off-peak times. It could be helpful as part of a comprehensive travel demand management program by shifting some travel demand out of peak periods. However, any shifts in transit riders would be minor, and the experience of most transit agencies has been that peak service requirements and costs are not reduced. There is an increase in complexity for both the rider and the transit agency with cash and paper ticket media. However, magnetic and smart card media can mitigate the difficulties in using and administering the system. Only about six percent of U.S. transit agencies include time-based strategies in their fare policy. Examples include Minneapolis and Seattle.
- Market based pricing -- Another type of differentiated pricing strategy widely used by the transit industry is market based, or consumer based pricing. This strategy often is included with the flat fare structure or with any of the other differentiated structures described above. This strategy offers differential fares according to frequency of use and willingness to prepay through the offering of passes and discounted tickets. This is often seen as a way to discriminate price among the different ridership markets (e.g., frequent versus infrequent users), and to reduce cash handling requirements by increasing pre-payment.

Market based pricing advantages are that this strategy is considered equitable, offers some ability to pay less for a trip, is more convenient to customers through prepayment, reduces cash handling by the transit agency, and with fare increases can minimize ridership loss in some market segments. Disadvantages are that it generally produces the least revenue; can have some fare abuse; has the highest fare media production and distribution cost; and requires extensive marketing to maximize ridership.

2.3 DEEP DISCOUNT PRICING

Offering significant discounts for prepayment of fares is one of the most important elements of market based pricing. This strategy is commonly referred to as “deep discount” pricing. The deep discount fare strategy motivates riders to increase their usage by providing major savings on purchases of weekly or monthly passes and multi-ride tickets.

Discounts are typically provided by two methods:

- Passes provide for unlimited rides during a specific time period, most commonly weekly or monthly. The pass price is set so that the daily user will receive a discount compared to paying the cash fare every day. For example, MARTA's cash fare is \$1.75; a daily commuter would pay ten fares during a week, or \$17.50. A Weekly TransCard costs \$13.00, or an effective discount of 26 percent. A Monthly TransCard costs \$52.50, which is equivalent to 30 cash fares; therefore a monthly pass holder would come out ahead by making more than 30 trips.
- Multi-ride tickets are often intended for occasional, but not everyday, users. A ticket-book of ten tickets might be discounted by 10 percent or more. The tickets could be used at any time. As an example, GCT on its express service fare offers a ten-ride ticket book for \$27, compared to a single fare of \$3.00.

Advantages of deep discounting include:

- The ability to optimize ridership and revenue, by encouraging increased usage among passengers who are relatively price-sensitive, and collecting higher fares from passengers who are less price-sensitive.
- Experience with pass usage shows that passengers who use passes tend to make more trips by transit than they would if they were paying single fares.
- Making a single purchase for a period of time instead of twice-daily cash transactions is much more convenient for the passenger, and reduces processing costs for the transit agency.

Disadvantages of deep discounting include:

- Increased complexity: each additional payment option increases the potential for confusion among both existing and prospective riders. Additional options may mean more administrative and operating costs to monitor, market, produce and distribute the additional fare media.
- While the discounted option is designed to offer a break to those who do not wish to pay the higher cash fare, taking advantage of the discount requires an initial payment that is higher than the cash fare.
- Use of passes may lead to illegal sharing of passes and counterfeiting.
- "Lost revenue" from high frequency use.

About 90 percent of U.S. transit systems offer a monthly pass. Over 40 percent are providing discounts on multi-ride tickets, with the most common discount between 10 and 20 percent. In summary, the provision of prepaid discounted fare options has become quite prevalent in the transit industry. All of the transit agencies in the Atlanta region include market based pricing strategies with discounted fare options as integral parts of their fare structure.

2.4 TRANSFER PRICING AND POLICY

Transfer pricing and policy are major issues that relate to both the pricing and convenience of transit service. The basic pricing options for transfers are as follows:

- Free transfers.
- Low-priced transfers (i.e., 10-25 percent of the full cash fare).
- No transfers (i.e., a full fare for each boarding); some systems that use this approach sell a one-day pass that allows unlimited trips, including transfers.
- “Upgrade” fares for transferring between different services; i.e. if the fare for the second vehicle is higher than the first, the passenger would pay the difference for a transfer.

The primary basis for transfer charges is that it offers the transit agency a convenient way of raising more revenue. However, most transit networks are designed to encourage, or in many cases require, transferring in order to complete the desired trip. As such, charging for transfers is often said to add “insult to injury” by forcing the rider to have to use more than one vehicle to make a trip and then charging an extra fare to do it. Other disadvantages are that transfer charges often conflict with the physical and operational design of the system, can destroy “seamless” travel goals for the agency, and increase fare collection costs. In addition to the pricing of transfers, the transfer policy must address the use of transfers such as the amount of time allowed for a transfer (e.g., 2 hours after the initial full fare boarding) and whether the transfer can be used for round-tripping or stop-overs.

Regional or Inter-operator Issues

There are special issues associated with inter-operator transfers related to cost recovery for each operator’s segment of a regional trip. An inter-operator transfer agreement must be established that allows the two (or more) agencies to account for and allocate the fare revenues paid in using the two (or more) systems. The mechanisms used for such transfers can include the following:

- Acceptance of transfers issued by connecting carrier (with no additional charge).
- Acceptance of passes issued by connecting carrier (with no additional charge).
- Acceptance of passes issued by connecting carrier (with upgrade charge).
- Payment of upgrade fare, with proof of purchase of a ticket.
- Use of multi-operator passes or stored-value cards.

When Cobb County began providing transit services in 1989, it became the second transit provider in the region. The Cobb County routes were designed to provide regional connections for its suburban riders with the MARTA system (and connections to Cobb County destinations for MARTA customers) in downtown and midtown Atlanta, Lenox Square, and Perimeter Mall. The need to address coordination issues and transfers led Cobb County (providing transit service as Cobb Community Transit or CCT) and MARTA to

develop and execute the region's first reciprocal fare agreement. Two additional agreements have been executed between MARTA and GRTA for the C-TRAN service and between MARTA and Gwinnett County for the GCT service. The agreements are summarized below:

CCT/ MARTA

MARTA has had a longstanding policy of free transfers on its bus and rail system. In 1989, MARTA and CCT set a regional transfer precedent by entering into a reciprocal transfer agreement. The agreement allows riders to have free transfers to the other system once the appropriate fare has been paid on the initial transit vehicle. MARTA and CCT recognized that free transfers would provide mutual benefits. Affordability and convenience would be improved for customers originating on either system, and this would lead to higher ridership on both systems. Without this agreement, today's cost for a one-way express trip using both systems would be \$4.75 instead of \$3.00, and a one-way reverse commute trip would be \$3.00 instead of \$1.75. Such high fares would deter many "choice" riders from using transit and would be a heavy burden for "captive" riders. The agreement provides lower fares both to Cobb residents commuting into Atlanta, and to residents of Fulton and DeKalb who are reverse-commuting to Cobb County.

The transfer either occurs at a rail station through the direct intermodal area, or by using valid MARTA or CCT transfer media. Currently, CCT has operating privileges within the intermodal areas of the Arts Center, Dunwoody, and Hamilton E. Holmes rail stations.

GRTA/ MARTA

When Clayton County's C-TRAN service began in 2001, GRTA as the public transit operator in Clayton County entered into a similar reciprocal transfer agreement with MARTA. The only current interface point is at Hartsfield Airport although the agreement allows for other connection points in the future.

The agreement includes a provision for the parties to devise a mutually agreeable method of counting passengers traveling from the MARTA service district and from the Clayton district. If the variance is greater than 8 percent, then a method of compensation for the over-utilized jurisdiction will be recommended. The methodology will be devised within 12 months of the agreement and the entire process will be repeated on a yearly basis. The agreement also states that the parties agree to work towards implementation of the appropriate recommendations from the RTAP regional fare policy development in a manner that is equitable.

GCT/ MARTA

Later in 2001, MARTA and Gwinnett County Transit (GCT) entered into a reciprocal transfer agreement that is similar to the GRTA/ MARTA agreement for the C-TRAN service. The agreement includes the same provisions for monitoring passenger flows and providing compensation to the over-utilized jurisdiction.

GCT buses have access to bus loading areas at MARTA's Arts Center and Doraville rail stations. GCT buses also connect with MARTA stations in downtown and midtown Atlanta.

2.5 OTHER REQUIREMENTS

Reduced Fares

Recipients of financial assistance under section 5307 of the Federal transit laws must provide reduced fares for elderly and handicapped persons during non-peak hours of operation that will not exceed one-half of the rates generally applicable to other persons at peak hours. Therefore virtually all U.S. transit systems offer reduced fares. Some agencies go beyond the legal requirements, either by offering the reduced fare during peak hours also, or by providing a discount greater than 50%.

The definitions of elderly and handicapped as applied under this rule permit a broader class of handicapped persons to take advantage of the reduced fare than would be permitted under the more restrictive definition applied to the non-discrimination provisions of FTA's section 504 program, which includes only handicapped persons otherwise unable to use the recipient's bus service for the general public. The definition of elderly persons may be determined by the FTA recipient but must, at a minimum, include all persons 65 years of age or over.

ADA Paratransit Fares

The Americans with Disabilities Act of 1990 (ADA) requires that complementary paratransit service must be provided for eligible persons within 3/4-mile of the agency's local fixed route service. The fare charged to the ADA eligible user of the complementary paratransit service shall not exceed twice the fare that would be charged to an individual paying full fare (i.e., without regard to discounts) for a trip of similar length, at a similar time of day, on the agency's local fixed route system.

3.0 FARE STRUCTURE

The fare structure is the combination of one or more fare strategies with specific fare levels. It is often helpful to examine fare strategies and current pricing levels of other transit agencies when developing a new fare structure.

Comparative fare information was gathered from 14 transit agencies around the U.S. These agencies were selected as examples of agencies operating in suburban environments to some extent, operating express commuter services, and providing regional connections. This comparative data is purposely focused on express fares since developing the express fare structure is GRTA's most immediate need. The fare structures of these agencies, plus the four public transit agencies currently operating in the Atlanta region, are presented in Table 3-1 on the following page. Some relevant observations are as follows:

- All of the systems that operate local and premium/ express service, except MARTA, have a fare differential for premium services. The average differential fare for the premium service is \$0.75.
- Dallas, Phoenix, Tampa, and Research Triangle in North Carolina (as well as CCT and GCT) provide flat express fare structures. Metro Transit in Minneapolis provides a peak/ off-peak express fare. The other nine surveyed agencies provide distance- or zone-based fare structures ranging from 2 – 4 zones. For the nine zone systems, the average express fare charged for 1-zone travel is \$2.00 with a range from \$1.25 to \$2.75; the average express fare charged for travel across all zones in the system is \$3.25 with a range from \$2.00 to \$4.60.
- Dallas and Tampa offer day passes, in lieu of transfer upgrade fees, to transfer from local to express service.
- Four of the agencies do not provide multi-ride tickets for express service; Valley Metro in Phoenix actually charges a higher unit cost for the express multi-ride ticket pack selling it solely as a convenience; the other nine agencies discount the multi-ride tickets from 8 percent to 20 percent.
- All of the surveyed systems provide express monthly passes. The prices range from \$45 to \$115. The passes are priced at a breakeven rate of usage averaging 32 one-way trips per month with a range from 22 to 40 one-way trips per month.

The observations drawn from the peer agencies fare structures have been used as a starting point for designing the interim RTAP express fare structure described in Section 5.

As stated above, the focus of this section has been focused on express fares. During the same time that the organizational structures are developed and fare policy decisions are made to support a universal smart card fare collection system in the region, comparative

data on local service fares should be evaluated in greater detail to develop a smart card based fare structure compatible with GRTA goal and priorities as discussed in Section 2. The smart card will provide the region with the opportunity to consider distance-based fares even on the local service. Special attention should be given to pricing that retains existing riders and attracts new “choice” riders. For example, short trip fares could likely be lower than today’s prices, and by attracting more ridership in that market segment, could potentially generate higher farebox revenues. Consideration could also be given to a uniform fare structure across the multiple operators to increase customer understanding and ease of use of the regional transit system and to promote seamless travel.

**Table 3-1
Comparative Local & Express Bus Fares at Peer Transit Agencies**

Peer Transit Agency	Local Adult Cash Fare	Express Adult Cash Fare (1)	Transfer Upgrade Local > Express	Express Multi-Ride Ticket	Percentage Discount	Express Monthly Pass	Breakeven Trips
Boston - MBTA	\$0.75 - \$1.25	\$1.75/ \$2.50/ \$2.75	pay difference	10 for \$16/ \$22.50/ \$25	8% - 10%	\$57/ \$85/ \$94	33 - 34
Charlotte - CATS	\$1.00	\$1.40/ \$2.00	pay difference	10 for \$11.90 / \$17	15%	\$56/ \$80	40
Dallas - DART	\$1.25	\$2.25	\$4.50 day pass	N/A	N/A	\$70.00	32
Denver - RTD	\$1.15	\$2.50/ \$3.50	pay difference	10 for \$20 / \$28	20%	\$75/ \$105	30
Houston - Metro	\$1.00	\$1.50/ \$2.50/ \$3.00/ \$3.50	pay difference	\$15 - \$150 SVC avail.	varies	\$50/ \$78/ \$94/ \$110	31 - 34
Los Angeles							
Foothill Transit	\$1.10	\$2.75/ \$3.75	pay difference	Metrocard SVC avail.	varies	\$95/ \$115	35/ 31
City of LA DOT	\$0.90	\$1.75/ \$2.20/ \$2.65/ \$3.10	pay difference (2)	N/A	N/A	\$56/ \$71/ \$86/ \$99	32 - 33
Metro	\$1.35	\$2.50/ \$3.60/ \$4.10/ \$4.60	pay difference	N/A	N/A	\$67/ \$82/ \$97/ \$112	22 - 27
Minneapolis- Metro Transit	\$1.75/ \$1.25	\$2.25/ \$1.75	free	\$10/15/20 SVC avail.	10%	\$85/ \$66	38
Phoenix - Valley Metro	\$1.25	\$1.75	pay difference	10 for \$18	3% more	\$51	30
San Diego - MTS	\$1.50 - \$2.00	\$2.25/ \$2.50/ \$3.00/ \$3.50	pay difference	N/A	N/A	\$54/ \$60/ \$72/ \$82	24
Seattle - Sound Transit	(3)	\$1.25/ \$2.00/ \$2.50	pay difference	(3)	varies	\$45/ \$72/ \$90 (4)	36
Tampa - HARTline	\$1.25	\$2.25	\$5 day pass	20 for \$40	11%	\$70.00	32
Research Triangle Transit - TTA	(5)	\$1.50	\$0.75	\$25 value for \$20	20%	\$48.00	32
<u>Metro Atlanta Systems</u>							
MARTA	\$1.75	\$1.75 rail	free	10 for \$17.50/20 for \$30	14%	\$52.50	30
Cobb County - CCT	\$1.25	\$3.00 1-way; \$4.00 rd. trip	(6)	10 for \$27/ \$36 (rt)	10%	\$55 (1 way) / \$70 (rt)	18 (rt)
Gwinnett County - GCT	\$1.75	\$3.00	(6)	10 for \$27	10%	\$100	34
Clayton County - C-TRAN	\$1.50	NA	(6)	N/A	N/A	N/A	N/A

Notes:

- Multiple fares are for zones (except Minneapolis - peak/ offpeak).
- Interagency transfer fee is \$0.25
- Local service operated by King County Metro & others: KCM peak/ offpeak fares \$1.50/ \$1.25; tickets available on selected routes through local operating agency.
- PugetPass is a regional pass, available in various denominations, valid on all five transit systems in region.
- Local service operated by three systems: DATA, CHT, CAT.
- Free transfers to and from MARTA; CCT and GCT pay difference from local to express.
- All systems offer half-fare (or less) for seniors & disabled passengers; many offer reduced youth fares.

Prepared by Manuel Padron & Associates
June 25, 2003



4.0 TECHNOLOGY

This section describes the smart card technology and its capabilities. A case study review of smart card fare collection implementation in the U.S. focusing on agencies operating in regional, multi-operator environments is also summarized. Finally, this section summarizes the operational and administrative issues associated with a universal fare collection system.

4.1 SMART CARD CAPABILITIES

Contactless smart cards, credit card-sized plastic cards with an embedded antenna and computer chip, have come into widespread use by transit agencies in Asian and European cities and are beginning to catch on in the U.S. Using smart cards to replace traditional fare media holds the promise of reducing cash handling, equipment maintenance, and security costs; increasing convenience for riders; improving collection of ridership data; lending a more modern image to transit; and providing new opportunities for seamless regional travel and innovative fare structures and marketing. The contactless electronic link between card and reader equipment allows for a very fast interface that is needed by mass transit.

The flexibility and information storage capability of smart card fare systems offer the opportunity for increased regional transit integration:

- Smart card fare media can serve as passes or fare cards for multiple operators. This increases attractiveness to customers and thus increases smart card market penetration.
- In addition to institutionalizing seamless regional transit travel, the greater memory and processing capability of smart cards compared to magnetic systems can enable individual operators to retain their own fare structures.
- The accurate transaction record of smart cards enables a clearinghouse for regional revenue to administer some integration issues. The capabilities of the fare systems allow the clearinghouse to promote equity and timeliness in revenue distribution across multiple operators.

Smart card payment technologies can provide operational and administrative benefits to transit agencies:

- Reduced operator intervention in fare collection.
- Reduced fare transaction time under smart card alternatives.
- Improved data collection and reporting capabilities, such as better ridership data for planning purposes.

- Enhanced inter-operator transfer process.
- Magnetic technology is less reliable than smart card technology and more likely to fail in revenue service. Experience indicates that magnetic systems fail 30 times as often as smart card systems.
- Outsourcing payment and settlement by financial institutions for smart card financial transactions may provide savings to the participating agencies.

4.2 REVIEW OF SMART CARD IMPLEMENTATION

A number of large metropolitan areas in the United States with multiple transit providers are in the process of implementing new electronic fare payment systems that offer regional fare integration and thus allow seamless travel throughout the multi-operator area. Besides simply allowing the different operators to accept a common ticketing medium, the technologies facilitate the interagency revenue accounting arrangements that are essential to such integration. This section summarizes the anticipated MARTA procurement features and schedule, as well as features of systems being implemented in seven other U.S. metropolitan areas.

MARTA

In early 2000, MARTA began the procurement of a completely new automatic fare collection (AFC) system that will replace tokens with stored value cards and smart card technology. The new AFC system is intended to place into service an integrated system to collect rail and bus fares and parking fees and process the revenue. The system is to handle cash, commercial credit and debit cards, and electronic media specific to MARTA, and is to be capable of handling MARTA's present flat fare, or a zone fare system, or a distance fare system, and a variety of discounted and special fares. The objective is to provide for as broad a range of fare policy options as practicable, and to accommodate seamless, regional fare policy among MARTA, GRTA, and the other public transit providers in the Atlanta metropolitan area. MARTA anticipates selecting the fare collection system vendor in August 2003 and completing installation of the new system by late 2005.

Washington, D.C.

The Washington Metropolitan Area Transit Authority (WMATA) introduced smart card technology (SmarTrip) on Metrorail in 1999. The rail system has had magnetic stored value fare cards since its inception. In 2000, SmarTrip card use was extended to the WMATA parking facilities. WMATA is retrofitting Metrobus fareboxes to accept the SmarTrip card to provide a more seamless trip on both bus and rail by 2003.

The permanent, rechargeable SmarTrip card costs \$5 and can hold up to \$200 in Metrorail value. Any fare purchase of more than \$20 earns a 10 percent bonus. The SmarTrip card is offered with balance protection if registered by the user and currently can be reloaded like a magnetic Metrorail farecard at station fare vending machines and customer service centers. Autoload of employer provided transit benefits is also offered. Credit/debit card reload is planned for implementation. Currently, time-specific passes are not available using the SmarTrip card. Average load on a SmarTrip card is over \$16. Average load on magnetic fare cards is just slightly over \$3 or a round trip.

The SmarTrip card was introduced with limited marketing and few distribution channels – primarily through existing customer service centers, hand sales at special events and the internet. Nevertheless in June 2002, WMATA sold its 250,000th SmarTrip card. The cards are selling at the rate of 1,000 per week with approximately one third of Metrorail riders using them regularly. Currently, SmarTrip is the largest retail application of smart card technology in North America.

WMATA plans to extend the SmarTrip system to other bus operators in the District of Columbia, Maryland, and Virginia, as well as the commuter rail systems in northern Virginia and Maryland, and to the light and heavy rail systems in Baltimore. Several supporting programs and policies are in development or under consideration, including:

- Implementation of a regional financial clearinghouse and customer service center
- Introduction of a guaranteed lowest fare program or "fair fares" to smart card users
- Creation of more seamless regional fare policies

The Washington region's goal is to achieve an 80 percent smart card market penetration among transit users.

Los Angeles

In February 2002, the Los Angeles County Metropolitan Transportation Authority (MTA) decided to move forward with a universal fare system and smart card technology for public transit users throughout LA County. The MTA Board awarded an \$84 million contract to Cubic Transportation System Inc., GFI Genfare and other subcontractors to manufacture and implement the electronic fare collection equipment that will eventually eliminate the need for tokens, cash, and passes. The move to smart cards is expected to take place within three years. The implementation schedule is as follows:

- June 2003: First implementation of ticket vending machines (TVM) when Pasadena LRT opens. Pilot testing with smart cards on Pasadena LRT and associated bus lines.
- 2003-4: Full rollout of MTA system.
- 2003: Procurement of Regional Customer Service Center (including clearing).
- 2004-5: Further expansion to participating municipal transit agencies (munis), etc.

How did the MTA get to the universal fare system/smart card decision point? In 1990, a magnetic stripe, stored value Metrocard was conceptualized to improve regional travel in LA County. At the time, magnetic stripe cards were the only technology readily available and proven. In 1993, the Metrocard was installed in revenue service in three munis thus allowing interagency transfers. By 2002, the Metrocard project was installed in five munis on over 550 buses in LA County. The participating munis are Culver City, Foothill, Montebello, Norwalk, and Santa Monica. While the MTA, the largest operator in the region,

supported the program it did not implement the technology. Thus, the true potential of a regional system could not be achieved.

Beginning in 1996, MTA reviewed the status and future of the program. Studies done on available technology and the local transit market recommended a universal fare system. That is, a system that would offer seamless, regional transit travel through use of a universal ticket in a multi-operator environment. The universal fare system would include both magnetic stripe and smart card technology. In 1998, the MTA Board adopted the definition for a Universal fare system and directed the procurement of Metrocard magnetic and smart card technology. Specifications were prepared and a RFP was issued. With the procurement in process, a major change began in mid 1999. Members of the MTA Board and staff made field visits to the new fare systems being implemented in Chicago and Washington, D.C. The result of these visits convinced the MTA that smart card technology had matured and should be considered as a stand alone option to magnetic stripe. Additional study was conducted with the following five technology alternatives evaluated:

- magnetic stripe core system with smart card capability
- smart card core system with magnetic capability
- smart card core system with printer
- smart card core system with manual paper transfers
- smart card core system

The technology options were evaluated from several perspectives including customers, partners, regional fare integration and individual operators. The study reviewed experience elsewhere and considered technology risk and life cycle cost. In September 2001, MTA and regional stakeholders comprised of 17 municipal transit operators selected the non-magnetic option. That is, the regional system would be based on smart cards and cash.

A smart card and cash only system was determined to provide the greatest benefits at the least cost of the alternatives considered:

- Financial
 - A smart card and cash system without magnetic or printing capability is estimated to save MTA approximately \$8 - \$10 million in initial capital investment.
 - Over the life of the investment, a smart card and cash only system is less expensive to operate.
- Operational Impacts
 - Smart card devices are significantly more reliable and have faster transaction processing times than magnetic systems. Magnetic equipment reliability issues and longer processing time can impact dwell time, maintenance cost and customer satisfaction.

- Customer Impacts
 - Significant benefits can be offered to customers using smart cards, including balance protection, more durable fare media, autoload capability, faster processing time, lowest fare guarantee programs and increased potential for third party opportunities.
 - If smart cards replace paper transfers, cash paying riders who transfer will face a fare increase if they do not have a smart card. This could be perceived negatively by customers, but could be overcome by a progressive smart card distribution program and a comprehensive customer communication program.

There are several issues still to be dealt with. For example, the smart card/cash decision left open the future of transfers. Some points for consideration:

- Paper transfers are a major source of fraud and theft.
- MTA may eliminate paper transfers, so that passengers who wish to transfer and receive a fare discount must use a smart card. Result:
 - Higher fare for MTA passengers who choose not to use smart card.
 - Minimizing potential negative impacts requires that most passengers have a smart card. This can be accomplished by passenger education, attractive pricing, and an extensive distribution and reload network.
- Low cost paper smart cards may provide a future solution, particularly if MTA moves from transfers to day passes (which have higher value and can justify more costly fare media).
- Munis will make their own decision to continue with paper or magnetic transfers on local service.

San Diego

In August 2002, the San Diego Metropolitan Transit Development Board (MTDB) and the North County Transit District (NCTD) approved \$35.6 million in contracts to Cubic Transportation System Inc., GFI Genfare and other subcontractors to create a regional integrated smart card fare collection system. The new technology will be created and used on MTDB's Metropolitan Transit System buses, NCTD's "Breeze" buses, the San Diego Trolley, and NCTD's coaster commuter train. It will unify fare payment for all of San Diego County's existing and new rail systems, as well as all fixed route and express buses.

The MTDB and NCTD began working on the smart card project in 1999. The agencies see the smart card technology as a great benefit to their customers. Passengers will be able to use one fare media device to travel across the various modes throughout San Diego County, without searching for change, asking for a transfer or even knowing what the transfer policy is. When the smart cards are introduced they will replace Monthly Passes. Customers will no longer have to buy new passes each month. Customers will have the choice of reloading value to their smart cards in a variety of ways: by visiting any of the

existing places where passes are currently sold, or by adding value on the internet, by phone and automatically, by tying their smart card to a checking account or credit card.

Agency benefits will include providing accurate and timely distribution of revenue and ridership data among the County operators. The technology should also increase fare revenue recovery and decrease the potential for fraud or counterfeit of fare media.

The move to smart cards is expected to take place within two and a half years. The implementation schedule is as follows:

- July 2003: Begin installation of smart card bus fareboxes.
- 2004: Installation of rail equipment and begin testing.
- January 2005: Full system rollout across buses, trolleys, and trains.

The smart card system also has a built-in capability to address additional applications. Although this contract is only for rail and bus fare integration, further applications may be explored, such as using the card to pay parking fees or purchasing ball park admissions.

How did the San Diego region get to the smart card decision point? It has been relatively easier than in other multi-operator regions because the San Diego region years ago achieved regional fare integration by establishing a uniform fare structure for the region's operators. This non electronic approach laid the institutional groundwork and the smart card technology was the logical next step when it became feasible. Although remaining as separate entities, most of the region's fixed route operators were banded together to operate as a combined Metropolitan Transit System (MTS). The purpose of MTS, and the related MTS symbol, was to identify this unified transit system to the public.

The MTDB serves as the policy setting and overall coordinating agency for public transportation in the metropolitan area. The MTDB took the lead in establishing fare integration and developing the Uniform Fare Structure Agreement. The agreement is updated annually. The general managers of the transit operators meet at least monthly, and there are several committees that regularly meet to address operations and fare issues. The basic elements of the agreement are that it does the following:

- Establishes a uniform fare structure for the region, providing a coordinated transit system in a multi-operator environment.
- Establishes a regional transit pass valid for travel on all fixed route services in the San Diego region, and establish a formula for distribution of pass revenue.
- Establishes a regional policy of free transfers between equal or lower levels of service and sets upgrade fares for transfers to higher levels of service.

Regional monthly passes and 10-ride tickets are accepted by all operators participating in the agreement. The base pass revenue is allocated to each operator, based on the operator's percentage of regional pass boardings for all adult passes. Slightly different arrangements are used for the higher priced passes, although the allocation is based on the number of riders and transfers on each system.

In 1997, San Diego had a great opportunity to expand the transit market with the opening of the Mission Valley LRT line. The MTDB took advantage of more aggressive marketing and a new fare strategy to capture new riders. The market-driven philosophy was designed to retain existing customers (via small changes in monthly pass pricing); attract new and occasional riders with substantial discounts on multi-ride tickets, tokens, and day passes; and increase cash fares on most routes to encourage the use of prepaid fare media. The fare structure was also designed to have customers pay more for longer distance trips and for higher quality services such as express buses. A fundamental goal was to retain existing customers and attract new customers.

A key feature of the fare policy is the Universal Transfer. The new paper transfer implemented in 1998 has no directional or route restrictions. For example, bus drivers punch two hours from their terminals providing approximately three hours of use with a transfer for stopovers, return trips, or normal routing in the transit system. While there was fear that revenue would be lost due to the use of a transfer for return trips, it was hoped that the added revenue of the higher cash fares would offset the expected loss of revenue. Results showed that transfer trips went up about 14.5 percent, but due to a 13.5 percent increase in ridership, the percentage of trips with paper transfers was virtually unchanged at 16 percent of the total trips. Several additional positives were a result of the new policy. Driver confrontations were virtually eliminated. The number of paper transfer types was reduced from four to one. As a result of the transfer simplicity, the use of transfers and waste by the drivers is substantially reduced. The use of the Universal Transfer was an important selling point to the policy Board to accept a fare adjustment of the basic cash fares.

In looking at the system after the first nine months of operation under the new fare policies, the MTDB realized a \$3.3 million increase in revenue. There were 6.0 million new riders attracted to the system. Prepaid fare media sales increased by 38 percent. The Universal Transfer increased short trips without significant revenue loss on the fixed route system.

San Francisco

On October 11, 2002, the Metropolitan Transportation Commission (MTC) announced that the six Bay Area transit operators participating in the Phase I demonstration of the TransLink regional fare payment system had agreed to extend the pilot program while their respective boards decide whether to proceed with Phase II. Phase II would involve the implementation of the TransLink system throughout the six operators' route and station networks. The press release also stated that those decisions were expected within the next few months. MTC is the planning, coordinating and financing agency for the nine-county Bay Area. The six operators participating in the TransLink pilot program include AC Transit, BART, Caltrain, Golden Gate Transit, San Francisco Muni, and the Santa Clara Valley Transportation Authority. The MTC would like to eventually have 16 of the 26 Bay Area operators to provide TransLink. MTC has contracted with Motorola, Inc. and ERG Limited to implement the TransLink system.

TransLink is not a uniform fare system. Rather, transit operators will keep their same fare structure. The purpose of TransLink is to make transit access easier for passengers as they would not need to fully understand the complicated fare structure of the Bay Area transit operators. Users would be able to purchase the same fare options on TransLink (e.g., discounted passes, ticket books, senior/student passes) as they can today. TransLink also provides some benefits to the users that are not available under the current cash/pass fare

system. Convenience is the obvious benefit. However, TransLink would also determine the most cost-effective fare program for users based on usage history. For example, a monthly Muni Fast Pass costs \$35 for unlimited rides. Muni's cash fare is \$1.00. Under TransLink, if a user who has chosen "cash" transactions reaches \$36 in Muni fares before the end of the Fast Pass period, the TransLink system will ask the user if he wants to purchase a Fast Pass. If the user purchases the pass, then their remaining rides on Muni through the Fast Pass period are free. If the user decides not to purchase the pass, then remaining rides on Muni would continue to cost \$1.00 each.

How did the Bay Area get to this decision point? Efforts to develop a regional fare integration program in the Bay Area have been underway since the early 1990s. It was initially intended that the project would use magnetic tickets, similar to the existing BART ticket, and the original TransLink ticket was tested at BART and two bus systems (BART Express and Central Contra Costa County) in 1994 and 1995. However, following the trial period, it was decided not to proceed with the original plan. The MTC, as the lead agency, commissioned a study to determine the most appropriate technology. The study, completed in late 1995, recommended the smart card technology and MTC began development of the regional system in 1996.

The original six-month TransLink Phase I pilot program ended July 31, 2002. TransLink is the first fare collection system in North America to settle funds between different organizations, or participants. Thus, much effort, leading up to and during Phase I, has gone into working on institutional roles and responsibilities; management, technical, financial, legal agreements, and operating rules; and clearinghouse, revenue allocation and cost sharing issues.

Some 3,000 passengers tested the TransLink system during the Phase I pilot program. The evaluation report showed that user satisfaction with TransLink is very high. No insurmountable technical problems emerged, and passengers and transit agencies alike found the accounting to be accurate. While the main purpose of Phase I was to test the hardware and software, one main shortcoming was that it utilized very few transit operators and routes. For example, TransLink is only available at eight BART stations and, until recently, was only available on one Muni Metro line. Therefore, convenience for the transit rider could not be tested well in the pilot.

In general, the transit operators have been reluctant to adopt TransLink, mainly for financial reasons. MTC is paying the capital costs of the system, but operators would be responsible for the operating costs. Currently operating costs are determined on a transactions basis and Motorola is under contract to process the transactions. Operators pay a graduated fee ranging from 25 cents to 3 cents per transaction. The fee goes down based on the number of transactions (few transactions = 25 cents and many transactions = 3 cents). A transaction is counted every time a user "tags" the system.

The transit operators believe that the system will be very expensive. For example, Muni offers free transfers to riders, but a rider must tag TransLink in order to get credit for the transfer. In Phase I, Muni's free transfer costs it 25 cents each. MTC is considering ways to modify the usage fee process.

One option is to provide discounts to the "charter" transit operator members of TransLink. Under this option, the first operators to adopt TransLink would be charged only 3 cents per

transaction, with MTC picking-up the remainder (e.g., 22 cents) of the tab. MTC would fund this subsidy from a proposed bridge toll increase (from \$2.00 to \$3.00).

Another option under consideration is to have Golden Gate Transit handle transaction processing. Golden Gate Transit (actually, the Golden Gate Bridge District) currently processes transactions for the Fast Trak automated bridge toll system. Golden Gate Transit has expressed a willingness to process the TransLink transactions as well, since it already has a centralized transaction center. If Golden Gate Transit processes the transactions, the graduated fee-per transaction system will probably be dropped.

BART is currently upgrading its entire fare collection system, but the upgrade is not compatible with TransLink. Muni sees advantage of adopting TransLink, including:

- Muni needs to replace most of its fare collection system and sees an opportunity for MTC to pay for most of it if they adopt TransLink.
- Muni incurs high costs for processing paper transactions, including transfers, ticket books, and passes. Muni sees an opportunity to eliminate paper transactions under TransLink.
- Muni loses millions of dollars annually because of fraudulent use of passes. For example, some pass vendors collect passes from passengers at the end of the month and return the passes to Muni as unsold. Muni sees TransLink as an opportunity to eliminate fraud.

The general consensus is that if Muni, the region's largest transit operator, adopts TransLink then other regional operators will follow. Most transit operators think that TransLink will work only if:

- TransLink replaces paper fare media, such as passes and ticket books, rather than merely adding another fare media option.
- The fee-per-transaction process is modified to be less costly to the transit operators.

Seattle

The King County Metro Transit (Metro) is leading the development of the Central Puget Sound Regional Fare Coordination Project on behalf of seven participating agencies which will enable customers to use one fare card on multiple systems throughout the four county Central Puget Sound region. The agencies are Metro, Community Transit, Kitsap Transit, Pierce Transit, Everett Transit, Washington State Ferries, and Sound Transit. Smart card fare collection technology will be used to allow linked trips between buses, ferries, and rail and to significantly expand each agency's strategic fare policy capabilities. The project Request for Proposals (RFP) was issued in February 1999 and the evaluation process was temporarily suspended in December 1999. In August 2000, the project evaluation process was resumed. The current operational target for a regional smart card fare collection system is currently 2006. As in the Bay Area, the transit operators have been reluctant to adopt the Smart Card system due to operating costs which has been envisioned to utilize the same fee-per-transaction system as TransLink.

How did the Central Puget Sound region get to the smart card decision point? From 1985 to 1990, the region's transit service providers participated in a "flash" pass program. However, pass sales never exceeded 2,400 per month and it was terminated. Two reasons were cited for the termination: the bilateral sales agreements were too complex and program administration costs exceeded the benefits to customers; and, one of the participating agencies, Community Transit, whose service area is north of Seattle, implemented direct service to downtown Seattle and the University of Washington district, reducing the need for its Snohomish County residents to have a regional pass and the transfer convenience it previously conferred.

The regional fare integration project was initiated in April 1994 to create a seamless fare system. Motivation for the effort came from continued residential growth and the development of major employment centers outside the traditional downtown Seattle area which was dispersing travel patterns. Also, off-peak, intercounty travel was rapidly increasing which suggested a need for a regional fare medium that could accommodate various transit market segments. Project sponsors also hoped that new fare technologies would help them upgrade, improve and replace member agencies' fare collection equipment. The near-term mission was to invest in a fare collection system that would reduce barriers to mobility while recognizing existing service boundaries and fare policies. In the longer term, the project hoped to address policies in such a manner that would improve service connections, identify and select a single fare medium and related technology and support services, and establish one regional fare structure based on distance or regional fare zones.

After extensive evaluation of existing electronic technologies, the project team concluded that smart card technology was the preferred alternative in January 1996. A demonstration project followed which identified cost and benefits and key institutional and technical issues to be addressed. The efforts eventually led to issuing the RFP in 1999. Although the project has enjoyed active cooperation from all the region's transit providers, two conclusions from this review are:

- Even with excellent interagency cooperation and previous experience with a regional "flash" pass program, the smart card development process can take 10 years or more from initiation to installation.
- Besides selection and testing of the technology, there are numerous institutional, management, operations, and customer service concerns that must be resolved.

Chicago

The Chicago Transit Authority (CTA) has implemented magnetic stripe fare cards and transfer cards, and is piloting smart cards. CTA accepts magnetic fare cards on its 1,900 buses and in its 143 rail stations. The magnetic cards have a 90 percent market penetration rate on rail and 60 percent on bus. The recent CTA investment in its magnetic based automatic fare collection (AFC) system was configured to be able to add smart card technology as a fare media option.

The smart card pilot program began in August 2000 with the goal of 3,500 users distributed geographically riding CTA buses, rail, and Pace suburban buses. Pace is the Suburban Bus Division of the Regional Transportation Authority. The smart card pilot program includes

smart card read/write devices installed in all CTA fare sales and collection equipment. The pilot program was implemented under the existing \$106 million AFC system contract with Cubic Transportation Systems, Inc.

With the smart cards, CTA customers will have benefits such as faster transition time, autoload, card registration, and balance protection. Through the use of magnetic and smart cards, CTA expects that float from stored value cards and expired card value will increase, generating additional potential interest earnings. CTA also expects electronic fare collection technology to reduce fraud and the operating costs of fare collection and processes. At the conclusion of the pilot program, the CTA will evaluate the program and customer response and usage of smart cards to help determine future smart card expansion.

Efforts to provide coordinated fares on fixed route services began in January 1996. CTA and Pace executed a Memorandum of Understanding on monthly passes. The agreement included the following:

- Pace shall accept the CTA's monthly pass (regular and reduced fare) on its fixed route system. The monthly pass shall not be valid on subscription bus or van pool services, and appropriate surcharges as set by Pace shall apply on Pace express routes.
- CTA shall print the passes with encoding to enable Pace's fare collection system to recognize the monthly pass. All joint monthly passes shall be printed and encoded with both CTA and Pace identifying information. CTA shall supply Pace with sufficient quantities on a timely basis for Pace's sales outlets.
- Pace and the CTA shall retain the revenues received for each party's own respective sales of the monthly pass. In addition, CTA shall reimburse Pace the sum of \$125,000 per calendar year quarter. On a semi-annual basis the parties shall reevaluate and may adjust their reimbursement amount to provide compensation to Pace for usage on Pace's system of monthly passes sold by the CTA. Both parties shall cooperate in providing sales and usage data to conduct such reevaluations.

Then in May 1997, CTA and Pace executed a Memorandum of Understanding on AFC systems. This agreement was motivated by the fact that both parties were beginning to acquire their magnetic based AFC system, and would be able to magnetically read, print and record CTA and Pace passes, transfers, and stored value cards. The agreement included the following:

- Pace agrees to accept the fare instruments generated by CTA's AFC system on Pace's fixed route system, provided Pace receives revenue reimbursement set forth below.
- CTA and Pace shall seek to implement their AFC systems at the same time, to the extent feasible. If the AFC systems cannot be implemented at the same time, then both parties agree to arrange for an interim acceptance procedure which will minimize transfer difficulties for riders.
- CTA shall reimburse Pace \$1.65 for each initial use of a stored value card on Pace. This reimbursement represents the value of one initial ride and transfer.

The parties mutually agree to reevaluate such reimbursement practices at regular intervals and make any necessary adjustments thereto.

- CTA and Pace shall cooperate fully in joint marketing and promotion programs for the new AFC systems.
- CTA and Pace shall keep accurate records of sales and usage of fare instruments, which records shall be available for audit upon reasonable notice given by one party to the other.

New York City

The New York region is an example of another region with multiple transit providers that are adopting electronic payment. In 1990, the New York Metropolitan Transportation Authority (MTA) announced that it was implementing an AFC program throughout its rail and bus system that would be based on a magnetic stripe, stored value fare card, called MetroCard. Also, New Jersey Transit and the Port Authority of New York and New Jersey are continuing to review potential fare system integration opportunities and are facilitating the creation of a regional smart card platform for multiple agency smart card operability.

The MTA MetroCard system implementation began in 1994 for the subway and 1995 for New York City transit buses. Next it was initiated on private buses and as flash passes on MTA commuter railroads. Participating agencies include New York City Transit subways and buses, seven private bus operators in the City, two MTA commuter railroads (Long Island Railroad and Metro-North Railroad) and one MTA suburban bus operation. MTA is currently acquiring cashless MetroCard reload machines to add value to MetroCards. These will be relatively smaller devices compared to full function TVMs. These devices are being configured with smart card processors, indicating future intent to move towards this technology.

Market acceptance of the MetroCard is high and is supported by strong policies that encourage the use of MetroCard. The supporting policies included:

- Eliminating sales of bundled tokens.
- Providing free transfers between bus and subway (MetroCard Gold in 1997).
- Introducing new discounts (e.g., 10 percent discount on card loads over \$15).
- Developing broad distribution network (a TVM network in subway stations and merchant outlets across City supplement original staffed windows in subway stations).

The MetroCard has reduced operating costs and losses from fraud, theft, transfer abuse, and fare evasion. For customers, MetroCard has provided increased payment convenience, seamless transfers, volume discounts and unlimited period passes. With supporting policies, the MTA has been able to achieve significant market penetration and benefits from magnetic technology. Smart cards are currently being considered regionally to integrate operators with differing fare structures.

4.3 RTAP FARE POLICY TEAM

Implementing a universal ticket program for a region carries with it extensive requirements, from both a technical and institutional point of view. Perhaps the most difficult issues are the institutional ones associated with the operational and administrative issues. The planning and development must address a range of complex issues and can, therefore, take several years. In the Los Angeles region, a Universal Fare System (UFS) Money Committee, and associated subcommittee structure, has been created to develop an interagency revenue allocation and distribution methodology and agreements, as well as alternative approaches for implementing UFS service functions. Service functions include:

- Card Base Management
- Customer Service
- Distribution and Reload Management
- Financial Management (Clearing, Funds Movement, Revenue Collection & Allocation)
- Security Management
- Infrastructure Systems and Operations Management
- Device Maintenance
- Program Management

Recognizing the need to begin immediately addressing short- and long-term technical and institutional issues, GRTA and its regional partners have established the **RTAP Fare Policy Team**. An initial meeting is scheduled for August 6, 2003. It is anticipated that the team will begin meeting on a regular basis to develop staff recommendations on fare policy and interagency agreements to support start-up of the RTAP express bus service. The Team will also begin addressing the interagency technical and institutional issues associated with the implementation of a universal smart card fare collection system for the region. It is anticipated that the RTAP Fare Policy Team will evolve into a permanent interagency staff committee that will monitor UFS service functions, provide direction, and address ongoing issues, fare tariffs and fare revenue allocation.

5.0 INTERIM APPROACH FOR EXPRESS SERVICE

As summarized in Section 4.2, implementation of a smart card based fare collection system requires a minimum of two to three years after the agency selects the equipment vendor. In the cases of Los Angeles and San Diego, the anticipated schedule is relatively short since both these systems operate the rail mode as a barrier-free proof-of-payment (POP) fare collection system. The timetable for the MARTA smartcard rollout could be longer since MARTA will have to upgrade its faregates at the rail stations. With express bus service starting in 2004, GRTA should also design and implement some type of interim express bus pass that will enhance the customer experience associated with the new express services, as well as offer seamless transfers to other regional transit services.

The following two sections describe two different approaches in Los Angeles and Seattle to providing an interim regional transit pass. Section 5.3 describes the proposed RTAP express service fare structure. Section 5.4 outlines key considerations for a proposed interagency fare policy agreement.

5.1 LOS ANGELES REGIONAL EZ TRANSIT PASS

Background

Transit operators in the Los Angeles region began conceptual work on a universal fare system in 1990. These efforts culminated in the February 2002 decision to move forward with a smart card technology-based, universal fare system throughout LA County that would be implemented within three years. In advance of the smart card, the transit operators decided to provide customers with some type of temporary fare media that could be implemented early-on and would enable easier inter-regional travel.

The Los Angeles County Metropolitan Transportation Authority (MTA) and municipal bus operators developed a monthly Regional EZ Transit Pass for unlimited travel on the Metro Bus and Rail systems, and on the fixed route systems of 12 municipal bus operators. The Regional EZ Transit Pass was rolled out as a fare option in September 2002.

Structure and Pricing

The Regional EZ Transit Pass, a paper flash pass, is priced at \$58 for a regular monthly pass with discounted passes available to the elderly and disabled. The paper flash pass can be used since the MTA rail operates as a barrier-free proof-of-payment (POP) fare collection system. The Regional EZ Transit Pass does not replace existing monthly passes of participating transit systems. On the other hand, it does provide a new temporary pass for those systems that previously had no monthly pass. Customers using express services and/or paying zone (distance) charges require an additional premium fare. Premium stamps start at \$15 extra (senior/ disabled/ Medicare start at \$7.50). Table 5-1 summarizes the

Regional Transit EZ Pass pricing levels. Table 5-2 summarizes the fare structure of the participating systems.

**Table 5-1
Regional Transit EZ Pass Pricing**

EZ Pass	Regular	Senior/ Disabled/ Medicare
Base	\$58	\$29
Express 1 Zone	\$73	\$36.50
Express 2 Zone	\$88	\$44
Express 3 Zone	\$103	\$51.50
Express 4 Zone	\$118	\$59
Express 5 Zone	\$133	\$66.50

Implementation Highlights

How is money from pass sales handled/ allocated? The money from the pass sales is retained by each selling agency. The revenues are anticipated to be reconciled at the end of the Fiscal Year based on the number of passengers boarding with the pass and the average fare per boarding of each agency.

Most of the munis have fareboxes where the operator keys in a boarding per EZ Transit Pass customer boarding and some will do a survey to collect the data. Remember that MTA rail operates as a barrier-free proof-of-payment (POP) fare collection system so counting here would be a sample as well. There are also plans to audit the data as part of the triennial audit. There appears to be potential for issues here due to inconsistent data collection methods.

Has the pass been popular (what is its "market share" in pass sales)? They are selling about 10,000 passes a month - about 1 to 2 percent of all boardings which is close to the number of people transferring from one system to another (see attached actual pass sales per month). They feel that the program is doing better than expected. Also, they expect sales to increase in January 2004 when the MTA pass goes up to \$52 and the Regional EZ Transit Pass remains the same.

What is this program costing the MTA (and the Munis) to put out there? Has EZ Transit Pass been worth it? They believe that the program has had value. They are spending about \$500,000 a year for printing, collecting about \$6 million from sales and should pay out in subsidy much less than that. The program is paying for itself and in fact is ahead. They do not know the exact amount of subsidies yet as MTA boarding data is still preliminary.

**Table 5-2
Comparative Fare Structures for
LA County Transit Systems Participating in Regional EZ Transit Pass Program
& Metro Atlanta Transit Systems**

LA County Transit Systems Agency	Local Adult Cash Fare	Express Adult Cash Fare (1)	Transfer Fee Local	Transfer Fee Local > Express	Transfer Fee Express > Local	Transfer Fee Interagency	Local Monthly Pass	Breakeven Trips	Express Multi-Ride Ticket	Percentage Discount	Express Monthly Pass	Breakeven Trips
Culver City Municipal Bus Lines	\$0.75		free	N/A	N/A	\$0.25	None		Metro SVC avail.	Varies		
Foothill Transit	\$1.10	\$2.75/ \$3.35	free	pay difference	free	free	\$45.00	41	Metro SVC avail.	Varies	Z3: \$95/ Z5: \$115	35.0
Glendale	\$0.25	\$1.00	full fare	pay difference	free	\$0.50	None					
City of LA DOT	\$0.90	\$1.75/ \$2.20/ \$2.65/ \$3.10	full fare	pay difference	free	\$0.25	\$40.00	45			\$56/ \$71/ \$86/ \$99	33.0
Long Beach Transit	\$0.90		\$0.10	N/A	N/A	\$0.35	\$40.00	45				
Metro	\$1.35 (2)	\$2.50/ \$3.60/ \$4.10/ \$4.60	\$0.25	pay difference	free	???	\$42.00 (2)	32			\$67/ \$82/ \$97/ \$112	23-27
Montebello Bus Lines	\$0.90	\$1.10	\$0.05	\$0.25	???	\$0.25	None		Metro SVC avail.	Varies		
Norwalk Transit	\$0.60		\$0.05	N/A	N/A	\$0.25	None					
Santa Clarita Transit	\$1.00	\$3.50/ \$4.00	free	pay difference	free	???	\$25.00	25	20 for \$70/ \$80	0%		
Santa Monica Big Blue Bus	\$0.75	\$1.75	\$0.25	pay difference	free	\$0.25	None					
Torrance Transit & MAX	\$0.75	\$1.25/ \$1.50	\$0.25	N/A	free	\$0.25	None				\$45 / \$54	36
Metro Atlanta Systems												
MARTA	\$1.75	\$1.75	free	free	free	free	\$52.50	30	10 for \$17.50/20 for \$30	14%	\$52.50	30
Cobb County - CCT	\$1.25	\$3.00 1-way; \$4.00 rd. trip	free	pay difference	free	free	\$45.00	36	10 for \$27/ \$36 (rt)	10%	\$55 (1 way) / \$70 (rt)	18 (rt)
Gwinnett County - GCT	\$1.75	\$3.00	free	pay difference	free	free	\$55.00	32	10 for \$27	10%	\$100	34
Clayton County - C-TRAN	\$1.50	N/A	free	N/A	free	free	\$52.50	35	N/A	N/A	N/A	N/A

Notes:

- Multiple fares are for zones.
- MTA local cash and monthly pass fares will change to \$1.25 and \$52 in January 2004.
- All systems offer half-fare (or less) for seniors & disabled passengers; many offer reduced youth fares.
- Fare information not available from City of Commerce and Gardena Municipal Bus Lines.

Prepared by Manuel Padron & Associates
June 25, 2003

5.2 SEATTLE REGION PUGETPASS

In the Seattle region the approach was taken to design a pass that would replace all existing passes being used by the various transit agencies in the region. This was done by developing a pass that would be sold in multiple denominations that match the various existing single trip fares being charged throughout the region.

The Sound Transit regional express bus service operates on a three-zone fare system. The cost of riding is based upon how many fare zones you travel through and your fare type (adult, youth, or senior/disabled). The Sound Transit regional express bus fares were set as shown in Table 5-3.

**Table 5-3
Sound Transit Regional Express Bus Fares**

Cash Fares			
	Adult	Youth	Senior/ Disabled
1 zone	\$1.25	\$0.75	\$0.50
2 zone	\$2.00	\$1.50	\$1.00
3 zone	\$2.50	\$2.00	\$1.25
Monthly Passes			
1 zone	\$45	\$27	\$18
2 zone	\$72	\$54	\$36
3 zone	\$90	\$72	\$45

When the proposed regional smart card fare collection system could not be implemented in time for the new express bus service, Sound Transit and its regional partners developed a new regional transit pass. Called PugetPass, the pass can be used by five transit providers in the three counties in the Puget Sound region. With multiple denominations, this pass is designed to replace most of the transit passes issued by transit agencies in the region. The PugetPass launch has been successful, and in fact the pass has gained some favor over implementing a smart card system.

As shown in Table 5-4, the monthly PugetPass is sold in 13 face value denominations ranging from \$0.50 to \$4.00. Three-month and annual passes are also offered for some denominations. The adult fare denominations for the Sound Transit regional express bus services are shown in bold in the table; the higher denominations are used by other transit providers for their existing express service fares and for Sound Transit's commuter rail service.

**Table 5-4
PugetPass Prices**

Denominations (face value)	Monthly Price
\$0.50	\$18
\$0.75	\$27
\$1.00	\$36
\$1.25	\$45
\$1.50	\$54
\$1.75	\$63
\$2.00	\$72
\$2.25	\$81
\$2.50	\$90
\$2.75	\$99
\$3.00	\$108
\$3.75	\$135
\$4.00	\$144

Customers are advised to buy the PugetPass that has the same cash value as the trip that they take most often. For example, if you have a trip that crosses two zones and it costs \$2 during peak hours, buy a PugetPass with a \$2 value for \$72. If you decide to take a trip that crosses three zones, you simply pay the difference between the higher fare and \$2 – your pass value.

5.3 PROPOSED RTAP EXPRESS FARE STRUCTURE

Overall, the proposed RTAP express bus fare policy should be simple to use, easy to understand, convenient, and not burdensome to GRTA and its regional partners in terms of administration and fare collection costs. This latter point is especially important during the interim period before smart card based fare collection system is in place.

The RTAP express bus service will be a premium service, i.e., bus routes will operate with a minimum of stops and provide the trips with shorter run times than experienced with typical urban transit service. Buses will offer a higher level of comfort and passenger amenities. Based on these factors and the higher operating costs of providing express service, the RTAP express bus fares are proposed to be higher than local service fares in the region.

The RTAP express bus service plan has routes with one-way distances ranging from 13 miles to 40 miles in length. Based on this wide range of trip lengths, the RTAP express bus fare structure is proposed to be a zone or distance-based structure.

While most express buses will enable commuters to reach their work places with a single-seat trip, virtually all express bus routes will offer connections to one or more MARTA rail stations and some routes will terminate at a MARTA rail station (e.g., Airport, Lindbergh, North Springs) and thus require those riders to board the MARTA rail to reach their destination. Likewise for the return trip, the customer may begin the trip on MARTA and transfer to the RTAP express bus to complete the return trip. In addition, some RTAP

express bus riders may need to use MARTA, CCT, C-TRAN, and GCT buses to complete their trips. Based on these factors, the RTAP express bus fare structure should have free transfers.

As discussed in Section 4, the smart card technology will promote seamless connections among the regional transit operators, allow a variety of fare structures and fare payment options to be offered, and provide for allocation of fare revenues among the operators for services rendered. However, for the interim fare collection system to be cost effective and operationally feasible, the inter-operator fare agreements must be similar to the existing reciprocal fare agreements in the region. That is, the fare paid to board the initial vehicle would be retained by that operator. In general, there would be distribution of fare revenues among the different providers, but fare revenues would not be able to be distributed to more than two operators for any trip. The proportion of trips requiring three or more operators (e.g., GRTA express bus, MARTA rail, and either CCT, GCT or C-Tran buses) is expected to be very small; the costs to “recognize” these trips in the system and allocate the fare revenue among the providers would outweigh the benefit in the interim period.

Table 5-5 presents the proposed RTAP express bus fare structure. The fare pricing would be a 3-zone structure based on route distance. One-way cash fares would be higher than round trip cash fares. Fare pricing is set such that express bus-only round trip fares would be the same as express bus/ MARTA combination round trip fares. Transfers would be free with a valid transfer ticket.

Weekly and monthly passes would be available. The passes would be “branded” as GRTA Regional Express Bus passes. The weekly passes would be priced equivalent to 5 round trips. The monthly passes would be priced equivalent to 18 round trips. The MARTA rail faregates present an additional problem not encountered in implementing a regional pass for Los Angeles and Seattle as described in the previous sections. The Los Angeles urban rail and Seattle commuter rail are proof-of-payment systems (i.e., no faregates). Again, for the long-term the smart card based technology will be implemented at the MARTA faregates and will more effectively address the various fare tariffs and use of multi-ride fare media (passes, etc.) across the different operators. In the Atlanta region the interim approach for a regional pass must be able to pass through the MARTA faregates.

To address the faregate entry issue, the concept would be the same as the MARTA TransCard pass. Magnetic stripe, weekly and monthly GRTA Express Bus passes, encoded by MARTA to allow entry through the faregates, would be sold. Customers would use the pass as a flash pass to board the buses.

Like the cash fares, fare revenues from pass sales would be retained initially by each selling agency. At the end of each fiscal year (or quarter) the fare revenues would be reconciled based on the number of passengers boarding with the GRTA pass and the average fare per boarding of each agency. The faregates would record the rail boardings. The bus operators would have to key in each customer bus boarding on the farebox keypad. The proposal requires that express bus transfer passengers entering MARTA rail stations must go through the faregates (i.e., may not enter through the “free” intermodal station area). The free intermodal areas are being closed as part of the new MARTA fare collection system so this will be the standard procedure in the future.

Many of the express routes will offer off-peak, midday service. During the off-peak, half fares would be available for senior and disabled passengers with the proper identification. The details of this proposed reduced fare program would need to be determined.

**Table 5-5
Proposed RTAP Express Bus Fares**

zones (2)	round trip bus only	one-way fare	Round-trip using MARTA (1)			weekly pass (3)	monthly pass (4)
			inbound	outbound	Total		
1	\$4.00	\$2.25	\$2.25	\$1.75	\$4.00	\$20.00	\$72.00
2	\$5.00	\$3.25	\$3.25	\$1.75	\$5.00	\$25.00	\$90.00
3	\$6.00	\$4.25	\$4.25	\$1.75	\$6.00	\$30.00	\$108.00

- (1) Inbound: board express bus, transfer to MARTA;
Outbound: board MARTA, transfer to express bus.
- (2) Zone boundaries would be based on trip distances.
- (3) Weekly pass breakeven round trips = 5
- (4) Monthly pass breakeven round trips = 18
- (5) Half fares available to seniors and disabled passengers in off-peak.

5.4 PROPOSED INTERAGENCY FARE POLICY AGREEMENT

GRTA and the existing transit operators (CCT, C-Tran, GCT, and MARTA) should develop and execute an interagency fare policy agreement signed by all parties. Initially, the interagency agreement would focus on the express service fare policy, but it would be anticipated that the document would be amended to include the interagency issues associated with local service fare policy and the universal smart card fare collection system. The proposed interagency fare policy agreement should contain the following features:

- Description of purpose of agreement and guiding principles
- Procedures for dispute resolution and amending the agreement to include new issues and/ or new parties
- Description of fare policy as it relates to fare structure and pricing, inter-operator transfers, and facility operational issues (e.g., closing “free” intermodal areas)
- Description of how fare revenues are initially retained by each agency and description of procedures for counting boarding passengers and reconciling fare revenue allocations among the operators
- Description of pass and transfer media and operator responsibilities for media print stock, printing costs, encoding costs, and costs associated with sales and distribution
- Summary of each operator’s role and responsibilities, including administrative, operating and maintenance commitments