

ITS in a Paratransit Taxi System: Building in Taxi Equipment Options and Increasing Monitoring and Cost Controls

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SFMTA Background

- Eighth largest transit system in United States, by ridership
- Service Area: 49 square miles
- Service Area Population: 800,000 residents
- 750,000 weekday fixed route boarding's, approx. 150,000 senior/disabled
- 15,000 registered Paratransit riders (9000 active taxi customers)
- 1.2 million annual paratransit trips (645,000 trips on taxi)



SF Paratransit Taxi



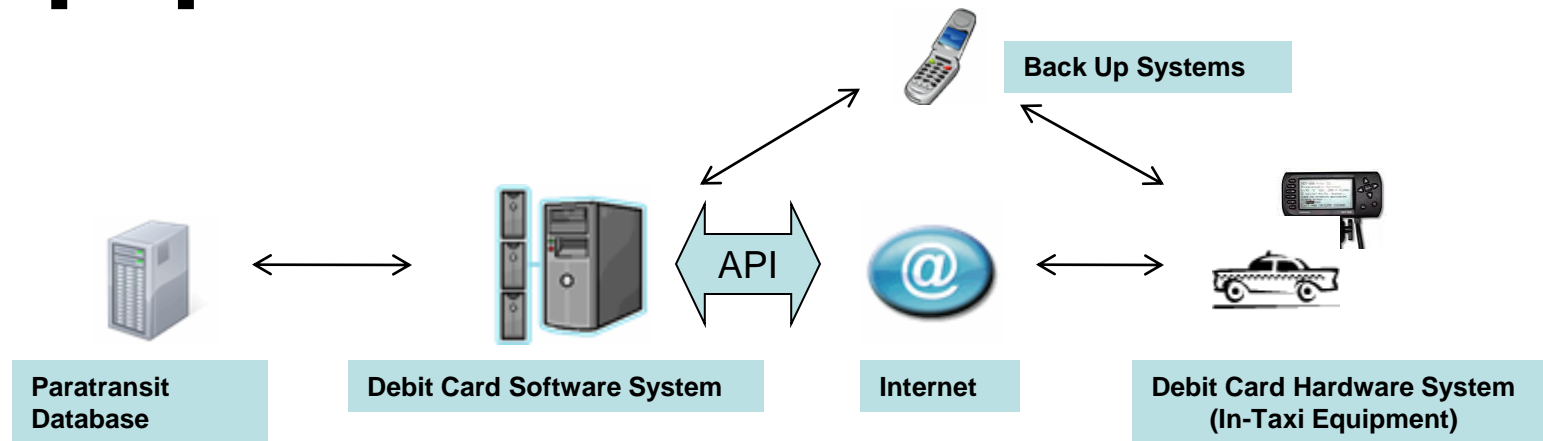
- Sedan Taxi service started in 1981
 - 1400 cabs currently in service
- Accessible Ramp Taxi started in 1994 with 6 cabs
 - 100 ramp taxis currently in service
- User choice
- Average trip cost \$12.18
- Average trip length 3 to 4 miles
- Up until today, the entire system has been managed with paper scrip payment system

Paratransit Debit Card System

- The Paratransit Debit Card System (PDCS) eliminates scrip and automates the fare payment process
- Magnetic swipe debit cards, called SF TaxiCards, issued to all paratransit users for use as photo identification and electronic payment
- All SF Taxis equipped with smart meter, swipe reader, mobile data terminals & GPS (In-taxi Equipment)
- Similar to a credit card transaction, the cab communicates wirelessly with a central server that maintains customer accounts

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The system architecture had to be open to allow multiple taxi equipments to be used



- We were dealing with multiple taxi agencies who each had their own idea of what they wanted in their cabs.
 - Some just wanted a swipe card for paratransit
 - Some wanted to also have the ability to accept credit cards from non-paratransit riders
 - Some wanted to do their own mobile dispatch

To manage this need we developed an API for the mobile equipment

- The API defines the communications protocol between the Debit card System and mobile equipment.
- API and test application was developed by CabConnect
- Taxi equipment manufacturers responded to an IFB with minimum standards for participation and demonstrated their equipment met these standards and communicated necessary data thru the API.
- Equipment that qualified was put on the approved supplier list

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**With this new system in place,
we gather critical data
electronically...**

Trip Data

- Date
- time of pick up and drop off
- location of pick up & drop off
- Cab & driver number
- Customer information
- Trip cost/meter amount
- Any tip (10% max \$2.00)



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Processing Transactions in Real Time


- Verify Customer Eligibility
- Check balance, value on card
- Capture origin, destination
- Record duration of trip, from pick up to drop off
- Meter amount, any tip
- Service Area Boundaries



Audit Data - In Taxi Equipment

- Denials at time of trip driver
 - patron doesn't match photo on card
- Denials time of trip – Debit Card System
 - insufficient value on card
 - out of service area
 - trip duration less than one minute
- Denials prior to reimbursement
 - Audit compares shortest route – from pick up drop off, to meter amount
 - wait trips (asking cab to wait)
 - round trips (pick up and drop off same location)

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Home Reports Activ


[Record 1 - 7 of 7]

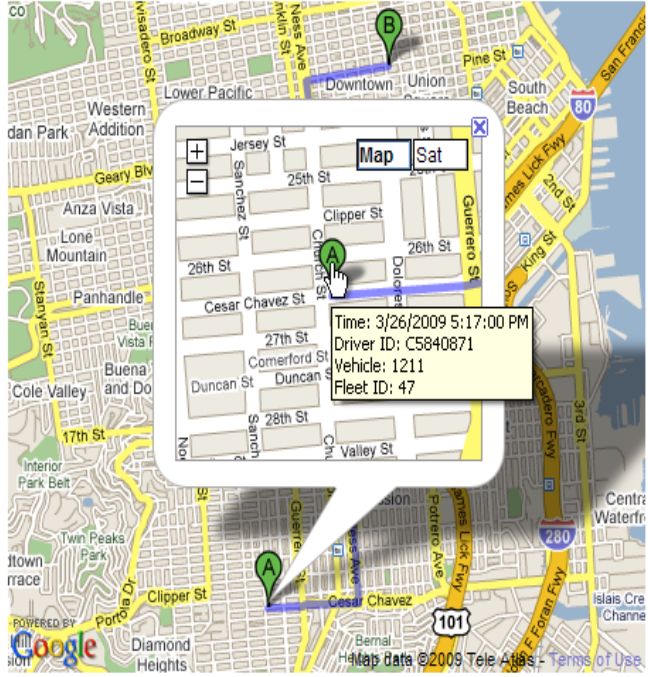
Date From: 03/01/2009
Date To: 03/31/2009
DO Date From:
DO Date To:
PU Date From:
PU Date To:

Add New Apply Filter

View	Edit	Route	Transaction
			52.1
			122.1
			347.1
			613.1
			245.1
			174.1
			419.1

[Record 1 - 7 of 7]





Map Sat

Time: 3/26/2009 5:17:00 PM
Driver ID: C5840871
Vehicle: 1211
Fleet ID: 47

A Cesar Chavez St

4.1 m

- Head east on Cesar Chavez St toward Dolores St
- Turn left at S Van Ness Ave
- Turn right at California St
Destination will be on the left

B California St

Map data ©2009 Sanborn, Tele Atlas

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Audit Data – Interactive Voice Response System

- Used if in-taxi-equipment isn't working
- Driver calls for back up IVR
- Origin and destination still captured by “pinging”
- Verifies customer account balance using IVR

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Trend Data

- Customer history
- Driver history
- Taxi company history
- Ride distribution
- Services per neighborhood, Supervisor district
- Trip generator analysis
 - Dialysis center trips, regional center trips

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User: iaala_admin@sfmta
Thursday, 23 April 2009
15:24



- Home
- Patrons
- Cards
- Reports
- Transactions
- Activity Logs
- Fleets
- Security

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Date From: DO Date From: PU Date From:
 Date To: DO Date To: PU Date To:

➕ Add New 🔍 Apply Filter 🔄 Reset Filter | Page Size:

Transaction #	Approval #	Patron	Date	Time	Card Number	Fare	Tip	Total	Vehicle	Driver
198824.1	842171	Cheryl Damico (pcc)	04/21/2009	03:28 PM	1941016078161672	\$16.60	\$1.70	\$18.30	1313	Y0001313
198807.1	655172	Cheryl Damico (pcc)	04/21/2009	11:54 AM	1941016078161672	\$15.70	\$1.60	\$17.30	1313	Y0001313
198419.1	202196	Cheryl Damico (pcc)	04/14/2009	03:32 PM	1941016078161672	\$16.15	\$1.65	\$17.80	1313	Y0001313
198065.1	672182	Cheryl Damico (pcc)	04/07/2009	03:22 PM	1941016078161672	\$16.60	\$1.70	\$18.30	1313	Y0001313
198051.1	372174	Cheryl Damico (pcc)	04/07/2009	12:21 PM	1941016078161672	\$15.70	\$1.60	\$17.30	1313	Y0001313
197875.1	639221	Cheryl Damico (pcc)	04/06/2009	12:13 PM	1941016078161672	\$8.00	\$0.00	\$8.00	1084	Y0004694
197828.1	422206	Cheryl Damico (pcc)	04/04/2009	08:06 PM	1941016078161672	\$18.26	\$0.00	\$18.26	1313	Y0004714
197827.1	BALCHK	Cheryl Damico (pcc)	04/04/2009	07:57 PM	1941016078161672	\$0.00	\$0.00	\$0.00	1313	Y0004714
197826.1	BALCHK	Cheryl Damico (pcc)	04/04/2009	07:50 PM	1941016078161672	\$0.00	\$0.00	\$0.00	1313	Y0004714
197825.1	BALCHK	Cheryl Damico (pcc)	04/04/2009	07:47 PM	1941016078161672	\$0.00	\$0.00	\$0.00	1313	Y0004714
0.0	BALCHK	Cheryl Damico (pcc)	04/01/2009	02:27 PM	1941016078161672	\$0.00	\$0.00	\$0.00		
197539.1	389186	Cheryl Damico (pcc)	03/31/2009	03:48 PM	1941016078161672	\$16.60	\$1.70	\$18.30	1313	Y0001313
197530.1	452204	Cheryl Damico (pcc)	03/31/2009	02:28 PM	1941016078161672	\$8.00	\$0.00	\$8.00	0525	Y0006866
197515.1	935168	Cheryl Damico (pcc)	03/31/2009	11:53 AM	1941016078161672	\$15.25	\$1.55	\$16.80	1313	Y0001313
0.0	BALCHK	Cheryl Damico (pcc)	03/30/2009	06:23 PM	1941016078161672	\$0.00	\$0.00	\$0.00		

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Monitoring

- Tracking trip patterns for potential fraud
 - driver/user pairs
 - linked trips
 - multiple trip origins not matching customer address
- Perception of increased monitoring effecting behavior



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Data uses for Future Planning

- Trip distribution low income, underserved neighborhoods
- Supervisor districts – reporting on service distribution
- Land use planning
 - housing, services
- Analyzing patient distribution to Dialysis Centers or other health service providers

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Data uses Future Planning cont.

- Service planning for transit routes or other fixed route, dial a ride or shuttle services
- Usage pattern analysis for fare structures
- Potential future grouping of trips

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