

ORANGES Evaluation Phase I Risk Assessment Report

Phase I of the US DOT sponsored
Evaluation of the ORANGES Electronic
Payment Systems Field Operational Test

US DOT/Volpe National
Transportation Systems Center

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(Revision 1)

Foreword

This document is the US DOT evaluation Risk Assessment report for Phase I of the ORANGES field operational test. This report was preceded by a series of working papers corresponding to each Phase I task, including:

- Evaluation Strategy and Plan – issued November 6, 2001
- Test Plans – issued January 20, 2003
- Statistical Analysis of Before Data – October 2, 2003

This document consolidates these working papers and incorporates an assessment of issues, risks, mitigation strategies and lessons learned looking forward to Phase II of the evaluation effort.

Revision 1 incorporates additional information received from the implementation team subsequent to the original version dated January 13, 2004.

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1 Introduction

This report describes the findings for Phase I of the US DOT-sponsored evaluation for the Orlando ORANGES multi-modal Field Operational Test (FOT), including:

- a background description of the ORANGES deployment;
- the Evaluation Strategy and Plan, which establish the evaluation goals, measures and test hypotheses;
- the detailed Test Plans, which develop the specific test procedures for each measure and test hypothesis;
- the process used for conducting discussion groups for the qualitative Test Plans;
- findings from the discussion groups;
- statistical analysis of results from the quantitative Test Plans; and
- an assessment of the risks and lessons learned from Phase I of the ORANGES FOT evaluation.

2 Background Description of the ORANGES Field Operational Test System

2.1 *Participants and Management Structure*

The ORANGES partnership has a three-tier management structure:

- **Public Sector Partners:** The Central Florida Regional Transportation Authority (doing business as LYNX), the Orlando-Orange County Expressway Authority (OOCEA) and the City of Orlando are the Public Agency Partners, with LYNX also serving as the Federal grantee and manager of the FOT. The following individuals have been the primary representatives for the Public Sector Partners on the evaluation team:
 - Doug Jamison, LYNX
 - David Wynne, OOCEA
 - Pamela Corbin, City of Orlando Parking Bureau

- **Private Sector Partners:** These private sector firms implemented the FOT system under contract, on behalf of the Public Partners. Post Buckley Schuh & Jernigan (PBSJ) is contracted to LYNX as their General ITS & APTS Consultant, with FOT responsibilities including program management, oversight and implementation support. Touch Technology International (TTI)¹ is the Lead Technical Partner responsible for system development and integration, implementing and operating the clearinghouse – contracted to LYNX. The other initial Technical Partners were Leapfrog Smart Products² and the University of Central Florida³ (supporting development and implementation of the smart card applications). Other Technical Partners joined the implementation team later – AnswerSearch (cardholder recruitment), Alliance Data Systems (merchant acquiring services for credit card transaction processing) and E-Squared Engineering (customer service strategy and brochures). Additional services and equipment suppliers included Suntrust Bank (ACH transfers of settlement funds), Ascom Transport Systems (transit validators), EFKON (toll plaza readers and smart card accepting transponder equipment), Gemplus (dual interface smart cards) and McGann Parking Systems (parking garage readers). The following individuals were the initial primary representatives for the lead Private Partners on the evaluation team:
 - Don Erwin, PBSJ⁴
 - Janet Mendenhall, TTI
- **Affiliates:** Various other organizations might eventually become involved in business relationships with the partnership. However, there are no affiliates at this point. The core focus of the FOT will be on evaluating the ORANGES system. Affiliates may join later if the system is successful, which will perhaps require new software applications for the regional smart card.

¹ During the course of the deployment, TTI underwent a corporate restructuring. The organization that became responsible for the ORANGES effort is known as Transaction Systems International (TSI)

² In 2002, Leapfrog entered Chapter 11 bankruptcy protection and their work was reallocated to others in the implementation team.

³ By the end of the implementation period, it was concluded that UCF had not contributed to the project and would no longer be listed as a partner.

⁴ In 2002, this role was assumed was Tom Delaney.

2.2 Deployment Overview

The FOT has implemented a central payment and clearinghouse system using core technology from Touch Technology Inc. (TTI). Payment transactions completed at smart card readers operated by individual agencies are transmitted to the ORANGES clearinghouse for settlement to agency-owned revenue accounts. Smart card payment applications are both agency specific and cash-based, including pre-paid transit passes, and account- and card-based stored value. Card-based stored value, or electronic cash, is stored in a purse application on the card and accepted as a form of payment across all agencies. The long-term ORANGES plan involves Central Florida residents and tourists using the prepaid accounts for many purposes.

The FOT involves a limited deployment:

- **Card base:** The agencies plan to maintain 800-1200 smart cards in active use at all times during the test. A single card can be loaded with multiple payment applications, thus allowing the card to be accepted for payment across all agencies.
- **Transit deployment:** LYNX has equipped Links 13 and 15, which both connect post-secondary educational institutions with the downtown area.
- **Toll deployment:** The Orlando-Orange County Expressway Authority (OOCEA) is equipping selected lanes of the Holland East toll plaza on State Route 408 to accept the EFKON transponder with a smart card as well as installing smart card accepting validators in selected manual lanes. Smart card acceptance through transponders was deferred one or two months from the initial deployment. The Holland East plaza is a 14-lane facility. Lanes 1-7 operate westbound, lanes 9-14 operate eastbound, and lane 8 is reversible. This plaza accounts for approximately 20% of the revenue and transactions annually for OOCEA.
- **Parking deployment:** The City of Orlando Parking Bureau has equipped cashier booths in the Central Boulevard, Library and Market Street garages.
- **Revaluing facilities:** Each agency offers facilities for smart card issuance and revaluing. This includes points of sale at agency-operated customer service facilities, selected attended toll lanes and some locations operated by third parties (additional details on revaluing locations and payment methods accepted are provided below). Passes will continue to be sold only through LYNX facilities and transponders will continue to be only available through OOCEA facilities.

- The strategy of technology deployment was specifically designed to isolate the smart card payment system from the existing legacy systems where necessary in the operation at each agency. This strategy offered the least risk to existing operation and revenue management.

2.3 OOCEA

Rather than integrate the existing E-PASS Electronic Toll Collection (ETC) system with the smart card clearinghouse, the OOCEA opted to create a parallel ETC system in equipped lanes, using EFKON smart card accepting transponders and smart card readers.

Figure 1:
Transponder
that Accepts
Smart Cards



Source: ORANGES
Consortium

Smart Card Accepting Transponders

The OOCEA customer service center will distribute the EFKON smart card accepting transponders in addition to conventional transponders (see Figure 1). Customers will insert the smart card into the EFKON transponder to have their toll fees deducted from their ORANGES toll account held at the central clearinghouse. The toll account operation is similar to the EPASS account currently offered by the OOCEA to its customers.

EFKON transponders use infrared communications with the laneside readers and communicate with EFKON controllers in the toll plaza. The EFKON system will be integrated with the clearinghouse, bypassing the existing ETC system. OOCEA customers receiving an EFKON transponder will continue to use their conventional transponder for non-equipped toll lanes. The conventional transponder is also read by the Holland East plaza equipment, which activates the “paid” laneside signal (the OOCEA account is also charged in the process, but this is reversed out when there was a corresponding payment from the ORANGES account).

Smart Card Validators

Selected manual lanes are also equipped with EFKON validators (see Figure 2), similar to those used for payments on the LYNX buses. The validators allow customers to pay tolls using electronic cash stored on the smart card by stopping and placing the smart card in proximity to the validator mounted in the lane. The smart card is an alternative to tossing coins into the automated coin machines in the unattended cash lanes. The EFKON lane controller has been integrated with the existing lane violation system.

**Figure 2: Toll Lane Smart
Card Validator**



Source: ORANGES
Consortium

Therefore, after the card is presented for payment, the completed payment will trigger a green light signaling the driver to proceed.

2.4 LYNX

All buses have registering fareboxes, which LYNX recently replaced with a new model. Integration of smart card readers into this new farebox model was not practical from both a schedule and budget standpoint for the FOT. The ORANGES partners opted for stand-alone validators from Ascom Transport Systems (see Figure 3) to stay within budget and schedule constraints. These are mounted beside the fareboxes but not integrated with them. The ORANGES card will be used as an alternative to cash fare payment and the LYNX paper transit pass.

Figure 3: Stand-Alone Transit Smart Card Validator



Source: ORANGES Consortium

2.5 City of Orlando Parking Bureau

Selected garages accept the ORANGES card using a smart card reader that has been integrated into a free-standing housing by McGann Software Systems, which also supports both proximity and swipe card technology (see Figure 4). The ORANGES card will replace the need for the hourly parker to pick up an entry ticket to mark the duration of time in the garage, as well as, provide electronic cash for the payment upon exit. Instead, the smart card is presented to the McGann reader upon garage entry and exit for fee calculation. The cash value stored on the card is debited for payment upon calculation of the parking fee. The transaction data is transferred to the ORANGES clearinghouse after being consolidated by the Parking revenue management system. At the request of the Parking Bureau participation in the FOT was restricted to hourly/daily customers and did not include monthly parking patrons, who currently use a proximity card

Figure 4: Parking Garage Validator



Source: ORANGES Consortium

2.6 Smart Card Issuance and Revaluing

Cards are initialized centrally, and distributed to the cardholders by mail. Cardholders use one of the revaluing points to add value to the electronic purse or to purchase a LYNX transit pass and load it onto the card. Replacement cards will still be initialized centrally and then distributed either by mail or through one of the revaluing locations.

Table 1 summarizes the available revaluing locations and the payment methods accepted at each:

Table 1. Revaluing Locations and Payment Methods Accepted

Agency	Revaluing Location	Payment Methods Accepted		
		Cash	Check	Credit Card
Parking Bureau	Central Boulevard Garage – Cashier Booth	✓	✓	
	Central Boulevard Garage – Payment Office	✓	✓	✓
	Market Garage – Cashier Booth	✓	✓	
	Library Garage – Cashier Booth	✓	✓	
LYNX	Downtown Bus Terminal – Sales Window	✓	✓	
	Valencia Community College East – Book Store	✓	✓	✓
	University of Central Florida – Student Union Ticket Office	✓		
OOCEA	Holland East Toll Plaza – Designated Staffed Lanes	✓		
	East Side Service Center	✓	✓	✓

Some automatic revaluing arrangements are also available:

- LYNX offers an automatic pass renewal service. Customers may register by providing a credit card number, which is used to automatically renew a pass five days prior to its expiration. The clearinghouse automatically requests a credit authorization on the registered account for the amount of the new transit pass. This pass renewal will be updated on the card when it is used at a LYNX validator as long as a positive authorization has been received on the purchase request. The original pass on the card continues to be used to expiration before the next purchased pass is used for fare payment. If a successful authorization cannot be obtained, the existing pass on the card will continue in use until it expires.
- OOCEA offers automatic toll account replenishment of funds via a registered credit card. As tolls are paid, funds are moved from the customer toll account to agency revenue. The clearinghouse automatically generates a credit card purchase request for \$20 to replenish the account whenever the balance drops to \$5 or less. If a successful credit card authorization cannot

be obtained, the transponder that has been issued will be hot-listed once existing funds are depleted to prevent further use until funds can be replenished.

Cardholder Participation Incentives

The agencies are offering several cardholder participation incentives:

- Cardholders receive a 15% discount on single ride, weekly and monthly LYNX fares (i.e., \$1.06 instead of \$1.25 for a single ride);
- Parking customers receive 50% off hourly and daily parking fees; and
- OOCEA customers receive a smart card with \$5 preloaded, and a \$20 check at the end of the 12-month trial if they have remained an active user throughout the FOT period. This incentive was discontinued after issuance of the initial 300 cards by OOCEA, as it was determined that many customers discontinued use of the smart card once the initial five dollars was used.

2.7 Clearinghouse

The primary role of a clearinghouse is to process all of the transactions in the payment system according to business rules established by the members and to settle funds among the participating agencies. Settlement is the creation of the accounting entries and this action is done daily by the system. Funds movement, however, is a separate action that occurs bi-monthly in the ORANGES project. This decision was made by the partners to reduce the cost of bank fees for ACH due to the limited scale of the field operational test (FOT).

In the ORANGES project, the clearinghouse also performs two important additional functions. It facilitates all transit pass purchases by credit card and all load processing to electronic cash stored on the card or to toll accounts. The ORANGES clearinghouse also plays a unique role for LYNX in this implementation by providing all software and revenue management processing of the smart card transactions performed for transit. This “front-end” role is not generally handled by a clearinghouse, but is instead typically done by a transit agency itself using software it has received from the hardware vendor. In ORANGES, Ascom Transport Services only provided the bus validator and collector hardware devices, but no operating software. Therefore, the clearinghouse system is performing both front-end and back-end processing for LYNX during this FOT.

In ORANGES, settlement processing is based upon the type of payment application, the owner of the application (including considering whether the application is shared among participants) and the issuer of the card. Settlement of payment applications can be very straightforward or more complex according to business rules. In the ORANGES project, there is only one transit agency, LYNX. Therefore, transit pass sales are only handled through LYNX or its contracted agents. All funds from transit pass sales are deposited by the clearinghouse into the LYNX revenue account.

The settlement of payments made with electronic cash requires the clearinghouse to know the issuer of the card and the owner of the reader where the payment was made. If, for example, a cardholder is issued a card from LYNX and loads \$30 into the electronic purse on the card, these funds are held by LYNX in an account called a funds pool until the electronic cash is used for payment. If during a certain settlement period, the LYNX card were used to make \$3 in toll payments at OOCEA and \$1 in payments at parking garages, the clearinghouse would execute the settlement by transferring these amounts from the LYNX account to the bank (revenue) accounts of the other agencies. If the card were used to pay \$1.06 for a bus ride, the clearinghouse would transfer funds from the LYNX funds pool to the LYNX revenue account. Additionally, if the LYNX cardholder makes the initial payment at a revaluing device operated by another agency, the funds will be initially placed in the account of the agency that receives the revaluing payment from the cardholder. However, the settlement process is used to transfer the funds to LYNX.

In the ORANGES project, the agencies were free to establish the accounting instructions that the clearinghouse should use in the settlement process. Both the OOCEA and the City of Orlando have chosen to use a single bank account for settlement, but to utilize reporting from the clearinghouse to make the appropriate internal account entries for revenue and for value held in the funds pool. LYNX has opted to maintain two separate bank accounts during this project. One bank account is for holding the funds pool that has not yet been used by the cardholders for purchases. The other is the LYNX revenue account for holding funds received for LYNX pass purchases and collected transit fares.

The various funds movements that are to occur in and out of each agency account with daily settlement are consolidated into net transfers through the use of a clearing account. Funds movement occurs every two weeks. Table 2 provides sample reconciliation information that summarizes the derivation of the net settlement payments.

Table 2. Sample Clearinghouse Settlement Activity

		E-CASH ACTIVITY AND SOURCE							
		LYNX		OOCEA		City Parking		Net To/From Funds Pool	
LYNX	\$	(1.00)	\$ 36.50	\$ (0.75)	\$ -	\$ -	\$ -	\$	34.75
OOCEA	\$	(0.75)	\$ -	\$ (341.79)	\$ 780.05	\$ (2.50)	\$ -	\$	435.01
City	\$	(3.00)	\$ -	\$ (26.25)	\$ 50.00	\$ (114.50)	\$ 424.19	\$	330.44
	\$	(4.75)	\$ 36.50	\$ (368.79)	\$ 830.05	\$ (117.00)	\$ 424.19	\$	800.20

Accounts

LYNX Funds Pool	\$ (1.00)	To LYNX Revenue for e-cash purchases
	\$ (277.10)	To LYNX Revenue for pass purchases
	\$ (0.75)	To OOCEA for purchases
	\$ (278.85)	Net to Clearing Account
LYNX Revenue	\$ 1.00	From LYNX FP for e-cash purchases
	\$ 277.10	From LYNX FP for pass purchases
	\$ 0.75	From OOCEA for purchases
	\$ 3.00	From City for purchases
	\$ 281.85	Net from Clearing Account
OOCEA	\$ 0.75	From LYNX FP for purchases
	\$ 26.25	From City for purchases
	\$ (0.75)	To LYNX Revenue for purchases
	\$ (2.50)	To City for purchases
	\$ (50.00)	To City for loads
	\$ (26.25)	Net to Clearing Account
City Parking	\$ 2.50	From OOCEA for purchases
	\$ 50.00	From OOCEA for Loads
	\$ (3.00)	To LYNX Revenue for purchases
	\$ (26.25)	To OOCEA for purchases
	\$ 23.25	Net from Clearing Account
	\$ (305.10)	Total credits to Clearing Account
	\$ 305.10	Total debits to Clearing Account

2.8 Implementation Schedule

The FOT deployment used the following approach to system design and development:

- *Pilot I:* The test-bed version of the system, demonstrating the integration of all equipment and subsystems in a laboratory testing environment, was to have been developed during the initial 11 months (i.e., April 2001 through February 2002). This stage of development actually took place over the 26 months between April 2001 and May 2003. This test-bed system created a prototype of the revenue service pilot in a laboratory-testing environment.
- *Pilot II:* The limited FOT field deployment was to have been completed, brought into revenue service and fully tested between months 12 – 18 (i.e., March 2002 through September 2002). Full FOT implementation was scheduled to overlap with the more limited Pilot II effort – from June 2002

through February 2003. The full FOT deployment was actually implemented from the start, with no intermediate limited deployment. So, the development from Pilot I through to full FOT deployment was to have spanned over the 12 months from March 2002 through February 2003. The Pilot II stage of development was initiated prior to the completion of Pilot I in May 2003, and brought into revenue service by August 2003. At that time, some functionality was not initially in place – in particular the toll accounts processing needed to support the smart card accepting transponders.

Overall, full field deployment was to have been completed over the 23 months between April 2001 and February 2003. This effort was actually completed (with the exception of deferred functionality such as the toll accounts processing for smart card accepting transponders) over the 29 months between April 2001 and August 2003. Much more time than anticipated was spent on addressing various design and resource availability issues, stretching the time to the completion of the Pilot I stage from 11 months to 26 months. During the latter stages of Pilot, development of Pilot II was underway – as a result only 3 months passed after the completion of the Pilot I stage until the system was brought into revenue service.

3 Evaluation Strategy and Plan

3.1 US DOT Evaluation Process

As part of the ITS program, US DOT requires that each FOT have an independent evaluator. This national evaluation is a supplementary effort to the locally funded and managed FOT self-evaluation. The national evaluation is separately funded and has independent goals, objectives, schedule and deliverables. The US DOT evaluations also provide useful feedback to the local FOT participants as well as other interested transportation stakeholders.

For further details, please refer to the TEA-21 Evaluation Guidelines, www.its.dot.gov/eval/ResourceGuide (originally published in the Federal Register). A brief overview of some material from the Guidelines is provided below for ready reference – together with the approach being used in the ORANGES evaluation:

- US DOT program assessment has a dual focus:
 - **Outputs:** The evaluation documents *what was done* in the FOT (e.g., systems built, the capabilities provided, institutional arrangements). The

background description of the ORANGES system provided in Section 2 of this report is the initial step in developing this type of documentation.

- **Outcomes:** The evaluation documents *what was achieved* through the FOT, relative to a set of goals and measures established in collaboration with the local participants early in the effort. Goals and measures have been developed by consensus for the ORANGES evaluation – as discussed in the Section 4 of this report.
- The federal Evaluation Guidelines define a common process for both the US DOT and local evaluations:
 - **Establish the Evaluation Team:** Evaluation team members should include participants from all local FOT participants (public and private sector partners) as well as representatives from the US DOT evaluation team⁵. The ORANGES evaluation team includes the core public agency partners as well as the lead private sector partners.
 - **Develop the Evaluation Strategy and Plan:** The evaluation team establishes the goals and measures that will be the focus of the evaluation. Each goal with a quantifiable measure is framed as a testable hypothesis – involving a statement about a potential benefit the FOT is expected to provide. The need to support certain goals with a qualitative assessment is also considered. In these cases, measurement involves monitoring the evolution of opinion for various groups of FOT participants (e.g., customers and/or employees) through discussion groups without any particular hypothesis.
 - **Develop Test Plans:** For each testable hypothesis and qualitative assessment, a plan is defined for gathering data on the associated measure. This includes defining desired opportunities to gather data for the before vs. after – and/or test vs. control – dimensions.
 - **Data Collection and Analysis:** The quantitative and qualitative data required by the test plans is collected – and used for qualitative assessments and comparison with the testable hypotheses. The role of the initial data collection is to gather “baseline” data about initial conditions before the FOT system is in place. Only this “baseline” data can be collected in Phase I – the remainder of the data collection will occur after the FOT system has been implemented.

⁵ The US DOT Evaluation Team for the ORANGES Evaluation was led by the Federal Transit Administration and the Volpe National Transportation Systems Center, with technical support from TranSystems.

- **Document the Evaluation:** The strategy, plans, results, conclusions and recommendations are combined into an Evaluation Final Report (this document).

3.2 Developing Consensus on the Evaluation Goals and Measures

The process for developing a consensus on an initial set of evaluation goals and measures was completed in collaboration with the ORANGES partners – and included the following steps:

- Generating a list of potential goals and measures based on input from the partners. These were discussed with the partners, including how data could be collected.
- Soliciting input from each partner independently on relative priority for the goals.
- Developing consensus with the partners on the initial set of evaluation goals and measures.

The starting point for this consensus building effort was a set of goals and measures proposed by the USDOT evaluation team. These were developed based on the priority input received from the partners as well as the following additional considerations:

- Consistency with goals of the federal ITS program.⁶
- A clearly associated benefit and measure.
- A *feasible and reasonable data collection* method for the measure, consistent with the scale and duration of the FOT.

Feasible and reasonable data collection generally corresponds to measures for which either:

- Quantitative data can be provided by the operating agencies (or derived from data that can be provided).
- Qualitative input can be gathered from discussion groups whose participation can be arranged by the operating agencies.

⁶ The following National ITS goals are cited in the Guidelines: (1) traveler safety; (2) traveler mobility; (3) transportation system efficiency; (4) productivity of transportation providers; (5) conservation of energy and protection of the environment; and (6) others as may be appropriate to unique features of the project.

3.3 Evaluation Goals, Measures and Test Hypotheses

Tables 3 and 4 identify the set of quantitative and qualitative goals and measures initially established for the evaluation and were developed through the consensus-building process. The tables also list the fundamental test hypothesis for each quantitative goal and measure. This initial consensus creates the basis to develop test plans and investigate sources for the baseline data collection effort. Nonetheless, this initial set of evaluation goals and measures may need to be amended:

- As the design of the FOT is finalized.
- If issues emerge with ensuring feasible and reasonable data collection.

Table 3: Quantitative Evaluation Goals/Measures and Test Hypotheses

FOT Evaluation Goal	Measure	Test Hypothesis
1. Increase parking revenue	• \$	• Revenue will increase from parking payment equipment that accepts smart cards, due to increased equipment availability and improved customer convenience. The degree of revenue increase will vary for different types of parking equipment.
2. Increase transponder market penetration	• Number of smart card users that newly acquire a transponder	• Of the smart card users, some will choose to newly acquire a transponder
3. Reduce transaction times	• Average transaction times	• Smart card transactions will be quicker than cash payment, so average time will reduce if there is a shift from cash to smart card.
4. Increase prepaid revenue share	• % revenue prepaid	• The % of revenue that is prepaid will increase for equipment that accepts smart cards
5. Reduce monthly pass distribution costs	• Procurement, inventory, delivery, commissions for any conventional passes made available on smart cards	• The number of conventional passes being distributed will decrease, thus reducing distribution costs

6. Increase automated payment equipment uptime	<ul style="list-style-type: none"> • % equipment availability 	<ul style="list-style-type: none"> • The decreased use of cash will improve equipment reliability
7. Cardholders use the joint account ⁷	<ul style="list-style-type: none"> • Card use profiles • Average prepaid balance • Modal use profile 	<ul style="list-style-type: none"> • Customers that activate joint transportation accounts will maintain a prepaid balance and use the card frequently. Multimodal use by individual cardholders will most often involve tolls and parking.

Table 4: Qualitative Goals/Measures and Test Hypotheses

FOT Evaluation Goal	Measure
8. Understand customer perceptions <ul style="list-style-type: none"> • General benefits • Ease of use • Convenience of revaluing 	<ul style="list-style-type: none"> • Customer feedback
9. Understand operations/maintenance staff perceptions, including: <ul style="list-style-type: none"> • General benefits • Reduced payment disputes • Reduced transfer abuse • Ease of customer use • Maintenance 	<ul style="list-style-type: none"> • Operations/maintenance staff feedback
10. Understand planning/management staff perceptions, including: <ul style="list-style-type: none"> • General benefits • More comprehensive data collection 	<ul style="list-style-type: none"> • Planning/management staff feedback
11. Understand interagency perceptions, including: <ul style="list-style-type: none"> • General institutional issues • Interagency collaboration 	<ul style="list-style-type: none"> • Partnership feedback

4 Test Plans for Quantitative Goals

This set of evaluation goals involves numerical measures and initial test hypotheses. In assessing any changes observed, it will be important to consider the limited scale of deployment. Many of the quantitative goals and measures involve potential changes in payment behavior (e.g., using a new payment method, willingness to make prepayments). Such changes in behavior might increase with a more comprehensive deployment and after the system has been in place longer.

⁷ At this point in the design process for FOT implementation, it is understood that the joint account will only involve the ability to use one or more different types of smart card with smart card readers installed at transit, parking and toll facilities. Joint account is not expected to involve any use of the same account for both smart cards and toll transponders.

Tables 5 and 6 summarize the required before and after data collection, as detailed in the remainder of this section.

4.1 Quantitative Goal 1 – Gather Clearinghouse Performance Measures

The clearinghouse operator will provide measures that characterize the clearinghouse operational performance (e.g., processing time required for transaction batches, communications error rates) as well as identify the specific measures. There is no test hypothesis for this goal. During after testing, the evaluators will complete a statistical assessment.

Table 5: Summary of Before Data Collection

	Facility Type			
	Clearinghouse	Buses	Garages	Toll Lanes
Quantitative Goals				
Goal 1 – Clearinghouse Performance Measures				
Goal 2 – Acceptance Test Results				
Goal 3 – Demonstrate Performance for New Transponders				
Goal 4 – Transaction Times		<	<	
Goal 5 – Prepaid Revenue Share		<	<	
Goal 6 – Automated Equipment Uptime		<		<
Goal 7 – Joint Account Use				
Goal 8 – Current Pass Distribution and Permit Billing Costs		<	<	
Goal 9 – Current Processing Cost per Cash Transaction		<	<	<

Table 6: Summary of After Data Collection

	Facility Type			
	Clearinghouse	Buses	Garages	Toll Lanes
Quantitative Goals				
Goal 1 – Clearinghouse Performance Measures	<			
Goal 2 – Acceptance Test Results	<	<	<	<
Goal 3 – Demonstrate Performance for New Transponders				<
Goal 4 – Transaction Times		<	<	
Goal 5 – Prepaid Revenue Share		<	<	

Goal 6 – Automated Equipment Uptime		✓		✓
Goal 7 – Joint Account Use	✓			
Goal 8 – Current Pass Distribution and Permit Billing Costs				
Goal 9 – Current Processing Cost per Cash Transaction				

4.2 Quantitative Goal 2 – Gather System Acceptance Test Results

The program manager will provide results from acceptance testing completed before the system is brought into revenue service. There is no specific measure or test hypothesis, but the acceptance testing results will provide an important baseline for the operational characteristics of the system.

4.3 Quantitative Goal 3 – Demonstrate Reliable Performance for Smart Card Accepting Transponders

The EFKON smart card accepting transponder is unproven in North America, and uses an infrared interface (also unproven in North America). The goal is to demonstrate reliable equipment operation during the operational test that does not adversely impact customer reaction to the ORANGES card.

Measure

- Difference between the numbers of monthly transactions for smart card accepting and conventional transponders.

Test Hypothesis

- Using a smart card accepting transponder instead of a conventional transponder will not reduce the number of transponder-based transactions.

If there were significant operational problems with the smart card accepting transponder or the interface, customers might divert some transactions to cash. The EFKON equipment is established in Europe and Asia, but this must be established for the FOT.

Modes Involved

- Toll

Types of Data Comparisons

- Test and control

The test will measure the average number of monthly transponder transactions by smart card transponder users. The control test will measure

the average number of monthly transponder transactions by conventional transponder users. These monthly totals will be examined throughout the operational test period for any reductions in use over time. Reductions for the smart card accepting transponders that reflect similar reductions in use of conventional transponders would still support the test hypothesis.

Data Needed

- Average number of monthly transactions for a group of smart card accepting transponders and a comparable group of conventional transponders.

Data Collection Methods

The clearinghouse will provide the number of toll transactions for smart card transponders. The existing E-Pass ETC system must provide the number of transactions completed by selected conventional transponders. Transponders of both types must have comparable travel patterns (e.g., commuters who average two toll transactions per weekday).

4.4 Quantitative Goal 4 – Reduce Transaction Times

Reducing average transaction times is important for all three modes and could translate directly into reduced queuing and bus dwell times. This quantitative goal does not apply to tolls, since the percentage paying by transponder or smart card will not noticeably increase within the high volume of daily plaza transactions.

Measure

- Average payment transaction duration, for each mode and type of equipment.

Test Hypothesis

- Prepaid payment transactions will be quicker than cash payment, so the average duration will decrease if the % prepaid increases.

Modes Involved

- Parking garages
- Transit

Types of Data Comparisons

- Before and after

Data Needed

- For each equipped parking garage exit or bus
 - Average transaction duration

Data Collection Methods

The basic approach for each equipped device will be to measure throughput with continuous demand. Average transaction time is the inverse of throughput.

The transit method will use the LYNX Automatic Passenger Counters (APC) vehicles. APC counts passengers that board and alight at each stop, and bus dwell time. Dwell time divided by the number boarding will provide the average transaction time for that stop. LYNX will identify any stops where alighting volume governs dwell time (i.e., which would cause high average transaction times).

For parking garages, transaction records for the cashier station plus those for the validators from the clearinghouse will provide the total. If the Parking Bureau cannot identify periods of continuous demand without field observation, it may be easiest for their staff to visually count the transactions.

4.5 Quantitative Goal 5 – Increase Prepaid Revenue Share

The agencies wish to (1) reduce cash handling costs and (2) increase the “float” investment revenue earned from holding prepaid revenue. However, changes in cash handling costs and float revenue are not expected due to the limited scale of deployment. Prepaid revenue share was selected as a surrogate quantitative goal that may be measurable for equipped facilities. It is necessary to determine whether some of the ORANGES card usage is displaced from other prepaid payment methods rather than from cash. This goal does not apply to tolls, since the percentage paying by transponder will not noticeably increase within the high volume of daily plaza transactions.

Measure

- % of transactions that use a prepaid revenue payment method

Test Hypothesis

- % prepaid transactions will increase for equipment accepting the ORANGES card.

Modes Involved

- Parking
- Transit

Types of Data Comparisons

- Before and after.

Data Needed

- For each payment device equipped for smart card acceptance
 - % transactions paid with cash
 - % transactions paid with the ORANGES card
 - % transactions paid with other non-cash methods

Data Collection Methods

Each agency will gather data from its revenue systems. These systems include the transaction data from parking garages, the revenue systems at LYNX garages and clearinghouse data.

4.6 Quantitative Goal 6 – Increase Automated Payment Equipment Uptime

Cash accepting equipment can suffer more downtime as the cash volume increases. This applies more to automated devices than to attended locations. By displacing cash use, the ORANGES card should reduce downtime. This would reduce maintenance costs and revenue loss (i.e., at unattended devices where revenue cannot be collected while the device is down).

Measure

- % operating hours with cash processing available (coins for toll machines; coins and bills for fareboxes)

Test Hypothesis

- The frequency and severity of planned and unplanned maintenance for unattended devices relates to the cash processed. Cash processing availability should increase as % prepaid increases.

Modes Involved

- Tolls – for automatic coin machines
- Transit – for fareboxes

Types of Data Comparisons

- Before and after

Data Needed

- For each equipped and control device
 - Daily cash revenue
 - % of operating hours each day with cash processing available

“Daily cash revenue” and the data collected for Goal 6 (i.e., % paid by cash, ORANGES card and other non-cash methods) will be used to take into account any differences in the level of cash acceptance between the before and after – and test and control – availability data.

Data Collection Methods

Data will be gathered by agencies from maintenance records.

LYNX maintenance tracks each incident and whether the cash processing is taken out of revenue service. They will provide the average number of failures per month and the duration out of revenue service.

OOCEA data may be more limited. Coin machines are maintained under a fixed price contract and the actual maintenance may not be available. The ETC system data indicates when each lane was out of service, but this may not indicate whether an outage is due to a coin machine failure.

If needed due to variations in repair frequency and severity, before and after data collection should be completed in the same season.

4.7 Quantitative Goal 7 – Cardholders Use the Joint Account

Agencies hope ORANGES cards are used to travel between modes and store high prepayments. This quantitative goal measures how and where cards are used (i.e., rather than the effects of the card use, with other quantitative goals).

Measures

- Cumulative probability distributions for transaction frequency, over the cardholders population, segregated between payment and revaluing transactions as well as by mode
- Cumulative probability distributions for transaction value, over the transactions population, segregated between payment and revaluing transactions as well as by mode
- Average stored value balance, for each card, segregated on the basis of card use frequency
- Percentage breakdown of the cardholder population, between cards used for one mode, for mode pairs or for all three modes.

Test Hypothesis

- Most cardholders will maintain a prepaid balance and use the card regularly. Some may use the card alternately for transit and tolls, some for downtown parking and toll payment. Use for transit and parking is not expected to be common for this operational test because the selected transit routes do not serve park and ride facilities.

Modes Involved

- Parking
- Tolls
- Transit.

Types of Data Comparisons

- Test only

These measures involve the specifics for card use, so there are no before or control tests.

Data Needed

- Individual transaction values and dates, by cardholder, for each payment and revaluing device
- The stored value balance after each transaction

Data Collection Methods

The clearinghouse will gather the data from their transaction and balance databases.

4.8 Quantitative Goal 8 – Characterize Current Pass Distribution and Permit Billing Costs

LYNX uses prepaid fares extensively, issuing paper and magnetic stripe passes distributed through four sales outlets and by mail order. For the FOT, LYNX passes will be renewed directly on the smart card at sales outlets or revaluing locations. Sales locations will need fewer paper passes, which should provide savings.

The ORANGES card can also replace the monthly “proximity” permit for garage parking. Permit holders are billed monthly. Although not provided in the initial deployment, the system could in the future potentially be modified so that a permit on the card could be automatically renewed and billed to a pre-registered credit card.

However, any reduction in passes distributed will be limited during the test (and permits will still be billed using conventional methods). Characterizing current costs for pass distribution and permit billing will indicate potential cost savings if future deployment achieves bigger reductions.

This does not apply for tolls, which already use a transponder and autoloader.

Measure

- Costs for distributing (e.g., procurement, inventory, delivery and commissions) conventional weekly and monthly passes.
- Costs for monthly billing of garage permits.

Test Hypothesis

- None. The limited test scale is not expected to have much impact on these costs.

Modes Involved

- Transit
- Parking garages

Types of Data Comparisons

- Before only

Data Needed

- Number of weekly and monthly passes distributed per month.
- Number of garage “proximity” permits billed per month.
- Monthly cost for distributing passes. Detail the specific cost categories included.
- Monthly cost for billing garage permits. Detail the specific cost categories included.

Data Collection Methods

LYNX will provide monthly costs for distributing passes to sales outlets. City Parking will provide monthly costs for billing garage permits. This will include the types of costs to assist in interpreting the findings.

4.9 Quantitative Goal 9 – Characterize Current Processing Cost per Cash Transaction

ORANGES cards should decrease cash processing costs for transit, parking and tolls. However, many types of cash processing savings may not be achieved until card use is widespread. The limited use of smart cards in the test may not achieve a cost savings in this area.

Characterizing current cash processing costs will indicate potential cost savings if future deployment achieves bigger reductions.

Measure

- Costs for processing cash, for each mode.

Test Hypothesis

- None. The limited test scale is not expected to have much impact on these costs.

Modes Involved

- Transit
- Tolls
- Parking garages

Types of Data Comparisons

- Before only

Data Needed

- Monthly costs for processing cash, by mode.
- Dollar value of cash processed monthly, by mode.

Data Collection Methods

Each agency will provide the monthly cost for cash processing. This will include the types of costs to assist in interpreting the findings.

5 Test Plans for Qualitative Goals

The qualitative goals use discussion groups – focusing on the perceptions of various user categories. Discussion groups are exploratory, so test hypotheses were not developed. Hypotheses may be identified based on before data, depending on the views expressed.

5.1 Qualitative Goals 10 to 13 – Understand Perceptions of System Users (By User Category)

Measure

- Evolution of user perceptions expressed in discussion groups.

Modes Involved

- Parking
- Tolls
- Transit

Types of Data Comparisons

- Before and after

Discussion group participants should be users of the test system.

Data Needed

- Customers
 - General benefits
 - Ease of use
 - Convenience of revaluing
- Operations and maintenance staff
 - General benefits
 - Reduced payment disputes
 - Reduced transfer abuse
 - Ease of customer use
 - Maintenance
 - Training
- Planning and management staff
 - General benefits
 - More comprehensive data collection
- Partners
 - General institutional issues
 - Inter-partner collaboration issues

6 Discussion Group Process

6.1 Overview and Organization

The Evaluation Test Plans document identifies the data collection requirements for the set of goals and measures identified in collaboration with the Implementation Team. As part of this data collection effort, qualitative data is to be collected via three discussion groups. Discussion groups will be

comprised of 10-15 individuals. The discussion groups will represent: (1) customers and cardholders; (2) operations and maintenance staff; and (3) management and planning staff. The purpose of the discussion groups is to elicit information, opinions and preferences regarding the use of the ORANGES smart card.

The Implementation Team will arrange the logistics for conducting these discussion groups (e.g., facility, refreshments, incentive payment). The Evaluation Team will also play a direct role in helping the implementation team with these arrangements, to help ensure its goals are met. The discussion groups will be conducted at facilities provided by the agencies. This will likely be a meeting room at OOCEA, but could be elsewhere if the agencies choose. The prerequisites for the facilities are that they: (1) allow for providing understandable directions to attendees; (2) allow for evening access given the location and building security; (3) have adequate visitor parking nearby; (4) have enough space; and (5) have washroom facilities. If suitable meeting rooms at agency-operated locations are not available, the Evaluation Team can assist in referring the Implementation Team to the operators of suitable rented space (e.g., hotel meeting rooms).

Each group will have a facilitator to guide the discussion. The facilitators will be representatives from the Evaluation Team. The discussion group facilitator will elicit responses from group participants using open-ended style questions and polling.

Discussion groups will focus on and collect information about the following general topics:

- Cardholders
 - General benefits
 - Ease of use
 - Convenience of revaluing
- Operations and maintenance staff
 - General benefits
 - Reduced payment disputes
 - Reduced transfer abuse
 - Ease of customer use
 - Ease of operator use

- Maintenance
- Training
- Planning and management staff
 - General benefits
 - More comprehensive data collection

6.2 Selecting Discussion Group Members

Discussion group participant selection will involve a collaborative effort by the Implementation Team and the US DOT Evaluation Team.

General Selection Criteria

Recruited customers (cardholders) should represent the three smart card uses (transit, tolls and parking):

- **For toll customers**, the primary selection criteria will be a regular travel pattern that involves the toll plaza included in the test (i.e., Holland).
- **For parking customers**, the primary criteria will be regular use of one of three downtown parking garages included in the test (i.e., CBG, Library or Market).
- **For transit customers**, the primary criteria will be regular riders on Links (routes) included in the test (i.e., Link 13 or 15). There will also be an attempt to include those that use facilities from two or more of the agencies.

Pre-screening criteria for cardholders

Each of the three implementing agencies took responsibility for recruiting a number of the cardholders. As part of this effort, the Implementation Team gathered pre-screening information to assist with selecting participants for the discussion groups. Appendix A includes the discussion group pre-screening questions used for the LYNX recruitment effort.

The US DOT Evaluation Team reviewed cardholder characteristics as gathered by the implementing agencies through their recruitment efforts, and clustered them into recruitment subgroups (e.g., recruit 5 from toll users, 5 from LYNX Link 13 and 15 riders, and 5 parking customers.). The Implementation Team used these subgroups to recruit cardholder discussion

group participants, using phone, mail or email to solicit potential cardholder discussion group participants.

Employee Selection Process:

These participants were selected by the agencies prior to FOT implementation. The Evaluation Team recommended that the agencies avoid relying entirely on voluntary participation, and assure participating employees are separated from their supervisors (there is a benefit to having both those who wish to speak and those more reluctant to speak involved in this process). The agencies submitted their set of selected employee participants to the Evaluation Team in advance, to assist in preparing for the discussion groups.

6.3 Discussion Group Conduct

The FOT included the conduct of facilitated and focused discussion groups before the operational test period, and it is intended that these be repeated near the end of the demonstration period for after testing. The before test sessions were held shortly after the start of the initial pilot FOT. The after sessions should be held within a month after the completion of the FOT.

The discussion groups lasted about two hours and were conducted in a comfortable setting. This provided adequate time for dialog among the participants and the facilitator (Randy Farwell of TranSystems) in response to a set of open-ended questions. The Implementation Team identified appropriate venues for the sessions (a conference room at OOCEA headquarters), with assistance from the Evaluation Team.

The general approach to the discussion was to combine open-ended questions with “polling” type questions where the participants were asked to choose or rank from several presented or group generated options. The discussion group scripts are included in Appendix A. The general role of the facilitator was simply to ensure that the discussion kept moving and that some participants were not heard from too disproportionately compared to others.

One of the challenges with the groups was to avoid having much time consumed with generalized complaints that were unrelated to the operational test. This was done in a way that recognized that allowing a limited amount of such “venting” can contribute to the participants general openness in responding to the questions.

Cardholder Group

Recruited cardholders were taken through a structured group discussion that drew out their perceptions about key aspects of the program. The cardholder discussion group focused on matters involving the following:

- Convenience of use
- Trust and comfort level of use
- Reporting, informational needs (statements, etc.)
- Discounts and incentives
- Attitudinal perceptions regarding investment of effort by agency as compared with focusing on core functions (does a multipurpose smart card have benefits to users and is this a worthwhile effort of the agencies?)

The Implementation Team provided a stipend of \$50 to customer group/cardholder participants.

Employee Groups

Employee groups included representatives from transit, tolls and parking agencies. The employee information collected included:

- Gender and age (within set age ranges)
- Employer
- Employee work function (planning, management, operations or maintenance category, and their specific role in the organization)

Employee discussion groups focused on matters involving the following:

- Perceived convenience of use to customer
- Convenience of use to agency
- Perceived trust and comfort level of use by customer
- Trust and comfort level of use by the employee (are there concerns that employers will monitoring employees, for example)
- Trust and comfort level of use by the agency (are there management, concerns such as privacy, liability, monitoring employees, etc.)

- Reporting and informational needs (data collection, reports, statements, data storage, record-keeping, market research, marketing, etc.)
- Discounts and incentives (planning, management, marketing, record-keeping)
- Reliability and quality control (operations, maintenance, planning, management issues)
- Attitudinal perceptions regarding investment of effort by agency as compared with focusing on core functions (does a multipurpose smart card have benefits to users and is this a worthwhile effort of the agencies?)

6.4 Discussion Group Scripts

The conduct of the discussion groups followed a series of open-ended questions and group polling to elicit views, opinions, attitudes and suggestions about the FOT. Discussion group scripts are presented below for each of the groups. Although these scripts directed the facilitator in leading the discussion groups, they were not intended to be followed verbatim but were rather used as a map for the facilitator. The facilitator used his/her discretion to follow relevant discussion trails as they became clear.

Cardholder Group

Groups were instructed to arrive 15 minutes prior to the start of the discussion group to sign in to assure the discussion group session starts on time. Group members were invited to enter the venue and have a seat as they completed the sign-in process. Refreshments were available and they were invited to partake.

Once the group was present, the facilitator introduced himself and stated his role. This was to ask questions of the group, facilitate expression of opinions, record ideas on a flipchart and allow all to have a chance to speak.

Employee Groups

Discussion group participants were instructed to arrive a few minutes prior to discussion group and sign in noting name, organization, and position.

Discussion group participants were invited to enter the venue and have a seat as they completed the sign-in process. Refreshments were available and they were invited to partake.

Once the discussion group participants were present, the facilitator introduced himself and stated his role in this discussion group. This was to ask questions

of the group, facilitate expression of opinions and allow all to have a chance to speak.

7 “Before” Data Analysis for Quantitative Goals

For each goal requiring before data collection, the document reiterates the selected measure and (where applicable) the test hypothesis, followed by a discussion by mode about the data collected and the analysis. The data collection discussion identifies the type of data, method of collection, time periods and facilities.

The data collected for most of the measures is only a sample, so statistical analysis was performed. This is important because unforeseen circumstances can cause the variations in data. For example, the duration for a set of boarding transactions varied due to factors such as how long people take to pay with cash or whether the driver is asked for directions. The estimates for pass distribution, permit billing and cash processing costs are not samples and thus did not need statistical analysis.

First, the average and standard deviation was calculated. Using the standard deviation (a measure of how widely dispersed the sample observations may be) and the sample size, a statistical inference statement was developed. This was of the form, “With a 95% level of confidence, the overall population average for this sample is expected to lie within the following range around the sample average”.

This expected range is known as the confidence interval, and can be expressed as a precision percentage. For example, a range from 75 to 125 around an average of 100 can be expressed as +/- 25% precision. The statistical relationship for the precision percentage (for the 95% confidence level) can be expressed with the following formula:

- $P = ((1.96 * \sigma) / \sqrt{N}) / X$

Where:

P = Precision percentage

X = Average

σ = Standard Deviation

N = Sample Size

7.1 Quantitative Goal 4 – Reduce Transaction Times

Reducing average transaction times is important for all three modes and can translate directly into reduced queuing and bus dwell times. This quantitative

goal has not been applied to tolls for the evaluation, since the percentage paying by transponder or smart card will not noticeably increase within the high volume of daily plaza transactions.

Measure

- Average payment transaction duration, for each mode and type of equipment.

Test Hypothesis

- Prepaid payment transactions will be quicker than cash payment, so the average duration will decrease if the % prepaid increases.

Data Collection and Analysis

Parking

At each of the three equipped parking garages (Central Boulevard, Library and Market), a Parking Bureau observer recorded the duration for a sample of payment transactions at the cashier booth. The transaction time was the length of time the vehicle was stopped at the booth.

Table 7 summarizes the sample size, average, standard deviation, and precision percentage for each of these samples. The confidence intervals on the average for each garage are similar enough that it seems reasonable to combine the garages together into a single large sample. For all garages together, we make the following statistical statement:

- Three garages combined: At the 95% confidence level, the average transaction time is expected to be 23.3 s +/- 5% (i.e., between 22.1 and 24.5 seconds, 95% of the time).

Transit

On buses for each of the two equipped LYNX bus routes (Links 13 and 15), the Automatic Passenger Counting (APC) equipment was used to gather data during selected weeks when these buses were in use on these routes (only a subset of the LYNX bus fleet is APC-equipped). The APC equipment records at each stop the number of passengers that boarded and alighted as well as the duration the doors were open.

Several data filtering steps were taken to help construct samples where the duration the doors were open could be divided by the number of boarding

passengers at that stop to best represent the average transaction time per boarding passenger at that stop:

- LYNX filtered out stops entries that were time points/layovers (either due to it being a known characteristic of the stop, excessive dwell time or having no passenger activity), or for some other reason might have involved the doors being open longer than needed for passenger movement alone.

Table 7. Statistical Analysis of Parking Transaction Times Data

Garage	Sample Date	Sample Size	Average (s)	Standard Deviation (s)	Precision
Central Boulevard Garage	1/15	60	23.4	20.4	22%
	2/20	60	23.9	13.4	14%
	3/17	60	22.7	15.2	17%
	4/14	60	23.3	22.1	24%
	5/16	60	18.8	7.5	10%
	Combined	300	22.4	16.5	8%
Library Garage	1/16	60	22.1	8.6	10%
	2/18	60	25.6	10.1	10%
	3/20	60	19.8	18.2	23%
	4/25	60	25.9	17.0	17%
	5/28	62	25.4	12.8	13%
	Combined	302	23.8	14.0	7%
Market Garage	1/16	60	24.2	12.5	13%
	2/20	60	25.6	44.9	44%
	3/18	60	23.4	10.1	11%
	4/24	60	24.9	17.6	18%
	5/14	62	20.2	17.2	21%
	Combined	302	23.6	23.9	11%
All Garages Combined		904	23.3	18.6	5%

- An additional filtering step by the evaluation team removed any remaining stop entries that involved at least 120 seconds per boarding passenger. It was assumed that these represented unrecognized delays beyond what was needed to board passengers (e.g., layovers/layovers). This was a judgment in the sense that all longer durations per passenger (e.g., greater than about 30 seconds per passenger) might be of this type. On the other hand, some of these longer durations could be legitimately associated with a boarding passenger (e.g., trouble finding change or a fare dispute). Implicit in the test hypothesis is the expectation that the smart card would tend to reduce the

incidence of longer fare payment events. So, retaining the somewhat longer duration stop entries in the samples (i.e., the longer ones that are less than 120 seconds) is intended to capture situations that may be mitigated by the smart card.

- The evaluation team noted that some stop entries seem infeasible (e.g., several people boarding within 1-2 seconds). This could indicate a bias in the behavior of the APC equipment (e.g., over counting boardings, undercounting the duration of the door opening). There is no reason to believe that the underlying cause of these is limited only to these stop entries, and these have not been eliminated from the sample to avoid introducing a bias against short duration stop entries. It is assumed that these effects will be prevalent to a similar degree in the before and after testing (i.e., so that they balance out in the before vs. after comparison).
- Passengers simultaneously board (through the front door) and alight (through the rear door). LYNX filtered out stop entries where the number of alighting passengers exceeded the number boarding, in which case the duration of the doors being open would not have been governed by the number of boarding passengers.
- An additional filtering step undertaken by the evaluation team was to remove stop entries listing a dwell time of zero, since these entries apparently represent faulty data.

Table 8 summarizes the sample size, average, standard deviation, and precision percentage for each of these samples. Sample sizes provided by LYNX are substantially different, relative to the time periods covered. LYNX sometimes has dates when some APC data is missing, which accounts for these differences, although these occurrences are random and each sample should still remain representative (i.e., similar averages in the various samples). The confidence intervals on the average for each route are distinct enough that it seems reasonable to not combine the routes together into a single large sample. For these routes, we make the following statistical statements:

- Link 13: At the 95% confidence level, the average transaction time is expected to be 13.0 s +/- 4% (i.e., between 12.5 and 13.5 seconds, 95% of the time).
- Link 15: At the 95% confidence level, the average transaction time is expected to be 10.6 s +/- 3% (i.e., between 10.3 and 10.9 seconds, 95% of the time).

7.2 Quantitative Goal 5 – Increase Prepaid Revenue Share

The agencies wish to (1) reduce cash handling costs and (2) increase the “float” investment revenue earned from holding prepaid revenue. However, changes in cash handling costs and float revenue are not expected due to the limited scale of deployment. Prepaid revenue share was selected as a measurable surrogate quantitative goal for equipped facilities. It is necessary to determine whether some of the ORANGES card usage is displaced from other prepaid payment methods rather than from cash. For this reason, we look at the overall percentage using any prepaid method, rather than only the % using the ORANGES card. This goal has not been applied to tolls for the evaluation, since the percentage paying by transponder will not noticeably increase within the high volume of daily plaza transactions.

Table 8. Statistical Analysis of Transit Transaction Times Data

Bus Route	Sample Date	Sample Size	Average (s)	Standard Deviation (s)	Precision
Link 13	12/2-12/6	79	9.7	10.4	23%
	12/9-12/13	303	13.0	11.2	10%
	1/26-2/1	686	12.8	13.7	8%
	4/1-4/14	275	14.6	19.1	15%
	6/25-6/30	920	12.9	13.3	7%
	Combined	2263	13.0	13.9	4%
Link 15	12/2-12/6	490	10.3	7.4	6%
	12/9-12/13	442	10.5	7.6	7%
	1/26-2/1	569	10.8	11.6	9%
	4/1-4/14	275	11.6	11.2	11%
	6/11-6/17	119	11.8	9.2	14%
	6/20-6/30	933	10.2	7.5	5%
	Combined	2828	10.6	9.0	3%

Measure

- % of transactions that use a prepaid revenue payment method

Test Hypothesis

- % prepaid transactions will increase for equipment accepting the ORANGES card.

Data Collection and Analysis

Parking

The Parking Bureau was able to provide monthly summaries for each parking garage over the period from October 2002 through March 2003, indicating the amounts received for the following types of parking payment methods:

- Monthly parking permits – a prepaid method;
- Transient parking – cash payment at the exit cashier booth;
- Evening parking – cash payment on entry during the evening hours, so that the exit cashier booth can be unattended.

Table 9 presents this data (rounded to the nearest dollar). For each garage, the percent prepaid varies from month to month, so an overall percentage was not calculated for each garage. Instead, a statistical analysis was performed:

- Central Boulevard Garage: At the 95% confidence level, the average prepaid revenue share is expected to be 52% +/- 12% (i.e., between 45% and 58%, 95% of the time).
- Library Garage: At the 95% confidence level, the average prepaid revenue share is expected to be 46% +/- 16% (i.e., between 39% and 53%, 95% of the time).
- Market Garage: At the 95% confidence level, the average prepaid revenue share is expected to be 47% +/- 14% (i.e., between 40% and 54%, 95% of the time).

Table 9. Parking Prepaid Revenue Share Data

Garage	Month	Prepaid	Cash	Total	Prepaid Revenue Share
Central Boulevard	October	\$84,863	\$51,390	\$136,253	62%
	November	\$69,492	\$45,561	\$115,053	60%
	December	\$56,709	\$69,174	\$125,883	45%
	January	\$63,953	\$59,772	\$123,726	52%
	February	\$57,552	\$61,458	\$119,010	48%
	March	\$58,530	\$77,712	\$136,241	43%
Library	October	\$43,739	\$36,146	\$79,885	55%
	November	\$27,363	\$33,567	\$60,930	45%
	December	\$44,029	\$40,579	\$84,608	52%
	January	\$42,292	\$37,073	\$79,364	53%
	February	\$26,764	\$52,989	\$79,753	34%
	March	\$32,961	\$58,696	\$91,657	36%

Garage	Month	Prepaid	Cash	Total	Prepaid Revenue Share
Market	October	\$15,228	\$24,827	\$40,055	38%
	November	\$19,446	\$25,726	\$45,172	43%
	December	\$22,040	\$28,643	\$50,682	43%
	January	\$20,776	\$26,132	\$46,909	44%
	February	\$6,606	\$5,348	\$11,953	55%
	March	\$15,632	\$11,075	\$26,708	59%

Transit

LYNX was able to provide monthly summaries for the fareboxes on each route over the period from November 2002 through March 2003, indicating the percent of the ridership using the following categories of transit payment methods:

- Prepaid – passes, tickets and transfers – and free rides;
- Cash

Table 10 presents this data. This data represents the prepaid share of the ridership, rather than the prepaid share of the revenue (i.e., the prepaid revenue share would be somewhat lower given the lower average fare for prepaid riders). On December 28, 2002, LYNX introduced a new fare structure that replaced calendar weekly period passes with activate-on-first-use 7 day period passes, and added a day pass. As one would expect, these new fare options have shown a tendency to increase the prepaid ridership share. This share was in transition during the before data collection period, so an overall percentage was not calculated for each route. Instead, a statistical analysis was performed for the data beginning from January 2003:

- Link 13: At the 95% confidence level, the average prepaid ridership share is expected to be 58% +/- 3% (i.e., between 57% and 60%, 95% of the time).
- Link 15: At the 95% confidence level, the average prepaid ridership share is expected to be 57% +/- 2% (i.e., between 56% and 58%, 95% of the time).

Table 10. Prepaid Ridership Share Data

Route	Month	Prepaid	Cash	Total	Prepaid Ridership Share
Link 13	November	18,104	18,951	37,055	49%
	December	15,680	16,306	31,986	49%
	January	20,942	16,020	36,962	57%

Route	Month	Prepaid	Cash	Total	Prepaid Ridership Share
	February	21,332	15,449	36,781	58%
	March	22,222	14,864	37,086	60%
Link 15	November	21,515	23,471	44,986	48%
	December	19,853	22,929	42,782	46%
	January	26,604	20,321	46,925	57%
	February	25,537	19,966	45,503	56%
	March	26,433	18,950	45,383	58%

7.3 Quantitative Goal 6 – Increase Automated Payment Equipment Uptime

Cash accepting equipment can suffer more downtime as the cash volume increases. This applies more to automated devices than to attended locations, since these devices use mechanical mechanisms to automate cash acceptance. By displacing cash use, the ORANGES card should reduce downtime. This would reduce maintenance costs and revenue loss (i.e., at unattended devices where revenue cannot be collected while the device is down).

Measure

- % operating hours with cash processing available (coins for toll Automatic Coin Machines (ACMs); coins and bills for fareboxes)

Test Hypothesis

- The frequency and severity of planned and unplanned maintenance for unattended devices relates to the amount of cash processed. Cash processing availability should increase as % prepaid increases.

Data Collection and Analysis

Tolls

OOCEA was able to provide data on the times when the various lanes at the Holland East toll plaza were down due to a failure attributed to “Automatic Coin Machines ((ACM) and tunnel vault” (see Table 11). ACM failures are expected to be a frequent occurrence in this category. This data was provided for the entire months from November 2002 through March 2003.

Only lanes 4 and 5 (westbound) and lanes 10 and 11 (eastbound) are equipped with ACMs. The percentage availability calculation is based on the fact that

these four lanes operate continuously. For the purposes of the evaluation, combining the data for the 5-month period enhances the overall value of the percentage availability. The statistical assessment for this 5-month sample indicates:

- At the 95% confidence level, the average ACM % availability is expected to be 99.38% +/- 0.37% (i.e., between 99.02% and 99.74%, 95% of the time).

Table 11. Toll Lanes Automated Coin Machine Uptime Data

Month	Downtime (DD:HH:MM)	Availability
November	00:18:09	99.4%
December	00:19:14	99.4%
January	00:12:35	99.6%
February	01:11:16	98.7%
March	00:07:30	99.8%
Combined	03:20:44	99.4%

Transit

LYNX was able to provide durations for the ten fareboxes that will be equipped for ORANGES acceptance for the entire months beginning November 2002 through March 2003 (see Table 12). The specific cause of the various farebox downtime incidents is not available from this data, although it is known that problems with the cash accepting components are a common cause of farebox incidents.

In this case, combining the data for the 5 months enhances the overall value of the percentage availability. These durations have been combined for the ten fareboxes. The statistical assessment for this 5-month sample indicates:

- At the 95% confidence level, the average farebox % availability is expected to be 99.12% +/- 0.19% (i.e., between 98.93% and 99.31%, 95% of the time).

Table 12. Transit Farebox Uptime Data

Month	Scheduled for Operation (DD:HH:MM)	Operational (DD:HH:MM)	Availability
November	180:10:45	179:7:51	99.4%

Month	Scheduled for Operation (DD:HH:MM)	Operational (DD:HH:MM)	Availability
December	186:21:52	185:14:47	99.3%
January	185:21:13	183:23:02	99.0%
February	168:00:32	166:07:59	99.0%
March	186:21:43	184:19:48	98.9%
Combined	913:04:05	905:01:27	99.1%

7.4 Quantitative Goal 8 – Characterize Current Pass Distribution and Permit Billing Costs

LYNX uses prepaid fares extensively, issuing paper and magnetic stripe passes that are distributed through four sales outlets and by mail order. For the FOT, LYNX passes will be renewed directly on the smart card, at sales outlets or revaluing locations. Sales locations will need fewer paper passes, which should provide savings.

The ORANGES card may also replace the monthly “proximity” permit for garage parking. Currently, permit holders are billed monthly. Although this capability is not included in the initial deployment, a permit could be automatically renewed and the cost billed to a pre-registered credit card.

However, any reduction in the number of passes distributed will be limited during the test (and permits will continue to be billed using conventional methods). Characterizing the current costs for pass distribution and permit billing will indicate the magnitude of the potential cost savings if future deployment achieves bigger reductions. The specific cost categories and assumptions included have been documented for use in any such future consideration of this data.

This goal has not been applied to tolls, which already use a transponder and autoload.

Measure

- Costs for monthly billing of garage permits.
- Costs for distributing conventional weekly and monthly passes.

Data Collection and Analysis

Parking

The Parking Bureau assembled average monthly costs for processing monthly permit invoices. The Parking Bureau included in the cost:

- Salary/benefits cost for the accounting clerk performing this function;
- Postage costs for mailing the invoices.

Table 13 summarizes this data.

Table 13. Parking Permit Invoice Processing Costs

Accounting Clerk Salary/Benefits (\$/hour)	\$20.19
Average Accounting Clerk Time (Hours/month)	3
Average # Invoices Mailed per Month	335
Postage per Invoice	\$0.37
Total Average Invoice Processing Cost (\$/month)	\$184.52
Average Monthly Cost per 1000 Invoices	\$550.81

Transit

LYNX assembled monthly costs for processing monthly and weekly passes for the period between November 2002 and March 2003. The average number of passes processed per month was used to calculate the average cost per pass processed. LYNX included in this cost:

- Salary/benefits cost for the customer service staff that sell the passes (\$14.24 per hour times a number of hours per month used for pass sales, based on the actual number of passes sold and an assumed average transaction time of 30 seconds per pass sold);
- Cost of the passes themselves (at a cost of \$0.11 per pass);
- Salary/benefit cost for the accounting clerks in the money room that process passes for distribution (\$17.03 per hour times a number of hours used per month for pass processing); and
- Commissions for pass sales on consignment.

Table 14 summarizes this data. In addition, to presenting the basis for the costs in each reported month, we have also established the results for the entire period combined.

7.5 Quantitative Goal 9 – Characterize Current Processing Cost per Cash Transaction

ORANGES cards should decrease cash processing costs for transit, parking and tolls. However, many types of cash processing savings may not be achieved until card use is more widespread. Thus, the limited use of smart cards in the test may not achieve a significant cost savings in this area.

Table 14. Transit Pass Processing Costs

Month	# of Passes Sold	Cost for Customer Service Staff	Cost for Pass Stock	Cost for Money Room Staff	Cost for Consignment Sales Commissions	Total Cost	Cost per 1000 Passes Sold
November	7,282	\$864.13	\$793.74	\$885.56	\$2,087.85	\$3,745.72	\$514.38
December	5,986	\$710.34	\$652.47	\$885.56	\$2,105.90	\$4,354.27	\$727.41
January	8,034	\$953.37	\$875.71	\$885.56	\$2,890.30	\$5,604.94	\$697.65
February	7,935	\$941.62	\$864.92	\$1,021.80	\$2,240.20	\$5,068.54	\$638.76
March	9,064	\$1,075.59	\$987.98	\$1,021.80	\$2,195.04	\$5,280.41	\$582.57
Combined	38,301	\$4,545.05	\$4,174.82	\$3,814.72	\$11,519.29	\$24,053.88	\$628.02

However, characterizing current cash processing costs will indicate potential cost savings if future deployment achieves bigger reductions in the use of cash. The specific cost categories and assumptions included have been documented for use in any such future consideration of this data.

Measure

- Costs for processing cash, for each mode.

Data Collection and Analysis

Parking

The Parking Bureau assembled costs for the period from October 2002 through March 2003 related to the cash processing costs at each garage. The types of costs the Parking Bureau included were:

- A portion of the salary/benefits cost for the accounting clerk who counts the cash collected from garages, surface lots, and events.

The cash revenue processed during this period was used to calculate the average cost per dollar of cash processed. Table 15 summarizes this data for the

three equipped garages and for all three garages combined, with costs and revenues being the totals for this 6-month period.

Table 15. Parking Garage Cash Processing Costs

Garage	Cash Processed	Cost for Money Counting Staff	Cost per \$1000 Processed
Central Boulevard	\$366,825	\$2,002	\$5.46
Market	\$163,409	\$2,002	\$12.25
Library	\$259,050	\$2,002	\$7.73
Combined	\$789,284	\$6,006	\$7.61

Transit

LYNX assembled monthly costs for processing cash revenue for the period between November 2002 and March 2003. LYNX included in this cost:

- Salary/benefit cost for the accounting clerks in the money room that process cash revenue from both pass sales and fareboxes (\$17.03 per hour times a number of hours used per month for cash processing); and
- Armored car charges to transport the pass sales cash from the sales location and farebox revenue from the garages to the money room location.

Table 16 summarizes this data. In addition, to presenting the basis for the costs in each reported month, we have also established the results for the entire period combined.

Table 16. Transit Pass Processing Costs

Month	Cash Processed	Cost for Money Room Staff	Armored Car Charges	Total Cost	Cost per \$1000 Cash Revenue
November	\$929,890.90	\$10,013.64	\$1,966.89	\$11,980.53	\$12.88
December	\$892,892.47	\$10,013.64	\$1,966.89	\$11,980.53	\$13.42
January	\$987,955.97	\$10,013.64	\$1,838.89	\$11,852.53	\$12.00
February	\$969,269.47	\$9,877.40	\$1,838.89	\$11,716.29	\$12.09
March	\$936,840.97	\$9,877.40	\$1,882.96	\$11,760.36	\$12.55
Combined	\$4,716,849.78	\$49,795.72	\$9,494.52	\$59,290.24	\$12.57

Tolls

OOCEA decided not to release cash processing costs data, so this goal could not be evaluated for this agency.

8 Assessment of Current Issues, Risks and Lessons Learned

This section reviews the current status of the ORANGES demonstration, with an emphasis on assessing the current issues, risks to success and lessons learned so far. The minutes from the evaluation conference calls conducted once per month have been included as Appendix B.

8.1 Current Issues

The original premise of the ORANGES demonstration project was that it would demonstrate institutional and technical issues involved in multiple agencies using a single smart card and common stored value purse to pay for transit, tolls and parking in Orlando. As anticipated, several notable issues have emerged so far in the course of the project:

- **Changes in Scope of Deployment:** There have been several changes in the types of smart card use that ORANGES would support:
 - LYNX originally intended that the new GFI Odyssey validating fareboxes being purchased would be equipped to accept the smart card. A dual interface card (with contactless and contact interfaces) was preferred, to allow use with parking meters, parking payment kiosks and certain types of card balance revaluing equipment. However, at that point (in late 2001) GFI was only offering integrated smart card readers for the Odyssey farebox from Sony and Cubic. The proprietary smart cards that work with these readers are not available in dual interface versions. A reader was desired that would use the Type A or Type B contactless interface, for which dual interface smart cards were available. Although the Cubic Tri-Reader can support Type A, Type B and Cubic proprietary card technology, the GFI implementation of this reader on their fare boxes in late 2001 did not yet support the Type A or B cards. Support of the Type A card needed for ORANGES was scheduled to occur, but would not be available to the project until sometime in 2003. This would have caused an implementation delay.

LYNX was by early 2002 leaning towards adopting the Sony card and reader type offered by GFI and accepting the limitations associated with using a contactless-only smart card. However, the decision to adopt

EFKON equipment for the toll plaza implementation required use of the Mifare contactless interface for compatibility⁸. EFKON was not willing to develop support for the Sony card in their system since it was not being guaranteed a hardware order or being paid for engineering time. A dual interface smart card with a Mifare contactless interface was selected from Gemplus, but an external “stand-alone” smart card reader was needed. Proxibus readers from Ascom were selected for LYNX buses.

One important implication of this stand-alone validator approach was the resulting absence of a driver interface (i.e., validator keypad and display). LYNX chose not to install a driver interface to avoid the driver having an additional interface to that for the farebox. There were some associated limitations in passenger options. For example, (if allowed by the card reader logic) an interface could have allowed the driver to collect the fare for an accompanying person from stored value on the same card after a passenger pays for their fare with their pass.

- OOCEA was initially reluctant to integrate smart card accepting transponders or laneside smart card readers with its existing transponder-based toll collection system. There was a concern with integration costs and possible temporary disruptions to the operation of the existing system during integration. There was also an initial reluctance to equip the system with laneside smart card readers, based on an underlying concern about whether this might negatively affect transponder market penetration.

In early 2002, EFKON was selected to provide a system for smart card accepting transponders that would operate in a manner almost entirely independent from the existing toll system. These transponders and readers use infrared technology for short-range communications. The integration was limited to a signal from the EFKON equipment to activate the laneside displays (traffic lights) that tell drivers when the toll has been collected and they can drive through. In October 2002, OOCEA decided to incorporate the EFKON “Touch’N’Go” laneside readers in selected lanes..

- The City of Orlando Parking Bureau initially planned to accept the smart card at garage entrance and exit lanes, parking meters and parking payment kiosks. A decision was made in 2001 not to incorporate smart card readers into parking kiosks. A decision was made in late 2002 not to

⁸ Mifare is a variant on the Type A interface, available from several card manufacturers.

incorporate smart card acceptance at the parking meters. These decisions were made due to a lack of funding for software development, and the delays that this additional software development would have required, and affected the number of parking participants in the study.

- **Limited Scale of Deployment:** The implementing agencies took into account the cost and the time available for implementation when establishing the scale of deployment (i.e., the routes and locations at which to deploy smart card accepting equipment). The implementing agencies also indicated that risk management was taken into account at certain decision points. One example was in considering the potential expense of the escalating integration issues that are often prevalent when fully integrating with legacy systems using a limited budget. Another example was selecting payment applications that took existing patents (e.g., the process patent for the use of transponders to pay for parking) into account. The opportunity was taken to seek out private sector partners that were motivated to offer volunteer services and equipment, to maximize the scale of deployment given the limited budget.

The decision to avoid toll system integration was one factor that led to selecting EFKON equipment. EFKON supplied the equipment necessary to equip the busiest toll plaza in the OOCEA system, as requested by the ORANGES partnership. The partnership agreed to include EFKON in its outreach efforts, detailing the services and equipment supplied during the project.

The quantity of equipment supplied by ASCOM met the request from the ORANGES partners for outfitting the link 101-bus route and the LASER (University of Central Florida circulator route) on the LYNX system. Both routes were discontinued during the course of the project. Two other bus routes were selected (link 13 & link 15) in place of the link 101. Limiting where the smart card would be accepted impacted the potential pool of cardholders. For example, LYNX pass users that typically use non-equipped routes would be less likely to be interested in the smart card (since a pass on the smart card would not be useable on these routes).

- **Limited Number of Cardholders:** The implementing agencies initially intended to issue 150-500 smart cards. This was considered by the evaluation team to represent a very low number of cardholders for useful results. There was also a concern that some issued cards might not remain in regular use throughout the demonstration period. As a result, the implementing agencies agreed that 800-1200 active cards would need to be

in use throughout the 12-month evaluation period (i.e., issuing additional cards if some become inactive). It was agreed that a card would be considered inactive if it had not been used at least once within three consecutive weeks.

- **Duration of Implementation Period:** As was discussed earlier, the overall implementation period (from the start of development through to ORANGES cards being used by actual cardholders in revenue service) took longer than the implementation team had originally planned. The plan was for it to take 11 months to develop an integrated demonstration system in an office environment, followed by a 13-month period until the fully deployed revenue service demonstration system would be in place. This 13-month period was itself intended to be staged. A limited scale version of the field deployment was going to be put in place over a 7-month period, followed by an expansion of the field deployment system to the full scale of the demonstration over the remaining 6 months of the rollout period.

The overall deployment period thus increased from a planned 23 months to 26 months. This was due in part to increased time for the initial systems integration stage, which appears to have involved several factors:

- As discussed earlier, several complications and reassessments arose as the implementation team selected the appropriate smart card, readers and equipment retrofits to install.
- **Vendor Agreements:** Agreements enabling use of the Ascom and EFKON equipment were not executed until June 2002, 14 months after the start of the FOT development.
- **Equipment Selection/Additional Toll Component:** Discussion about the specific nature of the parking field equipment (and the addition of the laneside readers to the toll plaza component) was not resolved with suppliers until October 2002.
- **LYNX Service Changes:** An additional delay arose in late 2002, due to changes in LYNX operational funding at the end of 2002 that cancelled the routes that had been intended for use in the trial. Alternative routes had to be selected that could use a similar number of the Ascom validators, since this quantity had already been agreed.
- **Supplier Production Delays:** In July/August 2003, there were delays in receiving the smart card shipment, which delayed the initial enrollment

- of cardholders and card distribution even though the cardholders had already been recruited.
- **Software/Systems Integration:** There were systems integration delays for a variety of reasons, including limits on the availability of staffing resources. The decision to use some demonstration equipment provided by the vendor at no cost appears to have increased the complexity and time required for the integration effort. Although the vendor provided the equipment and in some cases its associated software, they did not provide all of the software customization and integration support services that they would provide under normal circumstances. This increased the effort and complexity for the systems integrator. These additional requirements exacerbated the system integration delays.
 - **Deferred System Functionality:** The deployment system was launched in August 2003 without the implementation of the EFKON smart card enabled transponder. The central clearinghouse system for the deployment processes the various payments and revaluing transactions retrieved from field equipment to enable appropriate funds transfers between participant accounts, rather than maintaining centralized account balances. Centralized account balances are needed for smart card accepting transponders. The systems integrator needed additional time to support this functionality. The implementing agencies decided to launch the FOT without the smart card accepting transponders, rather than defer the remainder of the system. The project team had indicated that this capability would be in place by the end of September 2003, but as of November 2003 it is not yet implemented.
 - **Limited Initial Card Activity:** Although the agencies used a pre-screening method to select cardholders, with each offering an incentive (either to initially try out the card or on an ongoing basis), the initial experience with cardholder transaction activity has been discouraging. The initial group of cardholders was recruited in May and June of 2003 with an anticipated launch date of July 2003. System integration and smart card delivery delays resulted in cardholders not receiving their smart cards until the third week in August. The delay between recruiting and actual implementation appears to one factor that has had an adverse affect on participation. Recruiting recommenced in November 2003, it is hoped that participation will be higher now that the system is in the field. For the week ending November 9, 2003, TTI reports that 771 cards had been issued but only 12% were active⁹.

⁹ A card is being defined as active once it is first used in a payment or revaluing transaction. A card is being defined as inactive once it has not been used for any transactions in three consecutive weeks.

The number of active cards is currently well below the requirement to maintain 800-1200 active cards throughout the trial. The selection of 30-50 cardholders has been deferred until the smart card accepting transponders functionality is operational (i.e., these cardholders would also be issued with a smart card accepting transponder).

- **Discontinued Smart Card:** In September 2003, Gemplus informed the implementing agencies (with no prior warning) that the GemCombi dual interface smart card originally purchased has now been discontinued and is no longer in production. The replacement dual interface card from Gemplus is to be based on the Java operating system and be “backwards” compatible with the existing readers. However, these cards are not expected to be available until 2005. The original inventory was 2100 cards, so there are still additional cards that could be distributed. Another option (with cost and time effects) would be to modify the system to accept a different card.

8.2 Risks to FOT Success and Mitigation Strategies

The following discusses certain risks for the success of the FOT that can be discerned at this point, and some possible mitigation strategies:

- **Limited Scale of Deployment Could Make Interpretation of Evaluation Results Challenging:** For various reasons, the implementation team has only deployed smart card acceptance to a limited extent with each agency. As a result, there is some risk that it will be difficult to draw conclusions about the test hypothesis when looking at the effect on the measure in the before/after testing. For example, with only a limited number of boarding passengers using the smart card on the equipped LYNX routes, as a proportion of the overall boarding volume, it is likely that only a limited effect on the average transaction time measure may be observed. This issue/risk was identified early in the evaluation strategy as an effect of the limited scale of deployment.

Assuming that the scale of the deployment will not be increased, there is no straightforward mitigation strategy. The lack of a demonstrated success against an evaluation goal/measure does not inherently imply failure.

- **Limited Card Activity:** The initial transaction activity experience indicates that over half of the recruited cardholders have not used their card in the past three weeks with any mode, within about 2 months of the start of the trial. There is a risk that additional cardholders could become inactive.

It is suggested that the implementing agencies contact cardholders that have become inactive to discuss any concerns they might have about the system. In particular, LYNX has noted that University of Central Florida and Valencia Community College were not in session during the initial recruitment. Since these students are some of the primary users of the equipped routes, a secondary recruitment drive could be useful.

- **Smart Card Supply:** Given the current active cards rate (roughly 10%), the current inventory of 2100 cards would not be sufficient to achieve the required 800-1000 active cards. As a result, the 12-month demonstration period will inevitably have a degree of attrition. Additional compatible cards may not be available from Gemplus until 2005, which could prove to be a critical factor.

The agencies should consider retrieving inactive cards from cardholders if possible and redistributing the cards to new participants. The alternative or complementary strategy would be to increase the active cards rate, by providing additional outreach and incentives to motivate cardholders to use the card.

8.3 Lessons Learned

The following discusses some of the lessons learned from the experience to date with the implementation of this FOT:

- **Systems Integration:**
Do not underestimate the complexity of integration and interoperability issues: The implementation team required considerably longer to complete the design phase of the system than they originally expected. This involved determining the correct combination of smart card, readers and retrofitting of various types of existing field equipment. The primary complicating factor was that the vendors were only willing to provide a limited amount of support without being paid for their efforts. This issue could be addressed more easily with documented requirements for the system prior to vendor selection
- **Recruitment:**
Extra effort in initial cardholder recruitment screening and education could pay dividends: The limited number of cards being issued made it essential for cardholders to be properly screened. The usage patterns of potential recruits were screened by agency customer

service representatives and via the project web-site to attempt to recruit cardholders that use the actual routes and locations accepting the cards. Flyers were also handed out at the specific toll plaza and parking garages where the cards were to be accepted. LYNX recruiting was completed on-board buses and at bus stops (for Link 13 & Link 15) by a professional recruiting firm.

Some of the initially recruited cardholders are not using their card at all, using it for a brief time then stopping, or using it sporadically. It is possible that some adjustments to the recruitment approach could have helped in identifying cardholders that would be likely to use the card. Insight into this might be gained through followup with cardholders.

It is also possible that some cardholders have found some strange or uncomfortable things in using the system, which are getting in the way of their using it. It is also possible that the limited number of card acceptance locations is a disincentive toward continuous use. In any case, additional education/outreach for cardholders at the outset and from time to time during the FOT could have a very positive impact (in helping cardholders feel more comfortable in using the system and/or improving the system in some way).

- **Equipment Inventory and Suppliers:**

Be conservative in the number of smart cards ordered: Smart card systems can substitute a new smart card from the card originally selected, although this will incur additional costs to allow the readers to accept the new cards. Yet, as Gemplus has shown, card products with limited market share can be discontinued before the replacement product is available (or conceivably without offering a replacement at all) and with little warning to current customers. By ordering only 2100 cards from Gemplus when there was a mandatory requirement for maintaining 800-1000 active cards throughout the 12-month demonstration period, the implementation team was inherently assuming that if there was a lower than expected active card rate or higher than expected cardholder attrition, they would be able fall back on ordering additional cards.

- **Developing Effective Cost Strategies:**

There are tradeoffs to using reduced cost equipment in a demonstration project: The implementation team made several arrangements with vendors, to supply equipment at a reduced price in consideration of the relatively high profile that involvement would

provide. Some vendors were interested in the opportunity to offer lower cost equipment, but offered only limited quantities. In addition, software customization and systems integration support services that would typically be offered by the equipment vendor became the responsibility of the overall systems integrator.

The implementing agencies indicate that this approach was based on a risk management decision that took into account the odds for success and cost estimates received for integration with existing systems. They estimate that half of the federal funding provided for the project might have been expended for this part of the overall integration effort alone. The implementation team identified these equipment arrangements with vendors as a viable solution to achieve implementation given the available funding, once it was clear that initial attempts had proved unacceptable from a risk management perspective. This approach limited the need to use capital project funding for these equipment purchases. The conservative scale of deployment also helped reserve sufficient funding to last throughout the duration of the field operational test.

9 Conclusion

Phase I of this evaluation has developed a comprehensive set of goals based on a consensus building process with the implementing agencies, as well as feasible and practical measures and data collection methods. These data collection measures have now been used to establish a solid base of quantitative and qualitative before data. Completing the after data collection will provide some of the first quantitative data on the types of benefits expected from multimodal electronic payment systems. In addition, the before and after cardholder and employee discussion groups will provide critical insights into how perceptions about key issues are affected by the experience of using such a system.

Based on insights from examining the system implementation period, several important issues, risks, mitigation strategies and lessons learned have been documented.

Appendix A Discussion Group Pre-Screening, Scripts and Notes Summaries

LYNX Discussion Group Pre-Screening Questions

Q6. Are you ... Male .. Female ..

Q7. What is your age? 18-24.. 25-34.. 35-44.. 45-54.. 55-64.. 65 and over..

Q8: Are you a student at .. UCF .. Valencia .. High School.. Other.. Not a student..

Q9. **IF YOU ARE CURRENTLY A STUDENT:** When do you expect to graduate? Month _ Year __

Q10. Do you travel on LYNX buses on a regular basis? Yes .. No..

IF YES TO Q10, PLEASE ANSWER Q11 – Q13. IF NO, PLEASE SKIP TO Q14.

Q11. In a typical week do you ride on ...Link 13.. Link 15.. Other Links only..

Q12. **IF LINK 13 OR 15 CHECKED IN Q11:** In a typical week, how many one-way trips do you take on Link 13 or 15? (WRITE IN NUMBER) _____

Q13. How do you usually pay your LYNX fare? 30-day pass.. 7-day pass.. Pay per trip..

Q14. Do you travel through the SR 408 Holland East toll plaza? Yes .. No..

IF YES TO Q14, PLEASE ANSWER Q15 – Q16. IF NO TO Q14, PLEASE SKIP TO Q17.

Q15. Do you have E-PASS? Yes .. No..

Q16. In a typical week, on how many days per week do you travel through the SR408 Holland East toll plaza? _____

Q17. Do you park in the City of Orlando Central Blvd, Library, or Market parking garages? Yes .. No..

IF YES TO Q17, PLEASE ANSWER Q18 – Q19. IF NO, SKIP TO Q20a

Q18. In a typical week, how many days per week do you park at the City of Orlando Central Blvd., Library, or Market parking garages? _____

Q19. How do you typically pay for parking at these garages? Monthly pass . Cash. Check .

Q20a. Do you own a car? Yes .. No..

Q20b: License plate number: _____

Q21. Are an Advantage Pass holder? Yes .. No.. If Yes, please show your pass to the interviewer. _____

Cardholder Discussion Group Script

The opening questions will be about transportation in general in the region... (5 minutes)

- *What do you think of transportation conditions in Central Florida these days?*
- *Do you think traffic is getting better or worse?*
- *Any ideas for how mobility within the region can be improved?*

Move to questions that address the ORANGES project more directly... (15 minutes)

- *How many of you have ever used the toll roads?*
- *How many of you have ever used transit?*
- *How many of you have ever used one of the downtown parking garages?*
- *We talked about some ways to move traffic and people around better. Tell me, how about the toll plazas? Do you think we would be better off if we can keep more cars moving through the toll plazas rather than needing to stop to pay? How so? How many agree with this list?*
- *Do you think it is important to help passengers get onto LYNX buses faster at stops? How so? How many agree with this list?*
- *What about parking in downtown? Do you think it is important to speed up entering and exiting the parking garages? How so? How many agree with this list?*

Shift focus more directly onto the ORANGES project... (30 minutes)

- *Would you be likely to use transit, the toll roads and parking garages more frequently if you did not have to worry about having a way to pay the fare or toll? Why or why not?*
- *How about if people had a way to pay for tolls, parking, transit services and potentially many other products and services with a single card? Would this seem more convenient to you? Why? Why not?*
- *Do you think you would be more or less likely to use a method of transportation other than your usual if the form of payment was not a factor? For example, if you typically drive the toll roads and park downtown, would you be any more likely to consider trying transit occasionally? How many would? Why? Why not?*
- *Do you think it makes good sense to connect the different components of our regional transportation system in ways such as through a common form of payment? How so? Why? Why not?*
- *Does this make sense today? Why? Why not?*
- *Does it make sense for the future? Why? Why not?*

Focus on the ORANGES project... (45 minutes)

Facilitator... Central Florida was selected as a site for a national pilot test of using a multipurpose smart card as a common form of payment on transit, for tolls and for parking. In addition to helping make our transportation systems more integrated and better able to handle travel demand, the smart card can potentially reduce the cost of processing revenue.

- *Can you tell me what a smart card is? [answer... It is a prepaid account like a phone card, in this case for transportation, with a smart card chip. The smart card chip provides a way to make payments – for tolls, parking and transit – from the account. Because of the smart card chip, the card is more secure than a magnetic stripe card. This card can also be used to carry a monthly transit pass or a parking permit.]*

- *In general, what do you think about the idea of smart cards? (List them)*
- *How about convenience? How would this smart card make your life more convenient? (List them)*
- *How about the convenience of revaluing the card? What options would be most convenient for you? Using cash, credit, debit? Would you like to be able to do this over the internet? Over the phone? At retail locations?*
- *Would you be interested in being able to get the value in your account restored on a new card if it is lost or stolen?*
- *Smart cards are valuable and represent an investment on the part of the agencies to provide a more secure payment form for their customers. These cards are designed to be durable and last customers are encouraged to keep reusing them for several years. What do you think of having to pay a nominal fee or deposit (say \$5) when the card is issued or replaced? How many of you would find this acceptable? Why? Why not?*
- *What about incentives? If the card could provide you with incentives such as price breaks depending on how much you use it, would that be viewed positively or negatively? Why? How so?*
- *What types of incentives would interest you? (List them)*
- *A smart card can be used to provide incentives such as: (1) getting a % bonus when you add value to the card account; (2) getting a reduced price if you use the card more frequently or (3) a reduced price for paying with the card compared to paying in other ways. What other incentives would you find of value? Let's list and rank these.*
- *Any worries about smart cards? What are some of your concerns?*
- *Is trust an issue for you? Why? Why not? How so?*
- *What are you afraid might happen to you if you are using a smart card?*
- *How about being able to know your account balance and where and when you were charged? Would you want to get reports showing your usage?*
- *If so, what kind of information would you want to see?*
- *How often would you want to get this information? Monthly? Weekly? Daily? Whenever you asked for it?*
- *Would you like to be able to look it up on the web or by phone anytime?*
- *There are potential conveniences and worries you have mentioned about using smart cards. How comfortable are you with using a smart card for this pilot test? Tell me on a 1-10 scale, 1 very uncomfortable...10 very comfortable.*
- *Explain why you are/ are not comfortable. What are your concerns? What are you hopeful of? (List reasons)*

Shift to project importance and relevance...(20 minutes)

- *As I mentioned, Central Florida is the site of a national test for using a smart card for multiple transportation services.*
- *Do you agree with the need to explore this type of smart card use? Why? Why not?*
- *Do you think it is appropriate for our transportation agencies to be making an investment of effort into smart card uses? Why? Why not? How so?*
- *How do you see smart cards being used locally in the next 5, 10, 15 years?*
- *Do you think this pilot test takes away our transportation agencies' ability to focus on current problems? Why? Why not? How so?*
- *Do you think our transportation agencies should not be involved in this test? Why? Why not?*

- *Are there reasons for our transportation agencies to participate in this smart card pilot test? What are they?*

Cardholder Group conclusion...(5 minutes)

- *This concludes my set of questions for you. Do you have any questions or comments about what we have been discussing? What are they?*
- *If there are no more questions or comments, I want to thank you for your patience and participation. Your comments and views are valuable to the research team and will help in making decisions and informing policy about future steps in examining the application of smart cards in transportation.*

You have earned a stipend for your participation. (hand out envelopes with \$50) You are free to leave and thank you again.

Planning and Management Employees Discussion Group Script

The opening questions will be general: (10 minutes)

- *How many of you have ever used the toll roads?*
- *How many of you have ever used transit?*
- *How many of you have ever used one of the downtown parking garages?*
- *What are current transportation issues that are important to you?*
- *How well do you think our current transportation investments match transportation needs? What are your comments and concerns?*
- *If we need to find ways to improve mobility, what ideas do you have?*
- *Is it important to eliminate choke points in our transportation system to improve mobility? How might we do so?*

Shift focus more directly onto the ORANGES project: (15 minutes)

- *Do you think it makes good sense to connect the different components of our regional transportation system in ways such as through a common form of payment? How so? Why? Why not?*
- *Does this make sense today? Why? Why not?*
- *Does it make sense for the future? Why? Why not?*

Focus on the ORANGES project... (45 minutes)

Facilitator... Central Florida was selected as a site for a national pilot test of using a multipurpose smart card as a common form of payment on transit, for tolls and for parking.

- *Is there value in providing customer convenience? How so? What kinds of convenience does the smart card provide to our customers? For the expressway? For parking? For transit? (List)*
- *What, if any, value do you see the agencies might gain from using smart cards? Explain. For the expressway? For parking? For Transit? (List)*
- *What efforts do you see that we may need to focus interagency coordination on? Expressway? Parking? Transit? (List)*
- *What are areas of concern for you about the smart card project? What do you see as concerns for the agency? Expressway? Parking? Transit? (List)*
- *What do you see as concerns for employees? Expressway? Parking? Transit? (List)*
- *How do you see the smart card project potentially affecting your agency? Expressway? Parking? Transit? (List)*
- *How do you see the smart card project potentially affecting you? Expressway? Parking? Transit? (List)*
- *What do you see as potential trust issues for customers? Expressway? Parking? Transit? (List)*
- *What do you see as potential trust issues for you as employees? Expressway? Parking? Transit? (List)*
- *What do you see as potential trust issues for your agency? Expressway? Parking? Transit? (List)*
- *We listed trust issues for customers, what do you see as the comfort level of customers with using smart cards? [1-10 scale] Expressway? Parking? Transit? (List)*
- *What about reliability and dependability of the smart card equipment? What concerns do you have? Expressway? Parking? Transit? (List)*

- *What ideas do you have to minimize some of the concerns you mentioned? Expressway? Parking? Transit? (List)*
- *What about reporting, informational, record keeping and data needs? What opportunities and concerns do you see? Expressway? Parking? Transit? (List)*
- *What suggestions do you have for addressing reporting, informational and data needs? Expressway? Parking? Transit? [Cue on data collection, data storage, record keeping, reports, statements, market research, marketing] (List)*
- *What about providing discounts and incentives to customers? What problems and opportunities do you see? Expressway? Parking? Transit? (List)*
- *What suggestions do you have for addressing discounts and incentives for customers? Expressway? Parking? Transit? [Cue on parity/fairness, accuracy, and thresholds] (List)*
- *What problems and opportunities do you see for planning, management and market research? Expressway? Parking? Transit? (List)*
- *What suggestions do you have for addressing planning, management and market research? Expressway? Parking? Transit? (List)*
- *What problems and opportunities do you see for reliability, maintenance, operational and quality control issues? Expressway? Parking? Transit? (List)*
- *What suggestions do you have for addressing reliability, maintenance, operational and quality control issues? Expressway? Parking? Transit? (List)*

Shift to project importance and policy relevance... (45 minutes)

- *As you know, Central Florida is the site of a national test for using a smart card for multiple transportation purposes.*
- *Do you agree with the need to explore this type of smart card use? Why? Why not? Expressway? Parking? Transit? (List)*
- *Do you think it is appropriate for our transportation agencies to be making an investment of effort into smart card uses? Why? Why not? How so? Expressway? Parking? Transit? (List)*
- *Do you think this pilot test takes away from our transportation agencies ability to focus on current problems? Why? Why not? How so? Expressway? Parking? Transit? (List)*
- *Do you think our transportation agencies should not be involved in this test? Why? Why not? Expressway? Parking? Transit? (List)*
- *Are there reasons for our transportation agencies to participate in this smart card pilot test? What are they? Expressway? Parking? Transit? (List)*
- *Are there any other opportunities, issues or concerns you have that we have not covered? What are they? Expressway? Parking? Transit? (List)*

Conclusion... (5 minutes)

- *This concludes my set of questions for you. If there are no more questions or comments, I want to thank you for your patience and participation. Your comments and views are valuable to this project and the national evaluation of it. Your views will help in making decisions and informing policy about future steps in examining the application of smart cards in transportation.*

You are free to leave and thank you again.

Operations and Maintenance Employees Discussion Group Script

The opening questions will be general: (10 minutes)

- *How many of you have ever used the toll roads?*
- *How many of you have ever used transit?*
- *How many of you have ever used one of the downtown parking garages?*
- *What are transportation issues that are currently important to you?*
- *How well do you think our current transportation investments match transportation needs? What are your comments and concerns?*
- *If we need to find ways to improve mobility, what ideas do you have?*
- *Is it important to eliminate choke points in our transportation system to improve mobility? How might we do so?*
- *As an employee of one of the transportation agencies in the region, what are the biggest problems you deal with on a day-to-day basis? (List)*

Shift focus more directly onto the ORANGES project: (15 minutes)

- *Do you think it makes good sense to connect the different components of our regional transportation system in ways such as through a common form of payment? How so? Why? Why not?*
- *Does this make sense today? Why? Why not?*
- *Does it make sense for the future? Why? Why not?*

Focus on the ORANGES project... (45 minutes)

Facilitator... Central Florida was selected as a site for a national pilot test of using a multipurpose smart card as a common form of payment on transit, for tolls and for parking.

- *Is there value in providing customer convenience? How so? What kinds of convenience does the smart card provide to our customers? For the expressway? For parking? For transit? (List)*
- *What, if any, value do you see the agencies might gain from using smart cards? Explain. For the expressway? For parking? For Transit? (List)*
- *What efforts do you see that we may need to focus interagency coordination on? Expressway? Parking? Transit? (List)*
- *What do you see as positives and negatives for your agency? Expressway? Parking? Transit? (List)*
- *What do you see as positives and negatives for employees? Expressway? Parking? Transit? (List)*
- *What are positives and negatives for you personally as an employee about the smart card project? Expressway? Parking? Transit? (List)*
- *How do you see the smart card project potentially affecting your agency? Expressway? Parking? Transit? (List)*
- *How do you see the smart card project potentially affecting you? Expressway? Parking? Transit? (List)*
- *What do you see as potential trust issues for customers? Expressway? Parking? Transit? (List)*
- *What do you see as potential trust issues for you as an employee? Expressway? Parking? Transit? (List)*
- *What do you see as potential trust issues for your agency? Expressway? Parking? Transit? (List)*

- *We listed trust issues for customers, what do you see as the comfort level of customers with using smart cards? [1-10 scale] Expressway? Parking? Transit? (List)*
- *What about reliability and dependability of the smart card equipment? What opportunities and concerns do you see? Expressway? Parking? Transit? (List)*
- *What ideas do you have to minimize some of the concerns you mentioned? Expressway? Parking? Transit? (List)*
- *What about reporting, informational, record keeping and data needs? What opportunities and concerns do you see? Expressway? Parking? Transit? (List)*
- *What suggestions do you have for addressing reporting, informational and data needs? Expressway? Parking? Transit? [Cue on data collection, data storage, record keeping, reports, statements] (List)*
- *What about providing discounts and incentives to customers? What problems and opportunities do you see? Expressway? Parking? Transit? (List)*
- *What suggestions do you have for addressing discounts and incentives for customers? Expressway? Parking? Transit? [Cue on parity/fairness, accuracy, thresholds, data capture issues] (List)*
- *What problems and opportunities do you see for reliability, maintenance, operational and quality control issues? Expressway? Parking? Transit? (List)*
- *What suggestions do you have for addressing reliability, maintenance, operational and quality control issues? Expressway? Parking? Transit? (List)*

Shift to project importance and policy relevance...(45 minutes)

- *As you know, Central Florida is the site of a national test for using a smart card for multiple transportation purposes.*
- *Do you agree with the need to explore this type of smart card use? Why? Why not? Expressway? Parking? Transit? (List)*
- *Do you think it is appropriate for our transportation agencies to be making an investment of effort into smart card uses? Why? Why not? How so? Expressway? Parking? Transit? (List)*
- *Do you think this pilot test takes away from our transportation agencies ability to focus on current problems? Why? Why not? How so? Expressway? Parking? Transit? (List)*
- *Do you think our transportation agencies should not be involved in this test? Why? Why not? Expressway? Parking? Transit? (List)*
- *Are there reasons for our transportation agencies to participate in this smart card pilot test? What are they? Expressway? Parking? Transit? (List)*
- *Are there any other opportunities, issues or concerns you have that we have not covered? What are they? Expressway? Parking? Transit? (List)*

Conclusion....(5 minutes)

- *This concludes my set of questions for you. If there are no more questions or comments, I want to thank you for your patience and participation. Your comments and views are valuable to this project and the national evaluation of it. Your views will help in making decisions and informing policy about future steps in examining the application of smart cards in transportation.*

You are free to leave and thank you again.

Before Discussion Group Notes Summary

Operations and Maintenance Staff Group

Date and Location: August 26, 2003
OOCEA Board Room 9:00 – 11:00 am
Orlando, FL

Discussion Group facilitator: Randy Farwell

Discussion Group Attendees:

OOCEA	3
LYNX	4
Parking	5
Total	12

Questions and Notes:

1. *How many of you have ever used the toll roads?* 10 of 12
2. *How many of you have ever used transit?* 3 of 12
3. *How many of you have ever used one of the downtown parking garages?* 7 of 12
4. *What are transportation issues that are currently important to you?*
 - The customer.
 - Operational reliability.
 - Equipment must work.
 - Safety and cleanliness.
5. *How well do you think our current transportation investments match transportation needs? What are your comments and concerns?*
 - Existing transportation system is not working very well.
 - Transponders (OOCEA) [usage of] equate to less wait times on the toll ways.
 - Road Ranger program is a big success and good program. (Motorist Assistance).
 - The public does not know who to call for transportation information.
 - The public does not know who is in charge of transportation in Central Florida.
6. *If we need to find ways to improve mobility, what ideas do you have?*
 - Need more, better funding.
 - Dedicated transportation funding is key.
 - Need to keep system moving.
 - Need more services and alternatives (rail, park/ride services, express/HOV lanes, feeders)
 - Need higher frequency bus service.
 - Need to develop transit lanes.

7. *Is it important to eliminate choke points in our transportation system to improve mobility?*

How might we do so?

- I-4 and Fairbanks is major problem (poor design geometrics).
- There is too much peak directional flow on major roads (volume > capacity).
- The SR 436 toll plaza is a problem, multiple lanes merging down to too few lanes.
- There are no real transportation alternatives.
- Improve accident and incident management and traffic management.
- No enforcement of HOV lanes.
- Need better signage.

8. *As an employee of one of the transportation agencies in the region, what are the biggest problems you deal with on a day-to-day basis? (List)*

- Lack of public understanding of issues and options.
- Equipment, poor and failing.
- Working with limited resources and limited capacity.
- Customer service needs to be better.
- Need more, better advertising/public information about services available.
- Lack of understanding of issues by employees.

9. *Do you think it makes good sense to connect the different components of our regional transportation system in ways such as through a common form of payment? How so? Why? Why not?*

- Common payment is a good thing, no down side.

10. *Does this make sense today? Why? Why not?*

- Yes for tolls and parking. Not sure about application to transit today.

11. *Does it make sense for the future? Why? Why not?*

- Yes, with rail and park and ride network, then multipurpose smart cards make sense for all modes in future.

12. *Is there value in providing customer convenience? How so? What kinds of convenience does the smart card provide to our customers? (List)*

- Yes.
- No cash, reduced cash.
- No credit card/debit card payments.
- Speeds transactions for agency and user.
- Easier/more convenient payment for agency and user.

13. *What, if any, value do you see the agencies might gain from using smart cards? Explain. (List)*

- Saves money in cash processing.
- Reduces liability.
- Provides a constant cash flow.
- Labor savings.

14. *What efforts do you see that we may need to focus interagency coordination on? (List)*

- Interagency communication and coordination.

- Cross promotions/marketing.
- Increased, bigger pool of funds.
- Coordinated funds accounting

15. What do you see as positives and negatives for your agency? (List)

- Risks, what happens with power loss?
- How do we know system will work, work reliably?
- Upon what basis do we decide to move ahead with full deployment?
- How will we increase participation?

16. What do you see as positives and negatives for employees? (List)

- For bus operators, this is one more thing they now have to do.
- Drivers will need to log in/out with cards and need to track cards.
- No moving parts, means not much to fix. Not good for mechanics.
- More work right now (during test).
- Need a better way to download data from vehicles (risk of data loss and damage to handheld unit)
- We will need to integrate with existing (multiple) systems, lots of work to do this.

17. What are positives and negatives for you personally as an employee about the smart card project? (List)

- Generally the test and concept is a positive thing.
- Means more (duplicative) work right now (must operate in dual modes).
- Participants in new application.

18. How do you see the smart card project potentially affecting your agency? (List)

- Will speed transactions.
- Will speed boarding.
- Adding value (revaluation of card) in toll lanes (receipt lanes) will slow traffic.
- Adding value (revaluation of card) in cashier lanes will slow traffic in garages.
- Will speed traffic in cash lanes.
- Recharging (revaluing cards) is a concern.

19. How do you see the smart card project potentially affecting you? (List)

- Work environment becomes more cashless.
- Wider applicability of payment means more convenience.
- Faster transaction times are good, providing better services.
- Helps keep current with technology.

20. What do you see as potential trust issues for customers? (List)

- How will customers know we are providing correct information?
- Need to be forthright with customers.
- Customers, employees need to know the technology will work.
- Need to know the technology is reliable.
- Need to know that money is safe, secure.

21. What do you see as potential trust issues for you as an employee? (List)

- Employee's life will be better or worse depending on whether technology works and is reliable.
- No moving parts, fewer repairs, less need for repair/mechanical skills.

22. What do you see as potential trust issues for your agency? (List)

- Will the technology work? If not, agencies at risk.
- Is the clearinghouse credible and trustworthy?
- How much will technology cost the agencies if it works and if it does not work?

23. We listed trust issues for customers, what do you see as the comfort level of customers with using smart cards? [1-10 scale] (List)

1 = no trust, 10 = full trust.

- LYNX 8.5 out of 10.
- OOCEA 9.0 out of 10
- City 9.5 out of 10

24. What about reliability and dependability of the smart card equipment? What opportunities and concerns do you see? (List)

- LYNX - conflict due to limitation of test (few routes, few buses, not enough employees know about test)
- OOCEA – equipment/system issues, problems with startup but things work well now.
- City of Orlando, Parking Bureau - equipment/system issues, problems with startup but things work well now.

25. What ideas do you have to minimize some of the concerns you mentioned? (List)

- Common response is to minimize problems through better system integration.

26. What about reporting, informational, record keeping and data needs? What opportunities and concerns do you see? (List)

- Need to date the transaction not the reporting date (system now stamps record based on the date of the report rather than the date of the transactions).
- How do will LYNX count riders if payment is not through the farebox?
- Need to be able to see customer accounts, transactions to provide better customer support.

27. What suggestions do you have for addressing reporting, informational and data needs? (List)

- See question 26 responses. Group responded the same as to question 26.

28. What about providing discounts and incentives to customers? What problems and opportunities do you see? (List)

- LYNX - requires exact fare.
- City of Orlando, Parking Bureau – incentives must be based on, approved by (limited by) policy makers (City Council).
- OOCEA – there are many opportunities to combine policy and commercial incentives for the customer.

29. What suggestions do you have for addressing discounts and incentives for customers? (List)

- See responses to question 28. Group responded the same as to question 28.
- 30. What problems and opportunities do you see for reliability, maintenance, operational and quality control issues? (List)**
- See responses to questions 24 and 25. Group responded the same as to questions 24 and 25.
- 31. What suggestions do you have for addressing reliability, maintenance, operational and quality control issues? (List)**
- See responses to questions 24 and 25. Group responded the same as to questions 24 and 25.
- 32. Do you agree with the need to explore this type of smart card use? Why? Why not? Expressway? Parking? Transit? (List)**
- There was general agreement that there is need and it is a good idea to pursue smart card use.
- 33. Do you think it is appropriate for our transportation agencies to be making an investment of effort into smart card uses? Why? Why not? How so? (List)**
- Yes, the group thought it appropriate for the transportation agencies to spend time and effort on developing smart card payment systems.
- 34. Do you think this pilot test takes away from our transportation agencies ability to focus on current problems? Why? Why not? How so? (List)**
- No, group felt that the project focuses and forces the agencies to coordinate and to address current and future problems today. This effort requires the agencies to focus more attention on details.
- 35. Do you think our transportation agencies should not be involved in this test? Why? Why not? (List)**
- Yes, the agencies should be involved in this test. Be ready for the future.
- 36. Are there reasons for our transportation agencies to participate in this smart card pilot test? What are they? (List)**
- Yes, to improve services for the customer and for each agency. To improve ability of agencies to provide mobility.
- 37. Are there any other opportunities, issues or concerns you have that we have not covered? What are they? (List)**
- A test of this type requires a long lead-time. Full deployment will be better.
 - Need better training and communication with employees concerning the test and the equipment.

Planning and Management Staff Group

Date and Location: August 28, 2003
OOCEA Board Room 2:00 – 3:30 PM
Orlando, FL

Discussion Group facilitator: Randy Farwell

Discussion Group Attendees:

OOCEA	1	
LYNX	5	(Blanche Sherman left after initial questions)
Parking	<u>2</u>	
Total	8	

Questions and Notes:

1. *How many of you have ever used the toll roads?* 8 of 8
2. *How many of you have ever used transit?* 7 of 8
3. *How many of you have ever used one of the downtown parking garages?* 7 of 8
4. *What are transportation issues that are currently important to you?*
 - Speed
 - Congestions
 - Time
 - Convenience
 - Safety
 - Accessibility
 - Efficiency
5. *How well do you think our current transportation investments match transportation needs? What are your comments and concerns?*
 - System is adequate for now.
 - Level of service continues to degrade
 - We need to keep up with demand (travel demand)
 - System is congested, not speedy.
 - Transit network is not efficient
 - Transit network is not convenient
 - We need to continue to add infrastructure (all modes)
 - Parking supply seems to be good.
6. *If we need to find ways to improve mobility, what ideas do you have?*
 - Need to make investments in infrastructure
 - Need a rail system (light and commuter)
 - Need circumferential roadway (beltway)

- Need feeder and express bus service
 - Need to improve transit service frequency
7. *Is it important to eliminate choke points in our transportation system to improve mobility? How might we do so?*
- Yes, of course.
 - Deploy technology
 - Redesign transit and roadway networks
 - Need better land use and growth management
8. *Do you think it makes good sense to connect the different components of our regional transportation system in ways such as through a common form of payment? How so? Why? Why not?*
- Yes
 - Common payment lowers overhead costs
 - Common payment adds convenience for customer and operations
9. *Does this make sense today? Why? Why not?*
- Maybe, not sure yet.
10. *Does it make sense for the future? Why? Why not?*
- Yes, it makes sense in the future.
 - There will likely be more modes to coordinate.
 - It will help coordinate and integrate operations and services.
 - There are good economic synergies.
11. *Is there value in providing customer convenience? How so? What kinds of convenience does the smart card provide to our customers? (List)*
- Yes.
 - Speed.
 - No cash, reduced cash, no need for exact change.
 - No credit card/debit card payments.
 - Provides record of transactions.
 - Provides electronic audit trail, accounting.
 - Provides security, guard against fraud.
12. *What, if any, value do you see the agencies might gain from using smart cards? Explain. (List)*
- Record of transaction
 - Agencies can better know customer needs (track behavior, demand)
 - Provides information for predictive understanding of travel demand
 - Saves money in cash processing, saves operations and maintenance costs
 - Increased cash flow
 - Allows agencies to design, build, and operate services to better meet demand.
13. *What efforts do you see that we may need to focus interagency coordination on? (List)*
- Agencies ARE coordinating (on this project).
 - Common goals

- Economic issues vs. impacts of integration
- Common customer orientation.

14. What are areas of concern for you about the smart card project? What do you see as concerns for the agency? (List)

- Is the project too limited?
- Is it a benefit to the customer in its limited scope?
- Need extensive revaluation network.
- Will the customer see the benefits?

15. What do you see as concerns for employees? (List)

- Customer service is an issue, who does the customer call?
- Job security (reduced cash collection)
- What if the test does not work, what is the fallout?
- What if others do not do their part (bus drivers not in loop)?

16. How do you see the smart card project potentially affecting your agency? (List)

- Changes to SOP.
- Changes in investments, capital and operating programming
- Changes in resources available
- Changes in inventory requirements
- Changes in cash handling
- Changes in planning for long term service and network improvements (better information)
- Improved transaction times, faster service.

17. How do you see the smart card project potentially affecting you? (List)

- Will never get life back (project has changed duties, expectations).
- Shift from single agency perspective to more of a regional multi-agency perspective.
- The service (project) needs to keep running, needs attention.
- Increased responsibility.

18. What do you see as potential trust issues for customers? (List)

- Will they have faith in the system (system integrity, trustworthiness)?
- Will the system work?
- Is someone watching them (Big Brother)?

19. What do you see as potential trust issues for you as an employee? (List)

- Do we know fair share comes back to each agency (clearinghouse)?
- How do we make sure impacts do not adversely affecting regular work?
- Do I get stuck with someone else's problem (applies to agency and employee)?
- Can I trust that other employees (in own and in other agencies) will do fair share?
- There is an additional requirement or burden on existing resources (human, capital, financial)

20. What do you see as potential trust issues for your agency? (List)

- Same as above. See Q19.

21. We listed trust issues for customers, what do you see as the comfort level of customers with using smart cards? [1-10 scale] (List)

- 1 = no trust, 10 = full trust.
- LYNX 5 out of 10.
- OOCEA 5 out of 10
- City 7 out of 10

22. What about reliability and dependability of the smart card equipment? What concerns do you see? (List)

- LYNX – likely to be problems because the equipment is on a moving, vibrating vehicle. Card readers and connections are likely to fail or be tampered with and will require constant attention.
- OOCEA – expects high equipment reliability
- Parking – expects high equipment reliability
- Other system concerns...
- Uploading data may be a problem
- Lots of training required (LYNX – many and variable operators, supervisors, maintenance staff)
- Units need to be programmed daily (LYNX – another requirement for the driver)
- Disappearing unit ID cards (LYNX)
- More folks need to be trained in each agency.

23. What ideas do you have to minimize some of the concerns you mentioned? (List)

- Training, education
- Drivers need to buy into concept
- Full deployment would be better
- Operating in dual modes, causes confusion, more work, limited benefits to all
- Change standard operating procedures.
- Careful transition from current limited dual mode test to standard full deployment.

24. What about reporting, informational, record keeping and data needs? What opportunities and concerns do you see? (List)

- Concern over data integrity, are uploads working?
- Concern over availability of system support
- Opportunity to use electronic footprints (audit trail) of customers to market, deliver better services.

25. What suggestions do you have for addressing reporting, informational and data needs? (List)

- Want to maintain and access (scrutinize) big transaction database (all agencies all modes)
- Use information for better planning analyses (individual and combined modes)
- Better know the travel demands of the customer
- Great opportunities for agencies to partner and develop multimodal transportation options.

- 26. What about providing discounts and incentives to customers? What problems and opportunities do you see? (List)**
- Great chance to partner and offer incentives to encourage positive travel behavior.
 - How do we make sure there is consistency across agencies (equity and fairness, avoid confusion)?
 - Opportunities to provide comprehensive incentives (all modes, all agencies).
- 27. What suggestions do you have for addressing discounts and incentives for customers? (List)**
- Need to coordinate and orchestrate common goals and incentive with policies and programs
 - See also responses to question 26.
- 28. What problems and opportunities do you see for planning, management and market research? (List)**
- Marketing
 - Cross promotion
 - Coordinated market research
 - Common database
 - Common data manipulation tools
 - Need to create common regional goals and objectives beyond agency goals and objectives.
 - Need to create framework for coordinated policy and program planning
- 29. What suggestions do you have for addressing planning, management and market research? (List)**
- Need access to data.
 - Need to have a way to do “blind” data inquiries
 - Need to develop and interagency marketing plan
- 30. What problems and opportunities do you see for reliability, maintenance, operational and quality control issues? (List)**
- Will the equipment/system be reliable?
 - Are there adequate reboot options (how fast can we bring system up when it crashes)?
 - Can we trust there is system integrity?
 - How do we know there is reliability and integrity in the system?
 - Are we prepared for, can we handle this if it is a success?
- 31. What suggestions do you have for addressing reliability, maintenance, operational and quality control issues? (List)**
- Need to develop procedures to maintain equipment/system reliability.
 - Need to establish redundancy and system reboot procedures.
 - Need to establish system integrity checks, audits.
 - Need to plan for full deployment.
- 32. Do you agree with the need to explore this type of smart card use? Why? Why not? (List)**

- Yes, 7 out of 7 (Blanche left earlier)
- 33. Do you think it is appropriate for our transportation agencies to be making an investment of effort into smart card uses? Why? Why not? How so? (List)**
- Yes, 7 out of 7
- 34. Do you think this pilot test takes away from our transportation agencies ability to focus on current problems? Why? Why not? How so? (List)**
- In the short term, yes.
 - In the long term, no.
- 35. Do you think our transportation agencies should NOT be involved in this test? Why? Why not? (List)**
- No, 7 out of 7 agreed that the agencies should be doing this test.
- 36. Are there reasons for our transportation agencies to participate in this smart card pilot test? What are they? (List)**
- Yes, 7 out of 7 agreed.
 - Need to explore options and opportunities to provide better mobility.
 - Helps to improve regional transportation.
 - Provides a convenient alternative way to pay (for customer and agency)
 - To learn about new technology applications.
- 37. Are there any other opportunities, issues or concerns you have that we have not covered? What are they? (List)**
- Learned to trust other agencies.
 - Learned more about other agencies.
 - Built relationships.
 - We can work well together.

Cardholders Group

Date and Location: August 26, 2003
OOCEA Board Room 7:00 – 9:00 PM
Orlando, FL

Discussion Group Facilitator: Randy Farwell

Discussion Group Attendees:

OOCEA	5
LYNX	3
Parking	<u>3</u>
Total	11

Questions and Notes:

- 1. What do you think of transportation conditions in Central Florida these days?***
 - Messy
 - Disorganized
 - Takes too long to get anywhere
 - No direct routes (bus and roads)
 - No/not enough bus service
 - Expensive
 - Too congested
 - Need more bus shelters
- 2. Do you think traffic is getting better or worse?***
 - Things are getting worse
- 3. Any ideas for how mobility within the region can be improved?***
 - Need light rail, commuter rail
 - Need better bus routes, more bus service
 - Need park and ride lots (safe) and express bus service
 - Need more options and a better system for getting around (multi-layered, balanced system)
 - Need high-speed tolls
 - Need HOV lanes
 - Need to add capacity (widen roads, add rail)
 - Add alternatives routes (beltway, bypasses)
 - Increase speeds on highways (correct design limitations)
- 4. How many of you have ever used the toll roads?***
 - 8 of 11
- 5. How many of you have ever used transit?***
 - 8 of 11

6. ***How many of you have ever used one of the downtown parking garages?***
 - 3 of 11

7. ***We talked about some ways to move traffic and people around better. Tell me, how about the toll plazas? Do you think we would be better off if we can keep more cars moving through the toll plazas rather than needing to stop to pay? How so? How many agree with this list?***
 - Yes, need to increase speed through plazas.
 - Provide markings on pavement to let drivers know the fare.
 - Provide more information in advance (signs) stating cost of toll.
 - Better accident, incident response.

8. ***Do you think it is important to help passengers get onto LYNX buses faster at stops? How so? How many agree with this list?***
 - Yes, provide dedicated transit lanes
 - Adjust timetables (schedules) to reflect congestion
 - Provide express bus service
 - More government coordination to provide more, better service, more funding for transit, roads

9. ***What about parking in downtown? Do you think it is important to speed up entering and exiting the parking garages? How so? How many agree with this list?***
 - Need to speed access to and exit from garages.
 - Reduce waiting in lines.
 - Unified payment system for public and private garages
 - Have more manned cashier booths

10. ***Would you be likely to use transit, the toll roads and parking garages more frequently if you did not have to worry about having a way to pay the fare or toll? Why or why not?***
 - Yes, common payment equals greater probability to use (try) another mode.
 - Speeding transaction (reducing transaction time) means greater convenience, increased use

11. ***How about if people had a way to pay for tolls, parking, transit services and potentially many other products and services with a single card? Would this seem more convenient to you? Why? Why not?***
 - Yes, it is desirable to be able to use one card for multiple transportation modes and commercial uses too.
 - Increased convenience.

12. ***Do you think you would be more or less likely to use a method of transportation other than your usual if the form of payment was not a factor? For example, if you typically drive the toll roads and park downtown, would you be any more likely to consider trying transit occasionally? How many would? Why? Why not?***
 - Yes, group would be more apt to use (try) other modes.

13. ***Do you think it makes good sense to connect the different components of our regional transportation system in ways such as through a common form of payment? How so? Why? Why not?***

- Yes, it is wise to connect the regional transportation system with a common payment card. Makes the modes work together better. More convenient to users.
14. ***Does this make sense today? Why? Why not?***
- Yes.
15. ***Does it make sense for the future? Why? Why not?***
- Yes.
16. ***In general, what do you think about the idea of smart cards? (List them)***
- Yes, it is a good idea.
17. ***How about convenience? How would this smart card make your life more convenient? (List them)***
- Yes. The smart card concept is a good idea. It would make life more convenient.
 - Speeds transactions
 - Funds are more secure, no need to carry cash.
 - Make replenishing (revaluing) card easy and convenient.
18. ***How about the convenience of revaluing the card? What options would be most convenient for you? Using cash, credit, debit? Would you like to be able to do this over the Internet? Over the phone? At retail locations?***
- Allow online replenishment
 - Use 3rd party locations to replenish cards (7-11, grocery stores, etc.)
 - Tie card to bank accounts so they are replenished automatically
 - By phone
 - Tie card to credit card to automatically replenish card.
19. ***Would you be interested in being able to get the value in your account restored on a new card if it is lost or stolen?***
- Yes.
20. ***Smart cards are valuable and represent an investment on the part of the agencies to provide a more secure payment form for their customers. These cards are designed to be durable and last customers are encouraged to keep reusing them for several years. What do you think of having to pay a nominal fee or deposit (say \$5) when the card is issued or replaced? How many of you would find this acceptable? Why? Why not?***
- Card should be free initially, nominal fee if replaced
 - Card should be free initially and user allowed 1 free replacement every year or so.
21. ***What about incentives? If the card could provide you with incentives such as price breaks depending on how much you use it, would that be viewed positively or negatively? Why? How so?***
- Yes, positively of course.
 - More use, more incentive (discount)
22. ***What types of incentives would interest you? (List them)***
- More use, more incentive (discount)
 - Price breaks

- Use card to pay bills.
 - Use card as library card.
23. ***A smart card can be used to provide incentives such as: (1) getting a % bonus when you add value to the card account; (2) getting a reduced price if you use the card more frequently or (3) a reduced price for paying with the card compared to paying in other ways. What other incentives would you find of value? Let's list and rank these.***
- Percentage discounts
 - Rebate back onto card, credits for more use
 - Longevity discounts (as longtime cardholder)
 - Longevity discounts (for not losing card)
24. ***Any worries about smart cards? What are some of your concerns?***
- What happens if I lose the card?
 - What risks or liabilities are there if I lose the card?
 - Will my funds be protected?
 - Someone might steal my card.
 - What happens if the power or computer system fails? Can I still use the card?
25. ***Is trust an issue for you? Why? Why not? How so?***
- Trust is somewhat an issue.
26. ***What are you afraid might happen to you if you are using a smart card?***
- Big brother effect.
 - Who is and why might someone be watching?
 - Do not want names/addresses to be sold to marketing databases.
 - Will someone be checking to see if I am speeding?
 - Will cardholders have fraud prevention?
 - Am I liable for fares when I need to swipe the card multiple times before it registers? (LYNX)
 - What is the extent of our liability on lost or stolen cards?
27. ***How about being able to know your account balance and where and when you were charged?***
- Group wants to be able to access date, time, location, amount for all transactions.
28. ***Would you want to get reports showing your usage?***
- Yes, the group wants to see the current charge and account balance with every transaction.
 - Group wants to see up to date transaction and balance history online.
29. ***If so, what kind of information would you want to see?***
- See response to Q29.
30. ***How often would you want to get this information? Monthly? Weekly? Daily? Whenever you asked for it?***
- Receive monthly statements.
 - Be able to access real-time online information of transactions and balance.

- Be able to access real-time balance information and latest transactions by phone.

31. *Would you like to be able to look it up on the web or by phone anytime?*

- Yes, both. See Q30.

32. *There are potential conveniences and worries you have mentioned about using smart cards. How comfortable are you with using a smart card for this pilot test? Tell me on a 1-10 scale, 1 very uncomfortable...10 very comfortable.*

(One participant not present during question).

Freq.	Response	Average score = 7.6
0	10	N = 10
3	9	(generally, LYNX participants were least comfortable).
3	8	
2	7	
1	6	
1	5	
0	4	
0	3	
0	2	
0	1	

33. *Explain why you are/are not comfortable. What are your concerns? What are you hopeful of? (List reasons)*

- Personal information at risk.
- Potential for fraud.
- Security of access to ones account.

34. *Do you agree with the need to explore this type of smart card use? Why? Why not?*

- Yes, 100%. "This is a good thing to pursue."

35. *Do you think it is appropriate for our transportation agencies to be making an investment of effort into smart card uses? Why? Why not? How so?*

- Yes, very much so.
- Glad to see these agencies solving tomorrow's problems today.
- This test is a way to do more, to improve transportation.

36. *How do you see smart cards being used locally in the next 5, 10, 15 years?*

- Use smart cards for many other things:
 - Newsstands
 - Vending machines
 - Cab service
 - Library
 - To pay bills
 - In general commerce
 - Use card for public and private parking
 - At the airport (parking)
 - On rental cars
 - Rail and intercity rail services
 - At hospitals (parking and medical fees)

- Valet parking
- Expand use to other areas, regions, and cities.

37. Do you think this pilot test takes away our transportation agencies' ability to focus on current problems? Why? Why not? How so?

- No, this is one way to help fix some of our transportation problems.

38. Do you think our transportation agencies should not be involved in this test? Why? Why not?

- No, the group strongly felt that this test was a good use of time and effort.

39. Are there reasons for our transportation agencies to participate in this smart card pilot test? What are they?

- Speed transactions
- Greater convenience
- Improved accessibility (no need to have exact change or money for that matter)
- This prepares Central Florida for the future.
- Glad to see three agencies coordinating
- Testing the smart card makes sense; it will help improve the transportation system.
- The test (the agencies working together) will make better use of our resources.
- Opportunity to improve service and performance (faster, more convenient).

Appendix B

Minutes from Evaluation Team Meetings and Conference Calls

Meeting #1: Kickoff Meeting Minutes **June 20, 2001 – 1:00 pm – 3:30 pm**

Participants:

- Sean Ricketson Federal Transit Administration (FTA)
- Ann Joslin Central Florida Regional Transportation Authority (Lynx)
- Patti Bryant Central Florida Regional Transportation Authority (Lynx)
- Jorge Figueredo Orange-Osceola County Expressway Authority (OOCEA)
- Pamela Hodgins City of Orlando Parking Bureau
- Terry Davis Touch Technology International (TTI)
- Janet Mendenhall Touch Technology International (TTI)
- Bob McQueen Post Buckley Schuh and Jernigan (PBSJ)
- Rena Barta Post Buckley Schuh and Jernigan (PBSJ)
- Don Erwin Post Buckley Schuh and Jernigan (PBSJ)
- Leisa Moniz US DOT, Volpe National Transportation Systems Center
- Doug Parker Multisystems

Overview of U.S. DOT Field Operational Test (FOT) Evaluations – Sean Ricketson

- The U.S. DOT Evaluation is a separate project from the FTA perspective – although intended to complement the ORANGES EPS Field Operational Test (FOT), the evaluation is separately funded and has an independent set of goals, deliverables and schedule. The overall purpose of the federal evaluation process is to document the outcome and benefits of the FOT, primarily for the benefit of a national audience. It is not intended to serve as a “report card” on the project.
- The importance of establishing strong communication links between the FOT project team and the U.S. DOT Evaluation team was emphasized. Sean stressed the desire for good relationships on the project with good

cooperation, and that project participants should feel free to contact him at any time about any concerns or sensitive issues. Sean Ricketson phone (202) 366-6678.

ORANGES FOT Program Overview and Status – Don Erwin (see attached)

- This presentation provided an overview of the current plans and status. It was largely excerpted from presentations made during the Kickoff Meeting for the ORANGES FOT effort held on April 3, 2001 – copies of all the presentations from this kickoff meeting were provided to the Volpe evaluation team.
- The following summarizes some of the points raised in discussion:

OOCEA

- Transponders that accept a smart card might be experimented with during the FOT, but would not be part of the initial phase of the project. The use of “Touch and Go” smart card readers in selected toll lanes (i.e., by customers without transponders) is being considered, but will likely also only be experimenting with in the FOT. “Touch and Go” operation would likely not be allowed in any transponder-only lanes.
- There is some concern that more extensive deployment of laneside smart card readers – before transponders that accept a smart card are available – could potentially interfere with increasing transponder market penetration (current penetration is about 65%). Pricing mechanisms are currently under consideration to help drive further increases in market penetration for transponders: (1) an off-peak discount for transponder users; and (2) an exemption for transponder users from a cash toll increase.
- The core of the OOCEA linkage with the FOT EPS will be the development of a joint transportation account through the TTI Card Touch clearinghouse (i.e., where the customer can reload a single account that can then be used to pay for transit, tolls and parking). There might also be a “pooled loyalty program”. This would involve collaboration between TTI and Transcore – the OOCEA E-Pass systems integrator and (through Amtech) transponder/reader vendor; the details of this integration have not yet been established. OOCEA expects that the interoperability linkages recently developed between E-Pass and the FDOT statewide SunPass program will not require that any linkage between the SunPass and Card Touch systems.

Lynx

- New fareboxes are being procured with integrated smart card readers (the cost of the fareboxes is being applied as a local match in the FOT). Even though the fareboxes on all Lynx buses will be equipped for smart card acceptance, the FOT deployment (e.g., the selection of customers for smart card issuance, buses to be probed for smart card transactions) will only involve a selected route.
- The eventual full deployment of smart cards throughout Lynx operations might lead to changes in fare policy/structure and/or the elimination of some conventional paper fare media. However, the initial limited deployment will require that smart cards simply complement the current fare policy, structure and media (i.e., these must remain unchanged, for use throughout the remainder of the system).
- Revaluing locations have not been determined yet, but would initially be deployed at such locations as the downtown transit center, other feasible locations convenient to the test group customers – and potentially kiosks at some social service agencies.

City

- The extent of smart card acceptance for City parking facilities has not yet been established. In general, the following elements are being considered:
 - Extending OOCEA E-Pass systems to support parking payment at selected off-street garages/lots (i.e., integrating transponder and, potentially, Touch and Go smart card readers). Current off-street systems use equipment from Amano Cincinnati and McGann software – in some cases a proximity card system is in use.
 - About 3,000 on-street meters have accepted a reloadable smart card for many years. This is a contact smart card system, with the revaluing facility located at the central Parking Bureau office. It is not yet established whether this parking meter stored value will be part of the ORANGES system, through either (1) use of a dual interface smart card and/or (2) linkage with the Card Touch joint transportation account.

Schedule

- The initial FOT schedule involves:

- *Pilot I:* A test-bed system will be developed during the initial 11 months (from April 2001). This would test integrated operation for a limited set of the actual systems and equipment in an office environment, to create a prototype of the revenue service pilot. To accomplish this will require the development of all necessary hardware and software interfaces. The design and operational concept need to be developed and finalized as part of this effort.
- *Pilot II:* The limited FOT field deployment will be completed, brought into revenue service and fully tested between months 11 - 20. It is likely inevitable that some further development/calibration of the hardware and software interfaces will be needed during this period, due to unanticipated conditions only revealed once the equipment is installed in revenue service.
- ***The ORANGES team is to provide a more detailed schedule to the evaluation team.*** The initial schedule suggests – since the ORANGES effort was initiated in April 2001 – that Pilot I would be completed by February 2002 and that Pilot II would be completed by December 2002.

General

- PBS&J asked whether there are any implications of using public funding for a project that may later involve private participation. Sean responded that as long as the agencies benefit and the purpose of the project has been served, he didn't think that presented any problem to the government.

National Evaluation Project Overview and Status – Leisa Moniz and Doug Parker (see attached)

- This presentation addressed:
 - An overview of the National Evaluation framework and process, including:
 - *Deliverables/ schedule for Phase I of the evaluation:* The Phase I evaluation effort is scheduled for completion by January 2002. An adjustment may be required to align with the scheduled completion of the ORANGES Pilot I stage by February 2002.
 - *Evaluation team coordination mechanisms:* Don Erwin and Doug Parker (cc. Leisa Moniz) are to be the primary points of contact to

coordinate evaluation activities for the FOT and U.S. DOT Evaluation efforts, respectively. Leisa Moniz will serve as the Program Manager and technical lead for the U.S. DOT evaluation team.

- The near-term collaborative work process needed to develop a consensus on the goals and measures to be used in the evaluation. In essence, the consensus needs to be based on the combination of: (1) which goals are of high priority for ORANGES participants; (2) which goals have expected benefits – and a corresponding measure – that are understood; and (3) which goals have measures involving a feasible and reasonable data collection effort.
- The latter point is important, considering the finite resources available for the U.S. DOT Evaluation. *Feasible and reasonable data collection* will likely correspond to measures for which either: (1) quantitative data can be provided by the operating agencies (or derived from data that can be provided); or (2) qualitative data can be gathered from focus groups whose participation can be arranged by the operating agencies. The limits on available data collection resources essentially mean that certain goals/measures considered desirable by the FOT team might need to be deemed not feasible and reasonable by the Volpe evaluation team.
- The FOT team provided documentation from an initial set of “Active Partnership Management” interviews – conducted by Dr. Kan Chen, a member of the PBSJ team – with Lynx, OOCEA, the City Parking Bureau and TTI. These interviews will provide the Volpe evaluation team with initial insight into the goals and priorities, as perceived by the ORANGES participants at the outset of the effort.

Next Steps

- A sequence of one or more conference calls will be used to conduct the collaborative effort to develop consensus on evaluation goals, measures and data collection.
- ***The Volpe evaluation team will develop an initial “strawman” set of potential goals prior to the initial conference call and distribute via email.***
- ***Conference call is scheduled for July 11, 2001 at 10:00A.M.***

Meeting #2: Developing Draft Evaluation Goals and Measures July 11, 2001 – 10:00 am – 12:30 pm

Participants:

- Sean Ricketson Federal Transit Administration (FTA)
- Ann Joslin Central Florida Regional Transportation Authority (Lynx)
- Patti Bryant Central Florida Regional Transportation Authority (Lynx)
- Jorge Figueredo Orange-Osceola County Expressway Authority (OOCEA)
- Sam Vennaro City of Orlando Parking Bureau
- Janet Mendenhall Touch Technology International (TTI)
- Rena Barta Post Buckley Schuh and Jernigan (PBSJ)
- Don Erwin Post Buckley Schuh and Jernigan (PBSJ)
- Carl Ahlert Post Buckley Schuh and Jernigan (PBSJ)
- Leisa Moniz US DOT, Volpe National Transportation Systems Center
- Doug Parker Multisystems

Review Minutes from Meeting #1: Kickoff (June 20, 2001)

- Sean Ricketson requested that the minutes reflect the potential for OOCEA trial deployment of smart card readers in a plaza lane and/or smart card accepting transponders. This is covered in the current version of the minutes (first bullet, under the heading “OOCEA”), so no revisions are needed.
- Jorge Figueredo agreed that both types of smart card deployments may be considered. Smart card readers might reduce cash use by certain “niche” customers – specifically, card users who are unlikely to get a transponder (e.g., visitor, rare toll user). The role for the smart card accepting transponder was less clear, as the clearinghouse account balance could be debited with a transponder or with a smart card acting through a transponder. One benefit would be that a balance stored on the card (i.e., for offline use with transit or parking) could be immediately updated as part of a toll transaction. Another issue is that Transcore, (which is OOCEA’s systems integrator) has confirmed that Amtech does not expect to have a smart card accepting device available in the timeframe of the FOT without

receiving additional funds to support development. The option of using the Mark IV Smart Fusion product is not under consideration due to the potential for communications interference.

- The completion schedules indicated in the minutes for the *Pilot I* and *Pilot II* stages should be changed to reflect the current schedule – the schedule in the project kickoff presentation of April 2001 is still the current one.
- The action item from the previous minutes about the revised ORANGES schedule was also discussed. A revised schedule is being developed. Sean Ricketson agreed with the ORANGES team that the revised schedule should be finalized before being circulated at FTA – since any revision may lead to questions about the reasons for the changes. ***July 20, 2001 was set as the target date for the ORANGES team to complete the finalized schedule to FTA.***

Draft Evaluation Goals and Measures

- The draft version of the goals and measures worksheet discussed during this meeting is attached.
- The FOT design process is still underway and the evaluation goals and measures may therefore need to periodically evolve. There will be conference call meetings between the FOT and USDOT teams roughly monthly, and the potential need to adapt the goals and measures will be monitored on an ongoing basis. The purpose of establishing a set of goals and measures at this early stage is to allow baseline data collection to begin. There is some risk that later changes to the evaluation goals and measures could in fact negate the usefulness of some early baseline data collection effort.
- There are inherent challenges in trying to extrapolate full deployment benefits from the observed effects of limited scale FOT deployment on the measures. For example, the limited scale of the pilot (i.e., perhaps a select number of LYNX routes) – as well as the potentially limited number of revaluing locations and the time lag for public awareness – may unrealistically limit ridership changes observed during the FOT. The evaluation team will also use feedback from riders about suggested enhancements.
- A similar issue was raised about cost reduction benefits (i.e., that the limited scale and duration of the FOT could limit the cost reductions that could be achieved through the FOT relative to what could eventually be achieved

through a comprehensive rollout). In this case, the intended approach is to focus more on the collection of baseline data about current costs in areas that could see improvement – as the basis for judging potential benefits for full deployment.

- Gathering comparison data (e.g., on costs) from other transportation agencies was discussed. This is not within the current scope of the USDOT evaluation effort – nor is this called for under the TEA-21 Evaluation Guidelines. If this were pursued, it would be a substantial effort – the data is not readily available from some agencies and will need to be reconciled when it is available since each agency often collects data on a different basis from another. One fundamental purpose of federal support for FOT evaluations is to collect benefit/cost/performance data for use by others throughout the nation. This effort is the first EPS FOT and as such has limited potential to leverage data from previous implementations. Another EPS FOT with a USDOT evaluation is being initiated for Delaware and there should be opportunities for these two FOTs to coordinate and provide evaluation data to each other, as it becomes available.
- An effort is being made to select measures that are applicable for many transit agencies. For example, the evaluation can measure transaction times for various payment types (applicable at many agencies in addition to LYNX) rather than the changes in processing time for the specific volumes and mix of transaction types observed at LYNX or OOCEA (applicable only at LYNX).
- Unexpected benefits could emerge during the FOT evaluation. Structured discussions with feedback groups of various types (e.g., customers, employees and stakeholders) will be used to help identify and understand their impact. The USDOT evaluation will need to rely on the agencies to identify and recruit participants for these feedback groups – and provide participation incentives.
- There is a potentially valuable role for feedback discussions with various employee categories throughout the evaluation. Employee support for and attitudes about EPS introduction can have a critical impact – employee collaboration can be essential for effective system operations and for presenting the system favorably to the public. Employee discussion groups could generate important insights into their attitudes, perceptions and concerns – and the evolution of these as the FOT progresses. From a federal perspective, Sean Ricketson encouraged such exploration as of considerable potential value to agencies nationwide. However, this is a

potentially sensitive issue for employee relations, which each agency will need to decide about individually.

- Recruiting cardholders for the feedback group will require either: (1) offering the opportunity to participate when they are issued the card; or (2) getting contact information at the time the card is issued so that some can be approached later about participation. If card use patterns will be tracked – for all cardholders or only for those providing feedback – participants would need to opt-in. Janet Mendenhall noted that all stored value account activity can be reported by the clearinghouse software (e.g., number and value of payment and revaluing transactions, balance variability). This suggests that card use could be tracked based on the card/account number without necessarily connecting to the cardholder's identity. Without gathering various demographic data, the value of linking card activity to the cardholder would seem to be limited in any case.
- There were several instances where an analogous goal/measure – to one already in the draft list – was identified for use with another agency (e.g., transaction time, employee feedback and data collection enhancements do not only apply to transit).
- Baseline measurement will not apply where it involves bus fareboxes, since the current fareboxes are being replaced as part of the FOT implementation. In such cases, test vs. control data collection could be used (e.g., comparing new farebox maintenance costs on routes with smart card users vs. routes without).
- Agency representatives considered all of the draft measures feasible – at least on a preliminary basis; in several cases they will follow up with others at their agencies to confirm feasibility and/or the most reasonable data collection approach.
 - LYNX can provide monthly reports – by route – that cover ridership and the percentage breakdown by fare payment method.
 - Payment transaction timing can be undertaken by ridecheck personnel, either on-board or through observing footage from the onboard video cameras.
 - OOCEA pays Transcore on a monthly lump sum basis for maintaining the current toll equipment, so OOCEA will work with them to gather maintenance cost data.

Next Steps

- ***USDOT team will distribute the following by July 13, 2001:***
 - ***The minutes of this meeting***
 - ***Revised version of minutes for June 20, 2001 meeting***
 - ***Revised version of “Prioritization of Draft Goals and Measures – Worksheet”.***
- ***The participants in this meeting – and any other FOT participants, as available – will fill in the worksheet with their priority input (i.e., allocation of 10 points) and return to the USDOT team by July 23, 2001.*** There will be no aggregation of the priority input to form “scores” for each candidate goal/measure – the priority input will simply assist the USDOT in selecting goals/measures. It will not be an issue if more participants submit priority input from one agency than another.
- ***The USDOT team will distribute the proposed list of evaluation goals and measures by July 27, 2001.***
- ***The next conference call is tentatively scheduled for August 7, 2001.*** This call will focus on establishing consensus on the evaluation goals and measures, as well as on identifying the baseline data collection methods and contact people.
- ***The next on-site USDOT evaluation meeting is expected for late August or early September.*** The primary purposes will be to (1) present the “Evaluation Strategy and Plan” deliverable and (2) facilitate on-site meetings with various agency staff to refine data collection methods for the evaluation test plans.

Meeting #3: Discuss Draft Evaluation Goals and Measures Consensus

August 7, 2001 – 10:00 am – 12:30 pm

Participants:

- Sean Ricketson Federal Transit Administration (FTA)
- Ann Joslin Central Florida Regional Transportation Authority (Lynx)
- Pamela Hodgens City of Orlando Parking Bureau
- Terry Davis Touch Technology International (TTI)
- Janet Mendenhall Touch Technology International (TTI)
- Rena Barta Post Buckley Schuh and Jernigan (PBSJ)
- Don Erwin Post Buckley Schuh and Jernigan (PBSJ)
- Leisa Moniz US DOT, Volpe National Transportation Systems Center
- Doug Parker Multisystems

Review Minutes from Meeting #2: Developing Draft Evaluation Goals and Measures (July 11, 2001)

- No revisions were suggested.

Evaluation Goals and Measures Consensus

- Priority input was received from LYNX, City Parking and PBSJ. TTI indicated that they thought we had already received their priority input by email – they have now sent it again and the TTI input has been incorporated as well.
- The attachment to the agenda showed the same set of goals/measures from the priority input worksheet, with those for which any priority input had been received shown in bold. (Although the original version distributed with the agenda – and discussed during the meeting – did not incorporate the input subsequently received from TTI, the TTI input does not change the set of goals highlighted.) The following three goals had not received any priority to date:
 - Increase transit ridership
 - Increase transponder market penetration

- Reduce data collection costs
- PBSJ indicated that they expect OOCEA would place some priority on the transponder market penetration goal.
- There was consensus that the evaluation should pursue addressing each of the goals/measures that received some priority from the FOT partners, pending exploration of whether the associated data collection is reasonable and feasible.
- The ridership and data collection cost goals/measures did not appear to have any priority with the FOT partners, so the question of whether these should be included in the evaluation goals/measures was discussed:
 - There was consensus that the ridership goal/measure should be dropped from further consideration – the partners feel that there is little potential for any meaningful ridership impact given the limited deployment.
 - It emerged that the only agency with data collection costs that the EPS might reduce was LYNX, since they currently use manual traffic checkers. However, LYNX is already eliminating these manual checkers for 2002, having implemented their APC system. Thus, there was also consensus that the data collection cost goal/measure should be dropped.
- There was consensus that the “maintenance costs” and “equipment uptime” goals/measures are essentially duplicative – and that only the “equipment uptime” goal/measure should be retained, being the most reasonable and feasible to collect and more comparable with similar data from other agencies.
- There was consensus that the qualitative goal/measure employing employee feedback should pursue the use of two distinct employee groups:
 - Operations employees (e.g., bus operators, toll/parking booth attendants, maintainers) on equipment-related issues (e.g., customer ease of use, reduction in disputes, maintenance)
 - Planning/management employees on issues related to performance monitoring/management (e.g., increased value of more comprehensive data)
- Based on the above adjustments, the finalized version of the evaluation goals/measures list is attached. This list is only “finalized” in the sense that it is an agreed basis for moving forward with developing test plans and assessing details for baseline data collection. As the project evolves, the

need to further adapt this list might emerge. Also, it is possible that issues related to reasonable and feasible data collection could emerge that warrant reassessment of the list.

Test Plans and Baseline Data Collection

- Don Erwin again expressed the interest of the ORANGES partners in gathering any data available from other agencies against which the ORANGES results can be compared – referred to as “benchmarking” data. While not an explicit requirement of the Phase I evaluation study, it is worthwhile to undertake some targeted outreach to agencies that might be able to provide comparable data for the evaluation goals/measures. To this end, there will be an attempt to forward the evaluation goals/measures to APTA, IBTTA and IPI – with the request that they invite their membership to provide any relevant data. Sean Ricketson noted that USDOT is considering initiating focused research in this area during 2002. Leisa Moniz also noted that the Delaware FOT Evaluation effort is developing goals/measures as well – it appears that some of the Delaware goals/measures will be similar to those for Orlando, which may allow these FOTs to benchmark each other to some extent.
- Preliminary data collection issues were discussed for each of the evaluation goals/measures:
 - *Parking revenue:* Available from the City – separately for meters, booths and kiosks.
 - *New Transponders Associated with Joint Account:* OOCEA can provide data on new transponder issuance (by its nature, this measure will not require any baseline data collection).
 - *Transaction Times by Payment Type:*
 - The general approach for transit and tolls will be to gather information on overall payment transactions throughput (i.e., X persons board a bus or pass through a toll lane in Y seconds) coupled with the percentages using each payment type. For LYNX, APC equipped buses can provide throughput data, while the fareboxes data can provide corresponding data for the mix of payment types. For the toll roads, the toll system can provide both types of data – in addition, Don mentioned recent throughput studies by UCF for which he will check the relevance. However, LYNX baseline data collection will not be relevant since the data would only be for the

current fareboxes – which are being replaced. For toll roads, this measure will only be relevant if the FOT decides to equip some lanes for direct smart card use.

- For parking, this data would be relevant for whichever payment environments (i.e., meters, kiosks and booths) incorporate smart card acceptance during the FOT. However, there is no automatic data collection on throughput available so some direct observation would need to be arranged.
- *Pass/Permit Distribution Costs:* The toll roads should not have any current distribution costs that would be reduced through the FOT. However, costs associated with distributing transit paper fare media and parking permits might be reduced. Costs can be gathered but it will be important to keep track of what cost categories are included in each case – so that the after data collection can use the same categories.
- *% Equipment Availability:* For each agency, the maintenance department tracks the frequency and duration of equipment outages. Again, baseline data collection is not relevant in the case of LYNX since the current fareboxes will be replaced.
- *Joint Account Usage Measures:* TTI indicates that they can provide data for each of the measures in the list – in fact they expect that once the system is designed they might be able to suggest additional useful measures. However, by its nature this goal/measure is not relevant for before data collection.
- *Customer and Employee Feedback Groups:* The customers selected to participate in these groups should be those that will be using smart cards or the joint account during the FOT. Similarly, the employees selected should be those dealing with smart card equipped facilities. Since these decisions have not yet been made, the selection of participants will need to be deferred.
- *Partnership Feedback Groups:* Since there are already various institutional/partnering discussion being undertaken as part of the FOT implementation effort, the FOT team may wish to avoid adding in an additional discussion group – that might be perceived as duplicative. The list identifies the type of interagency institutional information we would like to gather for the evaluation – and the FOT team will determine whether they would prefer to develop that information through their

core partnership building mechanisms or set up an additional set of meetings dedicated to the evaluation.

Next Steps

- ***USDOT team will distribute the following by August 10, 2001:***
 - ***The minutes of this meeting***
 - ***Finalized version of the working “Evaluation Goals and Measures” list.***
- ***USDOT team will follow up with Ann Joslin, Pam Hodgens and Don Erwin to advance the preparations for baseline data collection – each will seek to identify specific agency contacts and mechanisms for the desired data collection.***
- ***USDOT team will request assistance from APTA, IBTTA and IPI – to solicit any input on benchmarking data that is available from other agencies.***
- ***USDOT team plans to submit the draft for Deliverable 1 – “Evaluation Strategy and Plan” by September 7, 2001.***
- ***The next on-site USDOT evaluation meeting is scheduled for September 20, 2001, 11 a.m. – 2 p.m. (location in Orlando TBD).*** The primary purposes will be to (1) present the “Evaluation Strategy and Plan” deliverable and (2) facilitate on-site meetings with various agency staff (from September 19-21, 2001) to refine data collection methods for the evaluation test plans.

Meeting #4: Design Status Update and Evaluation Strategy/Plan Deliverable

October 18, 2001 – 11:00 am – 12:30 pm

Participants:

- Sean Ricketson Federal Transit Administration (FTA)
- Doug Jamison Central Florida Regional Transportation Authority (Lynx)
- Ann Joslin Central Florida Regional Transportation Authority (Lynx)
- Sam Vennaro City of Orlando Parking Bureau
- Jorge Figueredo Osceola Orange County Expressway Authority
- Janet Mendenhall Touch Technology International (TTI)
- Rena Barta Post Buckley Schuh and Jernigan (PBSJ)
- Don Erwin Post Buckley Schuh and Jernigan (PBSJ)
- Leisa Moniz US DOT, Volpe National Transportation Systems Center
- Doug Parker Multisystems

Review Minutes from Meeting #3: Discuss Draft Evaluation Goals and Measures Consensus (August 7, 2001)

- No revisions were suggested.

ORANGES Design Status

- Alternative approaches are being evaluated for the Lynx farebox procurement. There has been some delay in the ORANGES design effort due to the need for these decisions. (Although the farebox procurement is funded separately from the operational test, this farebox funding is part of the operational test local match – and the operational test funding is being used for integration of the new fareboxes into the overall electronic payment system.)
- The main issue affecting ORANGES is the available smart card interface options.
 - Lynx is considering a sole source procurement for GFI Odyssey fareboxes with integrated smart card readers.

- The GFI Odyssey farebox is currently available in fully integrated form with only a Sony card reader. The difficulty with Sony cards is that there is no dual interface card available. If a dual interface card cannot be used:
 - Contact interface devices might not be part of the ORANGES system.
 - A separate contact card might be used, with back-office integration allowing multiple card types to access the ORANGES account.
- GFI indicates that they are scheduled to support the Cubic Tri-Reader by February 2002 (i.e., for Washington DC buses). GFI must modify the farebox software to integrate the Tri-Reader with the Odyssey. Using a Tri-Reader theoretically means that any dual interface card could be selected – as long as it uses a 14443 Type A, 14443 Type B or GO-Card (i.e., Cubic proprietary) contactless interface. Of course, with whatever specific card is selected, software modifications would be needed to allow the Tri-Reader and the farebox to communicate with the card software (e.g., communications protocol, command sets, security codes). The initial DC implementation will only support the Cubic SmartTrip card.
- GFI has indicated that they expect to develop the interface for an unspecified Type B card by the end of 2002.
- Lynx is not expecting to decide which specific buses/routes will be equipped for smart card acceptance until the more fundamental farebox-related decisions are made.
- There are also several current design issues related to integrating legacy systems with the new clearinghouse.
 - Assuming that new garage software is procured together with the fareboxes, there is the opportunity to arrange for integrating this software with the ORANGES clearinghouse as part of the implementation. Otherwise, the legacy garage software would need to be integrated with the clearinghouse.
 - The ORANGES team is currently working with the E-PASS systems integrator (TransCore) to help determine the type of integration between the ORANGES clearinghouse and the E-PASS system that is feasible/desirable. It now seems less likely that the E-PASS transponder

account will be linked with the ORANGES stored value account. Instead, certain toll lanes may be equipped with smart card readers and alternatives are being considered for linking these readers with the ORANGES clearinghouse:

- Smart card readers might bypass the E-PASS system and communicate directly with the clearinghouse.
- Smart card readers might be integrated with the E-PASS system, which would submit the transactions to the clearinghouse for reimbursement using periodic file transfers.
- The main issue with the MacKay meters – as noted previously – is that they are currently set up to accept only a particular type of contact smart card. Also, an interface may need to be developed with the central software used for managing these parking meters.
- As with the farebox issues, the date when the issues will be resolved is not clear.

Finalizing the Evaluation Strategy and Plan (Task 1 Deliverable)

- The Volpe team presented a brief overview of the draft deliverable for Task 1 – the Evaluation Strategy and Plan. Although some written comments have already been received, no further comments on the document were provided during the call.
- It was agreed that the document, after addressing comments received up to Nov 2/01, will be considered finalized – but only as an interim deliverable. A foreword will be added to make clear that the content (e.g., ORANGES design, goals/measures, etc.) would be updated for the final report if circumstances have subsequently evolved. Sean noted that this interim version would be the first to be reviewed by others at US DOT.

Next Steps

- Task 2 (Develop Test Plans) is now underway. This will involve some followup with agency representatives to identify specific contacts for data collection issues. Sean and Don requested that they be kept informed about such agency contacts.
- The next conference call discussion was scheduled for Nov 19/01, beginning at 1:00 p.m.

- Ann Joslin noted that she is departing from Lynx, with Doug Jamison taking over as the Lynx project manager for this effort.

Meeting #5: US DOT Input on Goals and Measures November 19, 2001 – 1:00 pm – 2:30 pm

Participants:

- Sean Ricketson Federal Transit Administration (FTA)
- Doug Jamison Central Florida Regional Transportation Authority (Lynx)
- Sam Vennaro City of Orlando Parking Bureau
- David Wynne Osceola Orange County Expressway Authority
- Janet Mendenhall Touch Technology International (TTI)
- Don Erwin Post Buckley Schuh and Jernigan (PBSJ)
- Leisa Moniz US DOT, Volpe National Transportation Systems Center
- Doug Parker Multisystems

Review Minutes from Meeting #4: Design Status Update and Evaluation Strategy and Plan Deliverable (September 18, 2001)

- No revisions were suggested.

ORANGES Design Status

- Contract development between LYNX and both PBSJ and TTI has now been substantially completed. Efforts continue on developing partnership agreements.
- Current plans are to begin implementing the Pilot I level of implementation in February 2002. Pilot I will involve a “laboratory” implementation (i.e., integrating central software with actual units of the various types of field equipment). The Pilot I system will be used as a platform to help address integration issues – related to integrating the software with the field equipment and with the legacy payment systems at each agency – before initiating deployment of the equipment in limited scale revenue service (i.e., in Pilot II).
- The new LYNX fareboxes will not yet be available in February 2002 for immediate use in Pilot I, and will be added later. Although negotiations are still underway, LYNX is currently expecting to purchase GFI Odyssey fareboxes (with the Cubic Tri-Reader smart card reader peripheral). This decision may be made by LYNX at a January 2002 meeting, but it is not yet

known how quickly a farebox can be made available for use with the Pilot I system.

US DOT Input on Task 1 Deliverable

- Mitretek has on ongoing contract with US DOT to provide cross-cutting feedback – to promote consistencies and synergy throughout the ITS program. As part of this role, Mitretek provided input after reviewing the draft Task 1 deliverable. This input from the overall ITS program of US DOT was discussed with the stakeholders to reach consensus on any appropriate changes in the document (i.e., when it is eventually amended for incorporation into the evaluation Phase I final report). In particular, it was important to agree on any appropriate evolution of the goals and measures that were previously established by consensus – since these goals and measures form the foundation for the current Test Plans task.
- The first attachment – entitled, “Comments on Oranges Evaluation Strategy and Plan” – provides both the original Mitretek comments as well as commentary based on the conclusions of the stakeholders group in this meeting. The second attachment highlights the agreed changes to the goals and measures summary tables (i.e., extracted from the Task 1 deliverable).

Next Steps

- The current Test Plans task of the evaluation effort cannot be completed until the revenue collection locations are decided (i.e., the locations at which the Pilot II deployment will establish smart card acceptance). These decisions are expected at some point during the Pilot I implementation level, although the specific timing has not yet been defined.
- The next conference call discussion was scheduled for December 18/01, beginning at 11:00 a.m.

Meeting #6: Developing Test Plans December 19, 2001 – 9:00 am – 10:30 am

Participants:

- Sean Ricketson Federal Transit Administration (FTA)
- Jill Maeder Central Florida Regional Transportation Authority (Lynx)
- Pam Corben City of Orlando Parking Bureau
- David Wynne Osceola Orange County Expressway Authority
- Janet Mendenhall Touch Technology International (TTI)
- Don Erwin Post Buckley Schuh and Jernigan (PBSJ)
- Tom Delaney PBSJ
- Leisa Moniz US DOT, Volpe National Transportation Systems Center
- Doug Parker Multisystems

Introductions

Jill Maeder was sitting in for Doug Jamison of LYNX.

Tom Delaney recently joined PBSJ from Leapfrog Systems.

Review Minutes from Meeting #5: US DOT Input on Goals and Measures (November 19, 2001)

- No revisions were suggested.

ORANGES Design Status

- GFI farebox support is currently only available for Sony readers and the Cubic Tri-Reader. Although a dual interface card was preferred, the agencies expect to use Sony contactless-only cards – dual interface Sony cards are not available. Using the Cubic Tri-Reader was also considered, but GFI/Cubic development work to date – on Tri-Reader integration with the farebox – only supports the use of Cubic cards (i.e., Cubic single purse dual interface cards are not available). Additional GFI/Cubic development is needed before their farebox combination will support a Type A or B card – the card types that offer single purse dual interface. GFI fareboxes are not expected to support a contactless reader that works with a dual interface card (e.g., Tri-Reader, other Type A or Type B reader) until at least 2003.

- Both MacKay and Schlumberger have indicated that they cannot support contactless readers in their meter and kiosk devices – without substantial development costs that the project cannot support. So, the trial will be with fareboxes, toll lanes and parking lanes.
- OOCEA is pursuing a potential opportunity to use smart card accepting transponders instead of laneside readers for the toll lanes. Two ETC vendors from outside North America have expressed interest in implementing a no-cost demonstration system. OOCEA is currently involved in discussions with these vendors – although not named, one uses 5.9 GHz technology and the other infrared. The key factor is that both are offering smart card accepting transponders that have already been deployed in Europe or Asia. Of course, this implies that the transponders would accept the Sony contactless cards. If this approach is adopted, smart card accepting transponders might also be used for parking lanes – although stand-alone readers might still be used if the vendor would not include this in the no-cost demonstration system.

Progress on Task 2 – Developing Test Plans

- The evaluation team requested stakeholder feedback on the previously distributed partial draft of the test plans document. In addition to any other feedback, it is expected that preparatory discussions and on-site meetings will be needed with agency technical staff to complete the data collection section for each test plan. The evaluation team will complete the data analysis section of each test plan based on the completed data collection information.
- There was general agreement that specific smart card reader installation locations will likely not become established until around February – and that detailed discussions with agency staff to finalize the data collection should be left until after that information is available.

Next Steps

- The next conference call discussion was scheduled for January 28/02, beginning at 9:00 a.m.

- once again pursue smart card acceptance for parking meters and kiosks. However, issues related to the locations of the parking lots equipped with kiosks make their inclusion in the trial unlikely. It is also expected that the contact interface could create additional revaluing opportunities.
- Stand-alone smart card readers using the Mifare interface are available from multiple vendors.
 - Current ORANGES deployment plans involve:
 - An initial Pilot I “showroom” system is expected to be ready for demonstration at the ITSA EPS Workshop scheduled for March 14-15 in Orlando.
 - By June or July, it is expected that the “showroom” system, with enhanced functionality and interfaces, will be ready for field deployment to begin.
 - The first field deployment is not expected to be ready for revenue service until fall 2002.

Progress on Task 2 – Developing Test Plans

The schedule for the rest of the Phase I evaluation, with the next step being to complete Task 2 (Test Plans), must be based on the final implementation schedule. Field locations for smart card acceptance must be determined (i.e., which buses, meters and toll lanes will be equipped) before test plans can be completed. These decisions might be available within about a month. The timing for the field deployment will determine when to undertake before data collection (i.e., before data collection should be completed as close as is practical before the implementation).

Next Steps

The next conference call discussion was scheduled for February 26/02, beginning at 10:00 a.m.

Meeting #8
February 26, 2002 – 10:00 am – 12:00 pm

Participants:

- Sean Ricketson Federal Transit Administration (FTA)
- Doug Jamison Central Florida Regional Transportation Authority
(Lynx)
- Sam Vennaro City of Orlando Parking Bureau
- David Wynne Osceola Orange County Expressway Authority
- Janet Mendenhall Touch Technology International (TTI)
- Tom Delaney PBSJ
- Leisa Moniz US DOT, Volpe National Transportation Systems
Center
- Doug Parker Multisystems

Review Minutes from Meeting #7 (January 28, 2002)

No revisions were suggested.

ORANGES Design Status

There was a recent meeting with Ascom regarding their potential supply of smart card validators for on-board Lynx buses and in parking garage booths. Ascom has tentatively agreed to provide this equipment at no cost in exchange for a teaming agreement that would provide marketing opportunities to Ascom in conjunction with project publicity. This agreement is not finalized at this time. Similar opportunities are being offered to potential equipment vendors for other aspects of the project (e.g., EFKON for toll lanes, Gemplus for dual interface smart cards and Mackay for parking meters).

Ascom would only provide validators and the software to support their integration with both the clearinghouse and the existing Lynx system for revenue reporting. This TTI integration would include the custom programming of the validators, with Ascom providing a Software Development Kit.

- Bus validators would be mounted beside, and be completely separate from, the new fareboxes.
 - There would be no driver interface, so the validator will only be able to determine the fare based on information from the card. This implies that

the validator would charge no fare if there is a valid pass stored on the card, otherwise charging the full or transfer fare (depending on the details of the previous trip record stored on the card). A cardholder could not request that a smart card configured for adult fares also pay the fare for an accompanying child. Or, if a card carries a pass and stored value, the cardholder could not request that the stored value pay the fare for an accompanying person. The validators have a communications port that would allow Lynx to consider adding a driver interface at a later time if this ever seems desirable.

- The clearinghouse system will support automatic balance revaluing from a credit card when the central system balance drops below a set threshold, since this feature is currently available for conventional E-Pass transponders. However, it has not yet been determined whether the Ascom validators have enough memory to allow the balance updates to be transferred to the cards through a validator. There would need to be enough memory for all pending balance updates to be stored in the validator. When a balance update to a card would be completed somewhere in the system, the pending update could not be immediately deleted from all the other devices in the system. First, the completed update transaction would need to be transferred to the central system and then subsequently transferred out from the central system to all the devices. One option would be to limit the set of card updates stored in a bus validator to those cardholders that request bus update capability at card issuance.
- Data collection from the validators would involve either:
 - An infrared probe device used when the bus returns to the garage (i.e., analogous to farebox probing operations)
 - A Wireless LAN that would complete data transfer with the validator as it enters the garage.
- Validators for parking garage booths would be mounted at both the entry and exit lanes. The card would be used with the entry validator to store the entry date/time stamp on the card. When the card would later be used at the exit, the entry date/time stamp would be used to determine the amount to deduct from stored value.

The expected arrangements with EFKON for the smart card accepting transponders and infrared readers remain unchanged, but are still being finalized.

The same applies for arrangements with Mackay for parking meters that can accept the ORANGES card. The back-office parking meters software will need to be integrated by TTI. A new back-office system is currently being procured and arrangements will be made as part of this procurement for it to be integrated with both the parking meter smart card readers and the TTI clearinghouse.

The locations for card revaluing have not yet been finalized. At minimum, there will be the Autoload capability and attended locations at selected Lynx, OOCEA and Parking Bureau facilities. In addition, there may be “on-demand” credit card revaluing features (e.g., phone or Internet access) and various additional attended revaluing locations operated by third parties (e.g., retailers). The latter will be important for providing convenient revaluing opportunities near the selected parking meters and Lynx routes. For example, Lynx will consider extending its current arrangements with current retail pass vendors.

The number of smart cards is currently expected at 150-500. This number still needs to be finalized, for considerations such as:

- The specific Lynx test route
- The number of equipped toll lanes, parking meters and parking garages
- The numbers of cardholders that will use multiple modes
- The number of cards needed to replace lost, stolen or damaged cards during the trial.

The current expected schedule:

- Pilot I to be completed for August 2002. This will provide the first fully integrated system configuration for demonstration. All interfaces between field equipment, the TTI clearinghouse and any other systems will be in place but the equipment will not yet be installed in the field.
- Pilot II to be completed for November 2002. This will provide the installed system for revenue service.

At the March 2002 EPS workshop, the following ORANGES demonstrations are intended:

- TTI will have a version of the CardTouch clearinghouse software running, together with surrogate devices for payment and attended revaluing, so that they can demonstrate typical data transfer and transaction processing operations.

- Ascom, EFKON and perhaps Mackay will have their field equipment on display. Although the equipment will likely be enabled for completing smart card transactions, it will not be integrated with the TTI system.
- The smart cards in use will not necessarily be the actual Gemplus dual interface smart cards expected to be used for deployment, and the different vendor displays will not necessarily use the same smart card.

Progress on Task 2 – Developing Test Plans

Based on the current deployment schedule, before testing is targeted for around September 2002. The next step in the evaluation work program is to complete Task 2 (Test Plans). Comments on the previously issued partial draft of the Test Plans document are requested by March 22, 2002. Field locations for smart card acceptance must be determined by the agencies (i.e., which buses, meters and toll lanes will be equipped) before the Test Plans deliverable can be completed. Once the field locations are determined, an additional activity required to complete the Test Plans deliverable is a set of on-site interviews with the various agency staff that will perform the data collection, to finalize the required logistics.

Next Steps

The next conference call discussion was scheduled for March 26/02, beginning at 10:00 a.m.

Meeting #9
March 28, 2002 – 10:00 am – 11:00 am

Participants:

- Doug Jamison Central Florida Regional Transportation Authority
(Lynx)
- Sam Vennaro City of Orlando Parking Bureau
- David Wynne Orlando Orange County Expressway Authority
- Janet Mendenhall Touch Technology International (TTI)
- Tom Delaney PBSJ
- Don Erwin PBSJ
- Leisa Moniz US DOT, Volpe National Transportation Systems
Center
- Doug Parker Multisystems

Review Minutes from Meeting #8 (February 26, 2002)

No revisions were suggested.

ORANGES Design and Implementation Status

ORANGES was demonstrated to industry and local agency representatives at the ITSA EPS workshop held in Orlando on Mar 14-15, 2002. This was coupled with a demonstration to agency's Board and Citizens Advisory Committee representatives on Mar 13, 2002. The design and implementation team reports that these demonstrations had the desired effect, of helping to shift the focus of attendees from ORANGES as a concept and future initiative to ORANGES as a reality and imminent implementation.

Timelines for Completing the Phase I Evaluation

Based on the current deployment schedule, agency data collection for the before testing is targeted for around July/August 2002. To support this, the following timeline is planned:

- PBSJ indicates that they have developed comments on the previously issued partial draft of the Test Plans document, which they will provide by April 12/02.
- The smart card recipients and field locations for smart card acceptance (i.e., which buses, meters and toll lanes will be equipped) must be determined by

the agencies before the Test Plans deliverable can be completed. These details will be established and made available to the evaluation team by the end of April 2002.

- Once the field locations are established, an additional activity required to complete the Test Plans deliverable is a set of on-site planning sessions in May 2002 with the various agency staff that will perform the data collection, to finalize the required logistics.
- The Test Plans document will be completed by the end of June 2002 and the before data collection will be executed in July/August 2002.

Next Steps

The next conference call discussion was scheduled for May 1/02, beginning at 10:00 a.m.

Meeting #10
May 1, 2002 – 10:00 am – 12:00 pm

Participants:

- Doug Jamison Central Florida Regional Transportation Authority
(Lynx)
- Sam Vennaro City of Orlando Parking Bureau
- David Wynne Orlando Orange County Expressway Authority
- Janet Mendenhall Touch Technology International (TTI)
- Tom Delaney PBSJ
- Leisa Moniz US DOT, Volpe National Transportation Systems
Center
- Doug Parker Multisystems
- Randy Farwell Multisystems

Review Minutes from Meeting #9 (March 28, 2002)

No revisions were suggested.

ORANGES Design and Implementation Status

The agreement with EFKON for the use of their smart card accepting transponders has not been finalized. The agreement with Ascom for the use of their stand-alone smart card validators is nearly finalized.

Timelines for Completing the Phase I Evaluation

Based on the current deployment schedule, agency data collection for the before testing is targeted for around July/August 2002. To support this, the following timeline is planned:

- The smart card recipients and field locations for smart card acceptance (i.e., which buses, meters and toll lanes will be equipped) must be determined by the agencies before the Test Plans deliverable can be completed. These details will be established and made available to the evaluation team by the end of April 2002. See the section below for preliminary details discussed during this meeting.
- All comments on the partial test plans document will be provided by May 10, 2002. See the section below for discussion about comments provided so far.

- Once the field locations are established, an additional activity required to complete the Test Plans deliverable is a set of on-site planning sessions in May/June 2002 with the various agency staff that will perform the data collection, to finalize the required logistics.
- The Test Plans document will be completed by the end of June 2002 and the before data collection will be executed in July/August 2002.

Preliminary Details on Smart Card Acceptance Locations

The agencies are currently planning to issue about 100-500 smart cards.

Lynx is planning to equip Link 101 and the Laser bus service, both focused on the UCF campus.

OOCEA intends to equip the Holland East plaza as well as perhaps the Dean plaza.

City parking is considering equipping the Central Blvd and Market St garages as well as parking meters on Pine, Rosalind and Orange (all near City Hall).

Discussion about Initial Comments on Partial Test Plans Document

The parking meters intended for accepting the ORANGES smart card already accept the current contact parking-only smart card. Goal 1 (Increase parking revenue) would be more relevant for introducing smart cards to cash-only meters. For this reason, the usefulness of retaining this goal is in question.

Due to the limited scale of deployment, the implementation team is concerned that some goals/measures may show little effect in measurements of the overall population. There was particular discussion about the usefulness of retaining Goal 2 (Increase transponder market penetration) and Goal 4 (Increase prepaid revenue share).

Next Steps

The evaluation team will have a followup discussion with FTA representatives about issues surrounding the potential reduction in the number of evaluation measures due to the limited scale of deployment, and about possible alternatives to this course of action.

The next conference call discussion was scheduled for May 29, 2002, beginning at 10:00 a.m. However, this conference call has been subsequently postponed as a result of a request from FTA for the implementation partners to propose by June 14, 2002 their recommendations for updating the evaluation goals/measures.

Quantitative Goal 1: Increase Parking Revenue

Change in test hypothesis

	Transit	Parking	Tolls
Measures	•	• Revenue	•
Test Hypotheses	•	• Having a card avoids parking being deterred when the customer does not have small value coins, leading to an expected revenue increase (only applies to parking meters)	•
Data Collection Methods	•	• Parking Bureau can provide this data	•
Test Type	•	• Before and After	•

Quantitative Goal 2: Demonstrate Reliable Performance for Smart Card Transponders (formerly: Increase Transponder Market Penetration)

Significant change

	Transit	Parking	Tolls
Measures	•	•	• Difference between # of monthly transactions for smart card accepting transponders vs. conventional transponders
Test Hypotheses	•	•	• Using a smart card accepting transponder instead of a conventional transponder will not reduce the number of transponder-based transactions completed (i.e., there will be no difficulties with the smart card accepting approach that divert transactions to cash)
Data Collection Methods	•	•	<ul style="list-style-type: none"> • Average # of monthly transactions for conventional transponders will be gathered from the existing Transcore toll system • Average # of monthly transactions for smart card accepting transponders will be gathered from the TTI system.
Test Type	•	•	• After (Control vs. Test)

Quantitative Goal 3: Reduce Transaction Times

Not changed

	Transit	Parking	Tolls
Measures	• Average throughput	• Average throughput	•
Test Hypotheses	• More smart cards transactions will mean fewer cash transactions,	• More smart cards transactions will mean fewer cash transactions,	•

	Transit	Parking	Tolls
	leading to an improvement in throughput	leading to an improvement in throughput (improving throughput is of value for garages, but not for meters).	
Data Collection Methods	<ul style="list-style-type: none"> When a bus is APC equipped, the door open time and number of boardings can be gathered for various stops and used to calculate the throughput 	<ul style="list-style-type: none"> At the parking garages, the time to process a given number of exit payment transactions will be observed to calculate throughput 	<ul style="list-style-type: none">
Test Type	<ul style="list-style-type: none"> After (Control vs. Test) 	<ul style="list-style-type: none"> Before and After 	<ul style="list-style-type: none">

Quantitative Goal 4: Increase Prepaid Revenue Share

Not changed

	Transit	Parking	Tolls
Measures	<ul style="list-style-type: none"> % cash transactions (i.e., overall % prepaid is the complement) % smart card transactions 	<ul style="list-style-type: none"> % cash transactions (i.e., overall % prepaid is the complement) % smart card transactions 	<ul style="list-style-type: none">
Test Hypotheses	<ul style="list-style-type: none"> Smart card use will increase the overall % of prepaid transactions 	<ul style="list-style-type: none"> Smart card use will increase the overall % of prepaid transactions 	<ul style="list-style-type: none">
Data Collection Methods	<ul style="list-style-type: none"> Gather from the LYNX revenue system 	<ul style="list-style-type: none"> Gather from the Parking Bureau revenue systems for the garages and meters 	<ul style="list-style-type: none">
Test Type	<ul style="list-style-type: none"> After (Control vs. Test) 	<ul style="list-style-type: none"> Before and After 	<ul style="list-style-type: none">

Quantitative Goal 5: Reduce Pass/Permit Distribution Costs

Changed significantly

	Transit	Parking	Tolls
Measures	<ul style="list-style-type: none"> Current per pass distribution cost 	<ul style="list-style-type: none"> Current per permit distribution cost (only relevant if auto-load will be implement to avoid monthly billing costs on the current proximity cards) 	<ul style="list-style-type: none">

	Transit	Parking	Tolls
Test Hypotheses	<ul style="list-style-type: none"> No test hypothesis; as the limited scale of the test is not expected to have an appreciable impact 	<ul style="list-style-type: none"> No test hypothesis; as the limited scale of the test is not expected to have an appreciable impact 	<ul style="list-style-type: none">
Data Collection Methods	<ul style="list-style-type: none"> LYNX to gather the monthly costs in specified categories and the overall number of passes distributed at that cost 	<ul style="list-style-type: none"> Parking Bureau to gather the monthly costs in specified categories and the overall number of permits billed at that cost 	<ul style="list-style-type: none">
Test Type	<ul style="list-style-type: none"> Before only 	<ul style="list-style-type: none"> Before only 	<ul style="list-style-type: none">

Quantitative Goal 6: Increase Automated Payment Equipment Uptime

Refinement

	Transit	Parking	Tolls
Measures	<ul style="list-style-type: none"> % time coin or bill processing available for fareboxes 	<ul style="list-style-type: none"> % time coin processing available for meters (does not apply to garage booths) 	<ul style="list-style-type: none"> % time coin processing available for automatic coin acceptors in lanes
Test Hypotheses	<ul style="list-style-type: none"> Reduced use of cash will increase the availability of automated cash acceptance equipment 	<ul style="list-style-type: none"> Reduced use of cash will increase the availability of automated cash acceptance equipment 	<ul style="list-style-type: none"> Reduced use of cash will increase the availability of automated cash acceptance equipment
Data Collection Methods	<ul style="list-style-type: none"> Lynx will estimate based on maintenance reports 	<ul style="list-style-type: none"> Parking Bureau will estimate based on maintenance reports 	<ul style="list-style-type: none"> OOCEA will estimate based on maintenance reports
Test Type	<ul style="list-style-type: none"> After (Control vs. Test) 	<ul style="list-style-type: none"> Before and After 	<ul style="list-style-type: none"> Before and After

Quantitative Goal 7: Cardholders Use the Joint Account

Not changed

Measures	<ul style="list-style-type: none"> # of transactions, by mode and location Average transaction value Average reload value Average balance
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Test Hypotheses	<ul style="list-style-type: none">• Cardholders will use the joint account
Data Collection Methods	<ul style="list-style-type: none">• TTI will provide
Test Type	<ul style="list-style-type: none">• After (Test only)

Additional Quantitative Goals and Measures Identified

The test plan will attempt to incorporate the following additional quantitative goals and measures:

- **Processing Cost per Cash Transaction:** In a similar manner to the updated formulation of Goal 5, the intent would only be to characterize this cost under the “before” conditions.
- **Clearinghouse Performance Measures:** The intent is for TTI to capture measures such as processing time and error rates that characterize clearinghouse performance.
- **System Acceptance Test Results:** The completed system will undergo acceptance testing prior to being brought into revenue service. The implementation team will provide a copy of the written test results to the evaluation team to demonstrate the capabilities provided by the system.

Discussion Groups for Qualitative Goals

Goal 8: Customers

All cardholders will be required to provide some basic personal information as part of the card/transponder issuance process. The intent is to use this information to pre-screen the pool of cardholders for selecting the before and after discussion group participants. It is expected that some type of financial incentive from the agencies will nonetheless be needed to secure this participation. The evaluation team will provide input on appropriate personal questions for screening purposes.

Goal 9: Operations/Maintenance Staff and Goal 10: Planning/Management Staff

The agencies will recruit and make available a mix of employees for before and after discussion groups in each of these categories. These should be employees that will actually be involved with smart card equipped facilities.

Goal 11: Inter-Partners (was: Inter-Agency)

The name for this goal has been changed to reflect the fact that the issues and perspectives of the private sector participants as well as those of the agencies

are of interest. There will not be a separate discussion group for this goal. Rather, (1) the documentation from the partnering interviews by Kan Chen will continue to be provided (the next round of interviews are scheduled for July) and (2) evaluation conference calls will incorporate an explicit discussion of inter-participant issues.

Next Steps

The US DOT team will provide input by June 28, 2002 to the implementation team on the recommended scale of deployment.

Based on the conclusions reached in this meeting, the draft Task 2 deliverable (Test Plans) will be submitted for feedback by July 19, 2002.

Before data collection is targeted to begin in late August 2002.

Attached files:

- Project Status briefing – June 02.ppt
- Evaluation Test Revised Comments.doc

Meeting #12
September 3, 2002 – 1:00 pm – 2:00 pm

Participants:

- Pam Corbin Parking Bureau
- Doug Jamison LYNX
- Sam Vennaro Parking Bureau
- David Wynne OOCEA
- Tom Delaney PBSJ
- Sean Ricketson US DOT, Federal Transit Administration
- Leisa Moniz US DOT, Volpe National Transportation Systems
Center
- Randy Farwell Multisystems
- Doug Parker Multisystems

Review Minutes from June 12, 2002 Meeting

No revisions were suggested.

Pilot I Design and Implementation Update

The current schedule calls for the implementation of Pilot I (the testbed) by November 2002 and for implementation of the Field Operational Test system by February 2003.

There is now some uncertainty about the role of parking meters in the operational test. The response to the implementation team from MacKay involved higher than expected required funding and the modified meters were not to be available until April 2003. Parking meter decisions cannot be concluded for at least a week, and the evaluation team is to be informed as soon as this matter has been finalized.

An issue has arisen related to the two LYNX routes intended for operational test deployment. There is now the possibility that these two routes will be cut in December 2002 due to state and county funding issues. Alternate routes for the FOT are being considered.

The new LYNX fareboxes have now been installed and will be in revenue service for several months by the time the operational test begins. The test plans document will be adapted (i.e., the current test plans assume that before

testing would have been infeasible due to a coincident cutover to new fareboxes) to include before testing.

Remaining Comments on the Draft Test Plans Document

No further comments were offered on the draft test plans document. Since comments have been received from all the organizations of the implementation team, we will proceed to finalize the test plans document by September 9, 2002. It is understood that the implementation team is welcome to offer further comments. The test plans are a “living document” that could require adjustment for a variety of reasons.

Follow-Through Discussions with Agency Representatives

The participating agencies designated the following individuals as the lead agency contacts for follow-through on the arrangements for before testing and the discussion groups:

- Pam Corbin, Parking
- Doug Jamison, LYNX
- David Wynne, OOCEA

A draft of the discussion group guidelines will be distributed by September 16, 2002, together with the specific cardholder enrollment questions requested.

This “work group” will have a conference call with the evaluation team September 25, 2002 from 10:00 a.m. to 12:00 p.m. This conference call will discuss specific plans for conducting the before testing and arranging the discussion groups. It will also discuss the preferred timing for on-site meetings (e.g., in October 2002) to finalize this planning.

The next conference call for the overall team is scheduled for October 8, 2002 from 10:00 a.m. to 11:00 a.m.

Meeting #13
September 25, 2002 – 10:00 am -12:00 pm

Participants:

- Pam Corbin Parking Bureau
- Doug Jamison LYNX
- David Wynne OOCEA
- Sean Ricketson US DOT, Federal Transit Administration
- Leisa Moniz US DOT, Volpe National Transportation Systems
Center
- Randy Farwell Multisystems
- Doug Parker Multisystems

Before Data Collection Logistics

Goal 4 – Parking Meters Revenue

Meters

Covering the period November 2002 through January 2003, Pam Corbin will provide a spreadsheet indicating the total for each time revenue is collected from the meters, for each collection route that is expected to be equipped with some ORANGES meters. For each revenue collection route total, Pam will also provide the time period covered by the collection (i.e., the collection date/time and the prior collection date/time). Where possible this revenue total will indicate the amount collected for individual meters. If there are cases where the revenue cannot be attributed to individual meters, Pam will indicate the total number of meters and the number of ORANGES meters on the route.

Goal 5 – Transaction Times

Buses

Covering at least one week in each month between November 2002 through January 2003, Doug Jamison will provide a spreadsheet indicating the APC data for door open times, boarding count and alighting count at each stop on the routes to be equipped with ORANGES buses. Only the stops where the number of boarding passengers exceeds the number of alighting passengers will be retained (i.e., as stops where it is expected that the door open time will have been governed by the number of boarding passengers).

LYNX is constrained in the number of weeks per month they can cover because the required number of APC equipped buses from the LYNX fleets cannot be continuously assigned to the ORANGES routes. After the first week of such data collection, the number of usable stop data will be compared with the overall goal of gathering a sample of at least 50 – to decide whether the time period for data collection should be increased.

Garages

The garage cashier system records the times at which payment transactions are completed, but this is not enough information to determine which sequences of transactions had no gaps between the vehicles. Pam Corbin will arrange for a person to observe the egress from each of the ORANGES garages to observe the number of transactions completed during 50 different time periods with continuous demand over the Nov-Jan period – and provide a spreadsheet with the results. Doug Parker will provide a suggested data collection form.

Goal 6 – Prepaid Revenue Share

Buses

Covering the period November 2002 through January 2003, Doug Jamison will provide a spreadsheet indicating the daily percentage split between the different payment methods for each of the ORANGES routes.

Meters

Covering the period November 2002 through January 2003, Pam Corbin will provide a spreadsheet indicating the daily percentage split between the different payment methods for each of the collection routes that could have some ORANGES meters (ideally broken down for each of the individual ORANGES meters).

Garages

Covering the period November 2002 through January 2003, Pam Corbin will provide a spreadsheet indicating the daily percentage split between the different payment methods for each of the ORANGES garages. Pam will determine whether the daily reconciliation for each cashier actually distinguishes between the two forms of accepted payment (cash and checks), as the before testing would otherwise not be useful.

Goal 7 – Automated Equipment Uptime

Buses

Covering the period November 2002 through January 2003, Doug Jamison will provide a spreadsheet indicating for each maintenance incident with the cash accepting equipment on each ORANGES bus, the dates and times when the equipment went in and out of service.

Meters

Covering the period November 2002 through January 2003, Pam Corbin will provide a spreadsheet indicating, for each maintenance incident with the cash accepting equipment on each ORANGES meter, the dates and times when the equipment went in and out of service.

Toll Lanes

Covering the period November 2002 through January 2003, David Wynne will provide a spreadsheet indicating, for each maintenance incident with the automatic coin accepting machines in the Holland East Plaza, the dates and times when the equipment went in and out of service.

Goal 9 – Current Pass Distribution and Permit Billing Costs

Buses

Covering the period November 2002 through January 2003, Doug Jamison will provide a spreadsheet indicating the total pass distribution cost, the cost categories included in that total and the total number of passes distributed.

Garages

Covering the period November 2002 through January 2003, Pam Corbin will provide a spreadsheet indicating the total permit billings cost, the cost categories included in that total and the total number of permit billings involved.

Goal 10 – Current Cash Processing Costs

Buses

Covering the period November 2002 through January 2003, Doug Jamison will provide a spreadsheet indicating the total cash processing cost, the cost categories included in that total, the total number of cash transactions and the total value of the cash processed. Cash transactions for both direct fare payment and the purchase of prepaid fare media should be included.

Meters

Covering the period November 2002 through January 2003, Pam Corbin will provide a spreadsheet indicating the total cash processing cost, the cost categories included in that total and the total value of the cash processed.

Garages

Covering the period November 2002 through January 2003, Pam Corbin will provide a spreadsheet indicating the total cash processing cost, the cost categories included in that total, the total number of cash transactions and the total value of the cash processed.

Toll Lanes

Covering the period November 2002 through January 2003, David Wynne will provide a spreadsheet indicating the total cash processing cost, the cost categories included in that total, the total number of cash transactions and the total value of the cash processed.

Discussion Groups Logistics

Cardholders

The anticipated process for recruiting cardholder participants (i.e., as outlined in the test plans document) was reviewed and everyone agreed to support that process. Cardholder enrollment is not expected to be complete until late in January 2003, so it is expected that the before discussion group for cardholders will not be able to occur until mid-late February 2003. OOCEA offered their boardroom as a location that would be available for an evening discussion group.

The importance of modest cardholder incentives in recruiting a sufficiently large and diverse group was discussed. The additional cost for this would need to be approved by the agencies. Sean Ricketson offered to provide discussion group guidelines that the evaluation has been developing (with a cover letter to the participating agencies), which include an explanation of the need for these incentives.

Employees

The two different employee discussion groups are expected to occur in late January or early February 2003. By this time, employees will have been briefed on the general nature of the ORANGES trial and it will be clear which employees will be users of the ORANGES trial equipment. Each group will

include employees from each of the participating agencies. These discussion groups will likely also be held in the OOCEA boardroom.

Scheduling Onsite before Data Collection Visit for the Evaluation Team

November 21, 2002 (1:00-5:00 p.m.) was selected for an on-site meeting (at either PBSJ or LYNX offices) where the evaluation team will meet with the agency representatives involved in before data collection.

- The initial data collected by each agency will be reviewed so that any appropriate refinement for the remainder of the data collection period can be determined.
- The evaluation team will go to a parking garage with Parking Bureau representatives to undertake a “dry run” and finalize procedures for the required field data collection.

Meeting #14
October 2, 2002 – 10:00 am – 10:30 am

Participants:

- Pam Corbin Parking Bureau
- Doug Jamison LYNX
- David Wynne OOCEA
- Tom Delaney PBSJ
- Don Erwin PBSJ
- Sean Ricketson US DOT, Federal Transit Administration
- Leisa Moniz US DOT, Volpe National Transportation Systems
Center
- Randy Farwell Multisystems
- Doug Parker Multisystems

Review Minutes from September 3, 2002 Meeting

No revisions were suggested.

Design and Implementation Update

Implementation for the field operational test is still scheduled for February 2003. Several recent possible changes in the scope of the field operational test deployment have emerged:

- LYNX is expected to determine in the next week or so whether Link 101 and/or the LASER links will be cut due to current funding issues with Orange County. If so, the implementation team intends to select alternative links to provide a similar level of overall ridership. The other complication with selecting alternative links is that these would also need to involve a similar number of stand-alone validators (to correspond to the agreement with Ascom) and a dedicated fleet.
- It should become clear in the next week or so whether meters will be included in the deployment – at this point the implementation team suggests meters will likely not be included. The agencies have had difficulty agreeing on price and schedule with MacKay. If meters are not included, the intent is to equip an additional parking garage (Library).
- OOCEA is considering adding EFKON Touch’N’Go validators to selected lanes at the Holland East plaza. There is interest in exploring the potential

for such validators to help displace cash use for the “transponder-resistant” market segment. A technical issue being explored before deciding is the ability for these validators to support card balance updates to reflect revaluing transactions completed at the clearinghouse. This addition would not reduce the number of smart card accepting transponders issued.

Planning for Before Data Collection

The evaluation team briefly summarized the September 25, 2002 conference call focused on before data collection planning:

- The agencies will generally be collecting before data over the period November 2002 through January 2003.
- Discussion group guidelines have been provided to the agencies to assist them in providing the necessary logistical support, including a cover letter from FTA.
- An on-site coordination meeting is planned for November 21, 2002, to be attended by the full evaluation team
- Randy Farwell will provide on-site support and coordination as required for the before data collection agency effort, beginning during late October 2002.

The next conference call for the overall team is scheduled for October 23, 2002 from 10:00 a.m. to 11:00 a.m.

Meeting #15
October 23, 2002 – 10:00 am – 10:30 am

Participants:

- Pam Corbin Parking Bureau
- Doug Jamison LYNX
- Tom Delaney PBSJ
- Sean Ricketson US DOT, Federal Transit Administration
- Leisa Moniz US DOT, Volpe National Transportation Systems
Center
- Doug Parker Multisystems

Review Minutes from October 2, 2002 Meeting

No revisions were suggested.

Design and Implementation Update

Implementation for the field operational test is still scheduled for February 2003. Several recent changes in the scope of the field operational test deployment have emerged:

- LYBX has cut Link 101 and the LASER links due to funding issues with Orange County. The implementation team has selected Links 13 and 15 as alternatives. Link 13 connects the University of Central Florida (UCF) with the downtown area. Link 15 connects with another college on the east side and also passes through the downtown area. These links provide higher overall ridership than the 101/LASER links. A dedicated fleet of buses will be used, with the number of buses in service decreasing from 10 to 9.
- Parking meters will not be included in the deployment, as the agencies could not reach agreement on price and schedule with MacKay. An additional parking garage (Library) will be equipped. The additional garage is used by Florida A&M Law School and the City Library.
- Although a few technical issues remain to be resolved, OOCEA will almost certainly add EFKON Touch’N’Go validators to the manual and coin machine lanes at the Holland East plaza. The updated design and implementation schedule is expected from EFKON by October 29, 2002. Touch’N’Go would be an addition and would not reduce the number of smart card accepting transponders to be issued.

The cashier POS equipment in manual lanes will be equipped with a smart card revaluing peripheral, to allow these cashiers to act as attended POS locations for smart card revaluing transactions. As part of these revaluing transactions, the smart card will be authenticated on-line by the ORANGES clearinghouse. Only cash revaluing payments will be supported; credit and debit card transactions would be too long for an operating toll lane.

All communications with the ORANGES clearinghouse, for the online authorization of revaluing transactions and the daily exchange of information from lane validators, will be direct to avoid the need for any integration with the existing OOCEA toll collection system.

The test plans document will be updated by November 8, 2002 to reflect the impact of these changes.

Planning for Before Data Collection

Discussion about planning for the before data collection (November 2002 through January 2003) included:

- An on-site coordination meeting will occur November 21, 2002 at LYNX headquarters from 1 pm to 5 pm, to be attended by the full evaluation team.
- Randy Farwell is currently providing on-site support and coordination to help agencies prepare the details for before data collection. He met with David Wynne of OOCEA on October 15, 2002. Additional meetings are scheduled – with Pam Corben of the Parking Bureau on October 24, 2002 and with Doug Jamison of LYNX on October 25, 2002.

The next conference call for the overall team is scheduled for November 12, 2002 from 10:00 a.m. to 11:00 a.m.

Meeting #16
November 12, 2002 – 10:00 am – 11:00 am

Participants:

- Pam Corbin Parking Bureau
- Doug Jamison LYNX
- David Wynne OOCEA
- Janet Mendenhall TTI
- Tom Delaney PBSJ
- Leisa Moniz US DOT, Volpe National Transportation Systems
Center
- Doug Parker Multisystems

Review Minutes from October 23, 2002 Meeting

No revisions were suggested.

Design and Implementation Update

The scope of the implementation has not changed, but Janet Mendenhall discussed a schedule issue that TTI raised at the most recent management committee meeting. Due to current and unexpected staffing issues, TTI indicates it will not be able to deliver the testbed system in November as originally scheduled. The revised completion schedule will not be clear until TTI establishes an alternative staffing plan, which it expects to report next week. This delay will likely push the testbed system delivery into December, which is in turn expected to push acceptance testing into January and the field deployment into March.

If the field deployment does not occur in February as originally planned, it was agreed that the completion of before data collection should extend beyond January. The timing of the before discussion groups would also be affected by a change in the beginning of the field deployment.

Leisa Moniz indicated that US DOT is monitoring each Field Operational Test very closely. It is essential that LYNX – as the FTA grantee – identify this and any other important issue that may arise (including the cause, resolution and impact) in writing to Sean Ricketson (as well as Leisa Moniz and Doug Parker) as quickly as possible.

Some additional detail about the field deployment was discussed:

- In addition to the purse revaluing at manual toll lanes, each agency will equip at least one of their agency-operated customer service facilities to serve as a revaluing location for the common purse. The agencies will provide specific information on the number and locations of each agency's revaluing facilities.
- The Parking Bureau will not be offering automated renewal for monthly parking permits through the ORANGES system.

Initial Experience with Before Data Collection

Discussion about the initial experience with before data collection included:

- Randy Farwell is currently providing on-site support and coordination to help agencies execute the before data collection. He met with David Wynne of OOCEA on October 15, 2002, with Pam Corbin of the Parking Bureau on October 24, 2002 and with Doug Jamison of LYNX on October 25, 2002.
- Each agency indicates they have begun the before data collection effort.
- An on-site coordination meeting will occur November 21, 2002 at LYNX headquarters from 1 pm to 5 pm, to be attended by the full evaluation team. An agenda will be distributed in advance.

Discussion Groups Planning

There has been only limited discussion about the specific approach to discussion groups and the support that agencies can provide. Specifically, the issue about the agencies providing a financial incentive for cardholder participation remains unresolved further to the letter from Sean Ricketson highlighting the importance of such incentives.

The next conference call for the overall team is scheduled for December 3, 2002 from 10:00 a.m. to 11:00 a.m.

Initial Experience with Before Data Collection

Goal 4 – Transaction Times

Buses

Covering at least one week in each month between November 2002 through February 2003, Doug Jamison will provide a spreadsheet indicating the APC data for door open times, boarding count and alighting count at each stop on the routes to be equipped with ORANGES buses. LYNX is constrained in the number of weeks per month they can cover because the required number of APC equipped buses from the LYNX fleets cannot be continuously assigned to the ORANGES routes.

Terry Jordan, who handles APC data at LYNX, presented sample APC reports from earlier in 2002. He will filter this database to include only those stops with more boardings than alightings, as well as to exclude stops with unrealistic door open times (e.g., layovers). He will then export the filtered database to an Excel spreadsheet for analysis by the evaluation team. **The APC database for Links 13 and 15 for the week beginning November 18, 2002 will be filtered on this basis and provided to the evaluation team in early December.**

Garages

The garage cashier system records the number of transactions completed at each garage exit for each hour as well as the times at which individual payment transactions are completed. However, this is not enough information to determine which sequences of transactions had no gaps between exiting vehicles, the number of exit lanes open at various times during each hour, or the variability in transaction times.

Pam Corbin will arrange for agency staff to observe all exit lanes from each ORANGES garage over the December 2002 through February 2003 period, to observe the number of transactions completed during time periods with continuous demand – and provide an Excel spreadsheet with the results. Specifically, for each garage exit during one week per month, one hour of field data collection will be undertaken for an AM peak, off-peak and PM peak hour on each of Tuesday, Wednesday and Thursday. This data collection will be based on the following data collection approach:

Time Period	Number of Completed Exit Transactions	Was There Any Break in Continuous Exit Flow During this Time Period?
8:00-8:01	/	Yes
8:01-8:02		Yes
8:02-8:03	////	No
8:03-8:04	/////	No
8:04-8:05	//	Yes
Etc.		

In the above example, only the time periods 8:02-8:03 and 8:03-8:04 would be included as sample time periods for calculating throughput, since the other time periods either had no exit transactions or had breaks in the exit flow. In this case, those two time periods would represent samples with average transaction duration of 15 seconds and 12 seconds, respectively. By using time periods of only one-minute duration, the statistical analysis on the sample will assess the level of variability. This approach will also offer the option of using longer sample time periods (e.g., 2 minutes, 5 minutes) if these would seem to work better.

Once the initial week of data collection in December 2002 is completed, Parking will provide the associated spreadsheets to the evaluation team during January 2003 for initial analysis.

Goal 5 – Prepaid Revenue Share

Buses

Covering the period November 2002 through February 2003, Doug Jamison will provide an Excel spreadsheet indicating the daily percentage split between each of the different payment methods (i.e., cash, transfer and each type of pass) for each of the ORANGES routes. **The initial spreadsheet,**

covering data for November 2002, will be provided to the evaluation team during December 2002 for initial analysis.

Blanche Sherman presented sample reports from their GFI revenue software. She explained that nearly all transaction types are registered by the new farebox and will thus be available through these reports. Most pass transactions use a swipe card and are registered, although there are still a limited number of visually inspected passes (e.g., for employees) that rely on driver keypresses for registration.

The percentage split for each day will be used as a sample measurement (excluding days such as holidays when the payment method breakdown may be atypical), so that a statistical assessment can be done on the overall set of daily samples from throughout the before data collection period.

The statistical analysis may suggest that it is appropriate to segment the data into weekday and weekend samples if the payment method breakdown varies significantly (e.g., if weekly and monthly pass use is lower on weekends). Also, LYNX is introducing a new fare structure at the beginning of January 2003, including various pricing changes, eliminating transfer charges and adding a day pass. This can be expected to alter the payment method breakdown and the statistical analysis will likely need to segment the daily samples into separate groups for before and after the fare change.

Garages

Covering the period November 2002 through February 2003, Pam Corbin will provide a spreadsheet indicating the daily percentage split between the different payment methods for each of the ORANGES garages. **The initial spreadsheet, covering data for November 2002, will be provided to the evaluation team during December 2002 for initial analysis.**

Goal 6 – Automated Equipment Uptime

Buses

Covering the period November 2002 through February 2003, Doug Jamison will provide an Excel spreadsheet indicating, for each ORANGES farebox, the dates and times for each instance where the cash accepting equipment went out of and then back into service. This is recorded automatically by the farebox. The spreadsheet will also indicate the times when each ORANGES farebox when into and out of service each day. This will allow the percentage availability for the farebox cash accepting equipment to be determined for each day and used in the statistical assessment. **The initial spreadsheet,**

covering data for November 2002, will be provided to the evaluation team during December 2002 for initial analysis.

Toll Lanes

Covering the period November 2002 through February 2003, David Wynne will provide an Excel spreadsheet indicating, for each maintenance incident with the automatic coin accepting machines in the Holland East Plaza, the dates and times when the equipment went out of and then back into service. This will allow the percentage availability for the toll lane automatic coin accepting equipment to be determined for each day and used in the statistical assessment. **The initial spreadsheet, covering data for November 2002, will be provided to the evaluation team during December 2002 for initial analysis.**

This data will only capture downtime incidents that were of sufficient duration and severity that a call to the maintenance contractor was needed. Brief incidents involving minor blockage (e.g., trash thrown into the coin basket), which the toll lane personnel are able to clear on their own, are relatively common. **David Wynne will investigate the feasibility of capturing the duration of these minor downtime incidents, which would increase the validity of the data.**

Goal 8 – Current Pass Distribution and Permit Billing Costs

Buses

Covering the period November 2002 through February 2003, Doug Jamison will provide an Excel spreadsheet indicating the total pass distribution cost, the cost categories included in that total and the total number of passes distributed. Blanche Sherman and Endya Wilkes presented initial information on the cost categories that could be included. The evaluation team clarified that the cost categories should be limited to characterizing current costs, as the evaluation is not attempting to estimate cost changes due to the ORANGES implementation. **The next iteration of cost category information will be provided to the evaluation team in January 2003 for feedback.**

Garages

Covering the period November 2002 through February 2003, Pam Corbin will provide an Excel spreadsheet indicating the total permit billing cost, the cost categories included in that total and the total number of permit billings involved. **Initial information on the cost categories to be included**

will be provided to the evaluation team in January 2003 for feedback.

Goal 9 – Current Cash Processing Costs

Buses

Covering the period November 2002 through February 2003, Doug Jamison will provide an Excel spreadsheet indicating the total cash processing cost, the cost categories included in that total, the total number of cash transactions and the total value of the cash processed. Cash transactions for both direct fare payment and the purchase of prepaid fare media should be included. **Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback.**

Garages

Covering the period November 2002 through February 2003, Pam Corbin will provide a spreadsheet indicating the total cash processing cost, the cost categories included in that total, the total number of cash transactions and the total value of the cash processed. **Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback.**

Toll Lanes

Covering the period November 2002 through February 2003, David Wynne will provide a spreadsheet indicating the total cash processing cost, the cost categories included in that total, the total number of cash transactions and the total value of the cash processed. **Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback.**

Discussion Groups Planning

The agencies plan to initiate an outreach effort in January 2003, which will invite residents to express interest in becoming a cardholder during the trial. The screening and recruitment process for selecting participants in the cardholder discussion group, as well as the general approach and timing for both cardholder and employee discussion groups, were reviewed (these had been previously discussed and agreed upon). **Don Erwin will coordinate with each agency to determine during December 2002 their decisions about providing a uniform monetary incentive to cardholder participants.**

Don Erwin will provide copies of the latest executive stakeholder interviews, as well as a selection of minutes from executive meetings covering key project events and decisions, in lieu of the evaluation team pursuing a separate executive level discussion group.

Meeting #18
December 12, 2002 – 10:00 am – 11:00 am

Participants:

- Pam Corbin Parking Bureau
- Doug Jamison LYNX
- David Wynne OOCEA
- Janet Mendenhall TTI
- Tom Delaney PBSJ
- Don Erwin PBSJ
- Leisa Moniz US DOT, Volpe National Transportation Systems
Center
- Sean Ricketson Federal Transit Administration
- Randy Farwell Multisystems
- Doug Parker Multisystems

Review Minutes from November 12, 2002 Meeting

No revisions were suggested.

Design and Implementation Update

TTI has not yet established the revised completion date for the implementation of Pilot I. It is anticipated that the field implementation (Pilot II) will need to be at least 6 weeks after Pilot I implementation. **As soon as this issue is resolved and the schedule impact identified, LYNX will notify Sean Ricketson in writing.**

The revaluing infrastructure details are being finalized. Agencies are expecting to offer revaluing at each customer service center and at each parking garage. Revaluing may also be available on the grounds of the University of Central Florida and Valencia Community College. **PBSJ will provide details for the agency operated locations where card revaluing will be offered.**

Discussion About the November 21, 2002 Onsite Meeting Of The Before Data Collection Working Group and the Initial Experience with Before Data Collection

The following information and action items were noted about the ongoing before data collection (for the period between November 2002 and at least February 2003):

Goal 4 – Transaction Times

Buses

The APC database for the week beginning November 18, 2002 will be filtered and provided to the evaluation team in late December 2002.

The APC database for the week beginning December 16, 2002 will be filtered and provided to the evaluation team in January 2003.

Garages

Once the week of data collection in December 2002 is completed, Parking will provide the associated spreadsheets to the evaluation team during January 2003.

Goal 5 – Prepaid Revenue Share

Buses

A spreadsheet covering data for November 2002 will be provided to the evaluation team during January 2003 for initial analysis.

Beginning in January 2003, the fare structure will include day passes. Although the farebox will only record the number of day pass transactions, the analysis will benefit from being able to differentiate between day pass purchase and subsequent day pass re-use transactions. Doug Jamison suggested that LYNX would provide additional information on the number of daypasses sold on the route during the same time period as the farebox data. The number of day pass re-use transactions would be the total number of day pass transactions minus the number of day passes sold.

Garages

For each day throughout the before data collection period, beginning with November 2002, the Parking Bureau will provide – for each garage – the percentage split between transactions completed with cash/check at the cashier booth and prepaid transactions using a monthly permit.

A spreadsheet covering data for November 2002 will be provided to the evaluation team during January 2003 for initial analysis.

Goal 6 – Automated Equipment Uptime

Buses

A spreadsheet covering data for November 2002 will be provided to the evaluation team during January 2003.

Toll Lanes

A spreadsheet covering data for November 2002 will be provided to the evaluation team during January 2003.

David Wynne found out that Transcore is behind on entering maintenance logs data into the database that will be used for this report. He has asked them to expedite the entry for the data that begins with November 2002.

David Wynne also investigated the feasibility of toll plaza staff logging the duration of minor incidents that do not require a maintenance call. He found out that all plaza staff routine deal with these on an ongoing basis as they go about other duties, meaning that there is no way to log the specific times without considerable effort. The group concluded that these minor downtime incidents would not be captured.

Goal 8 – Current Pass Distribution and Permit Billing Costs

Buses

The next iteration of cost category information will be provided to the evaluation team in January 2003 for feedback.

Garages

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback.

Goal 9 – Current Cash Processing Costs

Buses

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback.

Garages

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback.

Toll Lanes

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback.

Discussion Groups Planning

Don Erwin will coordinate with each agency to determine during December 2002 their decisions about providing a uniform monetary incentive to cardholder participants in discussion groups.

Don Erwin will provide copies of the latest executive stakeholder interviews conducted by Kan Chen, as well as a selection of minutes from executive meetings covering key project events and decisions, in lieu of the evaluation team pursuing a separate executive level discussion group.

The next conference call for the overall team is scheduled for January 14, 2003 from 10:00 a.m. to 11:00 a.m.

Meeting #19
January 14, 2003 – 10:00 am – 11:00 am

Participants:

- Pam Corbin Parking Bureau
- Sam Vennaro Parking Bureau
- David Wynne OOCEA
- Janet Mendenhall TTI
- Tom Delaney PBSJ
- Rena Barta PBSJ
- Leisa Moniz US DOT, Volpe National Transportation Systems Center
- Sean Ricketson Federal Transit Administration
- Randy Farwell Multisystems
- Doug Parker Multisystems

Review Minutes from December 12, 2002 Meeting

No revisions were suggested.

Design and Implementation Update

TTI has not yet established the revised completion date for the implementation of Pilot I. It is anticipated that the field implementation (Pilot II) will need to be at least 6 weeks after Pilot I implementation. **As soon as this issue is resolved and the schedule impact identified, LYNX will notify Sean Ricketson in writing.**

Cards will be initialized centrally and initially distributed to the cardholders by mail. Cardholders would use one of the revaluing points to add a balance or a LYNX pass to the card. Replacement cards will still be initialized centrally and then distributed either by mail or through one of the revaluing locations.

Tom Delaney provided the following information about the specific revaluing locations intended:

- The Parking Bureau will offer a total of 5 attended point of sale locations for card revaluing. Cash revaluing will be offered at one point of sale in each of the Market and Library Garage booths. At the Central Boulevard

Garage, there will be three points of sale (one in the booth and two in the office). Each point of sale at the Central Boulevard Garage will support cash, debit card and credit card revaluing).

- LYNX will offer a total of 5 attended point of sale locations for card revaluing. These will be at the LYNX downtown transfer center and administrative building, as well as on the campuses of the University of Central Florida (UCF) and Valencia Community College. A point of sale is also being considered for the Colonial Plaza Mall. These non-LYNX revaluing locations are all located near the Links that will be equipped for the trial.
- OOCEA will offer a total of 5 attended point of sale locations for card revaluing. These will be at the East and West Customer Service Centers as well as at the OOCEA administrative building. In addition, one attended cashier booth in each direction at the Holland East plaza will be equipped as a card revaluing point of sale.

Discussion about the Mastercard PayPass Trial

Mastercard plans to operate a PayPass trial in Orlando from roughly the end of January through June 2003, primarily involving merchants and cardholders in the southwest area of the region. PayPass will be a smart card version of the cardholder's conventional Mastercard, and will operate by using a contactless interface to quickly provide to the merchant device the credit card data that is also found on the magnetic stripe. Mastercard primarily sees this as an option to increase the efficiency and convenience of credit card transactions, in particular those where speed is important and/or where physically handing over the card to the merchant is inconvenient (e.g., at a fast food restaurant drive-through lane).

Mastercard discussed integration possibilities with the ORANGES consortium during the PayPass planning stage, but their primary interest was with parking. The Parking Bureau will be accepting PayPass at attended sales locations but not at the garage exit cashier booths (e.g., PayPass might be used to pay for a monthly parking permit). There does not appear to be any significant potential for the ORANGES trial and the PayPass trial to affect each other, since they will be used in different locations and will have different target user groups.

Discussion about the Initial Experience with Before Data Collection

The following information and action items were noted about the ongoing before data collection (for the period between November 2002 and at least February 2003):

Goal 4 – Transaction Times

Buses

LYNX has provided November APC data reports. The evaluation team has requested that these reports be reformatted using raw data for each stop occurrence rather than data that has been aggregated at the stop level. **The revised version of the November APC data reports as well as the December APC data reports will be provided to the evaluation team by late January 2003.**

Garages

The Parking Bureau has provided reports from the observations of December garage throughput. Based on the light and sporadic exit volumes, the evaluation team has requested that the observation method be revised to record the actual times (i.e., in HH:MM:SS format) when each exit transaction begins and ends, or alternatively the duration of each transaction in seconds. It was agreed that the duration of each transaction should be from when the vehicle comes to a stop at the booth until the vehicle begins to depart from the booth. **Once the week of data collection in January 2003 is completed, Parking will provide the associated spreadsheets to the evaluation team during February 2003.**

Goal 5 – Prepaid Revenue Share

Buses

A spreadsheet covering data for November 2002 will be provided to the evaluation team during January 2003 for initial analysis.

Garages

A spreadsheet covering data for November 2002 will be provided to the evaluation team during January 2003 for initial analysis.

Goal 6 – Automated Equipment Uptime

Buses

A spreadsheet covering data for November 2002 will be provided to the evaluation team during January 2003.

Toll Lanes

David Wynne recently provided a spreadsheet covering data for November 2002. **A spreadsheet covering data for December 2002 will be provided to the evaluation team during January 2003.**

Goal 8 – Current Pass Distribution and Permit Billing Costs

Buses

The next iteration of cost category information will be provided to the evaluation team in January 2003 for feedback.

Garages

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback.

Goal 9 – Current Cash Processing Costs

Buses

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback.

Garages

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback.

Toll Lanes

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback.

Discussion Groups Planning

Tom Delaney indicated that the agencies have agreed to provide a \$50 incentive payment to cardholder discussion group participants. The intent will be to have cardholders indicate at enrollment whether they might be interested in participating, so that the “clustered recruitment” effort can focus on these individuals. Specific arrangements regarding the time, place and logistics for individual focus groups will be deferred until the timing is more clear (i.e., contingent on resolving the timing for the start of revenue service). **The evaluation team will draft a preliminary general script for each discussion group in February 2003.**

Don Erwin will provide copies of the latest executive stakeholder interviews conducted by Kan Chen in January 2003, as well as a selection of minutes from executive meetings covering key project events and decisions, in lieu of the evaluation team pursuing a separate executive level discussion group.

The next conference call for the overall team is scheduled for February 4, 2003 from 10:00 a.m. to 11:00 a.m.

and installation of Pilot 1 would begin no later than May 1, 2003. Pilot 2 will begin approximately 6 weeks after the conclusion of Pilot 1.

Discussion about establishing the Before Data Collection Requirements:

Goal 4 – Transaction Times

Buses

LYNX has provided November APC data reports. The evaluation team has requested that these reports be reformatted using raw data for each stop occurrence rather than data that has been aggregated at the stop level. The revised version of the November APC data reports as well as the December APC data reports will be provided to the evaluation team by late January 2003.

LYNX has provided revised APC data reports for the first two weeks in December. Evaluation team members on the call agreed that the format and data received meet the evaluation requirements. LYNX will submit data for the last two weeks of December and January by mid-February.

Garages

The Parking Bureau has provided reports from the observations of December garage throughput. Based on the light and sporadic exit volumes, the evaluation team has requested that the observation method be revised to record the actual times (i.e., in HH:MM:SS format) when each exit transaction begins and ends, or alternatively the duration of each transaction in seconds. It was agreed that the duration of each transaction should be from when the vehicle comes to a stop at the booth until the vehicle begins to depart from the booth. Once the week of data collection in January 2003 is completed, Parking will provide the associated spreadsheets to the evaluation team during February 2003. **The Parking Bureau stated that the feasibility of videotaping the transaction times at the booth seems unlikely and cited the issue of camera placement as one challenge. The Parking Bureau will now submit spreadsheets to the evaluation team based on visual inspection. This information will be forwarded to the evaluation team the week of February 3rd.**

Goal 5 – Prepaid Revenue Share

Buses

A spreadsheet covering data for November 2002 will be provided to the evaluation team during January 2003 for initial analysis. **The evaluation team is still waiting for this information to be submitted.**

Garages

A spreadsheet covering data for November 2002 will be provided to the evaluation team during January 2003 for initial analysis. **The evaluation team is still waiting for this information to be submitted.**

Goal 6 – Automated Equipment Uptime

Buses

A spreadsheet covering data for November 2002 will be provided to the evaluation team during January 2003. **The evaluation team is still waiting for this information to be submitted.**

Toll Lanes

David Wynne recently provided a spreadsheet covering data for November 2002. A spreadsheet covering data for December 2002 will be provided to the evaluation team during January 2003. **The spreadsheet submitted by OOCEA meets the evaluation team requirements. OOCEA will now collect and submit January ACM downtime data to the evaluation team by mid-February.**

Goal 8 – Current Pass Distribution and Permit Billing Costs

Buses

The next iteration of cost category information will be provided to the evaluation team in January 2003 for feedback. **The evaluation team is still waiting for this information to be submitted.**

Garages

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback. **The evaluation team is still waiting for this information to be submitted.**

Goal 9 – Current Cash Processing Costs

Buses

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback. LYNX provided initial information to Randy Farwell at a meeting held at LYNX on January 30th.

LYNX is working to augment the initial spreadsheet with additional data and will submit to the evaluation team for review within the next week.

Garages

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback. **The evaluation team is still waiting for this information to be submitted.**

Toll Lanes

Initial information on the cost categories to be included will be provided to the evaluation team in January 2003 for feedback. **The evaluation team is still waiting for this information to be submitted.**

Discussion Groups Planning

Tom Delaney indicated that the agencies have agreed to provide a \$50 incentive payment to cardholder discussion group participants. The intent will be to have cardholders indicate at enrollment whether they might be interested in participating, so that the “clustered recruitment” effort can focus on these individuals. Specific arrangements regarding the time, place and logistics for individual focus groups will be deferred until the timing is more clear (i.e., contingent on resolving the timing for the start of revenue service). The evaluation team will draft a preliminary general script for each discussion group in February 2003. **The evaluation team is in the process of finalizing the draft discussion group guidelines document. A draft of this document will be forwarded to the implementation team prior to the next call.**

Don Erwin will provide copies of the latest executive stakeholder interviews conducted by Kan Chen in January 2003, as well as a selection of minutes from executive meetings covering key project events and decisions, in lieu of the evaluation team pursuing a separate executive level discussion group.

The next conference call for the overall team is scheduled for Tuesday, March 4th from 10:00 a.m. to 11:00 a.m.

Meeting #21
March 4, 2003 – 10:00 am – 11:00 am

Participants:

- Pam Corbin Parking Bureau
- Sam Vennaro Parking Bureau
- David Wynne OOCEA
- Doug Jamison LYNX
- Janet Mendenhall TTI
- Tom Delaney PBSJ
- Sean Ricketson Federal Transit Administration
- Leisa Moniz US DOT/Volpe National Transportation Systems
Center
- Doug Parker Multisystems
- Randy Farwell Multisystems

Review Minutes from February 4, 2003 Meeting

No revisions were suggested.

Design and Implementation Update

Pilot I (model system) implementation is scheduled for May 2003, to include some feedback from a limited public demonstration in an office setting. To this end, TTI is scheduled to initially install the software in late April for the start of the acceptance testing. This testing will continue once the Pilot I system is in place. **The Implementation Team will provide the revised implementation schedule by March 21, 2003.**

Pilot II (field deployment) implementation is scheduled for July 2003. Installation will be completed early in July and the system will go into revenue service after about a week of additional acceptance testing. **The Implementation Team will provide written acceptance test results after acceptance tests are complete.**

The University of Central Florida (UCF) and Valencia Community College (VCC) are closed for 3 weeks in July, and the Implementation Team expects this might lead to some delay in the initial recruitment of LYNX cardholders. The Implementation Team has committed to maintaining the field deployment in place for six months from whenever the required 800-1200 active card

accounts are achieved. To track this, TTI will generate a weekly report that tracks the number of active card accounts. **The Evaluation Team will provide the requested content for this weekly clearinghouse activity report, which can also serve to address the data collection needs of Goal 7.**

Before Data Collection

The following table summarizes the status of the before data collection effort, and highlights current short-term action items for the Implementation Team. **Outstanding November, December and January data is overdue and must be provided to the Evaluation Team by March 21, 2003.**

Before Data Collection Status as of : Mar 4/03			
Evaluation Measure/Goal	LYNX	OOCEA	City of Orlando
#4, Transaction Times	APC data provided for Links 13 & 15 for weeks 12/02 & 12/09. Data for last 2 weeks of Dec provided. Data acceptable. Jan, Feb and Mar data is pending.		Provided manually collected transaction time data for each garage as follows: Library - 1/16, 2/18 CBG - 1/15, 2/20 Market - 1/16, 2/20. Data acceptable. Mar data is pending.
#5, Prepaid Revenue Share	LYNX provided a spreadsheet based on GFI farebox data showing cash and prepaid revenue for Links 13 & 15 for Nov, Dec, Jan. Data acceptable. Feb and Mar data is pending.		The City provided share of revenue summaries for each garage for period Nov through Dec. City needs to provide revenue data by garage, month and revenue type for Nov, Dec, Jan, Feb, Mar.
#6, Automated Equipment Uptime	LYNX needs to provide reports for GFI up/down time for Nov, Dec, Jan, Feb, Mar. No data submitted.	OOCEA provided ACM uptime reports for Nov, Dec, Jan. Data acceptable. Feb and Mar data is pending.	
#8, Current Pass Distribution or Permit Billing Costs	LYNX submitted draft cost per pass distribution for Nov & Dec in Jan/Feb. LYNX needs to submit pass distribution cost data for Nov, Dec, Jan, Feb, Mar.		The City provided unit cost of permit billing. City needs to provide permit billing cost data by month for Nov, Dec, Jan, Feb, Mar, showing methodology and relevant cost centers.
#9, Current Cash Processing Costs	LYNX submitted draft cost of cash processing for Nov & Dec in Jan/Feb. LYNX needs to submit cash processing cost data for Nov, Dec, Jan, Feb, Mar.	OOCEA must reconcile cost basis and submit data for Evaluation Team to review for Nov, Dec, Jan, Feb, Mar.	The City provided unit cost of cash processing. City needs to provide cash processing cost data by month for Nov, Dec, Jan, Feb, Mar, showing methodology and relevant cost centers.

Discussion Groups Planning

The Evaluation Team provided an overview of the “Discussion Groups Process” document, a draft of which was provided to the Implementation Team members on March 3, 2003. This document discusses selecting group participants, how the groups will be organized and conducted, and provides scripts for the facilitator of each group. The Evaluation Team will finalize this document based on feedback received by March 24, 2003, after which we will coordinate with the Implementation Team on the logistics of their arranging for these discussion groups. Based on the updated implementation schedule, it is expected that these group will be conducted in July 2003.

Don Erwin will provide copies of the latest executive stakeholder interviews conducted by Kan Chen in January 2003, as well as a selection of minutes from executive meetings covering key project events and decisions, in lieu of the evaluation team pursuing a separate executive level discussion group.

The next conference call for the overall team is scheduled for Tuesday, April 8, 2003 from 10:00 a.m. to 11:00 a.m.

Cardholder Recruitment Status

Tom Delaney indicated that the team is developing recruitment flyers.

OOCEA will hand out the flyers to current cash customers at the Holland East Toll Plaza. Customers will have the opportunity to enroll by calling a customer service number. LYNX has retained a local recruiting firm to assist them. Recruitment will be conducted on board LYNX buses involved in the FOT (Routes 13 & 15) as well as at bus stops. Interested parties may enroll by filling out the survey on the bus. City of Orlando, Parking Bureau will have the garage cashiers distribute flyers, or interested parties may call a City of Orlando number to enroll. Additionally, the ORANGES website will have a questionnaire available. Copies of the various recruitment materials will be sent to Doug Parker and Leisa Moniz.

Discussion Group Planning

Leisa Moniz indicated that comments and suggested revisions on the Discussion Group Process were submitted to the evaluation team from FHWA, FTA, LYNX and PBS&J. Comments were included in the revision dated March 24, 2003 and email to the Implementation team on March 28th by Doug Parker. Any further changes and/or comments should be sent ASAP to Doug Parker and Leisa Moniz.

Further planning and discussion on the format, logistics etc. regarding the discussion groups needs to occur prior to the mid-June, so that the Evaluation team can prepare accordingly.

Definition of “Active” Cardholder

A question was raised several weeks ago regarding a specific definition for “active” cardholder. Sean Ricketson, FTA indicated that an active cardholder would be a cardholder whose activity was detailed on three consecutive weeks of the Clearinghouse weekly activity reports. These reports will be supplied by TTI.

Doug Jamison indicated that agencies will/may follow-up with particular cardholders regarding lapses in activity, prior to categorizing them as “inactive”. This will aid in meeting the “active cards in use” requirement stipulated by the FTA.

Next meeting will take place on Tuesday May 6th at 10:30 AM.

Meeting was adjourned.

Meeting #23
May 6, 2003 – 10:30 am – 11:30 am

Participants:

- Sam Vennaro Parking Bureau
- David Wynne OOCEA
- Doug Jamison LYNX
- Janet Mendenhall TTI
- Tom Delaney PBS&J
- Leisa Moniz US DOT/Volpe National Transportation Systems
Center
- Sean Ricketson Federal Transit Administration
- Randy Farwell Multisystems
- Doug Parker Multisystems

Review Minutes from April 8, 2003 Meeting

A cardholder will first be considered “active” once the card has activity on a weekly clearinghouse activity report. An “active” would be transferred to “inactive” if no transactions appear on three consecutive weekly clearinghouse activity reports. An “inactive” card would be transferred to “active” once the card again has activity on a weekly clearinghouse activity report. “Blocked” cards would be tracked separately from the “inactive” category, with distinct “blocked” card categories including “lost”, “stolen” and “cancelled” cards.

Pilot I and II Implementation Update

Pilot I (office system) is scheduled for launch May 14-16, 2003. Acceptance testing is now underway on the Pilot I system, and will continue after the Pilot I launch. Written test results are scheduled to be available no later than the first week of June, 2003, and will be provided to the evaluation team. Other activities that will occur between the Pilot I and II launches include equipment installation, field testing and training.

Pilot II (revenue system) is scheduled for launch July 1, 2003. The incorporation of smart card payment through EFKON transponders into the *CardTouch* system is now scheduled to be delayed until September 1, 2003 – as explained in the letter from TTI dated April 16, 2003. Sean

Ricketson stressed that any further delays in the launch of this or any other component of the Pilot II system would be of great concern to the FTA.

Before Data Collection Status

Doug Jamison indicated that the remaining Lynx transaction times data will be provided in the next couple of weeks, and that the remaining Lynx farebox uptime data will be provided next week.

David Wynne indicated that the Automatic Coin Machine uptime data will be provided in the next week, but that it is still unclear if/when OOCEA management will decide they are willing to release operating costs data.

Parking has now provided all of the agreed before data.

Cardholder Recruitment and Discussion Group Planning Status

Tom Delaney indicated that the online recruitment effort for cardholders is starting today. Whether online or in writing, applicants need to reply to the screening questions and indicate whether they are willing to participate in the before and after cardholder discussion groups (Tom Delaney will send a sample of the printed enrollment questionnaire to the evaluation team). This effort will continue until the required number of cardholders is enrolled, which is expected to occur shortly before the Pilot II launch.

Once the cardholders have been enrolled, the implementation team will provide a spreadsheet to the evaluation team indicating, for each cardholder that expressed willingness to participate in the discussion groups, the answers to the screening questions. Based on this information, the evaluation team will cluster the cardholders into 3-5 groups based on the similarity in their responses.

The evaluation team will indicate that a certain number of cardholders from each cluster should be recruited for the discussion groups (e.g., 5 from Group A, 4 from Group B, and 6 from Group C). The implementation team will call cardholders from each group to recruit the required number of discussion group participants (the exact date, time and location of the before discussion group will need to be available for this recruitment effort). A target of 15 cardholders will be recruited, based on the expectation that 2-5 may not attend.

Assuming that the implementation team will not be able to provide data on the screening question responses of the cardholders until roughly July 1, 2003, it is expected that the before discussion groups will occur in early August 2003.

Weekly Clearinghouse Reports

The *CardTouch* system produces clearinghouse activity reports based on their transaction databases, using the Crystal Reports software. Janet Mendenhall will provide samples to the evaluation team of the weekly clearinghouse activity reports currently available from the *CardTouch* system. The format of the weekly clearinghouse reports will be established by early June 2003.

The next conference call was scheduled for Thursday June 19, 2003, 10:00 a.m.

reader with stronger range. It is estimated that this upgrade might be completed about a month into Pilot II.

There has been a delay in receiving the dual interface smart cards from Gemplus, which will delay the intended July 1/03 launch of Pilot II. The card order was originally placed on March 25/03, with delivery promised in 6-8 weeks. There have been subsequent deferrals from Gemplus, and the most recent promised shipping date is July 8/03. After the cards are shipped from France, it is expected to take 5-7 days for the card to be received at TTI in Phoenix, then about 7 days to set up the cards. Then, they will be shipped from Phoenix to the agencies and the agencies will need 2-3 days to enroll the cards in their systems. At that point, the cards would be mailed out to the cardholders. Assuming the July 8/03 shipping date is achieved, it will thus be late July or more likely early August before the cards would be used in revenue service. The Implementation Team has been applying pressure to senior management at Gemplus USA, including reminders that this project is receiving considerable exposure and is being evaluated by the FTA.

Before Data Collection Status

LYNX recently determined that the remaining APC before data for February and March 2003 has problems (all boardings at zero). They will need about a week to determine whether the correct data can be recovered from the raw APC data. It seems more likely at this point that this data will be deemed unrecoverable or suspect. In this event, the plan is to gather supplementary before data from LYNX to replace February and March. April has already been provided, so LYNX would provide May and perhaps June data.

OOCEA has not been able to reach internal agreement on the basis for reporting cost data, and will not be releasing cost data at this time. If cost data becomes releasable later in the evaluation period, they will provide it then.

Cardholder Recruitment and Discussion Group Planning Status

To date, the agencies have recruited 600-700 of the intended 1000 cardholders. They expect that the full number of cardholders may not be achieved until classes at VCC and UCF resume in August. A spreadsheet will be provided to the Evaluation Team in the next week or so, with the responses to the pre-screening questions from cardholders that expressed willingness to participate in the discussion groups. Most people enrolling for the card have

expressed interest in participating, suggesting that the incentive payment is a persuasive factor, although it is not known how many will be available on the specific date selected. The Evaluation Team will categorize these potential participants into “clusters” with similar characteristics and indicate a target number of participants for each group. At that point, the dates and locations for the discussion groups will be finalized. With this information, the agencies will make recruiting calls until the target number of participants from each group has been achieved.

Weekly Clearinghouse Reports

The weekly clearinghouse activity reports will use a week beginning day that is consistent with the rest of the reports being generated. The reports will be provided to the Evaluation Team each week via email, as an Excel spreadsheet attachment.

The next conference call was scheduled for Thursday July 17, 2003, 10:00 a.m.

Meeting #25
July 10, 2003 – 10:00 am – 10:30 am

Participants:

- Sam Vennaro Parking Bureau
- David Wynne OOCEA
- Doug Jamison LYNX
- Janet Mendenhall TTI
- Tom Delaney PBS&J
- Sean Ricketson Federal Transit Administration
- Doug Parker Multisystems

Review Minutes from June 20, 2003 Meeting

Tom Delaney indicated that he will be transmitting some comments on these minutes.

Pilot II Implementation Update

Doug Jamison indicated that Pilot II will be rolled out in three stages during July/August 2003 (with the card mailing date a result of the timing expected for the late card shipment from Gemplus). He sent a file with the following details:

Delivery 1

- July 23, 2003 - Production System Installed
- August 1, 2003 - Mail cards to participants
- August 5, 2003 - Estimated card receipt by participants

Delivery 2

- August 14, 2003 - System Upgrade
 - Enrollment Update (Transit pass autoloan, toll account)
 - ADS Interface (Credit Card authorizations)
 - LYNX FoxPro extract (to GFI revenue system from the CardTouch system)

Delivery 3

- August 28, 2003 - System Upgrade

- Toll account processing
- Autoload bus pass (30 day pass autoload via Credit Card)
- System reporting (custom)
- Web Services (statementing)
- ACH File Consolidation

All the card payment equipment has been installed, as of today. The two final components being installed today are:

Handheld devices that will be used in the LYNX bus garage to transfer transactions from (and updated data to) the onboard validators. These handheld devices will exchange data with the CardTouch system using a cradle installed in the bus garage.

Validators in the parking garages are wired to the devices that are just being installed to exchange data with the CardTouch system.

All Point of Sale equipment is expected to be installed by the end of July 2003.

Acceptance test results will be provided to the evaluation team as soon as the documentation is complete.

Before Data Collection Status

LYNX has resolved the data collection problem previously identified with the APC data for February and March 2003. They expect to provide this data to the evaluation time within about a week.

Cardholder Recruitment and Discussion Group Planning Status

The evaluation team has received from LYNX and OOCEA the spreadsheets providing demographic information about the cardholders they have recruited who expressed willingness to participate in the cardholder discussion group. Parking indicates that they had not yet provided a spreadsheet because they have so far only recruited about 100 cardholder participants. It was agreed that this should be enough to support the recruitment effort for discussion group participants, so Parking will send their spreadsheet to the evaluation team.

Once all three spreadsheets have been received, the evaluation team will provide the previously discussed clustering feedback. At that point, the dates for discussion groups will be finalized and the agencies will use the clustering feedback to complete the recruitment of discussion group participants.

Discussion groups will be held at OOCEA headquarters. Doug Jamison mentioned that LYNX cardholders who do not have access to a car will be able to arrive within a block of OOCEA headquarters on LYNX.

Weekly Clearinghouse Reports

There has been no change in the plans for activity reports to be provided to the evaluation team each week by email during the trial.

The next conference call was scheduled for Thursday August 14, 2003, 10:00 a.m.

Meeting #26
August 14, 2003 – 11:00 am – 12:00 pm

Participants:

- Pam Corbin Parking Bureau
- Sam Vennaro Parking Bureau
- David Wynne OOCEA
- Janet Mendenhall TTI
- Tom Delaney PBS&J
- Sean Ricketson Federal Transit Administration
- Leisa Moniz Volpe Center
- Randy Farwell TranSystems
- Doug Parker TranSystems

Review Minutes from July 10, 2003 Meeting

No comments were indicated.

Pilot II Implementation Update

As of Monday, August 11, 2003, the ORANGES Pilot II system has been considered to be in live production mode. Just prior to that date, all of the various transactions entered during testing (i.e., using the “blank” pre-production cards provided by Gemplus and “enrolled” at TTI, prior to the production cards being available) were cleared. Also, 150 cards have been initialized and mailed to each agency. Begin around today, the agencies are enrolling the cardholders into their systems and mailing out the cards to the cardholders. Thus, cardholder transactions could begin to appear in the system next week.

All of the agency-operated revaluing locations are operational, with the UCF and VCC locations due to be operational by the end of this week.

As the final stage of acceptance testing, PBSJ will be using “live” cards and accounts with “live” funds to complete additional test transactions throughout the system. This “end to end” testing will be used to ensure that all of the transactions associated with these cards and accounts flow through the system properly to the TTI system. As soon as the acceptance tests are completed, the documentation will be provided to the evaluation team.

Most of the training was completed in late July. The remaining training, which will be completed in September (approx.) , is detailed system operations training to the staff at OOCEA.

Completion of Before Data Collection

Before data collection is now complete and the statistical analysis report is being prepared.

Cardholder Recruitment and Discussion Group Logistics

The employee and cardholder discussion groups have now been scheduled, for August 26 and August 28 at the OOCEA administration building. The agency representatives are currently completing cardholder recruitment for this discussion group, and will send the names of the participating cardholders and employees to Randy Farwell.

Randy will also be meeting with the agency representatives on August 20 at OOCEA to finalize the logistical details. David Wynne indicated that OOCEA should be able to help with providing the required supplies (e.g., flip chart, markers). We are also requesting that one of the agencies provide recording equipment.

It was agreed that the \$50 stipend for cardholder participants will be provided as a mailed check after completion of the before discussion group.

Weekly Clearinghouse Reports

TTI will begin to provide weekly clearinghouse reports to the evaluation team as soon as cardholder transactions begin to appear (i.e., transactions from test cards will be filtered out).

The next conference call was scheduled for Wednesday September 10, 2003, 10:00 a.m.

Meeting #27
September 10, 2003 – 10:00 am – 11:00 am

Participants:

- Pam Corbin Parking Bureau
- Doug Jamison LYNX
- David Wynne OOCEA
- Janet Mendenhall TTI
- Tom Delaney PBS&J
- Sean Ricketson Federal Transit Administration
- Leisa Moniz Volpe Center
- Doug Parker TranSystems

Review Minutes from August 14, 2003 Meeting

No comments were indicated.

Pilot II Update

Pilot II is now operational, with the exception of the delayed implementation (discussed in previous minutes) for the OOCEA smart card accepting transponders functionality.

Cardholders are now completing transactions with all three agencies. Janet Mendenhall indicated that she has just distributed a card activation report that summarizes the status on the number of cards that have been issued and how many are active (i.e., have been used at least once in the past three weeks). Review and comment on this report is requested. The cards listed as issued are those that have been enrolled by one of the agencies, on the basis that the agencies are mailing them to the cardholders within a few days of enrolling the card with the clearinghouse.

So far roughly 671 cards have been issued, with 19% active. The required number of active cardholders throughout the 12 month test is 1000. Some agencies have not yet completed their card mailouts, and some cards will not be issued until acceptance through the transponders is activated.

PBSJ is continuing with the revenue service phase of the acceptance testing. Several performance issues have been noted and are in the process of being resolved. These include:

Cards are not currently always hot-listed consistently across the equipment of all three agencies. When a card is hot-listed, the agency that takes the report informs the clearinghouse, which then downloads this information to all the field devices. So far, they have tried hot-listing some of their test cards and have found that they could still be used with some equipment. The cause for this is currently under investigation.

Some issues have also been noted with behavior of the LYNX validators. Some of these issues are transparent to the cardholders (e.g., related to uploading transactions data with the collection device), while others affect cardholder functionality (e.g., collecting the fare from the stored value balance even though there is a valid pass).

Acceptance Test Documentation

This will be provided to the evaluation team once the testing is completed and the results documented.

Implementation Team Meeting Documentation

In past meetings, the implementation team had offered the documentation from meetings of the implementation team, in lieu of requiring senior management participation in additional meetings for the discussion groups. This documentation has not yet been provided, and Tom Delaney will check into what is available. For example, there have been Executive Committee presentations/meetings and another round of the stakeholder interviews conducted by Kan Chen.

Analysis of Before Data

This analysis and the associated deliverable are currently being completed by the evaluation team.

Discussion Groups Documentation

The three before discussion group sessions were conducted on August 26, 2003 and August 28, 2003. The documentation will be released as an appendix in an updated release of the "Discussion Groups Process" deliverable.

Weekly Clearinghouse Reports

Each week, TTI will send an email to the evaluation team providing the clearinghouse activity reports for that week. These reports are to include the transaction details, the modal summary and the card activation report. The

reports will be accumulated and eventually used as part of the after data analysis. The first set of transaction detail and modal summary reports were provided for the week beginning August 18, 2003. The first card activation report was issued for the time period through to September 7, 2003.

The next conference call was scheduled for Wednesday October 22, 2003, 10:00 a.m.

Meeting #28
October 22, 2003 – 10:00 am – 11:00 am

Participants:

- Pam Corbin Parking Bureau
- David Wynne OOCEA
- Tom Delaney PBS&J
- Sean Ricketson Federal Transit Administration
- Leisa Moniz Volpe Center
- Doug Parker TranSystems

Review Minutes from September 10, 2003 Meeting

No comments were indicated.

Pilot II Update

Pilot II is now operational, with the exception of the delayed implementation (discussed in previous minutes) for the Autoload and OOCEA smart card accepting transponders functionality. Implementation of this remaining functionality is now not expected to be completed until at least November (exact date to be determined).

An update to the software for the LYNX validators and collection devices was installed around September 23, 2003, which the implementation team indicates has addressed all the remaining performance issues for these devices. The implementation team indicates that the Autoload and transponder functionality are the only areas of the system remaining to be completed.

So far roughly 793 cards have been issued, with 144 (18%) active as of October 19, 2003. Approximately 80-100 cards will not be issued until acceptance through the transponders is activated.

The required number of active cardholders throughout the 12 month Field Operational Test is 1000. Given the functionality that remains to be implemented and the low number of active cardholders, the official start for the demonstration period remains to be determined.

The implementation team is following up with their recruitment/screening contractor to learn why so many cardholders have become inactive. LYNX use is particularly low. One possibility the implementation team will explore

is that more cardholders are needed from the student bodies of the University of Central Florida and Valencia Community College. These students are heavy users of the equipped LYNX routes, but these institutions were not in session at the time of the original recruitment.

Gemplus has informed the implementation team that the GemCombi dual interface smart cards are being discontinued and are no longer in production. The replacement dual interface card is to be based on the Java operating system and be backwards compatible with the current readers. However, these cards are not expected to be available until 2005. The original card inventory was 2100, so there are still additional cards that could be distributed.

Acceptance Test Documentation

Pilot I test results documentation was provided to the evaluation team on October 22, 2003, The Pilot II test results documentation is being completed and will be provided to the evaluation team within 2-3 weeks.

Implementation Team Meetings Documentation

Tom Delaney indicated that the presentations to the Executive Committee and the minutes of the Management Committee meetings will be provided to the evaluation team.

Evaluation Phase I Final Report

This analysis and the associated deliverable are currently being completed by the evaluation team.

Weekly Clearinghouse Reports

Each week, TTI will send an email to the evaluation team providing the clearinghouse activity reports for that week. These reports are to include the transaction details, the modal summary and the card activation report. The reports will be accumulated and eventually used as part of the after data analysis. The evaluation team has continued to receive these weekly reports since the week beginning August 18, 2003.

The next conference call was scheduled for Tuesday November 22, 2003, 10:00 a.m.