

Information Technology Plan

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BROWARD COUNTY TRANSIT

Information Technology (IT) Systems Plan

July 26, 2013

TRANSIT INFORMATION TECHNOLOGY SYSTEMS PLAN

INTRODUCTION

In order to develop an appropriate 10-year implementation plan and corresponding financial plan for BCT that also considers all aspects of capital infrastructure needs, it is appropriate for the transit agency to prepare an Information Technology (IT) Systems Plan. Such a plan is vital to carrying forward the agency's vision in improving its services for patrons through business process improvements, the application of technology enhancements, as well as its internal policies on how such technology implementation will occur. As part of this TDP, BCT's IT Systems Plan is introduced herein along with a general assessment of its efficacy.

DEFINITIONS

To inform the discussion of BCT's IT Systems Plan, it is helpful to understand the overarching systems that characterize it. To this end, the following are general definitions of these systems.

- *Information Technology (IT)* – The technology involving the development, implementation, maintenance, and use of computer-based hardware, software, and network systems for the collection, processing, organization, and distribution of data electronically. Under IT, there are a host of specific technology systems that can be applied for a wide range of purposes.
- *Intelligent Transportation Systems (ITS)* – The technology system that involves the application of advanced sensor, detection, control, computer, electronics, and communication technologies and management strategies in an integrated manner to improve the safety, efficiency, and convenience of the surface transportation system.
- *Advanced Public Transportation System (APTS)* – One of the five key ITS systems that are classified by function, APTS applies the technology of ITS specifically to public transportation in order to improve the quality of service, increase efficiency, enhance safety, and help attract more users to public transit by making it more convenient and user-friendly.

BCT'S CURRENT APTS TECHNOLOGIES

As indicated on the agency's website, BCT began investing in APTS projects during the 1990s to enhance fleet management and service performance. Now, as it plans for the future, BCT wants to continue to leverage technology advancements to not only improve the efficiency and effectiveness of its services, but also to enhance the overall passenger experience. The vision for BCT's APTS program within its IT Systems Plan is to ensure seamless integration with existing internal and regional ITS implementations as well as employ new technological advancements to meet the ongoing needs of Transit. Among the current APTS technologies that BCT has implemented are the following:

- Automatic Passenger Counters (APC)
- Real Time Transit Information
- Voice Annunciation System (VAS)
- Automated Fare Collection System (AFC)
- Geographic Information Systems (GIS)
- Comprehensive Scheduling and Customer Information System
- Automatic Vehicle Locator (AVL)
- Transit Signal Priority (TSP) on Hollywood/Pines Boulevard

BCT staff also has been working on plans to implement upgrades to these existing systems, as well as implement some new technologies in the future

BCT IT SYSTEMS PLAN

As noted, BCT intends to enhance much of its existing transit technologies, as well as introduce new and/or complementary technologies to the current mix. These intentions have been documented by staff in a summary IT Systems Plan, which is delineated below in Table 1.

The Draft IT Systems Plan was developed by the IT Transit Section that supports BCT staff and documented in July 2013, for the specific purpose of inclusion in this TDP. The remainder of this section briefly discusses each of the programmed technology improvements that are included in the plan. More information on the timing and costing (whether operating and/or capital) of these improvements is included in the TDP financial plan.

Computer-Aided Dispatch/Automatic Vehicle Locator/Single Sign-On/Real Time Passenger Information System

BCT has an existing Computer-Aided Dispatch/Automatic Vehicle Locator (CAD/AVL) system that helps manage fleet operations, track vehicle movements, and facilitate communication. Working in conjunction with this system is the agency's Automatic Passenger Counter (APC) technology, which counts passengers as they board and leave buses, and Voice Annunciation System (VAS), which gives English/Spanish/Creole on-board automatic voice announcements for major stops, transfer points, landmarks, and safety advisories. BCT is currently working on replacing the existing system with enhanced capabilities including Real-Time Bus/Passenger Information System, Yard Management System, and other beneficial functions. The real-time information system will provide patrons with accurate bus arrival information and allow them to plan their travel more efficiently. It also will help BCT staff support the agency's operational activities. The new system is expected to be deployed by the first quarter of FY 2015 (1Q2015), with planned system upgrades subsequently occurring in 2017 and 2020.

**Table 1
BCT IT Systems Plan**

Improvement	Planned Timeframe
Computer-Aided Dispatch/Automatic Vehicle Locator (AVL)/Single Sign-On/Real-Time Passenger Information	
Initial Implementation of New System Deployment	1Q2015
1st Upgrade	2017
2nd Upgrade	2020
HASTUS	
Customer Comments Module	2013
On-time Performance Module	2013
1st Upgrade	2017
HASTUS Crew and Hastus Vehicle	Ongoing
Upgrade	Upgrade in 2018
AssetWorks Fleet Anywhere (FA) Suites	Implement in 2013
Upgrade	Upgrade in 2018
Fare System Interoperability (includes Mobile Ticketing)	Full deployment in 2015/2016
PC Replacement Cycle and Growth with 3rd Party Software	Start in 2014
eLearning Training System	2014
Upgrade or Replacement	2019
Campus Surveillance System - Closed Circuit TV (CCTV)	Replace in 2014
Upgrade or Replacement	2020
OnBoard Vehicle Surveillance System	
Live Look-In Capability	2013
Next System Upgrade or replacement	2016
Real-Time Information @ Employee Facilities (Digital Signage)	2014
Upgrade	2019
Trapeze Bidding & Dispatching Software	Upgrade or Replace in 2016
GenFare Odyssey Electronic Validating Fareboxes	Upgrade or Replace in 2016/2017
Business Continuity (Copans 4)	2015/2016
Upgrade Hardware and Expansion	2019 and 2023
Security Assessment (Cyber and Network)	2015
Implement Key Recommendations	2016
Radio Lifecycle	Replace in 2017 and 2021
Paratransit VDI Implementation	Implement in 2014
Hardware/Software Upgrade	2017 and 2021
Paratransit Software	
Upgrade or Replacement	Upgrade or Replace in 2019
Real-Time Information for Downtown Kiosks	2015/2016
Wi-Fi Hardware Upgrade on Express/Breeze Buses	1/3 of Fleet
Replace Hardware and Consider Other Carriers	2016 and 2019
Workers Compensation Upgrade	2015
Document Management System	2015
Upgrade or Replacement	Upgrade in 2019
Video Conferencing	Implement in 2014
Netbackup Software Upgrades	Implement in 2014/2015
Network Upgrades	Implement in 2014/2015
End of Life Server Replacement	Ongoing
Technology Needs for The Wave	When Wave is implemented
Community Bus Technology Needs	As-needed
Traffic Signal Priority Full Deployment	TBD
IT Temp Resources	Ongoing
Additional IT Personnel	2014 - 2023
Maintenance/Support Services	Ongoing
Software Tools and Database Licenses	Ongoing
Real Time Communications (Service)	Ongoing

HASTUS Crew and Hastus Vehicle (Comments and ATP planned for 2013)

HASTUS is a computer-based, comprehensive scheduling and customer information system that has been in use at BCT since 2001. The software application is primarily used for the efficient production of vehicle timetables and operator assignments. Additionally, the application has an integrated module for customer information that currently is being used by BCT's Customer Service Representatives to answer telephone inquiries about transit service. The application has other modules available and BCT intends to acquire and utilize HASTUS's Comments Module and On-Time Performance Module sometime during the latter half of 2013 to further enhance its customer service and scheduling capabilities. The new ATP module will be tested using the current AVL System. Full deployment of the ATP Module will rely on data generated from full deployment of the new CAD/AVL System.

AssetWorks Fleet Anywhere (FA) Suites

Fleet Anywhere from AssetWorks is a computer-based fleet management system that tracks all functions related to the inventory and the maintenance of vehicles and equipment. For a transit agency, it can help staff process repair and preventive maintenance work orders, capture operating expenses by maintenance category, manage the parts inventory, and track warranty schedules and repairs, among other capabilities. BCT is planning an implementation of FA in 2013 and is also planning to assess the need for an upgrade in 2018.

Fare System Interoperability (Open Fare Payment System)

BCT's current fareboxes allow the agency to accommodate electronic fare payment, whereby electronic communication, data processing, and data storage techniques are used to automate manual fare collection processes. To further enhance the fare payment process and make it even more convenient for patrons, BCT will be pursuing the integration of Smart Card technology to these devices, which would also support the ongoing fare interoperability efforts in the region and allow for the transferability of fare payments across transit systems in Southeast Florida (e.g., Miami-Dade Transit's Easy Pass program). In addition, BCT is also researching the potential feasibility of an open fare payment system (e.g., "Mobile Ticket" technology) to further expand the array of payment methods that it can offer to riders. BCT will participate in a pilot and then proceed with full deployment based on the outcome of the pilot.

Personal Computer Replacement and Growth

Like all other capital equipment used by a transit agency, computer and technology-related equipment has a distinct life cycle and must be maintained and replaced accordingly. BCT intends to develop and maintain a scheduled replacement plan and to support any future personnel increases. Such a plan will allow the agency to ensure that it has an up-to-date and functional computer and technology infrastructure to support its services and operations in an ongoing fashion.

eLearning Solution for Computer Based Training (CBT)

BCT will implement an internal e-learning solution for Transit Operations & Maintenance employees focusing on service and operation improvements. This initiative will enable BCT to conduct ongoing CBT as needed.

Closed Circuit TV (CCTV) - Campus Surveillance System

BCT plans to upgrade to IP Camera Technology from coaxial Point to Point, where possible. This upgrade will also include expanded channel counts for Digital Video Recorders as a part of the life cycle replacement program.

On-Board Vehicle Surveillance System

BCT has been using an on-board, closed-circuit camera surveillance system on its buses since 2010. The system is used to record passenger and operator behavior, help deter crimes and disruptive behavior, and boost the overall safety and security of the vehicles while in service. The surveillance system recordings provide BCT staff with the ability to review occurrences for investigative and risk management purposes. A desired add-in, Live Look-in, is planned for acquisition in the next few months of 2013, which will provide the additional capability to view and listen, in real-time, to the activities occurring on any one of the equipped BCT buses. This additional capability will enable transit, law enforcement, and security personnel with the ability to better assess situations as they unfold, thereby helping the agencies devise and implement appropriate responses. Thereafter, the entire camera system will be slated for an upgrade or replacement in 2016.

Real-Time Information Monitors @ Employee Facilities (Digital Signage)

BCT intends to implement real-time information monitors at its major transit employee facilities. The monitors will be used to provide training, internal news, and job related information to the transit staff.

Trapeze Midas-BD Bidding & Dispatching Software

BCT currently uses Midas-Bidding and Dispatch Software, a vendor provided software package, to manage its operator bidding processes, operator dispatching, and timekeeping function. This work-force management software tool is slated to be upgraded or replaced in 2016.

Genfare Odyssey Electronic Validating Fareboxes

BCT's bus fleet is equipped with electronic validating fareboxes used to accept fares and bus passes. These fareboxes, have a built-in electronic identification system that can accept and validate coins, tokens, and bills. They also have the capability to accept and process magnetic fare cards; accept, issue, and validate electronic transfers. BCT has planned a replacement for the fareboxes in 2016/2017 which follows the Fare Systems Interoperability project.

Business Continuity

BCT intends to establish a backup Disaster Recovery Site to the existing Category 5 Rated Data Center site.

Security Assessment

After deployment of key Strategic Initiatives in 2015 (e.g. CAD AVL), BCT will initiate a Security Assessment and Evaluation for Cyber/Network Security Risk and recommended actions for mitigation.

Radio Lifecycle

As a part of Lifecycle replacement, BCT will replace the existing radios with newer technology based on technology advancements.

Paratransit Virtual Desktop

BCT intends to virtualize paratransit personal computers to clientless technology and upgrade backend infrastructure in 2014. Upgrades of the hardware and software will be considered in 2019.

Real-Time Information for Downtown Kiosks

The Fort Lauderdale Downtown Development Authority (DDA), in a pass through arrangement with BCT, is interested in enhancing the provision of transit services in the downtown area by strategically placing kiosks that would provide real-time bus schedule information for the local BCT routes serving this area. Real-time bus schedule information technology is designed to improve customer service by disseminating timely and accurate service information about projected bus arrival and departure times, disruptions and delays, transfers, and other transportation services at key locations. BCT will need to coordinate with the DDA on its implementation of the kiosks so that they can be coordinated with the transit agency's planned real-time information system deployment in 1Q2015.

Wi-Fi Hardware Upgrade on Express/Breeze Buses

BCT's current Express and Breeze bus services provide patrons with Wi-Fi on-board the vehicles to help accentuate the premium nature of these services. The existing Wi-Fi hardware on the vehicles is in need of upgrade to make the Wi-Fi service more reliable. BCT is still working on the schedule for this particular improvement; however, it is clear from staff that the agency's 10-year vision includes Wi-Fi only for premium bus services and not the entire fleet.

Workers Compensation Upgrade

BCT will upgrade the existing system to provide employees with first level reporting of on-the-job injuries and track standard NCCI codes for reporting.

Document Management System

By implementing a document management system, BCT will be able to reduce the storage requirements for physical documents, enhance productivity; reduce paper trail and convert e-File for easy access. BCT will be able to store a version history of all documents and record change logs.

Video Conferencing

Video conferencing capabilities will improve communications between BCT staff and will reduce the need for travel to and from BCT or County office locations, further enhancing productivity levels across dispersed workforces and teams in all BCT departments. Video conferencing equipment would only be installed at select locations.

Net Backup and Network Upgrades

BCT will maintain and upgrade backup and recovery systems along with Network Upgrades which will increase bandwidth for ease of access

End of Life Server Replacement

BCT plans the development of a Life Cycle Replacement Plan for server infrastructure, which would include cost estimates and procedures for end-of-life replacement, as well as upgrades and maintenance of software and hardware components where necessary.

Wave Technology Needs

The Wave is a planned 2.7-mile, 10-station streetcar system that will serve as a local circulator in Downtown Fort Lauderdale. The new system is expected to be operational in late 2016 and includes a number of APTS technologies to attract and assist riders and make their travel experience more convenient. Among the technology needs for which BCT will need to plan in conjunction with system start-up are real-time information monitors, information kiosks, video cameras, APCs, AVLs, automated annunciators, and potential signal priority applications, among other elements.

Community Bus Technology Needs

The aforementioned CAD/AVL/APC/Annunciation system upgrade that BCT is currently planning for the 1Q2015 time period will not only benefit the agency's existing local and premium bus services. The upgrade will also be expanded to the Community Bus service as necessary to ensure compatibility of technology and operations across all modes/services. This technology expansion to the Community Bus vehicles will occur sometime after the overall system upgrade has been completed and will be accommodated by new vehicle purchases for the program, as well.

Transit Signal Priority Implementation

Transit Signal Priority (TSP) is an APTS technology strategy that gives buses preference at selected traffic signals when they arrive at the intersections, potentially dependent on some set of pre-established conditions. Since signal delay presents a major impact to bus operations, this technology has the potential to help BCT better maintain its bus schedules on key corridors with minimum impact on cross street traffic. To this end, FDOT and Broward County Traffic Engineering have been working in conjunction with BCT on a pilot project to test the technology and assess its potential uses, benefits, and impacts. To date, TSP is not widely used; however, BCT is interested in expanding the application of the technology to major corridors across the county in coming years as part of its 10-year vision. A future expansion plan will need to be developed.

To date, BCT completed a Pilot Project that implemented TSP on Hollywood/Pines Blvd. for the BCT I-95 Express Hollywood route. TSP is currently active at over 30 intersections between Flamingo Road and I-95. Preliminary analysis demonstrated that BCT did observe some travel time savings from TSP implementation (see *Miami Urban Partnership Agreement (UPA) Pines Boulevard Transit Signal Priority Evaluation Report* which can be downloaded from http://www.nbrti.org/docs/pdf/Miami_UPA_FTA_Research_Report_No_0002.pdf). BCT is interested in expanding the application of TSP technology to

major corridors across the county in coming years as part of its 10-year vision. It is expected that corridors such as State Road 7/US 441, US 1, University Drive, and Oakland Park Boulevard will receive some further TSP implementation analysis by BCT and its transportation partners within the next few years. Other corridors such as Hollywood/Pines Blvd. east of I-95, Sample Road, Broward Boulevard, and Hallandale Beach Boulevard/Miramar Parkway may follow well within the 10-year timeframe of this plan.

Additional IT Personnel and IT Temporary Staff

Any organization with a robust technology infrastructure will require an equivalent IT staff with which to maintain it. This equivalence matters in both the quantity and the quality of the staff. Given BCT's commitment to technology as well as its planned enhancements, it also will be prudent for the agency to develop an IT staffing plan to ensure appropriate and sufficient support for both current and new/upgraded equipment with the proper mix of permanent and temporary staffing.

Maintenance and Support Services

BCT continues to provide IT Support Services for routine maintenance, security services and upgrades of software and hardware systems through various vendor agreements

Software Tools and Database Licenses

BCT will continue to maintain compliance with software license agreements for databases and programs such as Business Objects, Crystal, and Toad that are used for various support and project related functions.

Real Time Communications (Service)

With the implementation of the new CAD/AVL System, Real Time Communications requirements will increase. The additional carrier services are accounted for within this line item.

BCT IT SYSTEMS PLAN SUMMARY

Due to both the aging infrastructure and the need for new and enhanced technologies to continue to attract new riders while also providing the most convenient and beneficial services to existing patrons, BCT has plans on implementing an aggressive IT Systems Plan that will carry the agency successfully into the next decade and beyond. The vision for this plan summarized herein is sound and appropriate for the size of the agency and the scale and array of the services that it provides. A key recognition of staff is that technology must be maintained and the BCT plan incorporates ongoing support and upgrades, as well as provides for appropriate IT staffing levels as needed to ensure that the plan is implementable and that the existing and planned future technology infrastructure is sustainable. The availability of sufficient capital and operating funding will be the primary challenge to the agency's ability to implement all facets of this plan in a timely fashion.

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