Memorandum

MIAMI-DADE COUNTY

DATE: May 27, 2005

TO: Honorable Mayor Carlos Alvarez
Honorable Chairman Joe A. Martinez and Members
Board of County Commissioners

FROM: George M. Burgess
County Manager

SUBJECT: Initial Report from Supervisor of Elections

Attached please find two initial reports from Supervisor of Elections Lester Sola in response to my April 4, 2005 charge memorandum to him requesting a comprehensive review of the Elections Department. I have just received these documents today and will be reviewing them with my staff in the coming weeks before making any specific recommendations. Since there has been much public interest in this matter and a standing records request for this document in particular, I am forwarding a copy to you at this time.

If you have any questions please feel free to contact Assistant County Manager Alina Hudak or me directly. Thank you.

cc: Robert A. Ginsburg, County Attorney
Murray Greenberg, Deputy County Attorney
Alina T. Hudak, Assistant County Manager
Lester Sola, Supervisor of Elections
Miriam Singer, Director, Department of Procurement Management
Jennifer Glazer-Moon, Director, Office of Strategic Business Management
Cathy Jackson, Director, Audit and Management Services
June Randall, Deputy Director, Enterprise Technology Services Department
Charles Anderson, Commission Auditor
Christopher Mazzella, Inspector General
Hilda Fernandez, Director, Communications Department

Memorandum

MIAMI-DADE COUNTY

Date: May 27, 2005

To: George M. Burgess
County Manager

From: Lester Sola
Supervisor of Elections

Subject: Desirability and feasibility of converting to an optical scan voting system

Executive Summary

In a memorandum dated April 4, 2005, you directed me to review various aspects of the Elections Department's operations, including our current voting equipment and the desirability and feasibility of converting from our touchscreen system to an optical scan voting system. Because of the depth which a response to that issue requires, I am addressing that directive exclusively in this report and will address the other issues under separate cover.

First, for the purpose of analyzing and discussing options, I do want to state that we currently have equipment that – despite well-documented costs and challenges – does function and does not face decertification. This differs from the situation following the 2000 Presidential Election, when the County had soon-to-be-decertified voting equipment and a state-imposed deadline to convert to a new system. **In response to recent issues regarding our equipment, we have already taken steps to improve the integrity of our elections, including the comparison of machine-by-machine audit data and precinct totals *before election results are certified*.** This step would now bring to light issues such as the one that occurred in Precinct 816 in November 2004 immediately. We have already implemented and utilized this measure in recent municipal elections, and we will continue to do so for every election we administer. We will also continue to review all of our procedures and identify further means by which we can quickly reconcile all of the different sources of data available to us, enabling us to detect any potential problem early in the process.

Upon receiving your directive, I contacted the Department of Procurement Management (DPM) and asked them to conduct a market study and cost analysis of election equipment that is available and certified for use in the state of Florida, while our Department focused on the impact that a conversion would have on our operation and other important factors, such as voter confidence. Based on this analysis, I am strongly recommending that we explore the possibility of proceeding with the procurement of an optical scan election system because of a combination of two crucial factors. A conversion is likely to both 1) improve voter confidence and 2) result in cost savings to the taxpayers of Miami-Dade County. In the event that we ultimately choose to procure an optical scan system, I am recommending that any procurement and integration of a new system be conducted methodically and deliberately to avert the kinds of challenges this county experienced because of the decertification and state-imposed deadline I described above during the last conversion in 2002. We should be mindful of that experience as we seek to obtain the best equipment at the best-possible cost for our taxpayers, while integrating it into the Department's operation on a timetable that allows us to truly improve our operation.

Brief History

The 2000 Presidential Election exposed weaknesses in the punchcard voting system that was in use by most counties in Florida, including Miami-Dade. Specifically, many of the choices that voters made were instead tabulated as undervotes (no selection) or overvotes (too many selections), and voters did not have the opportunity to correct those selections because their ballots were not read until they arrived at a centralized tabulation facility. County canvassing boards were left with the task of assessing the voter's intent in the case of each "undetermined vote." In 2001, the state of Florida decertified punchcard systems as an approved method of voting and gave counties the option of purchasing two kinds of voting systems:

- **Optical scan** (also called "marksense"), which provides printed ballots on which voters either fill in an oval or bubble or draw an arrow indicating their choices, much in the same way that students indicate their answers on standardized tests. Counties purchasing optical scan readers are required to provide in-precinct ballot reading equipment, into which the voter inserts the ballot and receives an alert in the case of an overvote or undervote, giving the voter the opportunity to correct his or her selection. In 2004, about 32% of voters nationwide used this kind of equipment, according to the federal Election Assistance Commission (EAC).

- **Direct Recording Electronic** (or DRE, which includes "touch screen" equipment), which provides computerized terminals on which voters make their selections. The equipment does not allow overvotes and alerts the voter to an undervote, giving him or her the opportunity to make a selection if he or she intended to do so. In 2004, about 29% of voters nationwide used this kind of equipment, according to the EAC.

(Other kinds of election equipment used in the United States but not certified in the state of Florida include punchcards, still used by 19% of voters; mechanical lever machines, still used by 13% of voters; and hand-counted paper ballots, used by less than 1% of voters in mostly rural areas.)

In January 2002, the Miami-Dade County Board of County Commissioners (BCC) joined most other large Florida counties by approving a contract to procure DRE equipment. Miami-Dade selected Election Systems and Software's (ES&S) "iVotronic" touch screen equipment at an initial cost of $24.5 million, which also included a parallel optical scan system to accommodate absentee voters. In all, 16 of Florida's 67 counties selected touch screen equipment; the remainder selected (or retained previously-purchased) optical scan equipment. With the exception of Orange County (Orlando), all urban counties selected electronic equipment similar to Miami-Dade's. Thus, the majority of *counties* selected optical scan, although a large proportion of *voters* use touch screen equipment – while all counties necessarily use optical scan equipment for absentee voting. Some touch screen counties use optical scan ballots for provisional voters, as well – though pending legislation appears likely to change that for disabled voters. Counties appear to have believed that, as is the case with most processes, a perceived automation of the ballot creation and tabulation process was increasingly sensible with a more complex operation, measured by factors such as the number of registered voters, number of precincts and number of languages provided. That is, the larger one-time capital

investment required for electronic voting equipment was expected to be offset by a simplified operation and lower future operating expenses resulting from savings related to less use of paper and labor.

After functioning in several smaller municipal elections, the iVotronic system made its large-scale debut in the September 2002 Primary Election. Unfortunately, the election was not a success. The combination of iVotronic terminals that could not "boot up" quickly enough to be ready by 7 a.m. and pollworkers who were not prepared to address such challenges left lines of voters waiting outside many polling places after they should have been able to begin voting. Following that election, the County devoted unprecedented resources to ensure the success of the November 2002 Gubernatorial Election. The Miami-Dade Police Department and numerous other County departments assisted the Elections Department, and the election was widely considered to be a success, albeit at an estimated cost of $8 million, not including some interdepartmental support. (By comparison, Countywide elections through 2000 had generally cost approximately $1.5 million.)

Ongoing fiscal issues

The cost of the November 2002 election was accepted as necessary to enfranchise our County's voters, and the expectation was that it would be a one-time cost, with future elections costing significantly less. The subsequent streamlining of the logistical operation in non-"crisis mode" elections has, in fact, led to lower costs, with the November 2004 Presidential Election costing an estimated $7.27 million. (The County subsequently negotiated concessions from ES&S, which along with interdepartmental support reduced our costs to $6.64 million, but for the purpose of this analysis and in the interest of an accurate comparison, the non-discounted cost is used.)

While each election provides lessons and opportunities to further "rightsize" our operation, it is not reasonable to expect that a future election of a similar magnitude could cost significantly less. Our current system would necessitate a similar level of interdepartmental support, and the Department has already reduced its reliance on ES&S and pays a negotiated project management rate that is, to our knowledge, among the lowest of any jurisdiction. Instead of yielding future savings, as was reasonably expected, the $24.5 million expenditure led to more required expenditures. Indications are that still more expenditures, never envisioned when the equipment was purchased, are impending. For example, ES&S has informed me that we must replace the back-up batteries in our 7,200 iVotronic terminals at a cost of $147.50 per unit, or approximately $1 million, and the batteries in our 7,688 Personal Electronic Ballot (PEB) cartridges at a cost of $8.00 per unit, or $61,504. Additionally, we fully utilized our inventory of 7,200 iVotronic units in November 2004. Even with an increase in registered voters, lower historical voter turnout in mid-term elections means we would have enough equipment to effectively serve our voters in 2006, but we would need to purchase up to 1,000 additional units prior to 2008 at an estimated cost of $3,300 to $4,000 each, or a total of $3.3 million to $4 million. Essentially, from a fiscal standpoint, the decision facing this County is not whether to spend money on new equipment or not, but whether to continue spending money on our

current equipment versus investing in new equipment that may simplify our operation and generate future operational savings (which I will describe later in this report).

I should mention that even as expensive as our operation has become, our costs have actually been mitigated by, on some occasions, the provision of in-kind project management support from ES&S. Still, the system is designed in such a way that we would always have to rely on ES&S to a significant degree. We must purchase specialized equipment and replacement parts, and we are in no control over, for example, upgrades that could improve our operation. (Since late 2002, ES&S has been verbally assuring the County that an upgrade was forthcoming to improve issues such as iVotronic start-up times and the ability to accommodate all ballot styles on all units during Early Voting; last year, the company wrote in a letter to my predecessor that it was under no obligation to provide such upgrades. We have since been informed that the upgrade is now scheduled to be submitted for state certification in October 2005.)

Voter Confidence

Following 2000, our voters lost confidence in what they viewed as outdated punchcard technology, and the computerized touch screen system appeared to be the state of the art. In fact, it did address many of the issues of voter intent that arose in 2000, and the number of "undetermined" votes in our County has dropped significantly with the new system. However, a number of people in our community – some who are members of organized groups, but also many individuals from different parts of our County representing different ethnicities and political affiliations – have expressed concerns about a system that, in their view, does not provide a true auditable paper record of votes. These concerns have been exacerbated by several challenges related to our equipment that are not unique to Miami-Dade County but that have surfaced here because of the commendable efforts by local media and community groups and the County's own staff, who on several occasions have discovered equipment-related issues. Additionally, despite the many redundancies that we have in place to ensure the proper tabulation of votes even when an anomalous situation arises, our Deputy Supervisor of Elections for Outreach and Training has informed me that voters who attend community events have told our staff that while they appreciate our efforts to educate them, and while they have generally become comfortable with the process of voting on the equipment itself, they remain uneasy about the lack of a paper record that is independent of the equipment on which the votes are cast. These doubts, along with the continuing expenses associated with maintaining the equipment and administering touch screen elections, are not what the County envisioned when purchasing what it reasonably believed to be a state-of-the-art system.

An optical scan system provides a tangible record of votes that can be recounted even in what is, given the many redundancies in place, the mostly-theoretical case of a complete electronic failure. With our current system, the coding, casting of ballots and tabulation of an election are inextricably intertwined. Thus, a front-end coding error early in the ballot preparation process, such as the one that occurred during the March 8, 2005, Special Election, can ultimately affect the tabulation of an election (although fortunately, in that case, not enough to impact the

outcome). With an optical scan system, a coding or tabulation error could have been corrected after the fact, and paper ballots could have been re-tabulated. Of course, the Department must do everything necessary to prevent such situations regardless of the equipment in use, and as such, I have taken disciplinary action against the individuals involved and put the proper staff in charge of that operation. Additionally, I have fully enlisted the expertise of the Enterprise Technology Services Department (ETSD), which had previously been underutilized, and we have developed coding checklists and sign-off sheets to ensure accuracy and accountability while involving ES&S in the sign-off of election coding. I have more clearly defined the roles of tabulation room staff, and I have scheduled new training sessions for all technical and managerial staff. Still, acknowledging that human error can occur despite the best precautions, there is value in equipment that reduces the importance of such errors when they do occur. These are voter confidence issues, but they are not only that; not only in perception, but in reality, only optical scan equipment provides an auditable paper record that is independent of the tabulation system.

With respect to the ability to prevent voter error and disenfranchisement, touch screen and optical scan equipment have both provided dramatic improvements over punchcards. The Florida Division of Elections analyzed the percentage of ballots cast without a valid vote in the November 2004 Presidential Election. The average percentage of invalid votes (undervotes and overvotes) among optical scan voters was 0.40%; among touch screen voters, it was 0.42%. The state reported that the slightly better percentage for optical scan voters was an insignificant difference, and both figures were significantly better than in the 2.93% of votes that were invalid in 2000. However, removing absentee voters who are not given the opportunity to correct overvotes and undervotes, voters who voted *in person* on optical scan equipment cast a considerably lower percentage of invalid votes (0.29%) than those voting in person on touch screen equipment (0.42%). An in-person touch screen voter was 46% more likely to cast an invalid vote than was an in-person optical scan voter.

Optical scan elections in Miami-Dade

Working with DPM, we have analyzed the actual efforts and costs associated with the November 2004 Presidential Election and compared them with the efforts and costs that would have been required to administer the same election using an optical scan system. Our analysis shows that the election could have cost up to $2.2 million less with an optical scan system; smaller elections would experience smaller but nonetheless significant savings. The savings would come from a decreased use of inter-departmental support and County employees to support what would be a less technologically complex system, with an average of just two pieces of electronic voting equipment (the optical scan readers) per polling place rather than up to 30 (the iVotronic units). Additionally, we would rely significantly less on high-level technical support from a vendor. We would also be able to discontinue the practice of printing hundreds of thousands of paper "substitute" or back-up ballots that are delivered to polling places to be in place in case of equipment failure. Instead, most paper ballots we print would actually be utilized. Also, after November 2004, we began printing our own paper ballots, allowing us we experience a significant reduction in our printing costs. Essentially, because of absentee, provisional and substitute ballots, we already code and tabulate parallel

optical scan elections but do not derive many of the potential benefits of the system, such as the potential increased voter confidence I described above. (If we were to convert, the Department would ensure the full enfranchisement of our disabled community by maintaining ADA-equipped audio units, which could include the retention of the 1,000 audio iVotronic units in our current inventory.) Completing the conversion to an optical scan system would likely bring appreciable benefits with relatively modest incremental effort and expense. The lower operating costs, coupled with the elimination of future capital and maintenance expenses associated with the current touch screen system, would allow the County to recover the estimated purchase price of $9.4 million to $12.3 million within a few election cycles. In fact, based on the initial analysis **the County could save more than $13.21 million over five years.** (Further detail is provided in the attached DPM study.)

A conversion would present certain challenges. Our pollworkers and voters, as well as Department staff, would have to be trained once again to use a new system. However, the relative simplicity of an optical scan system, combined with the fact that, as I described above, we already use many aspects of such a system, makes it highly unlikely that challenges accompanying this conversion would approach those experienced during the conversion to our touch screen system. This can be further ensured though a methodical, deliberate procurement and implementation – a luxury the County did not have last time following the decertification of punchcards and a deadline to quickly implement the new system. An expedited procurement would take approximately nine months, excluding the contract award phase. We would also anticipate a voter education and outreach plan of approximately six months, followed by an implementation plan for the new equipment to include municipal elections. I believe our voters will accept the fact that we currently have a system that is certified for use and does work, but that a carefully-planned conversion can deliver increased assurances at a lower cost. Additionally, we would need to plan for the storage of additional paper ballots in our warehouse. However, the space required for this activity would be more than offset by the reduced space required by our voting equipment. Currently, our 75,000-square-foot warehouse houses 7,200 pieces of electronic voting equipment (as well as other documents and supplies that would be necessary with any system). An optical scan system would require 1,600 electronic readers (no less than two per polling place), and as I described above, we would either retain our 1,000 ADA-compliant audio iVotronic units or have a similar number of another kind of fully ADA-compliant unit. Those 2,600 pieces of equipment would be 4,600 less than the current 7,200 iVotronic units. By comparison, we have recently stored all absentee ballots from the November 2004 election, and they take up approximately 300 square feet of our warehouse, or 0.04% of our total warehouse space. Legally, ballots must be stored for 22 months, and the volume of ballots would of course increase if all voters (rather than only absentee voters) were voting on paper optical scan ballots. Still, the space required for our November 2004 absentee ballots projects to approximately 2,000 square feet if all ballots in that election had been optical scan. Ballots from that and numerous other elections could easily fit in the space that would be vacated by most of our touch screen voting equipment.

From the voter's perspective, an optical scan ballot would actually occupy far fewer pages than would a touch screen ballot. For example, in the November 2004 Presidential Election, voters had to work through at least 17 electronic pages (depending on their assigned ballot styles),

including several pages of review screens; absentee voters using optical scan ballots had only four or five pages, depending on ballot style.

I should mention that in the past, another way to address the issue of voter confidence has been proposed: the addition of printers to our voting equipment to print a record of each vote as it is cast. At this time, we cannot consider this option because no such equipment is certified for use in the state of Florida. However, even aside from that fact, the procurement of such equipment would be less desirable than a conversion to optical scan because while it could potentially meet our first requirement (voter confidence), it would fall short of our goal to simplify our operation and control our costs. In fact, it would further complicate our operation, by taking the complexities I described earlier and adding 7,200 new pieces of electronic equipment with maintenance and material (such as paper and ink) needs as well as additional training and technical support.

Conclusion

Miami-Dade County's current voting system has addressed many of the issues that arose in 2000, and yet new and unexpected issues have arisen with our touch screen system. The Elections Department has administered several successful large-scale touch screen elections. We now have the opportunity to draw upon knowledge that only years of experience can provide to further improve our County's elections. The possible conversion to an optical scan system would present certain challenges to our Department. Should the County proceed with a conversion, I would embrace the opportunity to lead an effort that, based on initial analysis, could deliver improved confidence and more fiscally sound elections to our taxpayers – while at the same time continuing to implement the necessary procedural reforms to ensure that the elections we administer with our current system in the interim are of the highest quality.

We have also provided this report to the Office of the Inspector General, the Office of Strategic Business Management, Audit and Management Services and the Enterprise Technology Services Department, as they have all provided valuable guidance to the Elections Department regarding our systems and procedures.

If you have any questions or require any additional information, please do not hesitate to contact me.

Attachments

c: Alina T. Hudak, Assistant County Manager
Miriam Singer, Director, Department of Procurement Management
Jennifer Glazer-Moon, Director, Office of Strategic Business Management
Cathy Jackson, Director, Audit and Management Services
June Randall, Deputy Director, Enterprise Technology Services Department
Christopher Mazzella, Inspector General
Hilda Fernandez, Director, Communications Department

MIAMI-DADE COUNTY

Election Voting Technologies
Market Research and Cost Comparison
for
Using Touch Screen vs. Optical Scan Election Systems

Department of Procurement Management
May 2005

Miami-Dade County
Election Voting Technologies
Market Research and Cost Comparison

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Miami-Dade County
Election Voting Technologies
Market Research and Cost Comparison

1. EXECUTIVE SUMMARY

As requested, the Department of Procurement Management (DPM) completed market research regarding the availability and estimated pricing of optical scan voting technologies certified for use in the State of Florida. Additionally, DPM completed a cost analysis of investing in new optical scan systems to replace the current touch screen voting technology used by the Miami-Dade County (County). The study shows that three vendors offer a total of seven models of state-approved optical scanners ranging in price from $4,200 to $6,000 per unit. The study also shows that vendors will require significant lead time (up to 9 months) to deliver the estimated 1,600 optical scanners, software and peripherals that the County would need to conduct a large election. The county requires 6-7 months to issue a formal competitive RFP solicitation, evaluate proposals, and conduct successful negotiations with the selected vendor for this type of acquisition. The Committee and Board approval process involves close to three additional months. While a significant initial capital investment is required to implement a comprehensive optical scanning voting system, it is less expensive to operate and manage than the current voting technology being used.

Should the County continue to use the touch screen system, an additional 1,000 machines and associated peripheral equipment will be needed at a cost of $5 million to substitute broken machines, for training, and to facilitate run-off elections, early voting, and increases in the number of registered voters. The additional equipment will be required only for presidential or other elections where voter turnout is expected to be large. Should the County opt to use an optical scan system to conduct elections, a total of 1,600 optical scanning machines, associated peripheral equipment and requisite system support will be required at a total cost of between $9.4 and $12.3 million based on vendor pricing.

With regard to operating costs, elections held in the County were grouped into four categories: presidential, gubernatorial and primary, special and countywide, and municipal. During presidential elections the County currently spent approximately $7.3 million using the ES&S iVotronic touch screen machines during the 2004 presidential election. This total excludes approximately $400,000 in vendor concessions and includes $287,000 borne by supporting departments that are not directly charged to the Elections Department. Using optical scan technology, this same election costs an estimated $5.1 million, or 29% less than using the touch screen technology. The estimated cost for gubernatorial or primary elections is $4.0 and $3.3 million respectively, using the touch screen and optical scan systems. During special and other countywide elections, where the level of staff effort required and voter turnout are lower than experienced during presidential or gubernatorial elections, the County spends approximately $2.4 million using the iVotronic touch screen system. The estimated cost of these elections using an optical scan system is $1.9 million, or 23% less than the touch screen system. Municipal elections are significantly less costly with expenses ranging from $30,000 to over $200,000 each using the current iVotronic

systems. For the purposes of this analysis, a typical municipal election is projected to cost $105,000 using the iVotronic touch screen system and $78,750 (25% less) using optical scan technology.

The operational savings generated by switching to optical scan technology are largely due to the fact that there will be no need to set up precincts the night before each election. Additionally, technical support requirements, ballot preparation and printing costs, and interdepartmental support are significantly reduced. Significant savings are also realized as the need to prepare and print paper ballots as a back-up in case of massive touch screen machine failures is eliminated.

Over the past several years, the Elections Department conducted 29 or more elections per year. For the five-year period 2006 through 2010, it is projected that the County will conduct between 29 and 32 elections each year, the majority of which (between 26 and 29) will be municipal elections. Based on these estimates and the additional costs incurred for presidential and other elections, the County will spend approximately $78.5 million in operating expenses over the next five years to conduct elections using the touch screen technology as shown in the table below. Additionally, a capital investment of $5 million will be required to purchase 1,000 additional iVotronic machines, 7,000 batteries, equipment warranties and other peripherals.

Options for Conducting Elections
(Cost in Million Dollars)

Option 1 - Retire Touch Screen System and Switch to Optical Scan Technology		
Five-year Total Operating Cost	$	60.93
New Capital Invenstment Required	$	9.39
Sub Total	$	70.32
Outstanding Debt (Existing Touch Screens)	$	20.58
Total cost of Option 1	$	90.90
Option 2 - Continue use of Touch Screen Technology		
Five-year Total Operating Cost	$	78.53
New Capital Invenstment Required	$	5.00
Sub Total	$	83.53
Outstanding Debt (Existing Touch Screens)	$	20.58
Total cost of Option 1	$	104.11
Cost Variance (Option 1 - Option 2)	$	13.21

It should also be noted that the County will continue to make payments on outstanding debt associated with the purchase of the existing touch screen systems. The County will pay approximately $2.94 million per year for the next seven years. Using

the optical scan system, in addition to the $9.4 to $12.3 million required to purchase the optical scanning machines and associated peripherals, it is estimated that the County would spend approximately $61 million over the next five years to operate the new system without payments toward the existing debt. However, if the County opts to use the optical scanning system to conduct elections, pays the outstanding capital used to purchase the existing touch screen machines, and purchases $9.4 million in new equipment, the total five-year estimated cost is $90.9 million. If the County continues to use the touch screen machines to deliver elections, pays the outstanding debt and invests an additional $5 million to purchase new equipment, the estimated total five-year cost is $104.1 million or $13.2 million more than the cost of using the optical scanning technology.

The analysis suggests that the cost of conducting elections can be significantly reduced by switching to an optical scan system. Additionally, having paper records available to verify and validate votes will be a key factor for addressing voter apprehension and distrust. Other factors that support the use of optical scan systems is the fact that the electronic voting systems industry remains fragmented, there are no industry standards, and individual jurisdictions have different legal, political and business requirements. Consequently, universal adoption of a standardized advanced voting system is still far from being a reality.

As the County contemplates making this change, staff should be cognizant of the fact that use of the paper ballots may require that special assistance be provided for some disabled persons. To overcome this obstacle, the County would continue to use the touch screen machines for persons with disabilities to meet ADA requirements. Additionally, the use of optical scan technology requires the perennial use of paper ballots and the management of the associated costs, retention and disposal logistics.

2. BACKGROUND

On April 4, 2005, the County Manager requested that the Miami-Dade County Elections Department (Elections) prepare a feasibility study for replacement of the existing touch screen electronic Voting System with a comprehensive Optical Scan System. The Department of Procurement Management (DPM) was asked to complete a comparative cost analysis of both systems.

Elections coordinates and manages municipal, county, state and federal elections held in the County each year. Currently, the Department manages 749 voting precincts in 539 voting locations throughout the County to accommodate more than one million registered voters. The County conducts several types of elections including: municipal, general, primary, countywide and special elections. Every four years the County conducts presidential and gubernatorial elections. Table 1 shows the elections conducted in 2004 and the planned elections for 2005 and 2006.

Table 1
Miami-Dade County
Election Schedule 2004 through 2006

Election Type	Year		
	2004	2005	2006
Municipal Elections	26	28	29
Special and Countywide	1	2	1
Primary/Gubernatorial	1	0	2
Presidential	1	0	
Total	29	30	32

Source: Miami-Dade County Elections Department

Elections conducts between 26 and 29 municipal elections each year. These elections constitute more than 90% of the elections. Countywide, gubernatorial, primaries and special elections together account for less than 10% of the number of elections conducted in Miami-Dade County.

Prior to 2001, the County like many other counties nationwide, conducted elections using punch cards. However, in an effort to improve voting procedures, to eliminate the highly publicized punch card problems in Florida, and to comply with State Laws, the County took steps to procure a new vote capture system in 2001.

On January 29, 2002, the Board of County Commissioners approved the award of a "turnkey" Direct Recording Elections (DRE) voting system with touch screen technology and optical scan capabilities. The selected vendor, Election Systems and Software Inc. (ES&S) was to provide the voting system, appropriate training, and maintenance and support for three years.

Despite the fact that the County has administered several very successful countywide and municipal elections using the new touch screen systems, operating costs are high and the technology and operational logistics remain complex and time consuming. Consequently, staff researched alternative voting systems that offer simplified election procedures and added voter assurances.

3. SCOPE OF STUDY

This review addresses the desirability and feasibility of replacing the County's touch screen voting system with an optical scan system. Specifically, as requested, the report assesses the cost of investing in a new optical scan system compared to the cost of continuing to operate the current systems based on recent market research findings.

Despite the availability of various voting technologies used across the nation, DPM was not asked to evaluate other alternatives such as touch screen technologies that also provide the required paper trails, or other less technologically sophisticated systems that can deliver elections. These alternative systems are not approved for use in Florida and were excluded from the analysis.

4. EXISTING MIAMI-DADE COUNTY ELECTION MANAGEMENT SYSTEMS

The County's existing touch screen system, normally referred to as the iVotronic Touch Screen System (iVotronics) initially cost $24,540,347 as shown in Table 2. This system includes 7,250 touch screen machines and associated computer software, communication packs and other peripherals. These machines are capable of displaying information in English, Spanish and Creole. A total of 1,000 iVotronic machines are compliant with the Americans with Disabilities Act (ADA) and allow users to vote with the aid of vocal instructions. Additionally, the system includes 14 optical scan units to process absentee ballots and the County developed processes for pre-election preparation, election day logistics, and post election activities. ES&S developed training plans and provided the requisite training, as needed, and ensured the system was state certified as required by the State of Florida.

In December 2003, the contract was amended for a net increase of up to $2,030,973 to address issues concerning settlements related to past elections support, lowering project management fees for 2004 and for purchasing additional materials. The total contract amount was increased to $26,571,320.

The County implemented the iVotronics system, trained appropriate staff and poll workers and set up demonstrations to familiarize the public with the new elections procedure. The typical election process includes the following steps.

1. Training (including refresher training) for poll workers, troubleshooters, technical support staff, help desk staff, ambassadors, and supervisors.

Table 2
Capital investment in Miami-Dade County's Election Management Systems (iVotronics)

Qty	Description	Extended Cost
6200	Standard iVotronic Touch Screen machines	18,612,400
50	Supervisor iVotronic Touch Screen machines	140,500
1000	ADA iVotronic Touch Screen voting machines	3,250,000
4	M650 Optical Scan Units	200,000
10	M100 Optical Scan Units	52,000
1	Third Party Software and Hardware	128,983
1	ES&S Software	160,800
1	ES&S Support Services	132,125
1	Shipping & Handling	183,750
1	Performance Bond	50,000
1	3-Yr Post – Warranty Maintenance (due 1/2005)	1,176,089
1	Associated Equipment	453,700
		24,540,347
	Amendment to contract in December 2003	Up to 2,030,973
	Grand Total	26,571,320

Source: Miami-Dade County Elections Department

2. Voting machines are "function-tested" at the Elections warehouse and ballots with the appropriate electoral races are pre-loaded for each precinct. The number of machines per precinct is based on a ratio of 200 voters per machine. This ratio is decreased, as required, to minimize waiting times and maximize voter convenience.

3. Voting machines are delivered the week before polling day and opened the day prior to the elections. They are linked electronically to allow a single machine to report final results for a cluster of voting machines and then the machines are set up, tested and locked.

4. On Election Day, the machines are opened and voters are allowed to cast their votes using touch screen selections in their preferred language. Paper Provisional Ballots are also provided for use on an as needed basis.

5. Votes are tallied and saved in the computer memory of each machine until the polls are closed. The current iVotronic machines do not provide a paper trail detailing voter choices.

6. Once the polls close, voting machine reports are collected electronically and a paper report listing the total activity for each machine is printed.

7. The electronic and paper records and all provisional ballots (completed on paper forms) are delivered to the collections areas for final vote counts.

8. Acceptable absentee ballots are scanned using four large optical scanners. The tabulated votes are included with the electronic data from the

iVotronic machines.

9. During the vote counting exercise, all electronic data from the iVotronic machines are compiled and added to the votes from absentee ballots to generate the overall election results.
10. All voting equipment (machines, printers, communication packs) are returned to the warehouse for storage.

It should also be noted that where appropriate, ten smaller optical scanning machines supplied by ES&S may be used for specialized precinct level absentee ballot tabulation.

5. MARKET RESEARCH

DPM conducted market research to determine the available technologies used in delivering elections countywide. Additionally, DPM conducted research to evaluate the availability of optical scan technologies, their cost, suggested elections processes, and whether these technologies are approved for use in Florida.

Electronic Voting Technology

In the period following the 2000 presidential elections, several jurisdictions implemented more sophisticated systems than punch card ballots. According to Scientific American, electronic voting systems have been in existence for 135 years when the technology was first patented. However, jurisdictions only started to experiment with the technology in the 1970s when advancements in computing made it economical to do so. However, elections technology has been slow to mature largely because the industry is fragmented, there are no industry standards, and individual jurisdictions have different legal, political and business requirements. There is a myriad of rules and requirements across jurisdictions with regard to the approach to testing, system verification and election certifications. Consequently, universal adoption of a standardized advanced voting system is still far from being a reality. As counties strive to improve their elections processes, it is important to assess whether a modification to existing equipment adds more value than simply replacing existing systems. In assessing voting systems, the following operational factors should be considered.

a. Staff should thoroughly understand the equipment and its operations
b. Ongoing and intensive testing and verification exercises must be carried out
c. Simple, effective voting procedures must be developed and staff and poll workers appropriately trained
d. Comprehensive audit trails are to be provided to minimize opportunities for fraud and to provide system and dada validation

Table 3 describes some existing voting technologies and the advantages and the disadvantages associated with each technology.

Table 3
Advantages and Disadvantages of Selected Voting Technologies

Technology	Advantage	Disadvantage	Comments/Suggestions
1. Hand Counted Paper Ballot	• Simple and has the lowest residual (left over/lingering and questionable ballots) rates	• Manual recounts usually differ from original much more than machine counted ballots • Persistent allegation of fraud	• Used by 1.3% of US jurisdiction. Can be counted by machine scanners. • Requires paper to be treated to make votes indelible. • Yields best results when machines are used to count the votes
2. Punch Cards	• Removes human errors in tallying • Compact machines	• Difficult to punch holes correctly • Difficulty in designing ballots • Card readers jam frequently • Easy to spoil* ballots	• First used in 1964
3. Mark Sense Ballots/Optical Scanning	• Lowest residual of any mechanical method when scanned in precinct • Easier than punching holes • Voters can read candidates directly on the ballot • Creates paper trail	• Easy to spoil • Bulky ballot • Ballot readers are slower, harder to calibrate and more prone to jamming than card readers	• Used since 1962 • An in-precinct scanner is suggested to catch problems and give the voter a second chance of voting • A DRE may be useful for marking ballots • Fill-in-the-shape ballots are better than connect-the-arrow • Provides opportunity to correct over/under votes
4. Electronic machines including Touch Screens	• Over votes are impossible • No human tallying errors • Easy for people with physical disabilities • Good feedback	• Usually poor user interface • Concerns about malicious software • Computer and software obsolescence • Complex logistics	• First used in 1976 • Requires ballot testing • Considered closed systems • Systems require testing and calibration including on election day
5. Internet Voting, Phone Messaging and Interactive Television	• Votes from home • Persons with disabilities can use their own special communications systems • No human errors in tallying	• Concerns about malicious software, network problems and hackers	• Use special web browsers • Requires new approaches to security

*A spoiled ballot includes over/under votes, tears , smudges or other markings or damage that renders the ballot unreadable

Source: Scientific American – October 2004

Optical Scan Election Management Options

An optical scanning system is a mixed system consisting of a paper ballot and an electro-mechanical method (in this case, an optical scanner) for collecting and tallying votes. Currently, there are three manufacturers of optical scanners that are certified for use by the State of Florida for conducting elections. Table 4 lists the manufacturers and the models offered. The County's current vendor, ES&S, is headquartered in Omaha, Nebraska; Diebold in McKinney, Texas; and Sequoia in Oakland, California.

Table 4
Manufacturers of Florida Certified Optical Scan Election management Systems

Manufacturer	Model	Type of Scanner	Type of Reader	Ballot Marked by	Ballot Mark required by voter
ES&S	Model 100	Precinct	Visible light	Pen or pencil	Blackens a circle
ES&S	Model 650	Central	Visible light	Pen or pencil	Blackens a circle
Diebold	AccuVote-OS	Precinct	Visible light	Pen or Pencil	Blackens a circle
Diebold	AccuVote-OS	Central	Visible light	Pen or Pencil	Blackens a circle
Sequoia	Optech 40CC	Central	Infrared	Pen or pencil	Completes a broken arrow
Sequoia	Optedi Eagle	Precinct	Infrared	Pen or pencil	Completes a broken arrow
Sequoia	Optecti Insight	Precinct	Visible light	Pen or pencil	Completes a broken arrow

Source: University of Maryland

The County has the option to choose between ballot designs that allow voters to either complete a broken arrow or shade (darken) a circle to indicate their vote. In all cases, votes can mark their ballots using a pen or pencil.

DPM solicited information from these potential vendors to obtain pricing for state-certified equipment, as well as, delivery schedules, peripheral equipment and supplies. Peripheral equipment and supplies included bubble paper, ballot boxes, computer cards, pens, equipment maintenance, warranty and training support costs. Additionally, information was requested for the pricing and delivery schedules for up to 7,500 lighted voting booths of the appropriate size required to accommodate the ballots used by Elections.

In the Summer of 2004, each of the suppliers noted above was contacted to assess their ability to provide the number of units required by the County. At the time of the survey, the County was contemplating an aggressive delivery and implementation timeline. Consequently, Sequoia advised that the company would not participate in the market survey citing concerns over voter education, manufacturing and delivery schedules, and timing of implementation, among other issues. However, while list prices for optical scanners can exceed $6,000, ES&S and Diebold offered pricing for optical scanners ranging from $4,200 to $5,200 per unit depending on the model

selected. Details of the pricing received are included in Attachment 1.

During pricing and scheduling discussions, vendors indicated that significant lead time (up to 9 months) would be required to deliver the quantities required by the County, the associated peripherals and the training needed. Additionally, vendors cautioned that it is important for the County to develop a strategic implementation plan to address issues such as logistics, delivery, timing, implementation planning, risk mitigation strategies, training, logic and accuracy testing, voter outreach, program development for the printed ballots, and deployment.

Voting Booths

The Elections Department identified a need for 7,500 self-standing lighted voting booths. DPM identified three (3) companies, in addition to Diebold, that offer voting booths: Election Works, Election Data Direct and Hart Intercivic. The required volumes of the desired models were available, as shown in Table 5. Prices range from $110 to $159 per unit. In addition to the options shown in the table, Diebold proposed a lighted voting booth priced at $167.

Table 5
Voting Booth Suppliers and Pricing

MODEL	FIRM	QTY	PRICE	EXT. PRICE
MODEL 2000 w/light	Election Works	7500	$129	$965,250
MODEL 2000 w/light	Election Data Direct	7500	$159	$1,192,500
ALL VOTE w/light	Election Works	7500	$109	$815,625
ALL VOTE w/light	Election Data Direct	7500	$115	$862,500
POLL MASTER w/light	Hart InterCivic	7500	$155	$1,162,500
POLL STAR w/light	Election Data Direct	7500	$110	$825,000

Procedure for Conducting Elections Using Optical Scan Technologies

In conducting an election using paper ballots and optical scanners, the County would follow the general elections process outlined below.

1. Ballots would be pre-printed on paper and delivered along with the optical scanners to the voting precinct on election day. Using carefully planned logistics, there would be no need to set up the equipment at the precincts the day before the election.
2. Each voting location (as opposed to each precinct) would be furnished with two optical scan units. Currently, Elections manages 749 voting precincts in 539 voting locations throughout the County. Additional units would be deployed as needed, or where precincts are very large.
3. Voters would cast their votes on paper ballots after which the ballot would be scanned. The County retains the paper ballot for a period of two years.

4. The optical scanner rejects spoiled ballots and emits an alert to the operator that the ballot has been rejected. Consequently, if ballots are scanned as each voter completes the voting process, before the voter leaves the precinct, the voter can be afforded an opportunity to complete a new ballot in the event their ballot is rejected. While this option may be more time consuming, it could contribute to increased voter confidence and process integrity.
5. Once voting is completed and the polls closed, the paper ballots and the data from the scanning units are delivered to the central location for final tally.
6. Absentee ballots would continue to be scanned using the existing equipment supplied by ES&S. New or updated systems would be competitively procured, as required.
7. All scanning equipment would be returned to the central warehouse for storage.
8. Staff would be trained in the operation and maintenance of the equipment, the simplified voting process and the new security requirements

6. COST ANALYSIS

Assumptions

For the purposes of this analysis, the following assumptions were made.

1. Only two optical scanning units are deployed to each voting location.
2. Elections would continue to use the same ratio of iVotronic machines per precinct based on the number of voters. The current ratio is 200 voters per machine.
3. Both the iVotronic and optical scan equipment require data to be retrieved at the precinct, and delivered to a central location for final tallying.
4. County time and labor expenses are expected to escalate at 8% to cover salaries, benefits and cost of living adjustments.
5. The cost of funds for this analysis is 4.5%, material inflation is 5% while other costs are inflated at 3%.
6. The County deploys different levels of resources for presidential, gubernatorial and other elections based on expected voter turnout (50% to 60% turnout for gubernatorial and 70% for presidential elections).
7. On the average, municipal elections cost $105,000 and $78,750 respectively for touch screen and optical scan technologies.
8. For this analysis, no residual value was included in the cost analysis for the iVotronic machines the County currently owns. The County is expected to contemplate trade-in or sale of the existing system in the future.

Capital Costs

Continuing use of the iVotronic system will require that the County purchase approximately 1,000 additional machines to substitute broken machines during, to

facilitate run-off elections, for training, and to facilitate early voting. These units will be required only during presidential elections. At a cost of $4,000 each, this would require an investment of $4 million and would require an additional $1 million to purchase peripheral equipment such as batteries and communication packs.

If the County chooses to purchase optical scan machines, in order to prepare for the presidential or other elections where high voter turnout is expected, a total of 1,600 optical scanning machines will be required. This assumes the County would place two scanning units at each of the established 539 polling places. The County would use the remaining 522 machines for early voting, spare units, run-off elections and training. The list price for optical scanners ranges from $4,200 to $6,000 per unit. At a cost of $4,200 per unit, these scanners will cost $6.72 million in the first year in addition to $1.69 million for peripherals, warranties, training and support services. Additionally, the switch to optical scan technology requires the County to invest in approximately 7,500 voting booths at a cost of $130 per booth for a total of $975,000. The total capital investment required for switching to optical scanners assuming a unit price of $4,200 and the cost of associated peripheral equipment is $9.4 million. At $6,000 per unit, the capital requirement increases to approximately $12.3 million including the cost of peripherals equipment.

Cost of Conducting Elections in Miami-Dade County

Using recent election experiences and based on the elections processes outlined above, Elections estimated the cost of conducting elections as shown in Table 6. Details of line item costs for both the iVotrinic and optical scan options are also presented in Attachments 2 and 3.

Table 6
Election Operating Cost Comparisons
Touch Screen vs. Optical Scan Technology by Election Type

Expenditure	Presidential Election (2004)		Special/Countywide Election (March 2005)		Primary Gubernatorial (2004)	
	Touch Screen Technology*	Optical Scan	Touch Screen Technology	Optical Scan	Touch Screen Technology	Optical Scan
Personnel (Time and Labor)	4,184,581	3,071,300	1,770,185	1,338,944	2485127	1899524
Precinct/Training Location Costs	55,529	55,529	66,513	66,513	67316	67316
Transportation	121,307	13,479	48,399	10,000	91521	10000
Advertisement and Promotion	383,323	383,323	58,498	58,498	377951	377951
Printing, Postage and Office Suppli	2,063,317	1,209,212	169,230	159,380	704866	683614
Communications and Security	461,669	393,419	305,317	229,231	335207	278932
Total Expenditure	**7,269,726**	**5,126,262**	**2,418,142**	**1,862,566**	**4,061,988**	**3,317,337**

* The toal cost for the 2004 presidential election excludes vendor concessions but includes $287,000 in in-kind services from other departments.

Source: Miami-Dade County Elections Department

In the case of presidential elections, the County spent $7.3 million using the ES&S iVotronic machines compared to an estimated $5.1 million if optical scan technology had been used. It should be noted however, that these costs also include the cost incurred by supporting County departments that are not directly charged to the

Elections Department during the 2004 presidential elections. Additionally, the total includes vendor concessions made subsequently.

In the case of special and countywide elections it is estimated that the County spends approximately $2.4 million per election using the iVotronic touch screen system compared to a projected total of $1.9 million using an optical scan system. During primary and gubernatorial elections where the Department needs to deploy more resources and machines than in a special election, the cost of conducting the election using the touch screen technology is estimated at $4 million compared to $3.3 million using optical scanners. The major cost differential between the systems includes the following.

a. Elections estimated that the use of optical scan systems will not require precincts to be set up the night before an election and will therefore result in significant time and labor savings.
b. Elections estimates that precinct location costs are reduced because of the reduction in training site rentals required to retrain staff in the use and management of the more complex touch screen system.
c. Printing and postage costs are projected to decrease considerably because the need to print paper ballots as a back-up to the iVotronic machines is eliminated.
d. Elections logistics will be simplified and general support requirements will decrease.

Table 7 summarizes the five-year total cost of conducting elections in the County. Based on previous and planned elections, the estimates include the costs for conducting 30 or more elections per year and either a presidential or gubernatorial election during even years starting in 2006. More than 90% of all elections each year will be lower cost municipal elections.

Using the touch screen technology, it is estimated that the County will spend approximately $78.5 million in operating costs over the next five years. Should the County continue to use the touch screen system, the County would need 1,000 additional machines at a cost of $5 million prior to the 2008 presidential election. With the inclusion of this capital cost and the outstanding debt on existing iVotronic machines, the five-year total cost estimate is $104.1 million. Additional details of the yearly cost estimates using the iVotronic touch screen system are included in Attachments 4.

Table 7
Estimated Elections Costs
Five Year Total Cost Comparison
(2006 through 2010)

Expense	iVotronic Touch Screen System	Optical Scan System	Variance
Personnel (Time and Labor)	$ 39,892,091	$ 30,206,497	$ 9,685,595
Precinct/Training Location Costs	1,073,407	1,073,407	-
Transportation	1,171,125	166,481	1,004,644
Advertisement and Promotion	3,552,235	3,552,235	-
Printing, Postage and Office Supplies	8,674,056	7,457,261	1,216,794
Communications and Security	5,537,527	4,504,721	1,032,807
Municipal Elections	18,630,771	13,973,078	4,657,693
Total 5-year Election Cost	$ 78,531,213	$ 60,933,680	17,597,533
Existing Debt	$ 20,580,000	$ 20,580,000	-
Capital Investment	$ 5,000,000	$ 9,385,270	(4,385,270)
Total Cost	$ 104,111,213	$ 90,898,950	$ 13,212,263

Using optical scan technology and paper ballots to deliver elections requires from $9.4 million to $12.3 million in capital investment depending on the vendor and the type of scanning machine selected. Operating costs over the five-year period 2006 through 2010 are estimated to be $60.9 million, or $17.6 million less than the cost of operating the touch screen system.

However, the County continues to make debt service payments on outstanding capital used to purchase the touch screen machines. Currently, seven years remain on the debt service payments for a total of $20.6 million. Consequently, if the County switches to the optical scan technology, invests $9.4 million in new optical scan equipment and pays the outstanding debt, the net five-year savings is estimated to be $13.2 million compared to the cost of continuing to use the touch screen system. Additional details of the yearly cost estimates using the optical scan system are included in Attachment 5.

7. DISCUSSION

The analysis suggests that the cost of conducting elections in Miami-Dade County can be significantly reduced by replacing the existing touch screen technology with an optical scan system. The analysis focused on a review of the costs and benefits of the equipment, and procedural changes needed in order to begin using an optical scan system. Based on the findings of the market research and the operating cost estimates provided by the Elections Department, over a 5-year period, the use of optical scan technology in conjunction with paper ballots can realize operational savings of more

than $17.5 million and overall savings of $13.2 million.

In assessing the option to use paper ballots with optical scanners in lieu of the touch screen system, the following should be considered.

1. The cost for printing and production of paper ballots may escalate depending on the type of paper ballots employed (such as indelible ballots).
2. The cost of technical support and associated election process logistics to create and manage databases to tabulate, compile and tally votes from different races in a single election. Elections will require significant technical support prior to, during, and after the elections for troubleshooting, ballot preparation and loading, and database assistance.
3. The cost estimates, pricing and support services required provided by in this analysis will have to be refined in the future to more clearly define and cost the tasks required to deliver elections in the county using optical scan technologies for the various types of elections.

In addition, the County recognizes that use of the paper ballots may be somewhat less convenient for some persons with disabilities, as they may need additional assistance in voting. Consequently, the County could continue to use touch screen machines in order to meet ADA requirements only. Other disadvantages associated with the optical scan technology include the significant cost of printing paper ballots, the need to retain ballots for two years, and the storage of bulky scanning machines. Not withstanding these storage issues, the warehousing needs will be much less than Elections currently requires for storing the iVotronic machines.

ATTACHMENTS

Attachment 1
Sample Pricing for Election Voting Systems

Diebold Election Systems

ALL ITEMS WILL BE SHIPPED FREIGHT F.O.B. And a Performance bond will also be included as part of the package.	REQUIRED QUANTITY	PRICE EACH	EXTENDED PRICE	RECOMMENDED QUANTITY	PRICE EACH	EXTENDED PRICE
AccuVote-OS Tabulators (Optical Scanners)	1,500	$ 4,200.00	$ 6,300,000.00	660	$ 4,200.00	$ 2,772,000.00
AccuVote-TS VIBS Units (Touch Screen)	1,000	$ 3,295.00	$ 3,295,000.00	850	$ 3,295.00	$ 2,800,750.00
AccuFeed - AF Units (High Volume Readers)	4	$ 3,125.00	$ 12,500.00	8	$ 3,125.00	$ 25,000.00
GEMS Application Software	1	$ 956,000.00	$ 956,000.00	1	$ 956,000.00	$ 956,000.00
Security Enhancement Software Application	1	$ 10,000.00	$ 10,000.00	1	$ 10,000.00	$ 10,000.00
Touch Screen Application Software	1,000	$ 100.00	$ 100,000.00	850	$ 100.00	$ 85,000.00
Optical Scan Application Software	1,500	$ 100.00	$ 150,000.00	660	$ 100.00	$ 66,000.00
Large Central Server Systems with Backup	2	$ 12,481.13	$ 24,962.26	2	$ 12,481.13	$ 24,962.26
Report Printers	4	$ 1,496.25	$ 5,985.00	4	$ 1,496.25	$ 5,985.00
Ethernet Hubs	4	$ 150.00	$ 600.00	4	$ 150.00	$ 600.00
Support	1	$ 500,000.00	$ 500,000.00	1	$ 500,000.00	$ 500,000.00
Training (Included with package purchase)	0		$ -	0		$ -
Installation and Testing (Included with package purchase)	0		$ -	0		$ -
Voter Awareness Program	0		$ -	0		$ -
Precinct Voter Card Encoder	1,000	$ 395.00	$ 395,000.00	850	$ 395.00	$ 335,750.00
Voter Cards	4,000	$ 3.50	$ 14,000.00	3,400	$ 3.50	$ 11,900.00
Supervisor Cards	2,000	$ 4.00	$ 8,000.00	1,700	$ 4.00	$ 6,800.00
Ballot Transfer Bags	1,500	$ 35.00	$ 52,500.00	660	$ 35.00	$ 23,100.00
Marking Pens (dozen each)	1,500	$ 6.95	$ 10,425.00	660	$ 6.95	$ 4,587.00
Secrecy Sleeves (10 per pkg) 18"	1,500	$ 42.50	$ 63,750.00	660	$ 42.50	$ 28,050.00
Warehouse Carts	200	$ 336.00	$ 67,200.00	170	$ 336.00	$ 57,120.00
Spare OS Memory Cards	1,500	$ 250.00	$ 375,000.00	660	$ 250.00	$ 165,000.00
Spare PCMCIA Memory Cards	1,000	$ 135.00	$ 135,000.00	850	$ 135.00	$ 114,750.00
Spare OS Paper Rolls	1,500	$ 1.00	$ 1,500.00	660	$ 1.00	$ 660.00
Spare OS Ribbons	1,500	$ 3.00	$ 4,500.00	660	$ 3.00	$ 1,980.00
Ender Cards	3,000	$ 15.00	$ 45,000.00	1,320	$ 15.00	$ 19,800.00
Diagnostic Cards	300	$ 15.00	$ 4,500.00	200	$ 15.00	$ 3,000.00
Spare TS Tape Rolls	1,000	$ 1.00	$ 1,000.00	850	$ 1.00	$ 850.00
Famous Names Memory Card	30	$ 255.00	$ 7,650.00	30	$ 255.00	$ 7,650.00
Tags for AccuVote-OS Units	1,500	$ -	$ -	660	$ -	$ -
Wrist Band Key Rings	1,500	$ -	$ -	660	$ -	$ -
Key Cap - black	1,500	$ -	$ -	660	$ -	$ -
Warranty - OS	1	$ 337,500.00	$ 337,500.00	1	$ 337,500.00	$ 337,500.00
Warranty - TS	1	$ 86,000.00	$ 86,000.00	1	$ 86,000.00	$ 86,000.00
Voting Booths with lights PollMaster2 (New)	7,500	$ 167.00	$ 1,252,500.00	7,500	$ 167.00	$ 1,252,500.00
Total Estimated Price			$ 14,216,072.26			$ 9,703,294.26

Election Systems and Software, Inc. (ES&S)

Model #100 (Optical Scanner Units)	1	$ 5,200.00		

Attachment 2
Estimated Election Operating Costs Using Existing Touch Screen System

Expenditure	Election Type: Presidential Election (2004)	Special/Countywide Election (March 2005)	Primary Gubernatorial (2004)
Personnel (Time and Labor)			
Seasonal Employees	1,306,497	439,869	593,868
Overtime Payroll	1,439,955	311,875	788,715
Poll Workers (Non-County and County)	1,151,341	826,490	811,362
Interdepartmental Staff Support	286,788	191,951	291,182
	4,184,581	1,770,185	2,485,127
Precinct/Training Location Costs			
Polling Place/Training Sites Rentals	55,529	66,513	67,316
	55,529	66,513	67,316
Transportation			
Vehicle Rentals	121,307	48,399	91,521
	121,307	48,399	91,521
Advertisement and Promotion			
Legal Ads and Publications	325,323	58,498	240,310
Radio/TV/Cable Advertising	58,000		137,641
	383,323	58,498	377,951
Printing, Postage and Office Supplies			
Postage	415,759	25,867	367,022
Ballot Printing	1,402,905	47,286	145,070
Printing Charges (Signs, flyers, booklets)	152,747	56,871	82,300
Office Supplies	28,439	2,000	14,666
Elections General Supplies	63,467	37,206	95,808
	2,063,317	169,230	704,866
Communications and Security			
Telephone ETSD	112,967	38,782	92,445
Cellular Telephones	38,056	26,625	35,848
GSA Security	174,146	135,024	94,364
Vendor Support	136,500	104,886	112,550
	461,669	305,317	335,207
Total Election Cost*	$ 7,269,726	$ 2,418,142	$ 4,061,988

* Excludes vendor concessions and includes $287,000 in departmental in-kind for the presidential election in 2004

Source: Miami-Dade County Elections Department

Attachment 3

Estimated Election Costs Using an Optical Scan System

Expenditure	Election Type: Presidential Election (2004)	Special/Countywide Election (March 2005)	Primary Gubernatorial (2004)
Personnel (Time and Labor)			
Seasonal Employees	970,779	388,305	431,098
Overtime Payroll	1,149,740	268,124	711,050
Poll Workers (Non-County and County)	721,351	528,954	524,430
Interdepartmental Staff Support	229,430	153,561	232,946
	3,071,300	1,338,944	1,899,524
Precinct/Training Location Costs			
Polling Place/Training Sites Rentals	55,529	66,513	67,316
	55,529	66,513	67,316
Transportation			
Vehicle Rentals	13,479	10,000	10,000
	13,479	10,000	10,000
Advertisement and Promotion			
Legal Ads and Publications	325,323	58,498	240,310
Radio/TV/Cable Advertising	58,000		137,641
	383,323	58,498	377,951
Printing, Postage and Office Supplies			
Postage	415,759	25,867	367,022
Ballot Printing	555,000	47,286	145,070
Printing Charges (Signs, flyers, booklets)	152,747	56,871	82,300
Office Supplies	28,439	2,000	12,566
Elections General Supplies	57,267	27,356	76,656
	1,209,212	159,380	683,614
Communications and Security			
Telephone ETSD	112,967	38,782	92,445
Cellular Telephones	38,056	26,625	35,848
GSA Security	174,146	135,024	94,364
Vendor Support	68,250	28,800	56,275
	393,419	229,231	278,932
Total Election Cost	$ 5,126,262	$ 1,862,566	$ 3,317,337

Source: Miami-Dade County Elections Department

Attachment 4

Estimated Five-Year Cost of Conducting Elections Using Existing Touch Screen Technologies

Expenditure/Year	2006	2007	2008	2009	2010
Personnel (Time and Labor)					
Seasonal Employees	1,757,813	1,026,126	3,696,123	1,196,874	2,391,486
Overtime Payroll	2,040,449	727,542	4,193,909	848,605	2,776,009
Poll Workers (Non-County and County)	2,645,151	1,928,036	4,535,662	2,248,861	3,598,699
Interdepartmental Staff Support	836,260	447,783	1,336,684	522,294	1,137,723
	7,279,674	4,129,488	13,762,379	4,816,634	9,903,916
Precinct/Training Location Costs					
Polling Place/Training Sites Rentals	211,202	146,661	297,132	161,694	256,718
	211,202	146,661	297,132	161,694	256,718
Transportation					
Vehicle Rentals	243,013	106,720	408,350	117,659	295,384
	243,013	106,720	408,350	117,659	295,384
Advertisement and Promotion					
Legal Ads and Publications	566,074	128,988	1,000,699	142,209	688,066
Radio/TV/Cable Advertising	289,046	-	385,816	-	351,337
	855,120	128,988	1,386,514	142,209	1,039,404
Printing, Postage and Office Supplies					
Postage	797,907	57,037	1,360,985	62,883	969,860
Ballot Printing	354,297	104,266	2,014,651	114,953	430,651
Printing Charges (Signs, flyers, booklets)	232,545	125,401	433,204	138,254	282,659
Office Supplies	32,899	4,410	69,192	4,862	39,988
Elections General Supplies	240,263	82,039	338,361	90,448	292,041
	1,657,910	373,152	4,216,393	411,400	2,015,200
Communications and Security					
Telephone ETSD	234,856	85,514	389,702	94,280	285,468
Cellular Telephones	103,237	58,708	157,873	64,726	125,485
GSA Security	349,652	314,984	627,208	367,397	475,698
Vendor Support	338,438	248,173	531,144	273,610	411,374
	1,026,183	707,379	1,705,927	800,013	1,298,025
Municipal Elections	$ 3,288,600	$ 3,429,216	$ 3,439,014	$ 3,999,838	$ 4,474,104
Total Election Operating Cost	$ 14,561,702	$ 9,021,604	$ 25,215,709	$ 10,449,447	$ 19,282,751

Attachment 5

Estimated Election Costs Using an Optical Scan System

Expenditure/Year	2006	2007	2008	2009	2010
Personnel (Time and Labor)					
Seasonal Employees	1,350,541	905,838	2,798,173	1,056,569	1,837,396
Overtime Payroll	1,825,442	625,480	3,577,537	729,559	2,483,494
Poll Workers (Non-County and County)	1,704,039	1,233,944	2,896,286	1,439,272	2,318,326
Interdepartmental Staff Support	669,009	358,227	1,069,348	417,836	910,180
	5,549,031	3,123,489	10,341,344	3,643,237	7,549,396
Precinct/Training Location Costs					
Polling Place/Training Sites Rentals	211,202	146,661	297,132	161,694	256,718
	211,202	146,661	297,132	161,694	256,718
Transportation					
Vehicle Rentals	31,500	22,050	50,332	24,310	38,288
	31,500	22,050	50,332	24,310	38,288
Advertisement and Promotion					
Legal Ads and Publications	566,074	128,988	1,000,699	142,209	688,066
Radio/TV/Cable Advertising	289,046	-	385,816	-	351,337
	855,120	128,988	1,386,514	142,209	1,039,404
Printing, Postage and Office Supplies					
Postage	797,907	57,037	1,360,985	62,883	969,860
Ballot Printing	354,297	104,266	1,033,095	114,953	430,651
Printing Charges (Signs, flyers, booklets)	232,545	125,401	433,204	138,254	282,659
Office Supplies	28,489	4,410	64,330	4,862	34,628
Elections General Supplies	189,701	60,320	275,440	66,503	230,583
	1,602,938	351,433	3,167,054	387,455	1,948,382
Communications and Security					
Telephone ETSD	234,856	85,514	389,702	94,280	285,468
Cellular Telephones	103,237	58,708	157,873	64,726	125,485
GSA Security	349,652	314,984	627,208	367,397	475,698
Vendor Support	152,658	67,185	264,036	78,364	207,690
	840,403	526,391	1,438,819	604,767	1,094,341
Municipal Elections	$ 2,466,450	$ 2,571,912	$ 2,579,260	$ 2,999,878	$ 3,355,578
Total Election Cost	$ 11,556,645	$ 6,870,924	$ 19,260,455	$ 7,963,550	$ 15,282,107

Memorandum

MIAMI-DADE COUNTY

Date: May 27, 2005

To: George M. Burgess
County Manager

From: Lester Sola
Supervisor of Elections

Subject: Elections Department review

I want to update you regarding a number of directives that you issued me in your memorandum dated April 4, 2005. Due to the volume of information necessary to respond and issue a recommendation regarding our voting equipment and a possible conversion to optical scan equipment, I have addressed that issue under separate cover. This memorandum covers the balance of the directives that you issued me.

Directive: **Develop controls in the management of election coding.**

Action taken: As you suggested, we have developed a detailed checklist to be used in the coding of elections. The list includes the issue that led to the coding problem that caused up to 476 undervotes in the March 8, 2005, Special Election, as well as all other critical decisions that are made during the election coding process. I have ensured that one qualified individual is always in charge of coding a given election. That person must sign off on the coding, and then another member of the tabulation room staff performs a quality assurance review, following the checklist and signing off on the coding, as well. Subsequently, personnel from the Enterprise Technology Services Department (ETSD), who I believe were previously underutilized by this Department given their expertise, review and approve the coding, as well. ETSD is an entity independent of this Department that has both developed many of our procedures and ensures that our personnel follow those procedures. Additionally, I have directed that the project manager from our vendor, Election Systems & Software (ES&S), be sufficiently involved in the process to be able to sign off on the coding and, importantly, be capable of being held accountable, as well.

I also strongly believe that we should utilize all information available to us to cross-check our work and detect any other potential coding or tabulation issues. To that end, I have already implemented a new procedure by which we compare the number of votes cast as reported on our audit logs to the precinct totals *before* certification of an election. We have already used this new procedure with the municipal elections we have coded this month and will continue doing so for all elections.

As you also suggested, we have expanded the testing parameters of our Logic and Accuracy Test to include the "abandoned ballot" scenario – ensuring that even the votes of voters who leave the booth without pressing the red "vote" button count as would any other vote. On March 8th and in five other municipal elections, these votes would have been recorded as undervotes. We are extremely fortunate that, based on our subsequent analysis, this situation did not impact the ultimate outcome of any elections, but we simply cannot afford to run such a risk. We have already implemented this change in our testing for every election, from our County's smallest municipalities to Countywide elections.

I am also extremely pleased to announce the appointment of our new Supervisor of Elections for Electronic Voting, Mr. Michael M. Johnson, who joined the department May 23rd. Mr. Johnson has a wealth of experience ranging from programming computers at NASA to serving as the proprietor of a company that trained thousands of employees following the difficult September 2002 election in preparation for the successful November 2002 election. We expect that his combination of a deep understanding of technology in general and our election system in particular, along with his excellent communication skills and ability to impart his knowledge on others, will be an asset to our Department

Directive: **Increase training of all staff in critical areas.**

Action taken: Our tabulation room is the "nerve center" of our electronic voting operation, and as such, we have already re-trained personnel in that area to avert future issues such as that which I referenced above. My observation is that training was previously less formal, with more experienced personnel sharing knowledge with less experienced personnel. We have now formalized the training process so that all personnel in this critical area understand all aspects of coding and tabulating an election, which should significantly reduce the possibility of similar errors occurring in the future. Tabulation room staff now understand the impact of each decision they make, and that understanding, coupled with the quality assurance measures I described above, should greatly increase the integrity of our processes.

Additionally, I have scheduled my management staff to attend similar training sessions. Managers can only effectively supervise if they themselves have an intimate understanding of the tasks performed by their subordinates. As you suggested, we have significantly increased not only the amount, but also the quality, of our training.

Because of well-publicized issues, the tabulation room is the most visible of our critical areas, but it is by no means the only one, which is why I am instituting similar improvements in other Department divisions. For example, within our absentee voting section, the Deputy Supervisor in charge of that operation has assessed the lessons learned during last year's election cycle. She has identified several distinct, key phases of the process, and each phase now has a detailed manual that serves as a guide for conducting structured training sessions. My observation is that the Department previously conducted some quality training, but we must do so on a consistent, rather than ad hoc, basis. We are currently compiling a Department-wide standard operating procedures manual to serve as a guide to all employees.

Directive: **Work closely with the Enterprise Technology Services Department (ETSD) to analyze the electronic voting system.**

Action taken: As I mentioned above, I have given ETSD personnel full access to our tabulation room and involved them in the coding and tabulation of elections, as well in critical quality assurance measures. They are also highly involved in other information technology areas of our Department and are ensuring that we conform to County standards so that they may effectively support our operation. They have already provided important recommendations, and I will continue to value their input. Miami-Dade County is fortunate to

have resources such as ETSD, along with experts in other departments such as Audit and Management Services (AMS), and as you may have already noticed, I have embraced your offer of their support and independent analysis. **I believe in full disclosure and transparency.** I would always prefer to be aware of issues so that I can effectively address them than simply hope that such issues do not exist. ETSD, AMS and my own staff know that they should always be forthcoming with any concerns, and I will take seriously their input and provide all necessary guidance and support to resolve any situation.

Directive: **Assess the organizational structure of the Department and realign functions to better meet our voters' needs.**

Action taken: I have submitted to you, for your review and approval, a revised Table of Organization that more logically aligns functions in our department. It also provides the necessary flexibility to accommodate the highly cyclical nature of this Department. As Chief Deputy Supervisor of Elections, I observed that the Department hired hundreds of seasonal employees during last year's peak election cycles, and the necessary supervision to guide these less experienced workers was often lacking. As such, I have proposed the addition of several supervisory positions. These workers will be able to serve as "line workers" during less busy periods and supervisors of seasonal employees during busier periods. Additionally, in some cases, the Department actually expended more in seasonal and overtime costs than it would have spent to add several new positions, and in these cases, I have proposed adding those positions.

I also continue looking for other opportunities to further reduce our reliance on seasonal labor for certain processes. For example, mail sorting technology has improved in quality and come down in price to a level that some relatively low-cost equipment may be able to significantly reduce the need for seasonal employees to assist in what is currently a heavily labor-intensive absentee ballot sorting, mailing and processing procedure. Whenever I identify an opportunity to improve the efficiency and effectiveness of our processes, while allowing our permanent employees to focus more on "voter contact" activities that only human beings can accomplish, I will pursue such opportunities.

Directive: **Work with community groups to develop concepts and discuss ideas and concerns about our voting system.**

Action taken: I have already convened a productive meeting with the Miami-Dade Election Reform Coalition, where members pledged to assist the Department as we move forward with our analysis of our voting system and other important opportunities for reform. I assured members that I share their passion for democracy and for identifying feasible ways in which we can improve the integrity of our processes. They have provided valuable input of which we will be mindful. For example, with respect to our consideration of a conversion to optical scan voting equipment, they have pointed out that while many members of the community would welcome such a change away from touch screen equipment, many of our disabled neighbors have embraced our audio-equipped, ADA-compliant iVotronic units. We are, of course, aware of the importance of meeting the needs of our entire community to the extent possible, and

input such as that from people who know the "pulse" of many different segments of the voting community assists us as we constantly seek to fully enfranchise all of our voters.

Democracy works best when we all participate, and the views of our community – members of organized groups as well as the many individuals from across the County who call and write to me, and whose views I carefully consider as I make decisions and recommendations to you – can only serve to strengthen our operation. I genuinely consider these groups and individuals to be our allies as we all work together to better serve our voters, and I will continue to actively seek their participation and input. It is important to me that we provide an audience to every voice of concern. It is only by truly listening to all stakeholders that we can develop an approach to address their concerns.

Directive: **Continue to increase voter outreach to improve voter awareness and confidence.**

Action taken: Our outreach division has long been a source of pride for this Department, and in fact, our outreach staff have most recently served as important "eyes and ears" in the community as we proceeded with our voting equipment analysis and wanted to know how the community – and the many diverse communities *within* our greater community – feel about our equipment. On an ongoing basis, our trilingual outreach staff registers new voters and teaches all voters how to use our voting equipment. They visit senior centers, churches, synagogues, shopping centers and schools, where they do their part to motivate soon-to-be-voters about the importance of participating in our democracy. Our enthusiastic staff attempt to never turn down an invitation to present information in any venue, and I have informed them that I support that approach and that if they ever identify a way in which they can more fully serve our voters, they should approach me and I will redistribute resources in any way possible to ensure that we are in constant contact with voters and potential voters. I have also encouraged them to continue thinking of creative ways to reach out to the hardest-to-reach members of our community.

Conclusion

I am fully cognizant of the importance of the position to which you have appointed me, and I am excited about the opportunity to truly make a difference. With your unwavering support and the cooperation of many members of our County family, I believe we have already made significant progress, and I look forward to continuing to make improvements whenever I identify opportunities to do so. If you have any further ideas, I will welcome and embrace them, just as I will continue to value the input of dedicated County employees and residents throughout the County.

If you have any questions or require any additional information, please do not hesitate to contact me.

cc: Alina Tejeda Hudak, Assistant County Manager
Cathy Jackson, Director, Audit and Management Services
June Randall, Deputy Director, Enterprise Technology Services Department