

RANKED CHOICE VOTING

Report on the use of Election Systems and Software's Ranked Choice Voice voting system in San Francisco in the November, 2004 General Election

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I. SUMMARY

Procedures, hardware, firmware and software developed by Election Systems and Software for a Ranked Choice Voting (RCV) voting system utilizing the Optech III-P Eagle and Optech IV-C optical scan systems consisting of:

1. ES&S Unity Version 2.4.2
 - a. Election Data Manager (EDM) V. 7.2.1.3 (RCV mod.)
 - b. Audit Manager (AM) V. 7.0.2
 - c. Optech Image Manager V. 3.2.0.0
 - d. Hardware Programming Manager (HPM) V. 5.0.3.2 (RCV mod.)
 - e. Data Acquisition Manager (DAM) V. 5.0.3.0
 - f. Election Reporting Manager (ERM) V. 6.4.3.2b (RCV mod.)
 - g. RMCOBOL (COTS) V. 7.50.01
 - h. COBOL-WOW (COTS) V. 3.12.00
2. ES&S Optech Ballot Scanners
 - a. IV-C, Model 400, Central Ballot Counter, Firmware V 1.08c (RCV mod.)
 - b. Eagle III-P Precinct Ballot Counter
3. IDA Board with PIC Micro Controller, Firmware V. RCV 74r1
 - a. HPS EEPROM, Firmware V. 1.30 (RCV mod.)
 - b. BIT EEPROM, Firmware V. 1.10 (RCV mod.)
4. Other Hardware
 - a. ES&S Memory Packs, APS EEPROM, Firmware V. 1.52RCV (RCV mod.)
 - b. Peripherals to a PC supporting Unity 2.4.2 RCV
 - i. Memory Pack Reader (MPR)/IDA with PIC Micro Controller IDA 1.02.01
 - ii. OmniDrive Pro (to upload PCMCIA card ballot images to ERM)

This system was previously certified in April of 2004 (original certification modified in both July and November of that year). The certification was conditional for one time use in San Francisco. The certification also required that a report be submitted to the VSPP to assess the feasibility and reliability of this system for potential use in future elections.

To aid in the drafting of that report, staff requested that San Francisco submit a report on the use of the system. To date, the county has not yet submitted that report. This limited the ability of staff to make recommendations as to the use of the system in future elections.

The staff report consists of four parts:

1. Status of conditions for certification
2. Review of approved modifications to ERM
3. Public Comment
4. Recommendations

II. GENERAL RESOLUTIONS

There were nine conditions attached to the certification.

- A. “The RCV modification shall/may only be used on a one-time basis in San Francisco’s November 2004 Election.”**

The system was used and did successfully conduct the November 2004 general election in San Francisco. This success did require some late changes to the system to be administratively approved. This is discussed in further detail in Section III.

- B. “The source code for the Optech III-P Eagle, Optech IV-C, Memorypack, and Intelligent Device Adapter firmware must be submitted for federal review and testing and results must be received by May 10, 2004. The review must include code that currently:**
- i. May be used to gain unlawful control of the program;**
 - ii. Provides executable path(s) to other code; and**
 - iii. Modifies other code or moves data/code into an executable location.”**

The aforementioned source code was submitted and reviewed. However, this review was not completed by the May 10, 2004 date. This required a modification to the certification to extend the deadline, which was done in July 2004.

- C. “ES&S, working in conjunction with the City and County of San Francisco, is required to amend the system’s procedures to enable and require creation of a detailed audit log to replace the unacceptable current audit log of the software.”**

Revised procedures were created to supplement the deficient audit log. Staff expects this process will be further detailed in the report from the County on the use of the system.

- D. “The RCV components may only be used with State certified equipment.”**

The underlining non-RCV components have various levels of state certification. Some of these components are not federally qualified and have a limited state certification. The vendor has committed to submit a long-term plan for these components by April 15, 2005.

- E. “Procedures produced by ES&S must be adopted prior to September 1, 2004 to address how to resolve tie votes and the detailed process for doing so.”**

The County and vendor developed a process to break ties after the completion of voting. Staff expects this process will be further detailed in the report from the County on the use of the system.

- F. “Voter education to ease potential voter confusion, with an emphasis on ballot layout design, is to begin as soon as the system is designed and available as it is intended to be used.”**

The County did conduct a voter education program on the RCV system. Staff expects this process will be further detailed in the report from the County on the use of the system.

- G. “Actual voted ballots must be used for recounts; ballot records and images may not be used to satisfy the mandatory 1% manual recount required by state law.”**

The County did use actual voted ballots for the 1% manual recount.

- H. “A representative from the Secretary of State’s Office must observe the first election in which the system is used. A report will be submitted to the VSP Panel to assess the feasibility and reliability of this system for potential use in future elections.”**

Both Mark Kyle and Gina Simi from the Secretary of State’s office observed the November, 2004 election in San Francisco. In addition Michael Wagaman observed the post-election RCV process. As previously discussed, the ability to make a recommendation for the future potential use of the system is limited by the lack of a report on the use of the system by the County.

- I. “The City and County of San Francisco is urged to prepare separate ballots for ranked choice voting in order to avoid potential voter confusion when casting ballots in elections that have both traditional and ranked choice voting options.”**

The County used a separate ballot card for the RCV contests.

III. REVIEW OF APPROVED MODIFICATIONS TO ERM

Prior to the November election, representatives from Election Systems and Software (ES&S) notified the Secretary of State that two limitations had been found with the system.

1. The RCV algorithm could only be run 19 times. If the resolution of a particular contest required the algorithm to be run for 20 or more times, the system could not accommodate that need.
2. The RCV algorithm could not process a tie involving more than four candidates. If a tie involving more than four candidates occurred, only four of the candidates’ names would appear on the resolution screen.

The vendor requested testing and administrative approval of these changes prior to the November election. Due to limited staff resources because of the upcoming election, such testing and approval was not granted. Rather, staff informed the vendor that those changes would be considered after the election if they became necessary to resolve the election.

When the unofficial election results were received on the evening of November 2, 2004, it was realized that in one contest the algorithm would need to be run 20 times. There were no problems related to tie votes.

On November 3, 2004, staff from the Secretary of State's office asked ES&S to submit the source code for a modified version of the ERM component to resolve the 19-algorithm problem. Staff requested that the vendor not include the change to the tie vote resolution as that was a more extensive change and would have delayed the approval process. The source code was reviewed by the state's technical consultant, Steve Freeman, who confirmed the change was very minor and only affected a few lines of code. Based on his recommendation, administrative approval for the change (ERM version 6.4.3.2a) was issued.

When the county began importing the ballot images into the newly approved system, another problem was discovered.

3. The number of ballot images that had been recorded was not matching the number of ballots being counted by the RCV component.

This problem halted the tabulation process. On November 3rd and 4th, the vendor attempted to diagnose the source of the problem. They eventually identified the problem as being an artificial limitation to the number of ballot images that could be imported into the central tabulation system at one time. This problem was unrelated to the previously approved change.

The vendor submitted a modification to remove this limitation (ERM version 6.4.3.2b). The source code for that change was reviewed by the state's technical consultant who confirmed the change was very minor and only affected a few lines of code. Based on his recommendation, administrative approval for the change was issued on November 5, 2004. This version successfully tabulated the results of the election.

IV. PUBLIC COMMENT

In response to the public meeting notice being issued and allowing for written submissions, staff has received three correspondences specific to this item.

Two of the correspondences touted RCV elections and advocated the approval of such systems. The third correspondence raised objections to the form of the Statement of Vote for RCV elections in San Francisco while also calling for the state to draft regulations and/or legislation to address those concerns.

V. RECOMMENDATIONS

The vendor has a current request for administrative approval to extend the certification of the modified RCV system until the end of 2005.

Staff recommends that no action be taken on that request until the County has submitted its report on the use of the system in the November 2004 election.