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California Secretary of State Hearing- "The Future of Voting in California: The People, the Equipment, the Cost"

February 8, 2010

Introduction

Secretary Bowen, on behalf of the U.S. Election Assistance Commission (EAC), I thank you for inviting me to speak to you today on the future of voting in California. As you know, I serve as the Director of the EAC's Testing and Certification Division. My division oversees the EAC's for the testing, certification, decertification, and recertification of voting system hardware and software by accredited laboratories mandated under Section 231 of the Help America Vote Act. I believe our program provides a unique perspective into the future of California elections through our ability to view the voting system industry as a whole rather than seeing it as most states or local jurisdictions see it in dealing with a limited number of voting systems and voting system manufacturers.

I'll speak today very briefly about our program in general and some of the challenges we have faced during our first several years of operation and then move on to discuss what I see as the two biggest challenges facing the EAC's program as it moves toward the future.

EAC Testing and Certification and Early Challenges

As of this date, the EAC has fully tested and certified four voting systems to the applicable Federal standards. Those systems are the ES&S Unity 3.2, the Premier (now ES&S) Assure 1.2 , the MicroVote EMS 4.0 and the Unisyn OpenElect Voting System. For more information on these systems and those that are currently under test by the EAC, please visit our web site at EAC Testing and Certification Program — U.S. Election Assistance Commission (www.eac.gov).

As most election officials are aware, the process of developing and implementing the EAC's certification program has not been without its challenges. These challenges included:

- The length of time it took to certify voting systems
- The cost to certify voting systems
- Test Laboratory efficiency
- Testing and Review Inconsistencies

Since beginning our program the EAC has identified several factors that have a profound effect upon both the time and cost involved in testing a voting system.

1. **System maturity**. Is the voting system really ready for testing when it is submitted to the test lab? Several of the systems we have tested were not as ready as they should have been for testing, particularly in the documentation reporting functions. Correction of documentation and design deficiencies will always increase the testing cost and lengthen the time of testing for the manufacturer, no matter what pricing structure is implemented by the laboratories or how efficiently the EAC would like to move the system along in our process.
2. **Laboratory billing process**. Although the HAVA proscribed process does not permit the EAC to dictate the testing prices for our independent laboratories, it is nevertheless clear that two different billing structures are in place amongst the labs. Some laboratories operate on a time and materials basis, while others provide a fixed-rate price. No matter which lab a voting system manufacturer chooses, it is our recommendation that they carefully weigh all factors related to the work of a lab before making a decision on where to test their voting system.
3. **Laboratory and manufacturer willingness to work within the EAC process**. The EAC has found, not surprisingly, a direct correlation between the time it takes to certify a voting system and the quality and efficiency of communication between the EAC, the manufacturer and test lab. The more quickly the EAC is presented with issues or questions that arise during testing and given all pertinent information regarding those issues the more quickly decisions can be made and testing can remain on schedule.

The EAC has also undertaken a number of steps to ensure that our process related to the testing and review of systems is more consistent and timely. These steps include:

- The hiring of two computer engineers to enhance the EAC in-house technical capabilities.
- Ensuring that our review process does not impinge on the certification timeframe by requiring our labs to submit their project schedule, and instructing our staff and technical reviewers that we are to work our review within the timeframe specified by the laboratory project plan.
- Instituting weekly teleconferences between the EAC, the laboratory and the voting system manufacturer. These teleconferences ensure that the EAC is kept abreast of the latest developments in the test engagement and can quickly and efficiently address problems as they arise.
- Development of the VVSG 1.1, an enhanced version of the 2005 VVSG which will include improved standards to make system testing more thorough and efficient and to incorporate the many EAC requests for interpretation of the 2005 VVSG we have issued over the past 2-3 years.

While the EAC has no illusions that the testing of voting systems will ever be a simple or routine undertaking, I believe that we have taken steps to mitigate the most formidable challenges we faced during the first several years of our program.

Challenges for 2010 and Beyond

Challenge 1: Commercial Off-the-Shelf (COTS)

The 2005 Voluntary Voting System Guidelines (VVSG) define COTS or **c**ommercial **o**ff-**t**he-**s**helf products, as "Commercial, readily available hardware devices (such as card readers, printers or personal computers) or software products (such as operating systems, programming language compilers, or database management systems).

Although card readers, printers, and operating systems are significant COTS components of voting systems, I will limit the current discussion to the uses of COTS personal computers (PCs) in voting systems.

The Issue

Although the COTS issue is by no means limited to one specific voting system manufacturer, the EAC's recent experience during the latter stages of their certification effort with Elections Systems and Software (ES&S) are used to illustrate the issue. The ES&S Unity 3.2 voting system certified by the EAC on July 21, 2009 contains in its system configuration several Dell COTS PCs. The specific models listed in the certification documentation are the Dell Latitude 600 Laptop, and the Dell GX 260 and GX 270 desktop computers. In addition, the voting system manufacturer lists minimum specifications for COTS PCs in their documentation. EAC research found that Dell no longer manufacturers any of the three PCs certified with the Unity 3.2 voting system.

The Unity certification was particularly important to Cuyahoga County, Ohio, who implemented this system immediately upon EAC certification. To obtain further information on the COTS used in the system sold to Cuyahoga, the EAC asked ES&S which models of PCs were being used in that jurisdiction. ES&S responded that Cuyahoga would be using Dell OptiPlex 745 PCs. In addition to the 745 being a different model from those PCs used in the EAC certification, EAC found out that the 745, like the Latitude 600, is no longer manufactured by Dell.

Because of the volatility of the commercial COTS PC market, the EAC is concerned that:

1. The utility of an EAC certification will be questioned if we certify systems that are literally unable to be built as certified.
2. Jurisdictions purchasing COTS PCS meeting the minimum specifications outlined by the manufacturer, but not tested with the system during EAC certification, may be faced with compatibility issues when an unknown COTS product is integrated into the "certified" voting system.

Meeting COTS Challenges in DOD

Similar to the voting systems arena, other organizations have been struggling with COTS issues for a decade or more. Beginning in 1994, the Department of Defense (DOD) was directed to integrate COTS components into the design of all DOD systems. On the positive side, DOD has realized significant cost savings using COTS products, and has made use of the powerful performance of commercial processors (from graphics designed for computer gaming) for improved DOD systems.

Unfortunately, because the development of COTS products is market driven, COTS technologies can become obsolete in 18 months or less, while DOD weapons and other systems have 5 to 10 year design cycles and 20 to 30 year expected service lives.

To mitigate the potential negative impact of COTS use, DOD systems designers and project managers have implemented procedures such as:

- Market research, surveillance and investigation of commercial products and trends
- Continuous assessments of the maintainability of COTS products
- Developing close relationships with certain COTS manufacturers to better understand their product roadmap in order to choose products at the beginning of their lifecycle and plan for future upgrades
- Work with manufacturers willing to implement design freezes on some COTS products to increase their lifecycle from the 12-18 month norm to 3 to 5 years.

Although all of the above procedures may not be as practical in voting systems as they are in DOD system design and procurement, valuable lessons can still be learned from the DOD experience.

In attempting to deal with COTS PC issues in the EAC testing and certification of voting systems, a number of options may be worth exploring that would mitigate potential obsolescence and incompatibility issues while keeping testing and certification costs to a minimum. EAC practices in this area might include:

- Permitting manufacturers to certify a voting system with the specific model of PC used in system testing. Allow those models to be used in the future with more memory and larger hard drives, but not less, and remain EAC certified.
- For other models of PCs from the same vendor (Dell, HP, etc.) a new model might be added to the certified voting system based on a letter from the PC manufacturer warranting that the new model is equivalent to the model tested and does not add or remove functionality. The VSTL would then perform a simple specification review to confirm the accuracy of the letter.
- PCs from other vendors that are equivalent to the PC tested with the voting system could be added to the certified system based on:
    - A declaration of conformance from the PC vendor that the PC meets the same requirements as the PC tested. (Done in other industries)

- A regression test by the VSTL running 1 election on the PC.

Challenge 2: Quality Assurance

Although the central element for any conformity assessment program is testing a product to ensure it meets a specific set of testable requirements, an additional challenge arises in ensuring that manufacturers have appropriate processes to control the quality and configuration of their products. The EAC Certification Program provides mechanisms to verify Manufacturer quality processes through fielded system testing and manufacturing site visits. Since EAC certified systems are all relatively new, this part of our program will begin to be implemented this year.

Until the development of the EAC Certification program, quality assurance was confined to whatever practices were followed by the voting system manufacturer. The experience in many States including California seems to indicate that whatever quality process was in place at the voting system manufacturer, it failed to consistently produce systems of the quality expected by election officials and the voting public.

Modern quality management is a **process** that must be embraced by the manufacturer to be truly successful. A successful quality management process for voting systems must include:

- Quality planning: Identifying which quality standards are relevant to the voting system development and how to satisfy them. For voting systems, quality assurance is required by Section 8 of the 2005 VVSG, which states, in part:

  > *Quality assurance provides continuous confirmation that a voting system conforms with the Guidelines and to the requirements of state and local jurisdictions. Quality assurance is a vendor function that is initiated prior to system development and continues throughout the maintenance life cycle of the voting system. Quality assurance focuses on building quality into a voting system and reducing dependence on system tests at the end of the life cycle to detect deficiencies, thus helping ensure the system:*
  >
  > *• Meets stated requirements and objectives*
  > *• Adheres to established standards and conventions*
  > *• Functions consistently with related components and meets dependencies for use within the jurisdiction*
  > *• Reflects all changes approved during its initial development, internal testing, national certification, and, if applicable, state certification processes*

- Quality assurance: Evaluating overall voting system performance to ensure the system satisfies the relevant quality standards. This must be done with the cooperation of state and local election administrators.

- Quality control: Monitoring voting system performance to ensure that they comply with the relevant quality standards while identifying ways to improve

Many in the software industry measure quality as costs per hour of downtime caused by software defects. Studies have found that downtime costs can range anywhere from $14,500 per hour in an ATM machine, up to $89,500 per hour for the reservation center at a small airline.

We currently have no statistics of which I am aware measuring the "cost" of downtime for a voting system? How is it measured? My sense is that in voting, "downtime" is not only measurable in dollars, but also in the almost invaluable area of public confidence in the quality the system.

Although we currently have no answer to how we will meet the challenge of improving voting system quality, one fact is indisputable- quality assurance costs money.

The challenge for all of us in these lean budgetary times, is determining where the money will come from to improve the quality of our voting systems and how that money can best be used? I don't need to tell Californians that the money is unlikely to be found in current state or local budgets. It remains to be seen whether Congress will assist states in this effort through additional HAVA funding. In the mean time, the EAC will do all we can to work with manufactures to monitor and hopefully improve the quality of EAC certified systems.

Thank you once again for inviting me to participate in this hearing, and to present my perspective on the important challenges facing us all over the next several years as the EAC continues to work to certify voting systems, and as California continues to wrestle with determining which systems best meet the needs of the voters of this great State.