Independent Testing of Voting Technologies: Key to Voter Integrity

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The Myers Automatic Booth lever voting machine was first used in 1892 in Lockport, New York. According to its manufacturer, this machine was designed to:

> "…*protect mechanically the voter from rascaldom, and make the process of casting the ballot perfectly plain, simple and secret*."

Lever booth mechanical technology was revolutionary in its day, and while lever machines have been retired across the US and elsewhere, the goal of voting technology has not changed much since Myers' day.

Eventually, lever machines gave way to punch cards, where voters punched out a selection on a ballot that corresponded to their choice. Problems with punch card voting systems, particularly in Florida, in the 2000 US Presidential Election between George Bush and Al Gore, put voting technology on the national "hot seat". The high numbers of spoiled ballots, and questions about voter intent on cards where the "chad" was not fully punched out were among the many problems attributed to ineffective process and bad technology.

With punch cards out of favor, election technology began taking greater advantage of increases in computing power, memory and display device technology. First to market were Direct Recording Electronic (DRE) machines and then optical scan-based voting and counting products. Internet voting technology is now in use in several countries in the EU, and has also been deployed in pilot projects in the US for military and overseas voters.

Irrespective of the technology used, in order to succeed, electronic election systems must deliver accurate and timely recording, counting, transmitting, and reporting of returned ballots. Electronic vote capture and counting technology has now been proven in many jurisdictions world-wide as being able to deliver accurate results far more quickly than any manual count and at a more favorable cost per vote. This positive outcome occurs when the technology is subjected to rigorous testing and validation that ensures the software is secure, the system is accurate, and that tally functions are reliable. This is all the more important given the intense scrutiny of electronic voting systems regularly applied by the media, political parties, and civic groups. In cases where little or no pre-election auditing and testing have been utilized, a range of problems have been observed, which ultimately undermine voter confidence in election results.

For this reason, an independent audit and test program should be required as part of any sound election automation initiative to examine software, security, accuracy and functionality, and to ensure that the system operates flawlessly on Election Day. In addition to providing the assurance that the system operates as planned, this allows for a new standard of objective transparency and visibility to citizens, candidates, and other stakeholders.

Independent testing must combine absolute objectivity, the highest ethical standards, a proven testing methodology and the ability to work closely with the election authority and stakeholders to engender maximum public confidence in the electronic election system.

Processes and Methods Driven by Internationally Recognized Accreditations

In the field of electronic election system testing, audit and certification, objective accreditations matter. The International Standards Organization (ISO) recognizes process effectiveness in its ISO 9001:2008 designation. In the US, the National Voluntary Laboratory Accreditation Program (NVLAP) of the US National Institute of Standards and Technology, and the United States Election Assistance Commission (EAC), has developed an extensive program to accredit Voting System Test Laboratories or VSTLs . SLI is accredited by these bodies and our lab is specifically accredited to laboratory standard ISO 17025, which requires a capability to deliver full replicability and auditability of test results. These accreditations, and others like them, reflect process maturity and provide election bodies with confidence that test results are repeatable and objectively verifiable. This is a critical component of a comprehensive third-party verification initiative.

Voting-Specific Tools and Technology

Voting systems have unique demands. For example, optical scan-based counting systems must be able to accurately and reliably read the hand-made marks of citizens. If not properly designed and tested, the inherent variability of hand marks can affect the performance of scanning systems and ultimately the accuracy of the count. While many IT audit firms have generalized experience in code and process review, methods and techniques that have been specifically developed to ensure electronic election systems operate as specified are required for a successful voting test and certification program. Methods must be configured to validate the full range of election system requirements in any electoral system. Additionally, test and audit methods should be supported with a broad range of automated management, repository and reporting tools to deliver transparent and accurate results that keep pace with tight delivery schedules.

In addition to full certification testing, pre- and post-election verification services and election forensic analysis can be valuable tools. These techniques ensure that the system configuration is correct and matches the originally certified baseline when deployed. Additionally, assurance is gained that no data manipulation or other penetration occurred during voting or counting and that results are verifiable.

Broad Technology and Voting System Experience

Experience with a broad range of product solutions is important to designing effective tests and providing accurate and timely test and audit results. As voting systems, ballot styles and election processes vary throughout the world, it is important to understand how these differences impact electronic voting to anticipate potential vulnerabilities and logistic challenges.

Our experience in the election testing industry has helped us appreciate the importance of communicating with election stakeholders with divergent points of view, including political parties, advocacy groups and the media. We have been honored to work with clients such as the Commission on Elections of the Philippines in conducting testing as well as advising on the development of effective communication and outreach strategies to keep the election stakeholders fully informed about the testing and certification process. Our experience shows that an active outreach program is vital to the integrity of the process and the acceptance of the election results.

Summary

Democratic elections have evolved over many years and the art and science of election administration has advanced with each election cycle. Positive results have formed a strong foundation of knowledge that transcends political boundaries and the inevitable, but fortunately occasional, failures have led to improved processes and controls.

Advances in electronic election systems are no different. Computing, transmission and display technologies all continue to evolve at a relentless pace. Asking whether to use available technology as part of a credible election process is not the question; when and how best to use these tools is what election administrators must now consider.

When properly implemented, electronic election systems count more accurately, provide more convenient access, report results more quickly and disenfranchise less voters than any manual system. However, given the unique nature of election processes, the unyielding need for accuracy and transparency and the very real threats to system integrity by poor implementation and potential bad actors, a vigorous, third party test, audit, and certification activity must be part of any automation solution. This program should be sponsored by the proper jurisdictional election authority and be provided by a certified vendor who employs election-specific test methods, people and technology in order to deliver the assurance that the system deployed will perform as specified and expected. If the voters have confidence in the credibility of testing of the voting equipment then they will trust the results. This was true in Myer's day, and remains just as true today.