

# Conformity Assessment Testing for Voting Systems: The U.S. Experience

by The United States Election Assistance Commission, Voting System Testing & Certification Division

In the wake of the presidential recount in Florida after the 2000 general election, the United States Congress passed the Help America Vote Act of 2002 (HAVA). HAVA created the Election Assistance Commission (EAC) and provided federal funds to assist states in upgrading voting systems. In addition to managing financial disbursements to each state, HAVA mandates the EAC to accredit independent Voting System Test Laboratories (VSTLs) and to certify voting equipment to voting system standards issued by the EAC. The passage of HAVA marked the first time in U.S. history the federal government offered these services to states and territories.

As one of its mandates, the EAC operates a conformity assessment testing program for voting systems called the Voting System Testing and Certification Program. A conformity assessment testing program is a process established to ensure that a product or service meets applicable standards. The EAC's testing and certification program is strictly voluntary; states and local election jurisdictions choose the extent to which they wish to participate in the program. Under HAVA, the EAC adopts the Voluntary Voting System Guidelines (VVSG) after receiving recommendations from its Technical Guidelines Development Committee (TGDC) and evaluating public comments and input from the National Institute of Standards and Technology (NIST).

There are four components of the EAC process for a voting system manufacturer to achieve and maintain federal certification:

- Pre-Testing,
- Certification Testing,
- Grant of Certification, and
- Post-Certification Compliance.

In order to illustrate the federal certification process, this paper follows the hypothetical voting system *ElecTab*, manufactured by Tabulate Inc. To receive federal certification, it must conform to the EAC's VVSG. As a conformity assessment testing program, a voting system must adhere to each applicable requirement in the VVSG in order to receive certification. Post-certification, the manufacturer must ensure the voting system maintains compliance with the VVSG and other

programmatic requirements, especially after the system is fielded in U.S. elections.



Before Tabulate Inc. submits *ElecTab* for testing to the VVSG, the EAC will encourage Tabulate Inc. to perform its own pre-submission testing to verify that the *ElecTab* voting system conforms to the VVSG. Effective manufacturer testing and quality assurance practices save all program participants time and money. When Tabulate Inc. is ready to begin certification testing, it must apply to become an EAC Registered Manufacturer. As an EAC Registered Manufacturer, Tabulate Inc. submits a System Application to the EAC. This application consists of a System Overview and other basic information needed to begin a testing campaign (i.e., name of the system, laboratory to perform testing). If the *ElecTab* application does not contain the required information, the EAC rejects the application. Tabulate Inc. must update the rejected *ElecTab* application with the required information and resubmit the application to begin certification testing.

The manufacturer chooses a laboratory for the engagement, which is noted on its System Application. The laboratory receives the documentation for the *ElecTab* voting system and begins developing a Test Plan. The Test Plan provides specific details concerning how the laboratory will perform certification testing for *ElecTab*. After the laboratory completes the Test Plan it is submitted to the EAC for review. The EAC conducts a technical review of the Test Plan to ensure the proposed testing will adequately demonstrate conformance to the VVSG. Upon the EAC approval of the *ElecTab* Test Plan, it is posted to the EAC website to inform the public of the testing campaign and ensure transparency in the voting system testing and certification process.

After approval of the Test Plan, the laboratory begins conformance testing for *ElecTab*. The laboratory tests the submitted system's functionality, accessibility, usability, software, hardware and security. Also, the laboratory evaluates the associated quality assurance and configuration management processes. If *ElecTab*

does not meet a requirement in the VVSG, Tabulate Inc. must modify the *ElecTab* voting system to adhere to the requirement. During certification testing, *ElecTab* does not remain in a static configuration. When the laboratory identifies a discrepancy, Tabulate Inc. must modify the system to meet the requirement by submitting new software, hardware or documentation. Due to modifications during the testing process, a voting system's configuration at the beginning of testing is often different than at the conclusion of testing.

When testing is complete and all documented discrepancies are resolved, the laboratory creates a Test Report documenting that the system met all applicable VVSG requirements and recommending the system for certification. The EAC confirms this recommendation by reviewing the laboratory's Test Report. If the Test Report exhibits errors or inconsistencies, the EAC requires the laboratory to fix the errors and resubmit the Test Report prior to the EAC approval. This review can result in additional testing ensuring full conformance to the standard. The EAC posts the Test Report to the EAC website to inform the states, local election jurisdictions and the public about the voting system and its pending certification.

The EAC's executive director approves *ElecTab's* Test Report and issues an Initial Decision on Certification. Before granting final certification, the EAC must receive a signed statement from the manufacturer agreeing to abide by all programmatic requirements and represent only certified configurations as EAC certified. The manufacturer must submit a trusted build for the *ElecTab* system to the EAC. The trusted build contains *ElecTab's* build environment, documentation and source code. With this information, the EAC can assist states and local election jurisdictions in verifying that a certified *ElecTab* voting system remains in the configuration certified by the EAC.

After receipt and verification of the trusted build, the EAC can grant certification for Tabulate Inc.'s *ElecTab* voting system. At the time of certification, the EAC issues a Certificate of Conformance to Tabulate Inc. for the *ElecTab* system. This certificate details the scope of *ElecTab's* certification, including the functionality and types of voting devices (e.g., direct-recording electronic voting system (DRE), optical scan and ballot-marking devices) included in the *ElecTab* voting system.

After *ElecTab* receives certification, the system is transferred into the EAC's Quality Monitoring Program. This program provides an additional layer of quality control for states and jurisdictions using the voting system. As part of the Quality Monitoring Program, the

EAC performs manufacturing facility and jurisdictional field audits to gather information on fielded voting systems and voting system anomalies. For example, manufacturers are required to report any anomaly a jurisdiction discovers with an EAC certified system during a federal election. This allows the EAC to track and audit EAC-certified systems in the field during elections. This information is posted to the EAC website to inform all stakeholders using the system of all problems users may have experienced. These tools seek to ensure voting systems continue to meet the VVSG as the systems are manufactured, delivered and used in federal elections.

The EAC's Voting System Testing and Certification Program represents the first time the federal government has been involved in the testing and certification of voting systems. Due to the voluntary nature of the EAC's program, states can pick and choose which portions, if any, of the program they would like to use. With this in mind, the EAC works hard to ensure voting systems are thoroughly tested to the VVSG and testing information is publicly available. By publicizing information related to certified systems the EAC is a resource to all election jurisdictions. In addition, the EAC's Quality Monitoring Program brings greater transparency to anomalies experienced by election jurisdictions using certified systems, thereby allowing all jurisdictions to benefit from the information gathered as part of the process.

The EAC is committed to transparency in the testing and certification process, which allows states, local governments and the public to follow and clearly understand the testing the EAC provides from System Application to Quality Monitoring.

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