Douglas County Nebraska Project Report

January 21, 2025

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1 Purpose

The U.S. Election Assistance Commission (EAC), in partnership with the Nebraska Secretary of State's office and Douglas County Election Commission, performed a fielded system review on July 15-17, 2024. The purpose of the review of Douglas County's voting system was to confirm that the system is identical to the system certified by the EAC and purchased by the state. With that goal in mind, the EAC set out to (1) observe and verify that the certified Election Systems and Software (ES&S) verification procedures were followed during the review, (2) perform a scope of conformance review of Election Voting System (EVS) 6.1.1.0 as fielded in the county, (3) observe, assist, and document a hash verification of a sample of the EVS 6.1.1.0 voting equipment that is utilized, and (4) observe the physical voting system and facility security during the project.

2 Background

The EAC's Testing and Certification Program assists state and local election officials by providing voting machine testing and certification. This program is a requirement of the Help America Vote Act (HAVA) of 2002, legislation that created the EAC and mandated that the Commission provide certification, decertification, and recertification of voting systems, as well as the accreditation of voting system testing laboratories and quality monitoring of fielded voting systems. This legislation marked the first time the federal government provided oversight for these activities, a step that allowed states to procure new certified voting systems without the added expense of independent testing and certification.

The EAC's Field Services Program (FSP) is tasked with implementing the Testing and Certification's Quality Monitoring Program (QMP). One element of the QMP is fielded system conformance reviews, which the EAC may conduct upon invitation, or with permission from the state or local election authority. The purpose of these reviews is to ensure voting systems used by jurisdictions are identical to those tested by the EAC accredited Voting System Test Laboratory (VSTL) and certified by the EAC.

The EAC's Testing and Certification Program is the critical first step in establishing a chain of custody over the voting systems used in our nation's elections. A registered voting system manufacturer that wishes to have its system tested and certified by the EAC must provide its software code to an EAC-accredited VSTL for review and testing. The VSTL uses the manufacturer's code to build the system in a secure and safe environment and subsequently test the system against the Voluntary Voting System Guidelines (VVSG). Once testing is completed and the VSTL determines the system conforms with all applicable requirements, the voting system may be certified by the EAC. At this point, the VSTL generates the trusted hash values for the system that will be used later to verify the voting system.

ES&S' EVS version 6.1.1.0 system was certified and issued a Scope of Conformance by the EAC on July 27, 2020. The 6.1.1.0 system used by Douglas County includes specific hardware and software components that are configured for the jurisdiction, which include a standalone Election Management System (EMS) workstation, central count scanners/tabulators, ballot marking devices, secure flash drives, and other components of the certified system.

3 Definitions

Accessibility: Measurable characteristics that indicate the degree to which a system is available to, and usable by, individuals with disabilities.

Ballot Marking Device (BMD): A device that permits contest options to be reviewed on an electronic interface, produces a human-readable paper ballot, and does not make any other lasting record of the voter's selections. The BMD can be used as an accessibility device when paired with an audio voting and/or sip-and-puff component that can allow voters with disabilities to be able to vote independently.

Conformance Review: A conformance review includes documenting all components of a voting system that are utilized and present to ensure that the items are consistent with the EAC's Scope of Conformance for the system.

Central Count Scanner/Tabulator: A central count scanner/tabulator is a high-speed, digital scan ballot tabulator designed for jurisdictions at a precinct or central count facility to process a high volume of ballots. These devices use digital cameras and imaging systems to read the front and back of each ballot and can evaluate the result.

Chain of Custody: A process used to track the movement and control of an asset through its lifecycle by documenting each person and organization who handles an asset, the date/time it was collected or transferred, and the purpose of the transfer.

Election Management Guidelines (EMG): EMG were created to assist state and local election officials in effectively managing and administering elections. These guidelines complement the technical standards for the VVSG for voting equipment. Each chapter of the EMG is vetted by recognized election experts and offers practical discussions of election issues, including examples and helpful tips including physical security and chain-of-custody. The EMG's goal is to familiarize election officials with election processes and challenges they will likely encounter during their tenure and is designed to be accessible to election officials at all levels.

Election Management Software (EMS): Set of processing functions and databases within a voting system that defines, develops, and maintains election databases, performs election definitions and setup functions, formats ballots, counts votes, consolidates and reports results, and maintains audit trails.

Engineering Change Order (ECO): A change to a certified voting system's hardware, software, technical data package, or data, the nature of which does not materially alter the system's reliability, functionality, capability, or operation. Such changes require VSTL review and endorsement, and EAC approval.

Hashing: Hashing is the process of computing a unique alphanumeric value on a data file or electronic message such as text, numbers, photos, programs, or files into a fixed-length string of letters and numbers through a mathematical algorithm.

Hash Value: A hash value is a signature that identifies some amount of data, usually a file or message. Cryptographic hashing algorithms are one-directional mathematical formulae designed to generate a unique value for every possible input—in this case, the data. Common algorithms include MDS, SHA-1, SHA-256, and SHA-512.

Hash Verification Review: A hash verification review involves generating the hashes from a voting system component's software and verifying those hashes against a trusted source. This review provides assurance that the system is the same as what was certified by the EAC and that there has been no manipulation of the program files.

Help America Vote Act (HAVA): Act passed by the U.S. Congress in 2002 to make sweeping reforms to the nation's voting process. HAVA addresses improvements to voting systems and voter access that were identified following the 2000 election.

Quality Monitoring Program (QMP): The QMP is a post-certification element of the EAC's Testing and Certification Program. QMP consists of several tools, one of which is fielded system reviews. These reviews are designed to ensure systems used by election jurisdictions are identical to those tested and certified by the EAC, monitor the completeness and adequacy of testing with the desired performance in fielded voting systems, and monitor the effectiveness of the VVSG.

Sample Review: A review of selected parts or devices from a voting system and its components. This review offers a representative evaluation, providing a solid basis for drawing a conclusion about the overall system.

Scope of Conformance: Documentation created by the EAC at the end of the testing and as part of certification. This document details the configuration of the system that underwent testing and can be used as a checklist in evaluating a fielded system.

Technical Data Package (TDP): Manufacturer documentation relating to the voting system, which can include manuals, description of components, and details of architectural and engineering design.

Voluntary Voting System Guidelines (VVSG): A set of specifications and requirements against which voting systems can be tested to determine if they meet required standards. Some factors examined under these tests include functionality, accessibility, and security capabilities. While HAVA mandates the EAC to develop and maintain these requirements, adhering to the VVSG is voluntary except in select states where it is required by their own state law.

Voting System Testing and Certification Program Manual: The primary purpose of this manual is to provide clear procedures to manufacturers for the testing and certification of voting systems to the VVSG consistent with the requirements of HAVA Section 321(a)(1).

4 References

A. EAC Scope of Conformance issued on July 27, 2020.
B. Testing and Certification Program Manual.
C. ES&S's EVS 6.1.1.0 Technical Data Package (Commercial/Proprietary Information)
D. Help America Vote Act (HAVA)
E. EAC Election Management Guidelines
F. EAC Chain of Custody Best Practices
G. Voluntary Voting System Guidelines Version 1.0 (2005), Volume 1

5 Participants

5.1 U.S. Election Assistance Commission (EAC)

- Roger Piha-Paul, Field Services Specialist
- Dan Cox, Field Services Program Manager

5.2 Nebraska Secretary of State's Office

- Wayne J. Bena, Deputy Secretary of State for Elections
- Andrew Buller, Assistant Deputy for Elections
- Minank Patel, IT Infrastructure Support Analyst

5.3 Douglas County Election Commission

- Brian Kruse, Douglas County Election Commissioner
- Chris Carithers, Douglas County Chief Deputy Election Commissioner
- Douglas County Designated Employees

5.4 Election Systems & Software

- Sue McKay, Vice President of Federal Certification
- Jeff Rodencal, Senior Federal Certification Specialist

6 Roles

6.1 U.S. Election Assistance Commission

The EAC provided project scope, guidance, and coordination for the fielded system review. This review included conducting introduction and exit interviews and providing technical assistance to Douglas County and the Nebraska Secretary of State's office. During the first part of the fielded system review, the EAC staff conducted a conformance review on all components from a sample set of selected voting system devices in the county to ensure conformance with the EAC certification. Secondly, the EAC observed and documented the results and processes used during voting system hash verification. Lastly, the EAC observed and noted the general voting system and facility security measures, policies, and procedures.

6.2 Nebraska Secretary of State's Office

The Nebraska Secretary of State's office provided technical resources and expertise needed to conduct the review, including verification laptops, an image USB for EMS verification, and additional USB drives as needed to perform hash verifications on the equipment. During the conformance and hash review they provided state oversight, ensured election equipment integrity, and guidance and support, as necessary.

6.3 Douglas County Election Commission

The Douglas County Election Commission provided technical staffing needed to conduct the hash verification review and provided access to voting equipment and facilities. During the review, they provided

constant oversight of their election equipment to maintain their system's chain of custody. In addition, Douglas County also provided the EAC with detailed specifics on how they conduct their elections and use their voting system.

6.4 Election Systems & Software (ES&S)

ES&S partnered with the EAC, the Nebraska Secretary of State's office, and the Douglas County Election Commission during the review process. They provided training prior to the review on how to perform hash verifications in accordance with their EAC-approved procedures to the Nebraska Secretary of State's office and the Douglas County Election Commission. In addition, they provided additional onsite technical expertise and customer support during the entire process, but they did not have any direct access to the equipment during the entire process.

7 Scope of Review

The scope of review covers what the EAC examined, how it was examined, and the objectives that were achieved during the review process of this project. The scope of review provides the foundation on which results were obtained and observations or recommendations that would be provided.

7.1 Device Sample Size

A sample of equipment to be inspected was agreed upon by the EAC in partnership with the Douglas County Election Commission and the Nebraska Secretary of State's office. This included the county's EVS 6.1.1.0 standalone workstation with the EMS, all nine of the DS850 central count scanners/tabulators, and a random sample size of 30 of the 243 ExpressVote BMDs utilized in the county to meet accessibility standards.

7.2 Confirm Application of ES&S Certified Procedures

Observe and document the verification procedures applied during the review by the Nebraska Secretary of State's office and Douglas County, are identical to the certified ES&S verification procedures as published in the TDP.

7.3 Voting System Conformance Review

During the conformance review process in Douglas County, the EAC reviewed and verified all components of the selected sample of the EVS 6.1.1.0 voting system. The purpose is to ensure that the system aligns with the EAC's Scope of Conformance as certified on July 27, 2020, and any other changes to the system configuration made through an engineering change order, if applicable.

7.4 Hash Verification Review

The EAC observed the setup of the EVS 6.1.1.0 verification laptops with Ubuntu and the creation of the Election Qualification Code (EQC), Scripting, and Firmware Export USB flash drives for the verification process. The EAC observed and documented the results of the hash verification performed by the county on the EMS, ExpressVote devices, and DS850s including serial numbers of the equipment and noting the roles, protocols, and procedures used throughout the process.

The hash verification procedure used during the review followed the system verification instructions created by ES&S under the VVSG 1.0 as certified by the EAC and outlined in the EVS 6.1.1.0 TDP.

7.5 Physical Voting System and Facility Security Observations

The EAC observed physical voting system security processes to ensure they are being implemented as described in the documentation for the system and in accordance with county procedures. The EAC also reviewed facility security implemented by Douglas County against chain of custody best practices outlined in the EAC's EMG.

8 Results and Observations

8.1 ES&S Certified Procedures

All system verification procedures followed by Douglas County and the Nebraska Secretary of State's office were observed by EAC personnel to ensure compliance with ES&S' TDP as certified by the EAC.

8.2 System Conformance

8.2.1 Standalone Workstation for EMS

The Dell OptiPlex 5050 standalone workstation was reviewed for conformance, along with all proprietary and Commercial off-the-Shelf (COTS) software and hardware, including proprietary USB devices; all were reviewed and fell within scope of conformance. The Dell OptiPlex 5050 standalone workstation had an EAC mark of certification present which was visible and in good condition.

8.2.2 DS850 Central Count Scanners/Tabulators

All nine DS850s in the county were reviewed and the model numbers matched the scope of conformance. All proprietary and COTS components for each machine including carts, USBs, printers, and battery backups were reviewed and functional and fell within the scope of conformance. All nine DS850s had EAC marks of certification present which were visible and in good condition.

8.2.3 ExpressVote Ballot Marking Devices (BMDs)

The thirty ExpressVote models in the county's inventory that are used as BMDs were reviewed and matched the scope of conformance. The components, including the Universal Voting Consoles (UVC) 98-00077 v. 2.0 for each device were also confirmed and all fell within scope of conformance. The thirty ExpressVote devices reviewed had EAC marks of certification present which were visible and in good condition.

8.3 Hash Verifications

8.3.1 Workstation and Election Management Software

The Dell OptiPlex 5050 standalone workstation was reviewed; it had BitLocker decrypted, and the hashes were generated and verified against the trusted hashes. Once the hashes were verified, the workstation was re-encrypted with BitLocker and then securely stored in the locked ballot security room. Hashes for the workstation were confirmed using ES&S' EVS 6.1.1.0's certified method of verifying. No discrepancies were identified.

8.3.2 DS850 Central Count Scanners/Tabulators

The DS850 software was extracted from the scanners/tabulators using approved USB drives and pursuant to ES&S system verification procedures. The hashes were calculated and verified using the

verification laptop provided by the Nebraska Secretary of State's office. The hashes generated for the DS850s matched the trusted hashes. No discrepancies were identified.

8.3.3 ExpressVote Ballot Marking Devices

The ExpressVote software was extracted from the 30 randomly selected ballot marking devices using certified USB drives owned by the county or state, and pursuant to ES&S procedures. The hashes were calculated and verified using the verification laptop provided by the Nebraska Secretary of State's office. The hashes generated for each ExpressVote matched the trusted hashes. No major discrepancies were noted. During the review EAC noted two devices had one minor maintenance item each that the county plans to have addressed when a service visit is scheduled with ES&S. The first item was that one ExpressVote did not have its serial number encoded in the device setup to match what was on the device label. When verifying the hash, the serial number on the extracted file name was listed as "Unknown" instead of the serial number. The second item was discovered on a different ExpressVote, where the battery backup was not charging and needed to be checked and/or replaced.

8.4 Physical Voting System and Facility Security Observations

8.4.1 Douglas County Facility and Voting System Security

The Douglas County facility had restricted access to the building, sensitive voting system equipment, and work areas through employee security access badges that are scanned and recorded in a digital log. All sensitive locations including facilities, work, and storage areas, and ballot drop boxes both on-site and remotely placed within the community, are monitored by 24-hour video surveillance. Sensitive access keys and critical data storage media are restricted to certain employees and are kept in safes. The staff demonstrated a high level of attention to their security protocols and are aware of the importance of facility and voting system security.

9 Suggestions

9.1 Hash Verification Program

The EAC suggests that the Douglas County Election Commission and the Nebraska Secretary of State's office implement a hash verification program to regularly conduct hash verifications including during pre-election and post-election testing of voting system devices.

9.2 Security Seals

The Douglas County Election Commission uses security seals on its voting system equipment during the election cycle to maintain chain of custody and security in accordance with the EAC's EMG and Chain of Custody Best Practices. The EAC suggests that all voting equipment be physically and tamper-evident sealed during off-cycles or during maintenance, and that a security event log be kept to document security and chain of custody of equipment, when not in use.

10 Conclusions

The EVS 6.1.1.0 procedural, conformance, hash, and security review conducted on July 15-17, 2024, yielded no findings, observations, or deficiencies that could potentially impact the security of the system as deployed. All ES&S system verification procedures, as certified, were followed during the review. The EMS

workstation, DS850, and ExpressVote components that were reviewed fell within the original Scope of Conformance, and no observable components were impacted by ECOs. The EMS workstation, DS850, and ExpressVote hashes that were reviewed matched the trusted hashes in accordance with ES&S' EAC-certified verification procedures. The Douglas County Election Commission's voting system and facility security during the review appear to comprehensive and thoroughly followed. The EAC can independently confirm that the software extracted is equivalent to, and the hardware inspected is consistent with, the Scope of Conformance issued by the EAC for the ES&S EVS 6.1.1.0 voting system on July 27, 2020.

11 Recognition

11.1 Douglas County Election Commission

The EAC's Field Services Team would like to recognize and thank Brian Kruse, Chris Carithers, and the rest of the Douglas County Election Commission's staff for their hospitality, leadership, hard work, time, expertise, and dedication to help complete this project and make it successful. The Douglas County Election Commission's staff members are dedicated election officials that provide a vital service to Omaha and their voting public. Their hard work and civic dedication help ensure that Douglas County's elections are safe, secure, accurate, and accessible.

11.2 Nebraska Secretary of State's Office

The EAC's Field Services Team would like to recognize and thank Secretary of State Robert Evnen, Deputy Secretary of State for Elections Wayne Bena, Assistant Deputy for Elections Andrew Buller, and IT Analyst Minank Patel from the Nebraska Secretary of State's office for helping facilitate this project and providing vital resources and staffing to ensure a successful review. Their leadership and dedication to ensure that Nebraska's elections are safe, secure, accurate, and accessible is noteworthy. We look forward to future projects with the Secretary of State in Nebraska.

11.3 Election Systems & Software (ES&S)

The EAC's Field Services Team would also like to thank Tim Hallett, Sue McKay, and Jeff Rodencal and the rest of the staff at Election Systems & Software (ES&S) for the training and technical expertise they provided to the Douglas County Election Commission prior to and during the project. Their customer support with the Douglas County Election Commission helped ensure the review process went smoothly and that in the event Douglas County had any issue, they would be there to assist.