**Date:** **NVLAP Lab Code:** Click or tap here to enter text.

**NIST HANDBOOK 150-22 CHECKLIST (ISO/IEC 17025:2017)**

# VOTING SYSTEM TESTING PROGRAM

**Instructions to the Assessor:** This checklist addresses specific accreditation criteria prescribed in NIST Handbook 150-22, *NVLAP Voting System Testing* (2021 Edition). Included also are instructions and comments sheets used for observing actual demonstrations of the performance of selected test methods. These criteria do not supersede the *Criteria for Accreditation* based on ISO/IEC 17025:2017, which are addressed in the NVLAP General Criteria Checklist.

Place an "X" beside each checklist item that represents a nonconformity. Place a "C" beside each item on which you are commenting for other reasons. Record the nonconformity explanation and/or comment in assessment report created in the assessor portal under the laboratory’s assessment record. Place "OK" beside all other items you observed or verified as compliant at the laboratory.

|  |  |  |  |
| --- | --- | --- | --- |
| **Requirement** | **Compliance****(OK, X, or C)** | **Management System Reference** | **Objective Evidence** |
| **4** | **General requirements** |
| **4.1** | **Impartiality** |
|  | **4.1.1** | The laboratory shall establish and maintain policies and procedures for maintaining laboratory impartiality and integrity in the conduct of voting system testing.  | Choose an item. |       |       |
|  |  | When conducting testing under HAVA, the laboratory policies and procedures shall ensure that: |  |  |  |
|  | **a)** | the laboratory does not perform both developmental testing and accredited testing of a particular voting system or system component; | Choose an item. |       |       |
|  | **b)** | the laboratory does not provide consultation or other services to a voting system developer such that the independence, or appearance of independence, in the testing of a voting system or system component would be compromised; | Choose an item. |       |       |
|  | **c)** | the laboratory has defined its prohibited conflicts and prohibited practices; and | Choose an item. |       |       |
|  | **d)** | the laboratory has documented the process for enforcement of its policies and procedures with regard to prohibited conflicts and practices. The enforcement program shall include an annual collection and review of employee information related to testing or development of voting systems including, but not limited to: any financial interests, prior employment or activities in outside organizations, gifts, and/or work related to voting system development. Any conflicts shall be resolved and documented. | Choose an item. |       |       |
|  | **4.1.2** | The laboratory shall have physical and electronic controls augmented with an explicit policy and set of procedures for maintaining separation, both physical and electronic, between the laboratory test personnel and laboratory consultants, product developers, system integrators, and others who may have an interest in and/or may unduly influence the outcome of the test. | Choose an item. |       |       |
| **4.2** | **Confidentiality** |
|  |  | In order to maintain confidentiality and impartiality, the laboratory shall maintain proper separation between personnel conducting testing and other personnel inside the laboratory or outside the laboratory, but inside the parent organization. | Choose an item. |       |       |
| **6** | **Resource requirements** |
| **6.2** | **Personnel** |
|  | **6.2.1** | The laboratory shall maintain technical staff appropriate for testing voting systems to be recognized by the EAC under HAVA. The staff shall be qualified and competent to: | Choose an item. |       |       |
|  | **a)** | establish and carry out the appropriate test methods required for the relevant versions of the VVSG; | Choose an item. |       |       |
|  | **b)** | understand and apply the test methods and their underlying rationale, including concepts of essential performance, physical and IT security, usability, and accessibility; | Choose an item. |       |       |
|  | **c)** | understand other normative references in the relevant version of the VVSG.  | Choose an item. |       |       |
|  | **6.2.2** | Laboratory personnel shall be knowledgeable of all relevant references in this handbook. | Choose an item. |       |       |
|  | **6.2.3** | The laboratory shall maintain a list of personnel designated to fulfill NVLAP requirements including: technical manager, authorized representative, approved signatories, QA manager, team leaders, and designated testing leads and co-leads for the areas listed below: | Choose an item. |       |       |
|  | **a)** | accessibility; | Choose an item. |       |       |
|  | **b)** | security; | Choose an item. |       |       |
|  | **c)** | source code review; | Choose an item. |       |       |
|  | **d)** | usability. | Choose an item. |       |       |
|  | **6.2.4** |  |  |  |  |
|  | **a)** | The laboratory shall notify both NVLAP and the EAC within 15 days of any change in key personnel, including designated testing area leads and co-leads.  | Choose an item. |       |       |
|  | **b)** | When key personnel are added to the staff, the notification of changes shall include a current resume and training record for each new staff member as well as the results of any proficiency testing, if applicable. | Choose an item. |       |       |
|  | **6.2.5** |  |  |  |  |
|  | **a)** | The laboratory shall document the required qualifications for each technical staff position. | Choose an item. |       |       |
|  | **b)** | The laboratory shall also document required certifications for each technical staff position. | Choose an item. |       |       |
|  | **6.2.6** |  |  |  |  |
|  | **a)** | The laboratory, and any laboratories that are subcontracted, shall have staff members with demonstrated and documented knowledge and skills commensurate with the scope of work, i.e., a technical or scientific degree (e.g., a bachelor’s or advanced degree in Computer Engineering, Computer and Network Security, Computer Science, Electrical Engineering, Human Computer Interaction, Human Factors and Applied Psychology or Ergonomics, Usability Engineering, or similar discipline).  | Choose an item. |       |       |
|  | **b)** | In lieu of degrees, equivalent experience is permissible (e.g., professional certifications; experience conducting testing in areas closely related to voting systems, experience conducting security and penetration testing and ethical hacking, experience conducting usability and accessibility reviews in multiple domains, testing with users, and conformance to usability and accessibility standards). | Choose an item. |       |       |
|  | **6.2.7** | The laboratory shall ensure adequate training of staff for the testing activities derived from the laboratory scope of accreditation. Personnel shall be able to demonstrate knowledge through documentation such as, but not limited to resumes and training records and through interviews or proficiency testing of the areas listed below: | Choose an item. |       |       |
|  | **a)** | requirements of the VVSGs 1.0, 1.1, and 2.0 and associated RFIs (Request for Interpretation) and NOCs (Notice of Change), EAC test assertions, VSTL test methods, and generation of test reports; | Choose an item. |       |       |
|  | **b)** | understanding of all relevant testing techniques including conformance and interoperability testing;  | Choose an item. |       |       |
|  | **c)** | universal design principles for accessibility, usability, and security and evaluation of how those principles have been incorporated into system design and structure; | Choose an item. |       |       |
|  | **d)** | computer and network security techniques including risk assessment techniques and penetration testing on networks; | Choose an item. |       |       |
|  | **e)** | source code review techniques (both manual and automated) including use of repositories of commonly known vulnerabilities; | Choose an item. |       |       |
|  | **f)** | physical security techniques and vulnerabilities; | Choose an item. |       |       |
|  | **g)** | identity and access management technologies and techniques including RBAC (Role-Based Access Control); | Choose an item. |       |       |
|  | **h)** | supply chain management issues related to voting systems; | Choose an item. |       |       |
|  | **i)** | cryptographic and security terminology including FIPS 140 validation of cryptographic security modules; | Choose an item. |       |       |
|  | **j)** | assessment of system performance against both usability and accessibility requirements including expert heuristic review; | Choose an item. |       |       |
|  | **k)** | execution of summative, quantitative, performance-based human-computer interaction usability tests and reporting on these tests; | Choose an item. |       |       |
|  | **l)** | protocols for interacting with people who have disabilities; | Choose an item. |       |       |
|  | **m)** | testing JSON and XML-based common election data formats for conformance and interoperability; | Choose an item. |       |       |
|  | **n)** | general standards compliance. | Choose an item. |       |       |
|  | **6.2.8** |  |  |  |  |
|  | **a)** | The laboratory shall have documented a detailed description of its training program for new and current staff members.  | Choose an item. |       |       |
|  | **b)** | Each new staff member shall be trained for assigned duties before being able to participate in testing activities.  | Choose an item. |       |       |
|  | **c)** | The training program shall be updated and current staff members shall be retrained when the VVSGs 1.0, 1.1, and 2.0 or other versions of the VVSG change, or when the individuals are assigned new responsibilities. | Choose an item. |       |       |
|  | **6.2.9** |  |  |  |  |
|  | **a)** | The laboratory shall review annually the competence of each staff member for each test method the staff member is authorized to conduct.  | Choose an item. |       |       |
|  | **b)** | A record of the annual review of each staff member shall be dated and signed by the supervisor and the employee. | Choose an item. |       |       |
|  | **6.2.10** | There is no distinction between full-time laboratory employees and individuals hired on a contract to perform testing activities. VSTLs maintain responsibility for and control of any work performed within its scope of accreditation. |  |  |  |
|  | **a)** | To that end, the VSTL shall ensure all individuals performing testing activities satisfy all accreditation requirements, irrespective of the means by which individuals are compensated (e.g., the VSTL shall ensure all test personnel receive proper training and are subject to annual performance reviews, etc.).  | Choose an item. |       |       |
|  | **b)** | When a change in the key personnel occurs, a report shall be submitted to NVLAP and to the affected validation program. | Choose an item. |       |       |
|  | **6.2.11** | The records for each person having an effect on the outcome of the testing shall include: |  |  |  |
|  | **a)** | position description; | Choose an item. |       |       |
|  | **b)** | resume/biography to match the person to the position; | Choose an item. |       |       |
|  | **c)** | duties assigned; | Choose an item. |       |       |
|  | **d)** | annual competence review; | Choose an item. |       |       |
|  | **e)** | training records and training plans. | Choose an item. |       |       |
| **6.3** | **Facilities and environment** |  |  |  |
|  | **6.3.1** |  |  |  |  |
|  | **a)** | The laboratory shall have adequate facilities to conduct the voting system testing on its scope of accreditation.  | Choose an item. |       |       |
|  | **b)** | If testing activities are conducted at more than one location, all locations shall meet the NVLAP requirements.  | Choose an item. |       |       |
|  | **c)** | If performing usability tests with users, the location shall also be accessible for people with disabilities. | Choose an item. |       |       |
|  | **6.3.2** |  |  |  |  |
|  | **a)** | A documented protection system shall be in place to ensure the safeguarding of customer proprietary hardware, software, test data, electronic and paper records, and other materials. | Choose an item. |       |       |
|  | **b)** | This system shall protect the proprietary materials and information from personnel outside the laboratory, visitors to the laboratory, laboratory personnel without a need to know, and other unauthorized persons.  | Choose an item. |       |       |
|  | **c)** | Backups shall include off-site storage. | Choose an item. |       |       |
|  | **6.3.3** |  |  |  |  |
|  | **a)** | Laboratories shall have systems (e.g., firewall, intrusion detection, anti-virus, two-factor authentication) in place to protect internal systems from distrusted external entities; this shall be accompanied with a planning document that shows how the security measures are integrated.  | Choose an item. |       |       |
|  | **b)** | The laboratory shall have regularly updated protection for all systems against viruses and other malware. | Choose an item. |       |       |
|  | **6.3.4** | If the laboratory is conducting multiple, simultaneous tests, it shall maintain a system of separation between the products of different customers. This includes the product itself, the test platform, peripherals, documentation, electronic media, manuals, testing area, office space, and records. | Choose an item. |       |       |
|  | **6.3.5** | If testing activities will be conducted outside the laboratory, the management system shall include procedures for conducting activities at customer sites or other off-site locations. For example, procedures may explain how to secure the site, where to store records and documentation, and how to control access to the test facility. | Choose an item. |       |       |
|  | **6.3.6** |  |  |  |  |
|  | **a)** | If the laboratory is conducting its tests at a customer site or other location outside the laboratory facility, the environment shall conform, as appropriate, to the requirements for a laboratory environment.  | Choose an item. |       |       |
|  | **b)** | If a customer’s system on which a test is conducted is potentially open to access by unauthorized entities during test, the VSTL shall control the test environment. This is to ensure that the systems are in a defined state compliant with the requirements for the test before starting testing work and that the systems ensure that unauthorized entities do not gain access during testing. | Choose an item. |       |       |
| **6.4** | **Equipment** |
|  | **6.4.1** |  |  |  |  |
|  | **a)** | The laboratory shall document and maintain records on all test equipment used during testing.  | Choose an item. |       |       |
|  | **b)** | The laboratory shall have procedures to configure and operate all equipment within its control. | Choose an item. |       |       |
|  | **6.4.2** |  |  |  |  |
|  | **a)** | Equipment used during the conduct of testing shall be under configuration control.  | Choose an item. |       |       |
|  | **b)** | The laboratory shall have procedures to ensure that any equipment used for testing is in a known state prior to use for testing. | Choose an item. |       |       |
|  | **6.4.3** |  |  |  |  |
|  | **a)** | Any software test tools shall be validated to be sure that they are accurately testing to the standard.  | Choose an item. |       |       |
|  | **b)** | They shall also be examined to ensure they do not interfere with the conduct of the test and do not modify or impact the integrity of the product under test in any way.  | Choose an item. |       |       |
| **6.5** | **Metrological traceability** |
|  | **6.5.1** |  |  |  |  |
|  | **a)** | All developed test methods and tests performed within the test campaign shall be traceable to VVSGs 1.0, 1.1, and 2.0 requirements and EAC test methods and assertions.  | Choose an item. |       |       |
|  | **b)** | This validation shall be documented (e.g., cross-reference matrix).  | Choose an item. |       |       |
| **6.6** | **Externally provided products and services** |
|  | **6.6.1** | All core voting system testing shall be conducted by a VSTL (which may include individuals hired on a contract, see 6.2.10). Core testing includes technical data package review, physical configuration audit, source code review, functional configuration audit, system integration test, interoperability tests, volume tests, accuracy testing, accessibility testing, telecommunications testing, usability tests, security tests, vulnerability testing, and penetration testing. | Choose an item. |       |       |
|  | **6.6.2** | When the VSTL subcontracts testing for any core voting system testing within its scope of accreditation, the subcontracted laboratory shall also be a NVLAP-accredited VSTL authorized to do business in the United States. | Choose an item. |       |       |
|  | **6.6.3** | When any specialized parts of a core test (i.e., within vulnerability testing or penetration testing, or within usability or accessibility testing) is subcontracted to a non-NVLAP-accredited VSTL, a VSTL shall first receive written authorization by the EAC. |  |  |  |
|  | **6.6.4** |  |  |  |  |
|  | **a)** | VSTLs shall use U.S. based accredited laboratories recognized by the EAC (see EAC’s Voting Test Laboratory Program Manual) for non-core testing.  | Choose an item. |       |       |
|  | **b)** | When an accredited laboratory is not available for non-core testing, the VSTL shall conduct an audit of the subcontracted laboratory and shall document that the laboratory is competent and qualified for use.NOTE Non-core testing includes testing for the following: electromagnetic compatibility, environmental, electrical, acoustical, and cryptographic modules, these test methods are covered through a separate accreditation and are not part of the VST accreditation process (Reference VVSGs 1.0, 1.1, and 2.0). | Choose an item. |       |       |
|  | **6.6.5** |  |  |  |  |
|  | **a)** | When a VSTL subcontracts to another laboratory, the VSTL is responsible for ensuring and documenting that setup, configuration, testing, and reporting is competent, appropriate, and conducted by qualified people. The VSTL shall ensure that there are no gaps in the knowledge required to conduct the testing. For example, a VSTL subcontracting with another laboratory to evaluate a FIPS cryptographic security module must be able to demonstrate knowledge of the basic concepts and terminology associated with FIPS cryptographic security modules, be able to effectively evaluate the report provided by the contracted laboratory, and conduct the functional testing where applicable. | Choose an item. |       |       |
|  | **b)** | The VSTL is responsible for ensuring and documenting that the entire voting system is properly tested. | Choose an item. |       |       |
| **7** | **Process requirements** |
| **7.1** | **Review of requests, tenders and contracts** |
|  | **7.1.1** | The procedures for review of contracts shall include procedures to ensure that the customer understands that its products and systems must meet the requirements of HAVA, VVSGs 1.0, 1.1, and 2.0, and the EAC. | Choose an item. |       |       |
|  | **7.1.2** | The review shall include (but is not limited to): laboratory competencies and resources to provide the service, vendor-supplied documentation, tests to be conducted, testing in addition to certification testing, and subcontracting. | Choose an item. |       |       |
|  | **7.1.3** | Procedures for the review of requests, tenders, and contracts shall include provisions to ensure that any state certification testing does not replace or dilute national certification requirements. | Choose an item. |       |       |
|  | **7.1.4** | When conducting a contract review, the VSTL shall determine if there are any special or changed requirements from the EAC or from state or local election authorities. | Choose an item. |       |       |
| **7.2** | **Selection, verification and validation of methods** |
|  | **7.2.1** |  |  |  |  |
|  | **a)** | In the VVSGs 1.0, 1.1, and 2.0, there are specified test methods, test methods that require adaptation, and requirements for which the laboratory shall have to develop test methods. When the EAC publishes amendments or augmentations to the standards or guidelines, the laboratory shall develop procedures for implementation of the new requirements.  | Choose an item. |       |       |
|  | **b)** | The laboratory shall provide a matrix cross-referencing the laboratory’s test methods to the voting system guideline as well as to any EAC-developed test methods.  | Choose an item. |       |       |
|  | **7.2.2** | Where the laboratory has developed or modified test methods to meet the requirements of the VVSGs 1.0, 1.1, and 2.0, validation of the test methods shall be referenced in the test report. | Choose an item. |       |       |
|  | **7.2.3** |  |  |  |  |
|  | **a)** | For the purposes of achieving product certification under HAVA, laboratories shall comply with interpretations of the test methods and test assertions as provided by the EAC.  | Choose an item. |       |       |
|  | **b)** | When exceptions to the testing methodology may be necessary for technical reasons, the laboratory shall request an interpretation from the EAC, inform the customer, and document the details of an interpretation in the test report. | Choose an item. |       |       |
|  | **7.2.4** |  |  |  |  |
|  | **a)** | As a part of the testing procedure, the laboratory shall describe by whom and how the voting system will be configured.  | Choose an item. |       |       |
|  | **b)** | If the customer configures any part of the voting system, the laboratory shall verify the configuration, including all software. | Choose an item. |       |       |
|  | **7.2.5** | Testing may be conducted at the customer site, the laboratory or another location that is mutually agreed to by the laboratory and the customer.  |  |  |  |
|  | **a)** | When testing activities are conducted outside the laboratory, the laboratory shall have additional documented procedures to ensure the integrity of all tests and recorded results. | Choose an item. |       |       |
|  | **b)** | These procedures shall also ensure that the same requirements that apply in the laboratory are maintained at the non-laboratory site. | Choose an item. |       |       |
| **7.4** | **Handling of test or calibration items** |
|  | **7.4.1** | The laboratory shall maintain separation between and control over the items from different tests, to include the product being tested, its platform, peripherals, and all documentation. | Choose an item. |       |       |
|  | **7.4.2** |  |  |  |  |
|  | **a)** | When the product being tested includes software components, the laboratory shall ensure that configuration management mechanisms are in place to prevent inadvertent modifications to the software components during the testing process.  | Choose an item. |       |       |
|  | **b)** | This includes the customer’s software, test tools, and commercial off-the-shelf (COTS) software. | Choose an item. |       |       |
| **7.7** | **Ensuring the validity of results** |
|  |  | The laboratory procedures for test method validation shall include tests for abnormal conditions as well as normal operations where the program functionality includes requirements to detect and respond to invalid data, operator actions, or hardware malfunctions. | Choose an item. |       |       |
| **7.8** | **Reporting of results** |
|  | **7.8.1** | Reports shall be submitted in a form consistent with the requirements of the latest version of the VVSG and EAC Voting System Testing and Certification Laboratory Manual (e.g., the report shall contain sufficient information for state certification officials to identify what testing was completed for the purpose of ascertaining what additional testing may be necessary at the state level).  | Choose an item. |       |       |
|  | **7.8.2** | Reports shall meet customer-laboratory contract obligations and be complete. | Choose an item. |       |       |
|  | **7.8.3** | The section of a test report that meets the VVSGs 1.0, 1.1, and 2.0 requirements for a summary or the recommendation section of a test report for a customer shall also meet the requirements of ISO/IEC 17025, 7.8.7 on opinions and interpretations under *Reporting the results*. | Choose an item. |       |       |
| **8** | **Management system requirements** |
| **8.2** | **Management system documentation** |
|  | **8.2.1** |  |  |  |  |
|  | **a)** | The controlled version of the laboratory management system documentation may be paper-based or computer-based. Version control shall be maintained in either case.  | Choose an item. |       |       |
|  | **b)** | If both methods are used, one or the other will be identified as a primary source with the other having the status of a copy (e.g., historical, archive, working, distribution). | Choose an item. |       |       |
|  | **8.2.2** | The following program-specific procedures (required, but not limited to) shall be available for assessor examination prior to the on-site visit (if requested), but in any event shall be part of the on-site assessment process: |  |  |  |
|  | **a)** | review of the vendor technical data package (VVSG 2.0 Section 3, VVSG 1.1 Volume II Section 3, and VVSG 1.0 Volume II Section 2); | Choose an item. |       |       |
|  | **b)** | writing a test plan for first-time testing and testing of modified systems (VVSG 1.1, Volume II, Appendix A and VVSG 1.0, Volume II, Appendix A); | Choose an item. |       |       |
|  | **c)** | writing test operation procedures (VVSG 1.1 Volume II Appendix A, and VVSG 1.0 Volume II Appendix A.6.4); | Choose an item. |       |       |
|  | **d)** | writing a national certification test report (VVSG 1.1 Volume II Appendix B, and VVSG 1.0 Volume II Appendix B); | Choose an item. |       |       |
|  | **e)** | reviewing the configuration management plan (VVSG 1.1 Volume II Section 2, and VVSG 1.0 Volume II Section 2.11); | Choose an item. |       |       |
|  | **f)** | performing security testing and penetration testing (VVSG 1.1 Volume II Section 7.4, and VVSG 1.0 Volume II Section 6.4); | Choose an item. |       |       |
|  | **g)** | performing analysis of FIPs cryptographic functionality if the analysis is not subcontracted, (VVSG 2.0 Section 13.3); | Choose an item. |       |       |
|  | **h)** | performing usability and accessibility testing, including review of the summative usability reports delivered in the TDP in the format of ISO/IEC 25062:2006 *Common Industry Format (CIF) for Usability Test Reports* (VVSG 2.0 Section 2.2 and 8.3, VVSG 1.1 Volume I 3.2.7-a.iv, 3.2.8.1-b, 3.3.3-a, 3.3.10, and VVSG 1.0 Volume I 3.1.1, 3.2.2.1-a, 3.2.2.2-a, 3.2.3-a), and any testing with voters with a range of demographics; | Choose an item. |       |       |
|  | **i)** | performing conformance and interoperability testing of common data format import and export implementations; (VVSG 2.0 Section 4); | Choose an item. |       |       |
|  | **j)** | conducting the test campaign, including procedures for working with the EAC during the test campaign; | Choose an item. |       |       |
|  | **k)** | test readiness review; | Choose an item. |       |       |
|  | **l)** | deficiency criteria tracking; | Choose an item. |       |       |
|  | **m)** | witnessing of system build and installation. | Choose an item. |       |       |
|  | NOTE: the program-specific procedures listed above in 8.2.2.b-e is equivalent for VVSG 2.0 to that found in the respective reference from VVSG 1.0 and/or VVSG1.1. |
| **8.4** | **Control of records** |
|  | **8.4.1** |  |  |  |  |
|  | **a)** | The laboratory shall set policies and procedures on the retention of records that meet the requirements of HAVA and the EAC and meet the needs of its customers as agreed in a contract.  | Choose an item. |       |       |
|  | **b)** | The policy shall require that all test documentation be maintained for a minimum of 5 years after the last test performed on any version of the voting system (or component of any version of the voting system). | Choose an item. |       |       |
|  | **8.4.2** | Laboratory records shall be maintained, released, or destroyed in accordance with the laboratory’s policy on proprietary information and contractual agreements with customers. | Choose an item. |       |       |
|  | **8.4.3** | The test report plus the laboratory’s records of the test shall contain sufficient information to allow repeating, reproducing, and/or auditing the entire test. | Choose an item. |       |       |
| **8.8** | **Internal audits** |
|  | **8.8.1** | The internal audit shall cover the laboratory management system and the application of the management system to all laboratory activities, including compliance with NVLAP, HAVA, VVSGs 1.0, 1.1, and 2.0, contractual, laboratory management system, and any additional EAC requirements.  | Choose an item. |       |       |
|  | **8.8.2** | In the case where only one member of the laboratory staff is competent to conduct a specific aspect of a test method and performing an audit of work in this area would result in that person auditing his or her own work, the audit may be conducted by another staff member. External experts may also be used in these situations. | Choose an item. |       |       |