

Appendix A: Glossary

This glossary contains terms needed to understand voting systems and related areas such as security, human factors, and testing. Sources consulted in preparing the definitions are listed in section A.2.

A.1 Glossary

A

abandoned ballot: Ballot that the voter did not place in the ballot box or record as cast on DRE before leaving the polling place

absentee ballot: Ballot cast by a voter unable to vote in person at his or her polling place on election day

acceptance testing: Examination of a voting system and its components by the purchasing election authority (usually in a simulated-use environment) to validate performance of delivered units in accordance with procurement requirements, and to validate that the delivered system is, in fact, the certified system purchased

Access Board: Independent federal agency whose primary mission is accessibility for people with disabilities and a leading source of information on accessible design

accessibility: Measurable characteristics that indicate the degree to which a system is available to, and usable by, individuals with disabilities. The most common disabilities include those associated with vision, hearing and mobility, as well as cognitive disabilities.

accessible voting station: Voting station equipped for individuals with disabilities

accreditation: Formal recognition that a laboratory is competent to carry out specific tests or calibrations

accreditation body: (1) Authoritative body that performs accreditation (2) An independent organization responsible for assessing the performance of other organizations against a recognized standard, and for formally confirming the status of those that meet the standard

accuracy: (1) Extent to which a given measurement agrees with an accepted standard for that measurement (2) Closeness of the agreement between the result of a measurement and a true value of the particular quantity subject to measurement. Accuracy is a qualitative concept and is not interchangeable with precision.

accuracy for voting systems: Ability of the system to capture, record, store, consolidate and report the specific selections and absence of selections, made by the voter for each ballot position without error. Required accuracy is defined in terms of an error rate that for testing purposes represents the maximum number of errors allowed while processing a specified volume of data.

adequate security: Security commensurate with the risk and the magnitude of harm resulting from the loss, misuse, unauthorized access to, or modification of, information. This includes ensuring that systems and applications operate effectively and provide appropriate confidentiality, integrity, and availability, through the use of cost-effective management, personnel, operational, and technical controls.

alternative format: The ballot or accompanying information is said to be in an alternative format if it is in a representation other than the standard ballot language and format. Examples include, but are not limited to languages other than English, Braille, ASCII text, large print, recorded audio.

audio ballot: a ballot in which a set of offices is presented to the voter in spoken, rather than written, form

audio-tactile interface (ATI): Voter interface designed to not require visual reading of a ballot. Audio is used to convey information to the voter and sensitive tactile controls allow the voter to communicate ballot selections to the voting system.

audit: Systematic, independent, documented process for obtaining records, statements of fact or other relevant information and assessing them objectively to determine the extent to which specified requirements are fulfilled

audit trail: Recorded information that allows election officials to review the activities that occurred on the voting equipment to verify or reconstruct the steps followed without compromising the ballot or voter secrecy

audit trail for direct-recording equipment: Paper printout of votes cast, produced by direct-recording electronic (DRE) voting machines, which election officials may use to crosscheck electronically tabulated totals

availability: The percentage of time during which a system is operating properly and available for use

B

ballot: The official presentation of all of the contests to be decided in a particular election. See also, **audio ballot, ballot image, video ballot, electronic voter interface.**

ballot configuration: Particular set of contests to appear on the ballot for a particular election district, their order, the list of ballot positions for each contest, and the binding of candidate names to ballot positions

ballot counter: Process in a voting device that counts the votes cast in an election

ballot counting logic: The software logic that defines the combinations of voter choices that are valid and invalid on a given ballot and that determines how the vote choices are totaled in a given election

ballot format: The concrete presentation of the contents of a ballot appropriate to the particular voting technology being used. The contents may be rendered using various methods of presentation (visual or audio), language or graphics.

ballot image: Electronically produced record of all votes cast by a single voter. See also **cast vote record**.

ballot instructions: Information provided to the voter during the voting session that describes the procedure for executing a ballot. Such material may (but need not) appear directly on the ballot.

ballot measure: (1) A question that appears on the ballot for approval or rejection. (2) A contest on a ballot where the voter may vote yes or no.

ballot position: A specific place in a ballot where a voter's selection for a particular contest may be indicated. Positions may be connected to row and column numbers on the face of a voting machine or ballot, particular bit positions in a binary record of a ballot (for example, an electronic ballot image), the equivalent in some other form. Ballot positions are bound to specific contests and candidate names by the ballot configuration.

ballot preparation: Selecting the specific contests and questions to be contained in a ballot format and related instructions; preparing and testing election-specific software containing these selections; producing all possible ballot formats; and validating the correctness of ballot materials and software containing these selections for an upcoming election

ballot production: Process of generating ballots for presentation to voters, e.g., printing paper ballots or configuring the ballot presentation on a DRE

ballot rotation: Process of varying the order of the candidate names within a given contest

ballot scanner: Device used to read the voter selection data from a paper ballot or ballot card

ballot style: See **ballot configuration**

C

candidate: Person contending in a contest for office. A candidate may be explicitly presented as one of the choices on the ballot or may be a write-in candidate.

candidate register: Record that reflects the total votes cast for the candidate. This record is augmented as each ballot is cast on a DRE or as digital signals from the conversion of voted paper ballots are logically interpreted and recorded.

canvass: Compilation of election returns and validation of the outcome that forms the basis of the official results by political subdivision

cast ballot: Ballot that has been deposited by the voter in the ballot box or electronically submitted for tabulation

cast vote record: Permanent record of all votes produced by a single voter whether in electronic, paper or other form. Also referred to as ballot image when used to refer to electronic ballots.

catastrophic system failure: Total loss of function or functions, such as the loss or unrecoverable corruption of voting data or the failure of an on board battery of volatile memory

central count voting system: A voting system that tabulates ballots from multiple precincts at a central location. Voted ballots are placed into secure storage at the polling place. Stored ballots are transported or transmitted to a central counting place which produces the vote count report.

certification: Procedure by which a third party gives written assurance that a product, process or service conforms to specified requirements. See also **state certification** and **national certification**.

certification testing: Testing performed under either national or state certification processes to verify voting system conformance to requirements

challenged ballot: Ballot provided to an individual who claim they are registered and eligible to vote but whose eligibility or registration status cannot be confirmed when they present themselves to vote. Once voted, such ballots must be kept separate from other ballots and are not included in the tabulation until after the voter's eligibility is confirmed. Michigan is an exception in that they determine voter eligibility before a ballot is issued. See also **provisional ballot**

checksum: Value computed from the content of a document or data record. Typically this is the sum of the numeric representations of all the characters in the text. Checksums are used to aid in detecting errors or alterations during transmission or storage.

claim of conformance: Statement by a vendor declaring that a specific product conforms to a particular standard or set of standard profiles; for voting systems, NASED qualification or EAC certification provides independent verification of a claim

closed primary: Primary election in which voters receive a ballot listing only those candidates running for office in the political party with which the voters are affiliated. In some states, non-partisan contests and ballot issues may be included. In some cases, political parties may allow unaffiliated voters to vote in their party's primary

commercial off-the-shelf (COTS): 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)

Common Industry Format (CIF): Refers to the format described in ANSI/INCITS 354-2001 "Common Industry Format (CIF) for Usability Test Reports

component: Element within a larger system; a component can be hardware or software. For hardware, it is a physical part of a subsystem that can be used to compose larger systems (e.g., circuit boards, internal modems, processors, computer memory). For software, it is a module of executable code that performs a well-defined function and interacts with other components.

confidentiality: Prevention of unauthorized disclosure of information

configuration management: Discipline applying technical and administrative direction and surveillance to identify and document functional and physical characteristics of a configuration item, control changes to these characteristics, record and report change processing and implementation status, and verify compliance with specified requirements

configuration management plan: Document detailing the process for identifying, controlling and managing various released items (such as code, hardware and documentation)

configuration status accounting: An element of configuration management, consisting of the recording and reporting of information needed to manage a configuration effectively. This includes a listing of the approved configuration identification, the status of proposed changes to the configuration, and the implementation status of approved changes.

conformance: Fulfillment of specified requirements by a product, process or service

conformance testing: Process of testing an implementation against the requirements specified in one or more standards. The outcomes of a conformance test are generally a pass or fail result, possibly including reports of problems encountered during the execution. Also known as certification testing.

contest: Decision to be made within an election, which may be a contest for office or a referendum, proposition and/or question. A single ballot may contain one or more contests.

count: Process of totaling votes. See **tabulation**.

counted ballot: Ballot that has been processed and whose votes are included in the candidates and measures vote totals

corrective action: Action taken to eliminate the causes of an existing deficiency or other undesirable situation in order to prevent recurrence

cross filing: Endorsement of a single candidate or slate of candidates by more than one political party. The candidate or slate appears on the ballot representing each endorsing political party. Also referred to as cross-party endorsement.

cryptographic key: Value used to control cryptographic operations, such as decryption, encryption, signature generation or signature verification

cryptography: Discipline that embodies the principles, means, and methods for the transformation of data in order to hide their semantic content, prevent their unauthorized use, prevent their undetected modification and establish their authenticity

cumulative voting: A method of voting exclusive to multi-member district election (e.g. county board) in which each voter may cast as many votes as there are seats to be filled and may cast two or more of those votes for a single candidate

D

data accuracy: (1) Data accuracy is defined in terms of ballot position error rate. This rate applies to the voting functions and supporting equipment that capture, record, store, consolidate and report the specific selections, and absence of selections, made by the voter for each ballot position. (2) The system's ability to process voting data absent internal errors generated by the system. It is distinguished from data integrity, which encompasses errors introduced by an outside source.

data integrity: Invulnerability of the system to accidental intervention or deliberate, fraudulent manipulation that would result in errors in the processing of data. It is distinguished from data accuracy that encompasses internal, system-generated errors.

decertification: Revocation of national or state certification of voting system hardware and software

decryption: Process of changing encrypted text into plain text

device: Functional unit that performs its assigned tasks as an integrated whole

digital signature: An asymmetric key operation where the private key is used to digitally sign an electronic document and the public key is used to verify the signature. Digital signatures provide data authentication and integrity protection

direct-recording electronic (DRE) voting system: An electronic voting system that utilizes electronic components for the functions of ballot presentation, vote capture, vote recording,

and tabulation which are logically and physically integrated into a single unit. A DRE produces a tabulation of the voting data stored in a removable memory component and in printed hardcopy.

directly verifiable: Voting system feature that allows the voter to verify at least one representation of his or her ballot with his/her own senses, not using any software or hardware intermediary. Examples include a marksense paper ballot and a DRE with a voter verifiable paper record feature.

disability: With respect to an individual; (1) a physical or mental impairment that substantially limits one or more of the major life activities of such individual; (2) a record of such an impairment; (3) being regarded as having such an impairment (definition from the Americans with Disabilities Act).

dynamic voting system software: Software that changes over time once it is installed on the voting equipment. See also voting system software.

E

EAC: Election Assistance Commission (www.eac.gov)

early voting: Broadly, voting conducted before election day where the voter completes the ballot in person at a county office or other designated polling place or ballot drop site prior to election day

election: A formal process of selecting a person for public office or of accepting or rejecting a political proposition by voting

election databases: Data file or set of files that contain geographic information about political subdivisions and boundaries, all contests and questions to be included in an election, and the candidates for each contest

election definition: Definition of the contests and questions that will appear on the ballot for a specific election

election district: Contiguous geographic area represented by a public official who is elected by voters residing within the district boundaries. The district may cover an entire state or political subdivision, may be a portion of the state or political subdivision, or may include portions of more than one political subdivision.

election management system: Set of processing functions and databases within a voting system that defines, develops and maintains election databases, performs election definitions and setup functions, format ballots, count votes, consolidates and report results, and maintains audit trails

election officials: The people associated with administering and conducting elections, including government personnel and poll workers

election programming: Process by which election officials or their designees use voting system software to logically define the ballot for a specific election

electronic cast vote record: An electronic version of the cast vote record

electronic voter interface: Subsystem within a voting system which communicates ballot information to a voter in video, audio or other alternative format which allows the voter to select candidates and issues by means of vocalization or physical actions

electronic voting machine: Any system that utilizes an electronic component. Term is generally used to refer to DREs. See also **voting equipment**, **voting system**.

electronic voting system: An electronic voting system is one or more integrated devices that utilize an electronic component for one or more of the following functions: ballot presentation, vote capture, vote recording, and tabulation. A DRE is a functionally and physically integrated electronic voting system which provides all four functions electronically in a single device. An optical scan (also known as marksense) system where the voter marks a paper ballot with a marking instrument and then deposits the ballot in a tabulation device is partially electronic in that the paper ballot provides the presentation, vote capture and vote recording functions. An optical scan system employing a ballot marking device adds a second electronic component for ballot presentation and vote capture functions.

encryption: Process of obscuring information by changing plain text into ciphertext for the purpose of security or privacy. See also **cryptography** and **decryption**.

error correcting code: coding system that allows data being read or transmitted to be checked for errors and, when detected, corrects those errors

F

Federal Information Processing Standards: Standards for federal computer systems developed by NIST. These standards are developed when there are no existing industry standards to address federal requirements for system interoperability, portability of data and software, and computer security.

firmware: Computer programming stored in programmable read-only memory thus becoming a permanent part of the computing device. It is created and tested like software.

Functional Configuration Audit (FCA): Exhaustive verification of every system function and combination of functions cited in the vendor's documentation. The FCA verifies the accuracy and completeness of the system's Voter Manual, Operations Procedures, Maintenance Procedures, and Diagnostic Testing Procedures.

functional test: Test performed to verify or validate the accomplishment of a function or a series of functions

G

general election: Election in which voters, regardless of party affiliation, are permitted to select candidates to fill public office and vote on ballot issues

guidelines: See **product standard**

H

hash: Algorithm that maps a bit string of arbitrary length to a fixed-length bit string.

hash function: A function that maps a bit string of arbitrary length to a fixed length bit string. Approved hash functions satisfy the following properties: 1. (One-way) It is computationally infeasible to find any input that maps to any pre-specified output, and 2. (Collision resistant) It is computationally infeasible to find any two distinct inputs that map to the same output.

I

indirectly verifiable: Voting system feature that allows a voter to verify his or her selections via a hardware or software intermediary. An example is a touch screen DRE where the voter verifies the ballot selections through the assistance of audio stimuli.

implementation statement: Statement by a vendor indicating the capabilities, features, and optional functions as well as extensions that have been implemented. Also known as implementation conformance statement.

Independent Testing Authority (ITA): Replaced by “accredited testing laboratories” and “test labs.” Prior usage referred to independent testing organizations accredited by the National Association of State Election Directors (NASED) to perform voting system qualification testing.

information security: Protecting information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to provide integrity, confidentiality, and availability

inspection: Examination of a product design, product, process or installation and determination of its conformity with specific requirements or, on the basis of professional judgment, with general requirements. Inspection of a process may include inspection of staffing, facilities, technology and methodology.

integrity: Guarding against improper information modification or destruction, and ensuring information non-repudiation and authenticity

internal audit log: A human readable record, resident on the voting machine, used to track all activities of that machine. This log records every activity performed on or by the machine indicating the event and when it happened.

K

key management: Activities involving the handling of cryptographic keys and other related security parameters (e.g., passwords) during the entire life cycle of the keys, including their generation, storage, establishment, entry and output, and zeroization.

L

logic and accuracy testing: Testing of the tabulator setups of a new election definition to ensure that the content correctly reflects the election being held (i.e., contests, candidates, number to be elected, ballot styles) and that all voting positions can be voted for the maximum number of eligible candidates and that results are accurately tabulated and reported.

logical correctness: Condition signifying that, for a given input, a computer program will satisfy the program specification and produce the required output

M

marksense: System by which votes are recorded by means of marks made in voting response fields designated on one or both faces of a ballot card or series of cards. Marksense systems may use an optical scanner or similar sensor to read the ballots. Also known as optical scan.

measure register: Record that reflects the total votes cast for and against a specific ballot issue. This record is augmented as each ballot is cast on a DRE or as digital signals from the conversion of voted paper ballots are logically interpreted and recorded.

mechanical lever voting machine: Machine that directly records a voter's choices via mechanical lever-actuated controls into a counting mechanism that tallies the votes without using a physical ballot

multi-seat contest: Contest in which multiple candidates can run, up to a specified number of seats. Voters may vote for no more than the specified number of candidates

N

NASED: National Association of State Election Directors, (www.nased.org)

national certification testing: Examination and testing of a voting system to determine if the system complies with the performance and other requirements of the national certification standards and with its own specifications

national certification test report: Report of results of independent testing of a voting system by an accredited test lab delivered to the EAC with a recommendation regarding granting a certification number

NIST: National Institute of Standards and Technology

non-partisan office: Elected office for which candidates run without political party affiliation

nonvolatile memory: Memory in which information can be stored indefinitely with no power applied. ROMs and PROMs are examples of nonvolatile memory.

NVLAP: The National Voluntary Laboratory Accreditation Program operated by NIST

O

open primary: Primary election in which any voters can participate, regardless of their political affiliation. Some states require voters to publicly declare their choice of party ballot at the polling place, after which the poll worker provides or activates the appropriate ballot. Other states allow the voters to make their choice of party ballot within the privacy of the voting booth.

operational environment: All software, hardware (including facilities, furnishings and fixtures), materials, documentation, and the interface used by the election personnel, maintenance operator, poll worker, and voter, required for voting equipment operations.

optical scan, optical scan system: System by which votes are recorded by means of marks made in voting response fields designated on one or both faces of a ballot card or series of cards. An optical scan system reads and tabulates ballots, usually paper ballots, by scanning the ballot and interpreting the contents. Also known as **marksense**.

overvote: Voting for more than the maximum number of selections allowed in a contest

P

paper-based voting system: Voting system that records votes, counts votes, and tabulates the vote count, using one or more ballot cards or paper ballots

paper record: Paper cast vote record that can be directly verified by a voter. See also **ballot image, cast vote record.**

partisan office: An elected office for which candidates run as representatives of a political party

personal assistive device: A device that is carried or worn by an individual with some physical impairment whose primary purpose is to help compensate for that impairment

Physical Configuration Audit (PCA): Inspection by an accredited test laboratory that compares the voting system components submitted for certification testing to the vendor's technical documentation and confirms that the documentation submitted meets the national certification requirements. Includes witnessing of the build of the executable system to ensure that the certified release is built from the tested components.

political subdivision: Any unit of government, such as counties and cities, school districts, and water and conservation districts having authority to hold elections for public offices or on ballot issues

polling location: Physical address of a polling place

polling place: Facility to which voters are assigned to cast in-person ballots

precinct: Election administration division corresponding to a contiguous geographic area that is the basis for determining which contests and issues the voters legally residing in that area are eligible to vote on

precinct count: Counting of ballots in the same precinct in which those ballots have been cast

precinct count voting system: a voting system that tabulates ballots at the polling place. These systems typically tabulate ballots as they are cast and print the results after the close of polling. For DREs, and for some paper-based systems, these systems provide electronic storage of the vote count and may transmit results to a central location over public telecommunication networks.

precision: (1) Extent to which a given set of measurements of the same sample agree with their mean. Thus, precision is commonly taken to be the standard deviation estimated from sets of duplicate measurements made under conditions of repeatability, that is, independent test results obtained with the same method on identical test material, in the same laboratory or test facility, by the same operator using the same equipment within short intervals of time. (2) Degree of refinement in measurement or specification, especially as represented by the number of digits given.

primary election: Election held to determine which candidate will represent a political party for a given office in the general election. Some states have an open primary, while others have a closed primary. Sometimes elections for nonpartisan offices and ballot issues are held during primary elections.

primary presidential delegation nomination: Primary election in which voters choose the delegates to the presidential nominating conventions allotted to their states by the national party committees

privacy: The ability to prevent others from determining how an individual voted

private key: The secret part of an asymmetric key pair that is typically used to digitally sign or decrypt data

product standard: Standard that specifies requirements to be fulfilled by a product or a group of products, to establish its fitness for purpose

provisional ballot: Ballot provided to individuals who claim they are registered and eligible to vote but whose eligibility or registration status cannot be confirmed when they present themselves to vote. Once voted, such ballots must be kept separate from other ballots and are not included in the tabulation until after the voter's eligibility is confirmed. In some jurisdictions called an affidavit ballot. See also **challenged ballot**.

public key: Public part of an asymmetric key pair that is typically used to verify digital signatures or encrypt data

public network direct-recording electronic (DRE) voting system: A DRE that transmits vote counts to a central location over a public telecommunication network

Q

qualification number: A number issued by NASED (National Association of State Election Directors) to a system that has been tested by an accredited Independent Testing Authority for compliance with the voting system standards. Issuance of a qualification number indicates that the system conforms to the national standards.

qualification test report: Report of results of independent testing of a voting system by an Independent Test Authority documenting the specific system configuration tested, the scope of tests conducted and when testing was completed.

qualification testing: Examination and testing of a voting system by a NASED-accredited Independent Test Authority to determine if the system conforms to the performance and other requirements of the national certification standards and the vendor's own specifications.

R

ranked order voting: Practice that allows voters to rank candidates in a contest in order of choice: 1, 2, 3 and so on. A candidate receiving a majority of the first choice votes wins that election. If no candidate receives a majority, the last place candidate is deleted, and all

ballots are counted again, with each ballot cast for the deleted candidate applied to the next choice candidate listed on the ballot. The process of eliminating the last place candidate and recounting the ballots continues until one candidate receives a majority of the vote. The practice is also known as instant runoff voting, preferences or preferential voting, or choice voting.

recall issue with options: Process that allows voters to remove elected representatives from office prior to the expiration of their terms of office. The recall may involve not only the question of whether a particular officer should be removed, but also the question of naming a successor in the event that there is an affirmative vote for the recall.

recertification: Re-examination, and possibly retesting of a voting system that was modified subsequent to receiving national and/or state certification. The object of is to determine if the system as modified still conforms to the requirements.

recount: Retabulation of the votes cast in an election

referendum: Process whereby a state law or constitutional amendment may be referred to the voters before it goes into effect

reproducibility: Ability to obtain the same test results by using the same test method on identical test items in different testing laboratories with different operators using different equipment

requirement: Provision that conveys criteria to be fulfilled

residual vote: Total number of votes that cannot be counted for a specific contest. There may be multiple reasons for residual votes (e.g., declining to vote for the contest, overvoting in a contest).

risk assessment: The process of identifying the risks to system security and determining the probability of occurrence, the resulting impact, and safeguards that would mitigate this impact

runoff election: Election to select a winner following a primary or a general election, in which no candidate in the contest received the required minimum percentage of the votes cast. The two candidates receiving the most votes for the contest in question proceed to the runoff election.

S

secure receptacle: The container for storing VVPAT paper audit records

security analysis: An inquiry into the potential existence of security flaws in a voting system. Includes an analysis of the system's software, firmware, and hardware, as well as the procedures associated with system development, deployment, operation and management.

security controls: Management, operational, and technical controls (i.e., safeguards or countermeasures) prescribed for an information system to protect the confidentiality, integrity, and availability of the system and its information.

semi-static voting system software: Software that may change in response to the voting equipment on which it is installed or to election-specific programming.

split precinct: A precinct that contains an election district subdivision, e.g., a water district or school board district, requiring an additional ballot configuration

spoiled ballot: Ballot that has been voted but will not be cast

state certification: State examination and possibly testing of a voting system to determine its compliance with state requirements for voting systems

static voting system software: Software that does not change based on the election being conducted or the voting equipment upon which it is installed, e.g., executable code

straight party voting: Mechanism that allows voters to cast a single vote to select all candidates on the ballot from a single political party

support software: Software that aids in the development, maintenance, or use of other software, for example, compilers, loaders and other utilities

symmetric (secret) encryption algorithm: Encryption algorithms using the same secret key for encryption and decryption

T

tabulation: Process of totaling votes. See also **count**.

t-coil: Inductive coil used in some hearing aids to allow reception of an audio band magnetic field signal, instead of an acoustic signal. The magnetic or inductive mode of reception is commonly used in conjunction with telephones, auditorium loop systems and other systems that provide the required magnetic field output.

tabulator: Device that counts votes

technical data package: Vendor documentation relating to the voting system required to be submitted with the system as a precondition of certification testing

telecommunications: Transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received

test: Technical operation that consists of the determination of one or more characteristics of a given product, process or service according to a specified procedure

test campaign: Sum of the work by a voting system test lab on a single product or system from contract through test plan, conduct of testing for each requirement (including hardware, software, and systems), reporting, archiving, and responding to issues afterwards

testing standard: Standard that is concerned with test methods, sometimes supplemented with other provisions related to testing, such as sampling, use of statistical methods or sequence of tests

test method: Specified technical procedure for performing a test

test plan: Document created prior to testing that outlines the scope and nature of testing, items to be tested, test approach, resources needed to perform testing, test tasks, risks and schedule

touch screen voting machine: A voting machine that utilizes a computer screen to display the ballot and allows the voter to indicate his or her selections by touching designated locations on the screen

U

undervote: Occurs when the number of choices selected by a voter in a contest is less than the maximum number allowed for that contest or when no selection is made for a single choice contest

usability: Effectiveness, efficiency and satisfaction with which a specified set of users can achieve a specified set of tasks in a particular environment. Usability in the context of voting refers to voters being able to cast valid votes as they intended quickly, without errors, and with confidence that their ballot choices were recorded correctly. It also refers to the usability of the setup and operation in the polling place of voting equipment.

usability testing: Encompasses a range of methods that examine how users in the target audience actually interact with a system, in contrast to analytic techniques such as usability inspection

V

valid vote: Vote from a ballot or ballot image that is legally acceptable according to state law

validation: Process of evaluating a system or component during or at the end of the development process to determine whether it satisfies specified requirements

verification: Process of evaluating a system or component to determine whether the products of a given development phase satisfy the conditions (such as specifications) imposed at the start of the phase

video ballot: Electronic voter interface which presents ballot information and voting instructions as video images. See also **ballot**.

vote for N of M: A ballot choice in which voters are allowed to vote for a specified number (“N”) of candidates in a multi-seat (“M”) contest

voted ballot: Ballot that contains all of a voter's selections and has been cast

voter verifiable: A voting system feature that provides the voter an opportunity to verify that his or her ballot selections are being recorded correctly, before the ballot is cast

voter verifiable audit record: Human-readable printed record of all of a voter's selections presented to the voter to view and check for accuracy

voting equipment: All devices, including the voting machine, used to display the ballot, accept voter selections, record voter selections, and tabulate the votes

voting machine: The mechanical, electromechanical and electric components of a voting system that the voter uses to view the ballot, indicate their selections, verify their selections. In some instances, the voting machine also casts and tabulates the votes. See **voting equipment**.

voting officials: Term used to designate the group of people associated with elections, including election personnel, poll workers, ballot designers and those responsible for the installation, operation and maintenance of the voting systems.

voting position: Specific response field on a ballot where the voter indicates the selection of a candidate or ballot proposition response

voting station: The location within a polling place where voters may record their votes. A voting station includes the area, location, booth or enclosure where voting takes place as well as the voting machine. See **voting machine**.

voting system: The total combination of mechanical, electromechanical or electronic equipment (including the software, firmware, and documentation required to program, control, and support the equipment) that is used to define ballots; to cast and count votes; to report or display election results; and to maintain and produce any audit trail information; and the practices and associated documentation used to identify system components and versions of such components; to test the system during its development and maintenance; to maintain records of system errors and defects; to determine specific system changes to be made to a system after the initial qualification of the system; and to make available any materials to the voter (such as notices, instructions, forms or paper ballots).

voting system software: All the executable code and associated configuration files needed for the proper operation of the voting system. This includes third party software such as operating systems, drivers, and database management tools. See also **dynamic voting system software**, **semi-static voting system software**, and **static voting system software**.

voting system testing: Examination and testing of a computerized voting system by using test methods to determine if the system complies with the requirements in the *Voluntary Voting System Guidelines* and with its own specifications.

voting system test laboratory: Test laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) to be competent to test voting systems. When NVLAP has completed its evaluation of a test lab, the Director of NIST will forward a recommendation to the EAC for the completion of the accreditation process.

W

write-in voting: To make a selection of an individual not listed on the ballot. In some jurisdictions, voters may do this by using a marking device to physically write their choice on the ballot or they may use a keypad, touch screen or other electronic means to enter the name.

A.2 Sources

Definitions in this glossary are either extracted from or based on the following sources:

44 U.S.C. 35	United States Code, Title 44, Chapter 35, Information Security, Section 3542, Definitions.
ACM SIGCHI	ACM's Special Interest Group on Computer-Human Interaction, http://www.acm.org/sigchi/ (February 2005).
ADA	Americans with Disabilities Act of 1990.
ANSI Dictionary	American National Dictionary for Information Processing Systems, American National Standards Committee X3, Information Processing Systems, 1982.
ANSI 354	American National Standards Institute, International Committee for Information Technology Standards, Common Industry Format for Usability Test Reports, ANSI/INCITS 354-2001
ANSI C63.19	American National Standards for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids, 2001.
electionline	http://electionline.org/ , (March 2005).

FIPS 81	Federal Information Processing Standard 81, DES Modes of Operations, December, 1980.
FIPS 140-2	Federal Information Processing Standard 140-2, Security Requirements for Cryptographic Modules, May 2001.
FIPS 199	Federal Information Processing Standard 199, Standards for Security Categorization of Federal Information and Information Systems, December 2003.
FIPS 201	Federal Information Processing Standard 201, Personal Identity Verification for Federal Employees and Contractors, February 2005.
HAVA	Help America Vote Act of 2002 - Public Law 107-252.
IEA	International Ergonomics Association, http://www.iea.cc/ , (February 2005).
IEEE 1583	IEEE P1583/D5.3.2 Draft Standard for the Evaluation of Voting Equipment, December 6, 2004.
ISO 5725	ISO/IEC 5725:1994 Accuracy (trueness and precision) of measurement methods and results.
ISO 9241	ISO/IEC 9241:1997 Ergonomic requirements for office work with visual display terminals (VDT).
ISO 17000	ISO/IEC 17000:2004 Conformity assessment -- Vocabulary and general principles.
ISO Guide 2-4	ISO/IEC Guide 2:2004 Standardization and related activities - General vocabulary.
ISO Guide 2-6	ISO/IEC Guide 2:1996 Standardization and related activities - General vocabulary.
NASS	National Association of Secretaries of State Election Reform Key Terms, http://www.nass.org/Election%20Reform%20Key%20Terms.pdf (February 2005).
NIST HB 143	NIST Handbook 143 State Weights and Measures Laboratories Program Handbook.
NIST HB 150	NIST Handbook 150:2001 NVLAP Procedures and General Requirements.
NIST HF Rpt.	NIST Special Publication 500-256 Improving the Usability and Accessibility of Voting Systems and Products, May 2004.

NIST SP 800-30	NIST Special Publication 800-30 Risk Management Guide for Information Technology Systems, July 2002.
NIST SP 800-49	NIST Special Publication 800-49 Federal S/MIME V3 Client Profile, November 2002.
NIST SP 800-53	NIST Special Publication 800-53 Recommended Security Controls for Federal Information Systems, Appendix B, Glossary.
NIST SP 800-59	NIST Special Publication 800-59 Guideline for Identifying an Information System as a National Security System, August 2003.
NIST SP 800-63	NIST Special Publication 800-63 Electronic Authentication Guideline: Recommendations of the National Institute of Standards and Technology, June 2004.
OMB A130	OMB Circular A-130, Appendix III.
Section 508 of the Rehabilitation Act of 1973, as amended.	Electronic and Information Technology Accessibility Standards (2002) Architectural and Transportation Barriers Compliance Board, 36 CFR Part 1194, http://www.accessboard.gov/sec508/508standards.htm .
Usability Glossary	Usability First Usability Glossary, http://www.usabilityfirst.com/glossary/main.cgi , (February 2005).
VIM	The ISO International Vocabulary of Basic and General Terms in Metrology (VIM), 1994.
VSS	2002 <i>Voting Systems Standards</i> , Volumes I and II. Federal Election Commission.
Whatis.com	http://Whatis.com , IT Encyclopedia

Appendix B: References

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Appendix B: References

B.1 Documents Incorporated in the *Guidelines*

The following publications have been incorporated into the Guidelines. When specific provisions from these publications have been incorporated, specific references are made in the body of the Guidelines.

Federal Regulations

Code of Federal Regulations, Title 29, Part 1910, Occupational Safety and Health Act

Code of Federal Regulations, Title 36, Part 1194, Architectural and Transportation Barriers Compliance Board, Electronic and Information Technology Standards - Final Rule

Code of Federal Regulations, Title 47, Parts 15 and 18, Rules and Regulations of the Federal Communications Commission

Code of Federal Regulations, Title 47, Part 15, "Radio Frequency Devices", Subpart J, "Computing Devices", Rules and Regulations of the Federal Communications Commission

American National Standards Institute (ANSI)

ANSI C63.4 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9Khz to 40 GHz

ANSI C63.19 American National Standard for Methods of Measurement of Compatibility between Wireless Communication Devices and Hearing Aids

ANSI-NCITS
354-2001 Industry Usability Reporting and the Common Industry Format

International Electrotechnical Commission (IEC)

IEC 61000-4-2 Electromagnetic Compatibility (EMC) Part 4: Testing and Measurement Techniques. Section 2 Electrostatic Discharge Immunity Test (Basic EMC publication).

IEC 61000-4-3 Electromagnetic Compatibility (EMC) Part 4: Testing and Measurement Techniques. Section 3 Radiated Radio-Frequency Electromagnetic Field Immunity Test.

IEC 61000-4-4 (1995-01)	Electromagnetic Compatibility (EMC) Part 4: Testing and Measurement Techniques. Section 4 Electrical Fast Transient/Burst Immunity Test.
IEC 61000-4-5 (1995-02)	Electromagnetic Compatibility (EMC) Part 4: Testing and Measurement Techniques. Section 5 Surge Immunity Test.
IEC 61000-4-6 (1996-04)	Electromagnetic Compatibility (EMC) Part 4: Testing and Measurement Techniques. Section 6 Immunity to Conducted Disturbances Induced by Radio-Frequency Fields.
IEC 61000-4-8 (1993-06)	Electromagnetic Compatibility (EMC) Part 4: Testing and Measurement Techniques. Section 8 Power-Frequency Magnetic Field Immunity Test. (Basic EMC publication).
IEC 61000-4-11 (1994-06)	Electromagnetic Compatibility (EMC) Part 4: Testing and Measurement Techniques. Section 11. Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests.
IEC 61000-5-7 Ed. 1.0 b:2001	Electromagnetic compatibility (EMC) Part 5-7: Installation and mitigation guidelines—Degrees of protection provided by enclosures against electromagnetic disturbances

National Institute of Standards and Technology

FIPS 140-2	Security Requirements for Cryptographic Modules
FIPS 180-2	Secure Hash Standard, August 2002
FIPS 186-2	Digital Signature Standard, February 2000
FIPS 188	Standard Security Label for Information Transfer
FIPS 196	Entity Authentication Using Public Key Cryptography
FIPS 197	Advanced Encryption Standard (AES)
SP 800-63	Electronic Authentication Guideline, Version 1.0.1

Military Standards

MIL-STD-498	Software Development and Documentation Standard, 1989
MIL-STD-810D(2)	Environmental Test Methods and Engineering Guidelines, 19 July 1983

B.2 Other Documents Used in Developing the Guidelines

The following publications have been used for guidance in the revision of the *Guidelines*.

American National Standards Institute (ANSI), International Organization for Standardization (ISO), International Electro-technical Commission (IEC)

ANSI/ISO/IEC TR 9294.1990	Information Technology Guidelines for the Management of Software Documentation
ISO/IEC TR 13335-4:2000	Information technology—Guidelines for the management of IT Security—Part 4: Selection of safeguards
ISO/IEC TR 13335-3:1998	Information technology—Guidelines for the management of IT Security—Part 3 Techniques for the management of IT security
ISO/IEC TR 13335-2:1997	Information technology—Guidelines for the management of IT Security—Part 2: Managing and planning IT security
ISO/IEC TR 13335-1:1996	Information technology—Guidelines for the management of IT Security—Part 1: Concepts and models for IT security
ISO 10007:1995	Quality Management Guidelines for Configuration Management
ISO 10005-1995	Quality Management Guidelines for Quality Plans
ANSI/ISO/ASQC QS9000-3-1997	QM and QA standards Part 3: Guidelines for the application of ANSI/ISO/ASQC Q9000-1994 to the Development, Supply, Installation, and Maintenance of Computer Software

Electronic Industries Alliance Standards

MB2, MB5, MB9	Maintainability Bulletins
EIA 157	Quality Bulletin
EIA QB2-QB5	Quality Bulletins
EIA RB9	Failure Mode and Effect Analysis, Revision 71
EIA SEB1—SEB4	Safety Engineering Bulletins
RS-232-C	Interface Between Data Terminal Equipment and Data Communications Equipment Employing Serial Binary Data Interchange
RS-366-A	Interface Between Data Terminal Equipment and Automatic Calling Equipment for Data Communication

RS-404 Standard for Start-Stop Signal Quality Between Data Terminal Equipment and Non-synchronous Data Communication Equipment

National Institute of Standards and Technology

NISTIR 4909 Software Quality Assurance: Documentation and Reviews

Institute of Electrical and Electronics Engineers

610.12-1990 IEEE Standard Glossary of Software Engineering Terminology

730-1998 IEEE Standard for Software Quality Assurance Plans

828-1998 IEEE Standard for Software Configuration Management Plans

829-1998 IEEE Standard for Software Test Documentation

830-1998 IEEE Recommended Practice for Software Requirements Specifications

Military Standards

MIL-STD-498 Software Development and Documentation, 27 May 1998

B.3 Legislation References

Help America Vote Act, Pub. L. 107-252, 42 USC Sections 15301-15545

Americans With Disabilities Act of 1990, Pub. L. 101-336, 42 USC Sections 12101-12213

42 USC 1974

Occupational Safety and Health Act, Pub. L. 91-596, 29 USC Sections 651-678, 42 USC Section 3142-1

Architectural Barriers Act of 1968, Pub. L. 90-480, 42 USC Sections 4151-4157

Voting Rights Act of 1965, Pub. L. 89-110, 42 USC Sections 1973; 1973a-p; 1973aa; 1973aa-1-6; 1973bb; 1973bb-1

B.4 Additional References

The following publications contain information that is useful in understanding and complying with the *Guidelines*.

American National Standards Institute (ANSI), International Organization for Standardization (ISO), International Electro-technical Commission (IEC)

- ANSI/ISO/IEC TR Information Technology Guidelines for the Preparation of 10176.1998 Programming Language Standards
- ANSI/ISO/IEC 6592.2000 Information Technology Guidelines for the Documentation of Computer Based Application Systems
- ANSI/ISO/ASQC 1997 Quality management and quality assurance standards Part 3: Q9000-3- Guidelines for the application of ANSI/IAO/ASQC Q9001-1994 to the Development, supply, installation and maintenance of computer software
- ANSI/ISO/ASQC Q9000-1-1994 Quality Management and Quality Assurance Standards—Guidelines for Selection and Use
- ANSI/ISO/ASQC Q10007-1995 Quality Management Guidelines for Configuration Management
- ANSI X9.31-1998 Digital Signatures Using Reversible Public Key Cryptography for the Financial Services Industry, 1998
- ANSI X9.62-1998 Public Key Cryptography for Financial Services Industry: The Elliptic Curve Digital Signature Algorithm, 1998
- ISO/IEC 8:2001 ITU-T Recommendation X.509 (2000), Information technology - 9594- Open Systems Interconnection - The Directory: Public-key and attribute certificate frameworks

National Institute of Standards and Technology

- FIPS 102 Guideline for Computer Security Certification and Accreditation
- FIPS 112 Password Usage (3)
- FIPS 113 Computer Data Authentication

Institute of Electrical and Electronics Engineers

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|------------|---|
| 488-1987 | IEEE Standard Digital Interface for Programmable Instrumentation |
| 796-1983 | IEEE Standard Microcomputer System Bus IEEE/ANSI Software Engineering Standards |
| 750.1-1995 | IEEE Guide for Software Quality Assurance Planning |
| 1008-1987 | IEEE Standard for Software Unit Testing |
| 1016-1998 | IEEE Recommended Practice for Software Design Descriptions |
| 1012-1998 | IEEE Guide for Software Verification and Validation Plans |

Military Standards

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|---------------|---|
| MIL-HDBK-454 | Standard General Requirements for Electronic Equipment |
| MIL-HDBK-470 | Maintainability Program for Systems & Equipment |
| MIL-HDBK-781A | Handbook for Reliability Test Methods, Plans, and Environments for Engineering, Development Qualification, and Production |
| MIL-STD-882 | Systems Safety Program Requirements |
| MIL-STD-1472 | <i>Human Engineering Design Criteria for Military Systems, Equipment and Facilities</i> |
| MIL-STD-973 | Configuration Management, 30 September 2000 |

Other References

Designing for the Color-Challenged: A Challenge, by Thomas G. Wolfmaier (March 1999);
http://www.sandia.gov/itg/newsletter/mar99/accessibility_color_challenged.html;

Effective Color Contrast: Designing for People with Partial Sight and Color Deficiencies, by Aries Arditi, Ph.D; http://www.lighthouse.org/color_contrast.htm

Electronic Markup Language (EML), Version 4.0, (Committee Draft) Organization for the Advancement of Structured Information Standards (OASIS), January 24, 2005

NIST Special Publication 500-256, Improving the Usability and Accessibility of Voting Systems and Products, <http://vote.nist.gov>

RSA Laboratories Technical Note, Public Key Cryptographic Standard (PKCS) #7: Cryptographic Message Syntax Standard, November 1, 1993

RSA Laboratories Technical Note, Extensions and Revisions to PKCS #7, May 13, 1997

The Americans with Disabilities Act Accessibility Guidelines (ADAAG 2202), Access Board; <http://www.access-board.gov/adaag/html/adaag.htm>

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