

# VVSG Version 2.0: Scope and Structure

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## Introduction

At the February 14, 2017, Technical Guidelines Development Committee (TGDC) Meeting, the Scope and Structure of the Voluntary Voting Systems Guidelines (VVSG) Version 2.0 were adopted unanimously. Although the structure and format of the document will be significantly different, the underlying scope will remain the same - voting systems as it defined by the Help America Vote Act (HAVA) of 2002. The approach at addressing the scope will however, take on a different look. All previous versions of the VVSG provided device specific guidelines and requirements. The VVSG Version 2.0 will refrain from providing device-specific guidance and instead provide guidelines on the functions that are performed within those devices. As previously mentioned, this new structure differs greatly from that of the previous versions of the VVSG, but aligns with the Objectives of the VVSG Version 2.0, as described in the VVSG Version 2.0 Project Charter that was adopted by the TGDC.

## Structure

The structure of the VVSG Version 2.0 remains as proposed by the election community, EAC, NIST and the TGDC, and as depicted in the VVSG Version 2.0 Project Charter. This new version, as noted above, differs significantly from previous versions of the VVSG because it will be a high level principles and guidelines document. The VVSG Version 2.0 will also have accompanying documents that detail requirements for how systems can meet the new guidelines and obtain certification, as well as test assertions for how the accredited test laboratories will validate that the system complies with those requirements.

The new structure of the VVSG Version 2.0:

- **Principles:** High level system design goals; and
  - **Guidelines:** Broad description of the functions that make up a voting system.

These items will comprise the new VVSG 2.0 to be voted on by the TGDC and adopted by a vote of the EAC Commissioners.

The structure of the accompanying documents:

- **Requirements:** Technical details necessary for manufacturers to design devices that meet the principles and guidelines of a voting system;
  - **Test Assertions:** Technical specifications required for laboratories to test a voting system against the requirements.

These two items will be adjunct to the VVSG itself but will be subject to review by the Standards Board and Board of Advisors and a Public Comment period before implementation.

## Scope

Generally, the scope of the VVSG Version 2.0 will continue to cover the ability to perform pre-voting, voting, and post-voting operations. The primary difference, however, is that instead of creating guidelines based on the system or device, the VVSG will describe all of the functions that are incorporated in a device or devices that make up a system. A summary of the principles of a voting system and the guidelines for each of the functions is listed below.

The Help America Vote Act of 2002, Section 301 (b) defines a voting system as “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.”

In order to provide an outline for how the structure of the VVSG Version 2.0 will be written, the presentation of the Scope of a voting system is depicted using the Principle and Guideline structure.

### Principles Defining Scope - HAVA. (Sections)

1. To define ballots;
2. To cast and count votes;
3. To report or display election results; and
4. To maintain and produce any audit trail information.

### Guidelines Defining Scope – 17 Core Functions. (sub-sections)

- a. Have the capability to input data necessary for constructing a ballot.
- b. Have the capability to associate the data necessary for constructing a ballot.
- c. Have the capability to layout the data necessary for constructing a ballot.
- d. Have the capability to generate ballots.
- e. Have the capability to transfer ballots.
- f. Have the capability to retrieve a ballot or ballot set.
- g. Have the capability to present a ballot or ballot set.
- h. Have the capability to capture the vote selections on the ballot.
- i. Have the capability to interpret the vote selections.
- j. Have the capability to extract the vote selections.
- k. Have the capability to present the vote selections.
- l. Have the capability to transfer the vote selections.
- m. Have the capability to store vote selections.
- n. Have the capability to retrieve vote selections.
- o. Have the capability to tabulate vote selections.
- p. Have the capability to transfer tabulated results.
- q. Have the capability to present the tabulated results.

Modifications to the method for defining the scope were designed to focus on the voting system functions and are in line with the Objectives of the VVSG Version 2.0 as defined in the Project Charter. Below are the Objectives of the VVSG Version 2.0 and a description of how those Objectives are being met.

## Objectives

- To assess the ability of the election systems to correctly execute secure, usable and accessible elections in order to provide assurance to voters that the election is an accurate reflection of the voters' will.
  - This will remain unchanged as each of these items will be assessed for each of the respective functions.
- To enable, not obstruct or impede, innovation and needed response to changing statutes, rules, jurisdictional and voters' needs.
  - By focusing on functions that make up a voting system, the combination of those functions in new, and even unforeseen, devices and technologies will still be able to be tested.
- To create a set of implementable guidelines that allows effective deployment of systems by jurisdictions constrained by election calendars, schedules and budgetary restrictions.
  - When a modification is made to a voting system usually only certain functions are changed within a device. Instead of re-testing the device as a whole, testing can be limited to the requirements for the specific function defined by the guideline.
- To facilitate the interoperability of election systems.
  - There is the ability for quicker development of common data formats (CDFs), as each function has a set of data inputs and outputs that can be focused on individually and simultaneously, instead of trying to create CDFs for devices that are ever changing.
- To facilitate an open and transparent process that allows voters and election jurisdictions to assess the performance and capability of the election systems.
  - The guidelines are the functions of the capabilities of the election systems. By defining each of those functional capabilities, creating requirements around those functional capabilities allows everyone to know how they should perform. Providing that information in conjunction with CDFs and enhanced auditability requirements makes it more transparent for anyone to assess the performance.
- To provide a set of testable requirements that a jurisdiction can understand and use to evaluate the performance of election systems and to procure new systems.
  - Providing requirements for specific functions allows jurisdictions to determine which functions are required for the election systems they are trying to procure, as every election system is just a combination of multiple functions. Additionally, providing the test assertions for those requirements then allows jurisdictions to perform their own testing for the combination of functions that make up the device are procuring and/or have already purchased.

## Use Cases

Since the approach to VVSG Version 2.0 is vastly different format from previous versions, the following section provides a list of commonly known devices along with the functions that make up those devices.

### Election Management System

The functional requirements for an election management system in the VVSG 1.1 are as follows:

An EMS is used to prepare ballots and programs for use in casting and counting votes, and to consolidate, report, and display election results. An EMS shall generate and maintain a database, or one or more interactive databases, that enables election officials or their designees to perform the following functions:

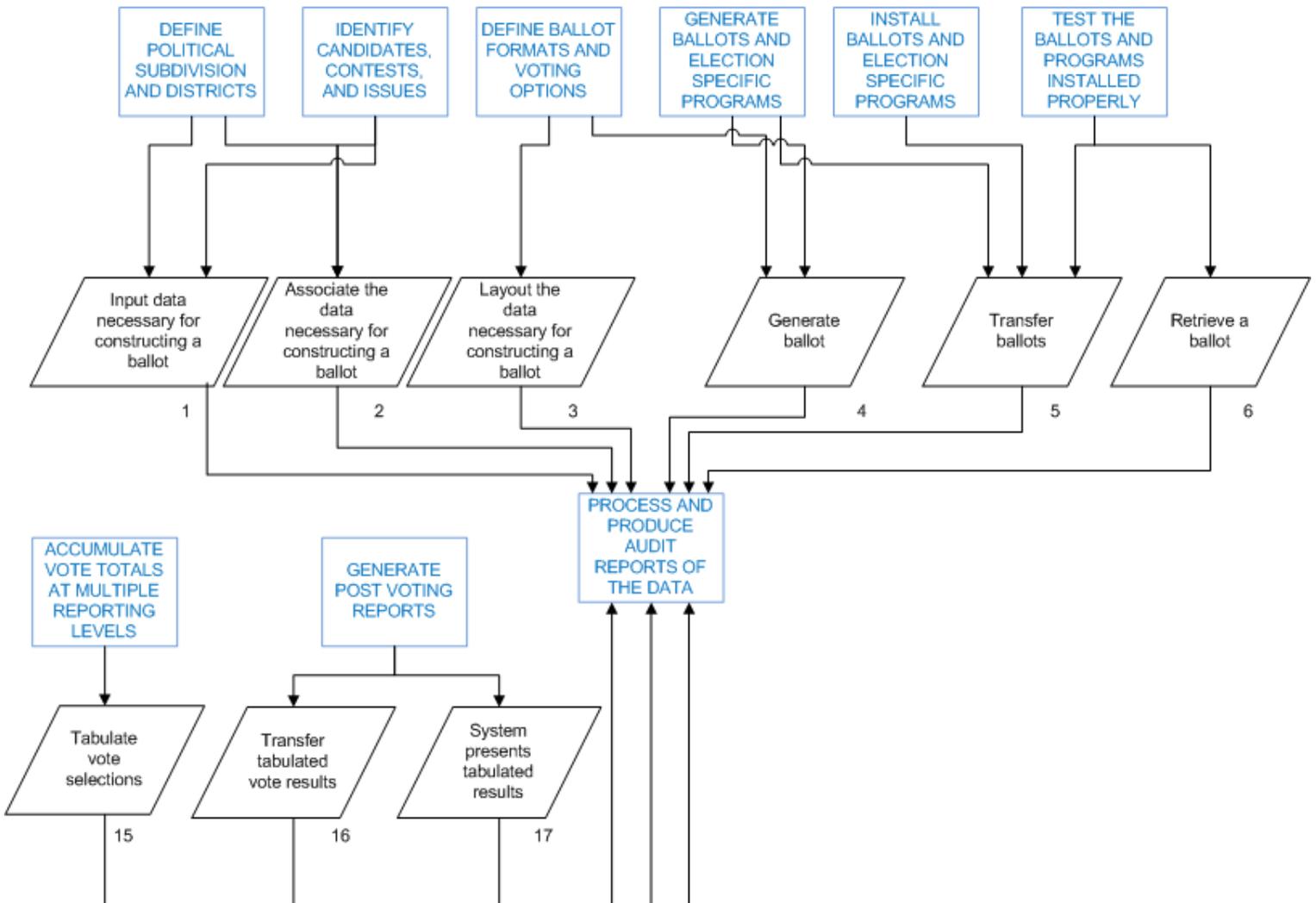
- Define political subdivision boundaries and multiple election districts as indicated in the system documentation
- Identify contests, candidates, and issues
- Define ballot formats and appropriate voting options
- Generate ballots and election-specific programs for voting equipment
- Install ballots and election-specific programs
- Test that ballots and programs have been properly prepared and installed
- Accumulate vote totals at multiple reporting levels as indicated in the system documentation
- Generate the required post-voting reports  
Process and produce audit reports

Diagram 1.0 depicts a graphic and provides descriptions of how each of the functions from VVSG 1.1, described above, intersects or aligns with the functions described for VVSG Version 2.0.

Diagram 1.0

# Election Management System

## Ballot Management & Central Tally Systems



## Electronic Ballot Markers

The functional requirements for an electronic ballot marker in the VVSG 1.1 are as follows:

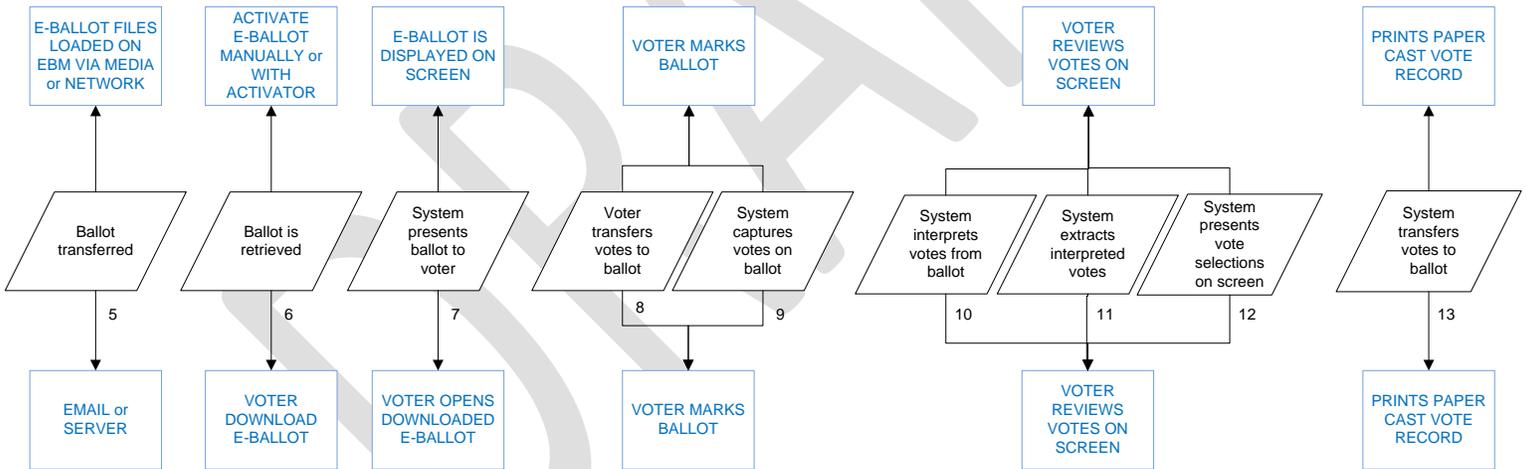
1. Ballot and program installation
  2. Activating the ballot
  3. Casting a ballot
    - a. Multiple requirements for displaying the ballot
    - b. Multiple requirements for marking the ballot
    - c. Allow the voter, before the ballot is printed, to review his or her choices and, if the voter desires, to delete or change his or her choices before the ballot is printed
    - d. Ensure that the votes printed accurately represent the actual votes cast

Diagram 2.0 depicts a graphic of two different electronic ballot markers, one that has typically been considered to be in scope and the other out of scope. However, both electronic ballot markers contain the same functions. Therefore, in VVSG Version 2.0 either *could* be tested as part of a voting system.

Diagram 2.0

## ELECTRONIC BALLOT MARKERS

### EBM in Vote Location



### Remote EBM

## Conclusion

To fulfill the Objectives of the Voluntary Voting System Guidelines (VMSG) Version 2.0 as described in the Project Charter adopted by the United States Election Assistance Commission's (EAC) Technical Guidelines Development Committee (TGDC), the TGDC moved to adopt the scope and structure contained within this document. Moving forward, the VMSG Version 2.0 will refrain from focusing on specific voting devices and components. Instead, it will focus on the functions that those devices and components perform. Further, the structure of the VMSG document will focus on Principles and Guidelines, along with associated documents that prescribe the Requirements and Test Assertions. This Scope and Structure document will facilitate the continued work on the VMSG Version 2.0 and lay the framework for the scope and structure of the final set of guidelines.

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