Texas Voting System Examination – Hart Vanguard 1.0

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Background

The Hart InterCivic ("Hart") Vanguard Voting System version 1.0 was certified by the U.S. Election Assistance Commission (EAC) to the requirement of the Voluntary Voting System Guidelines (VVSG) version 2.0 on July 7, 2025[1].

The VVSG 2.0[2] is the latest version of the guidelines which were adopted by the EAC in 2022. The EAC uses the requirements of the VVSG 2.0 to provide for its testing and certification program, in accordance with the Help America Vote Act (HAVA)[3]. The EAC requires manufacturers to register with its Testing and Certification Program prior to submitting voting systems to be tested. Hart InterCivic, Inc. (Hart) is an EAC registered manufacturer[4] that provided voting systems to election officials across the country, including in the State of Texas. The Hart Vanguard Voting System version 1.0 is the first voting system certified by the EAC against the requirements of the VVSG 2.0. It was tested by the SLI Labs, an EAC accredited voting system testing laboratory (VSTL)[5]. EAC certification is a precursor for the State of Texas's voting system certification process. Hart

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[1] EAC Certificate of Conformance and Scope of Certification, Hart Verity Voting Version 1.0 Voting System https://www.eac.gov/sites/default/files/2025-07/Hart_Verity_Vanguard_1.0_EAC_Certificate_and_Scope_of_Conformance.pdf

[2] Voluntary Voting System Guidelines Version 2.0 https://www.eac.gov/sites/default/files/TestingCertification/Voluntary_Voting_System_Guidelines_Version_2_0.pdf

[3] Help America Vote Act https://www.eac.gov/sites/default/files/eac_assets/1/6/HAVA41.PDF

[4] EAC Registered Manufacturer's https://www.eac.gov/voting-equipment/registered-manufacturers

[5] EAC Accredited Voting System Testing Laboratories https://www.eac.gov/voting-equipment/voting-system-test-laboratories-vstl

submitted its Verity Vanguard Voting System version 1.0 application to the State of Texas for examination and certification on July 8, 2025.

The Texas Secretary of State appointed me as a voting systems examiner under TEXAS ELECTION CODE § 122.035[6] to examine the Verity Vanguard Voting System version 1.0 application.

Prior to conducting the examination of the Verity Vanguard Voting System version 1.0 application, I reviewed multiple documents provided by Hart including the forms required by the Secretary of State for a voting system examination application, the certification documentation from the EAC's certification, the VSTL test plans[7][8] and report[9], and the Verity Vanguard Voting System version 1.0 technical data package (TDP). Based on the review of the documentation provided, I sent a list of questions and comments for Hart to address as part of the examination.

Pursuant to TEXAS ELECTION CODE§ 122.036(a), an exam of the Verity Vanguard Voting System version 1.0 took place on September 16-18, 2025, at the offices of Elections Division of the Texas Secretary of State in Austin, Texas. Additionally, in accordance with TEXAS ELECTION CODE§ 122.036(b), this is my written report on the examination which is being delivered to the Secretary of State.

System Overview

In accordance with the State of Texas's requirements for voting system examination and certification, Hart submitted the following voting system components and configurations on its application[ii].

Component	Description	Version/ Firmware
Vanguard Define	Election data import/ management and ballot design module	1.0.1
Vanguard Deploy	Election definition and deployment module	1.0.1
Vanguard Capture	Centralized scanning and adjudication module	1.0.1
Vanguard Results	Results and reporting module	1.0.1
Vanguard Users	Utility used to set user permissions and profiles for accessing Vanguard Workspace modules. Equipped with enhanced security and password permissions.	1.0.1

[6] https://statutes.capitol.texas.gov/docs/EL/htm/EL.122.htm
[7] https://www.eac.gov/sites/default/files/2024-08/Hart%20InterCivic%20Verity%20Vanguard%201.0%20Test%20Plan%20v3.0.pdf
[8] https://www.eac.gov/sites/default/files/2025-06/Attachment%20D%20%E2%80%93%20Hart%20InterCivic%20Verity%20Vanguard%201.0%20Test%20Plan%20-%20As%20Run.pdf
[9] https://www.eac.gov/sites/default/files/2025-08/Hart%20Vanguard%201.0%20Voting%20System%20Test%20Report%20v4.008122025.pdf

Vanguard Manage	Utility used to create and manage elections. Equipped with enhanced parameters for number and types of elections generated.	1.0.1
Vanguard Settings	Workstation utility to adjust clock settings, printer settings etc.	1.0.1
Vanguard Libraries	Optional unlockable application. Integrated text, translation, and audio recording archive for re-use between elections.	1.0.1
Vanguard Test Decks	Optional unlockable application. Automated Test Deck Creation, supporting "1 to max," "Variable pattern," and "Rotating pattern."	1.0.1
Vanguard Vault	Scanning solution for secure vote capture in the polling place. Equipped with enhanced usability and auditability.	1.0.1
Vanguard Flex	A universal ballot marking device that produces an auditable, summary ballot of a voter's choices.	1.0.1
Vanguard Adapt	An accessible device that voters can use to mark, review, and cast a printed vote record in one continuous session.	1.0.1
Vanguard Boost	A poll worker facing device to improve voter service by optimizing ballot issuance in the polling place.	1.0.1

Examination

Documentation Review

Prior to the commencement of the exam, the Secretary of State provided the examiners copies of the Hart Vanguard Voting System technical data package (TDP), which it received from Hart. I reviewed the documents to better understand the operations of the system, ask questions regarding specific features and functionality, and to create a detailed list of tests I would like to perform during the open-ended testing portion of the examination.

Observations

The Hart application documents[i][ii][iii] provided to the Secretary of State did not include the Hart Vanguard Adapt ballot marking device, which is part of the EAC certified configuration. Hart later added Vanguard Adapt to the Texas voting system application. The Hart Vanguard Adapt ballot marking device was provided for the examination and its functionality was included in the testing.

The application documents[i][ii][iii] included the Vanguard Ranked Choice module, as an "optional" feature for Texas. Hart and the Secretary of State informed the examiners that the Vanguard Ranked Choice module would not be included in the examination. Hart provided an updated Form 100 on September 11, 2025[iv], prior to the examination, which removes the Vanguard Ranked Choice module, but it remained in the other referenced documents. The Vanguard Ranked Choice module was never 'unlocked' during the voting system examination nor was the ranked choice voting functionality and tabulation tested.

The application documentation[v] states that "Cast Vote Records never include unique identifying information that can be associated with a specific ballot." Yet the TDP[vi][vii][viii][ix] refers to the imprinted ID that can be marked on the ballot by the Vanguard Vault scanner and tabulator as a "unique identifier" and a "second unique identifier." Further, the TDP[vi][viii][ix] states that "[t]his ID enables searchability and traceability at the individual ballot level" by storing it in the CVR. The application and the vendor documentation contradicted one another.

The TDP provided by Hart to the Secretary of State included two revisions of the Vanguard System Overview document (e.g., Rev. 09 and Rev. 10). According to the version of the EAC approved Test Report provided to the examiners, the revision of that document that was reviewed and therefore included in the EAC certification was Rev. 08. This information was provided to Hart in advance of the examination. Hart informed the examiners that it worked with the EAC and VSTL to update the Test Report, which is reflected on the EAC website[10].

Installation and Configuration

On September 16, 2025, the examination commenced with the vendor extracting the voting system software executable files, which came directly from the EAC accredited VSTL, SLI Labs. The election infrastructure community refers to these files as the "Trusted Build" since the VSTL is the entity that compiles the software source code after all testing has been completed and the EAC has issued an initial grant of certification (i.e., the files are trusted since the entity that created them maintains them until shipping to a jurisdiction). The image files that were extracted from the Trusted Build were then used to set up and configure the voting system to ensure the files used in the Texas examination were the same files as those tested by the VSTL as part of the EAC Testing and Certification Program.

Observations

After installing the voting system software applications, the vendor began to install a configuration file that was not identified in the Texas application for certification. The software application was also not identified in the EAC Certificate of Conformance and Scope of Certification nor the VSTL Test Report, yet it was provided by the VSTL. According to the TDP, the configuration utility is used on the Hart Vanguard workstations (e.g., EMS and Capture server and client devices) to assign a unique serial number to each workstation and set the names for each client[xi].

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[10] www.eac.gov/sites/default/files/2025-09/Attachment%20B%20-%20Verity%20Vanguard%201.0%20Technical%20Data%20Package.pdf

Software Validation (aka Hash) Test

The Secretary of State requires that each jurisdiction perform a hash validation on its voting system[11]. This process entails a jurisdiction generating a hash value from its voting system and comparing the value against the hash value provided by the EAC. The hash values provided by the EAC are generated by the VSTL during the certification testing at the time it creates the Trusted Build. The hash validation that the jurisdictions perform ensures that the voting system application files that were certified by the EAC and the State of Texas have not been modified (i.e., the extracted or hashed files on the voting system are the same as what was certified). To ensure that the Texas jurisdictions can perform the hash validation, the processes that the jurisdictions will perform, if the system is certified, are tested as part of the Texas voting system examination.

The Hart Vanguard Voting System version 1.0 has two methods for generating the hash values from each of its devices and workstations. One method incorporates a System Validation Tool (i.e., built in software) to compute the hash value from the applicable files that reside on the voting system. The other method is a manual method where the files are extracted from the voting system, and the hash values are generated on a separate, non-voting system computer.

Observations

For the voting devices, both methods for computing the hash value work effectively. There are pros and cons for each method, but jurisdictions should be able to follow the documented processes in the TDP to perform the hash validation[xii][xiii].

The method of using the software validation tool to compute the hash value on the workstations (e.g., EMS and Capture) works effectively. However, the manual method for generating the hash values for the workstations creates a document that is not feasible for a jurisdiction to use for validating the software. The manual process that is documented in the TDP generates a text ('.txt') file that is not usable in its current format. A jurisdiction would have to either convert the file into another format (i.e., .csv) or it would have to review each alphanumeric code for every voting system software file.

In reviewing the documentation, Hart should be able to modify the TDP to include instructions for automatically generating and exporting the hash values into a more usable .csv file format, which would make the manual method feasible for a jurisdiction. All other devices export the hash values in a .csv file format so the process for comparing the hash values for the workstation would be the same as verifying the hash values for all other

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[11] Election Advisory No. 2022-30 https://www.sos.state.tx.us/elections/laws/advisory2022-30.shtml

devices. If the vendor decides to update the documented procedures to export a .csv file, the documented procedures should be tested to ensure the documented procedures operate as intended.

Logic & Accuracy Test

The Secretary of State provided the examiners with a copy of the test script[xiv] and expected results[xv] for the logic and accuracy (L&A) test in advance of the examination. The test was performed using a General Election with three ballot styles (e.g., 1A, 2A, and 2B) encompassing two precincts, one of which was a split precinct (e.g., 2A and 2B), on a single 8.5"x14" ballot sheet. Each of the ballots were bilingual containing English and Spanish text. A total of sixty-three (63) ballots were voted, including ballots that contained undervotes, overvotes, votes for write-in candidates, and provisional ballots.

Secretary of State staff (staff) used the test script to mark ballots using the two ballot marking devices (BMD); the Vanguard Flex and Vanguard Adapt. Staff used the Vanguard Boost device to generate the ballot activation cards, which brings up the correct ballot style on the electronic ballot interface (i.e., BMD screen) for them (i.e., voter) to vote.

All ballots were scanned into the ballot scanners, Vanguard Vault and Vanguard Capture. As applicable, Vanguard Capture was used to adjudicate undervotes, overvotes, and ambiguous marks. The results were aggregated in Vanguard Results. Using Vanguard Results, write-in candidate selections were assigned to the candidates of choice. Vanguard Results was used to generate the necessary results reports.

Staff, with examiners observing, compared the results generated by the Vanguard voting system against the expected test results. All ballots were tabulated accurately, and the results reports were verified to match the pre-defined expected results.

Observations

The accuracy portion of the L&A testing went exactly as expected. The votes were tabulated and reported accurately.

Two potential issues were identified in the logic portion of the test. The first was the error message and handling of a ballot with an "ambiguous mark." The second was regarding the handling of a provisional ballot on the Vanguard Adapt ballot marking device. Neither of these issues impacted the accuracy or tabulation by the voting devices. Therefore, the identified items were raised to the vendor and documented so that they could be added to the open-ended testing and questions that Hart would be addressing the following day.

The L&A test was concluded successfully.

Open-Ended Testing and Vendor Questions

During the open-ended testing, we voted provisional ballots on the Vanguard Adapt to determine how the system handles the voted ballot and to understand what documented procedures, if any, would ensure the voted ballot does not inadvertently get counted. Similarly, we wanted to test how a multi-sheet ballot that gets spoiled after at least one sheet had been cast would be handled (i.e., at least one sheet is in the ballot box then one of the following sheets gets spoiled).

When observing the L&A, the examiners noticed a Warning message on the Vanguard Vault that stated "One or more marks are too small. Marks that are too small may or may not be counted." During the L&A, the voter (e.g., SOS staff) overrode the message and cast their ballot. This message raised questions from the examiners, so it was included in the open-ended testing. Prior to convening the open-ended testing, but after the L&A, I did some research into this issue. The TDP[xvi] describes this error message, and the handling of these marks in a section entitled "About Marginal Marks." The TDP documents and Hart described that there are two methods to configure Vanguard Vault to handle these types of marks. The configuration setting must be set in Vanguard Deploy software and then loaded onto Vanguard Vault (i.e., it cannot be modified on the scanner). As part of the open-ended test, I wanted to test both methods for configuring Vanguard Vault to handle a ballot containing what the voting system identifies as a "marginal mark." The first method is to configure Vanguard Vault, in the Deploy, to allow the voter to override and cast a ballot with such ambiguous marks, which is how it was configured for the L&A test. The second method is to configure Vanguard Vault to require an election worker to intervene (i.e., it does not allow the voter to override the message and cast the ballot).

The second issue related to marginal marks is that there are contradictory terminology and definitions for what is describes as a "marginal mark." Pursuant to Section 3.1.2-C of the VVSG 2.0, the vendor must document what constitutes a tabulatable mark, an ambiguous mark, and a marginal mark.

Observations

As part of the open-ended testing, it was observed that the Vanguard Adapt ballot marking device automatically deposits a provisional ballot, and under certain conditions, a spoiled ballot into the ballot box along with all voted ballots. This requires an election worker to open the secure ballot box during the voting process to retrieve such ballots, so they do not get inadvertently tabulated. When a voter is using the Vanguard Vault to mark a multi-sheet ballot, casts one or more cards, and then spoils a subsequent card (i.e., casts the first and spoils any sheet after), the voted sheets (i.e., not spoiled) will be cast into the ballot box.

The spoiled card will be extracted out of the top (i.e., not cast into the ballot box), just as all other spoiled ballots are handled. The Vanguard Adapt also provides a warning message for the election worker, informing them that a sheet(s) has been deposited in the secured ballot box and the election worker should unlock, open, and remove the cast sheets from the ballot box. For both the provisional ballots and for a spoiled multi-sheet ballot, an election worker must open the ballot box, which contains all properly cast ballots. As described, the election worker has access to every ballot previously cast into the device's built in ballot box and could pull any ballot the election worker chooses. There is no designation on the ballot that the sheet is "provisional" or "spoiled," respectively. It should be noted that Vanguard Adapt is generally used for voters with specific needs, such as limited vision, so the voter may not be able to review (i.e., confirm) it is the ballot s/he voted.

Examiners noticed that allowing the voter to override a ballot containing marks that "may or may not" be counted, as identified in the TDP, could result in the voter inadvertently casting a ballot without knowing if it will be cast as intended. It is a concern that the voter is not provided additional information on how to remediate the issue. Requiring an election worker to intervene when the Vanguard Vault properly detects what it constitutes as a "marginal mark" provides an opportunity for the election worker to inform the voter as to why the ballot is being flagged as having an error. It also offers an opportunity for an election worker to provide instructions to the voter on how to remediate the issue. This allows the voter to make an informed decision as to whether the voter wants to correct the vote selection(s) or have it cast with the understanding that the vote may or may not be counted. As mentioned, the Vanguard Vault is properly handling the ambiguous mark, in accordance with its documentation and the machine's warning messages; it is the voter who is making a mistake in marking the ballot. This is not a system error. The system properly provides two methods for handling the voter's mistake. However, it was my observation that requiring election worker intervention provides the voter a better opportunity to remediate the mistake.

When reviewing the TDP for the definition of a "mark," "marginal mark," and "ambiguous mark," as required by Section 3.1.2-C of the VVSG, I could not locate such definitions nor the document that such definitions should have been included in. In conversation about the issue, Hart identified that there was a TDP document[xvii] that was included in the EAC certification[12] but not provided to the Texas SOS. Hart allowed the examiners to review that TDP document. In reviewing it, I noticed that the definition of "marginal mark" contradicts

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[12] https://www.eac.gov/sites/default/files/2025-09/Attachment%20B%20-%20Verity%20Vanguard%201.0%20Technical%20Data%20Package.pdf

the functionality identified in Vanguard Deploy as "Marginal Mark." The text used in Vanguard Deploy is "Marginal Mark," yet that text sets a parameter for how the Vanguard Vault handles an "ambiguous mark," as defined in the TDP (i.e., text says "marginal mark" but the functionality handles "ambiguous mark"). VVSG 2.0 Section 3.12-C requires the vendor to define an ambiguous mark and marginal mark as two distinctly different items. Hart accurately defines them as two distinctly different items, yet the text in Vanguard Deploy does not match the definition in the TDP. This issue is solely a text and terminology issue; the functionality of Vanguard Vault properly and accurately handles the "Mismark Type" and rejects -or accepts- the ballot type based on the parameters set in Vanguard Deploy. It is my observation that this text issue should be corrected in a future version of the Hart Vanguard Voting System, but no edits need to be made in the current version since the functionality of the system operates properly.

Recommendation

The Hart Verity Vanguard Voting System version 1.0 performed as expected, tabulating and reporting all results accurately. The design of the Vanguard voting system includes security features that are improved from previous VVSG 1.0 certified voting systems. There are optional capabilities that can increase transparency and auditability. Accessibility features have been added to poll worker functionality, in addition to voter functionality, and have added components that could serve a larger population of voters by including functionality that can assist voters with limited dexterity. I recommend the Hart Verity Vanguard Voting System version 1.0 be certified by the Secretary of State. When deciding on certification, the Secretary should consider the following recommended conditions for use or require the vendor to make such modifications prior to the granting certification.

1. The vendor documentation should be updated to be more specific as to which unique identifiers are captured and stored in the cast vote record, and which are not.
2. Until Hart's proprietary software application for configuring the workstations has been tested and approved, it should not be loaded onto or run on the voting system. Additionally, Hart should document the process it will use for manually configuring these settings on the workstations, in the meantime.
3. The manual method for generating hash values from the server and client workstations should not be used by the counties until Hart has updated its documentation about how to perform the manual extract efficiently. As it currently stands, the Secretary should require that the counties only use the Software Validation Tool method on the server and client workstations (i.e., prohibit the manual method on the server and workstations).

4. The Secretary should require that the Vanguard Vault single feed scanner and tabulator be configured to require election worker intervention when the device detects what it describes as a "marginal mark" (i.e., prohibit the voter to override and tabulate a marginal mark without election worker intervention). This is done by setting the parameters for "Marginal Marks" in Vanguard Deploy to "Reject All" and the "Override By" parameter to "Poll Worker."
5. The Vault Imprinter, which is identified by Hart as "optional" should not be required to be installed. This feature, and the imprinting hardware, should be certified as "optional" for jurisdictions to decide if, and how, they may want to utilize this feature and functionality.
6. The Secretary should not certify the Vanguard Adapt ballot marking device until Hart has remediated the issues identified for provisional voters and for multi-sheet ballots that get spoiled.

Ryan Macias

October 24, 2025

Date

References

[i] Texas Application for Certification of Verity Vanguard 1.0 Letter
[ii] Verity Vanguard Voting 1.0 Configurations
[iii] Texas Form 100
[iv] Texas Form 100 Modified 09112025
[v] Texas Form 101 Responses
[vi] Vanguard System Administrator's Guide Rev A.05
[vii] Verity Vanguard System Overview Rev A.10
[viii] Vanguard Vault with Imprinter Polling Place Guide Rev A.05
[ix] Vanguard Vault with Imprinter Device Support Guide Rev A.05
[x] Test Report Attachment B – Verity Vanguard 1.0 Technical Data Package Listing
[xi] Verity Vanguard 1.0 Workstation Deployment Process Rev A.04
[xii] Vanguard Manual Application Hash Validation Process Rev A.00
[xiii] Vanguard System Administrator's Guide Rev A.05
[xiv] DRAFT Test Script.pdf
[xv] DRAFT Expected Totals.pdf
[xvi] Vanguard Deploy User Guide Rev A.05
[XVII] Vanguard 1.0 Performance Specifications Rev A.06