

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF STATE

**REPORT CONCERNING THE EXAMINATION RESULTS OF UNISYN
VOTING SOLUTIONS. OPENELECT 1302A WITH OPENELECT
VOTING OPTICAL PRECINCT TABULATOR, OPENELECT VOTING
CENTRAL SCAN CENTRAL TABULATOR, OPENELECT CENTRAL
SUITE AND OPENELECT VOTING INTERFACE ADA DEVICE**



Issued By:

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Acting Secretary of the Commonwealth
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EXAMINATION RESULTS OF UNISYN VOTING SOLUTIONS. OPENELECT 1.3.0.2A WITH OPENELECT VOTING OPTICAL PRECINCT TABULATOR, OPENELECT VOTING CENTRAL SCAN CENTRAL TABULATOR, OPENELECT CENTRAL SUITE AND OPENELECT VOTING INTERFACE ADA DEVICE

I. INTRODUCTION

Article XI-A of the Pennsylvania Election Code, 25 P.S. §§ 3031.1 *et seq.*, authorizes the use of electronic voting systems. Section 1105-A of the Pennsylvania Election Code, 25 P.S. § 3031.5, requires that the Secretary of the Commonwealth (Secretary) examine all electronic voting systems used in any election in Pennsylvania and that the Secretary make and file a report stating whether, in his opinion, the electronic voting system can be safely used by voters and meets all the applicable requirements of the Election Code.

Upon the request of Unisyn Voting Solutions (Unisyn), the Department of State's Bureau of Commissions, Elections and Legislation (Department) scheduled an examination for August 14, 2017, of OpenElect 1.3.0.2 Voting System (OVS 1.3.0.2) which consisted of OPENELECT CENTRAL SUITE (OCS) election management software used in conjunction with the following hardware components: 1) the OPENELECT VOTING OPTICAL (OVO) precinct tabulator optical scan device; 2) the OPENELECT VOTING CENTRAL SCAN (OVCS) central tabulator optical scan device; 3) the OPENELECT VOTING INTERFACE (OVI-VC) Americans with Disabilities Act (ADA) compliant Ballot Marking Device (BMD). OVS 1.3.0.2 system can be configured to include another ballot marking component OVI-7, which is not part of the system considered for certification in Pennsylvania.

The Secretary of the Commonwealth appointed SLI Global Solutions as a professional consultant to conduct an examination of OVS 1.3.0.2. Mike Santos, Senior Test Manager of SLI Global Solutions, (Examiner) conducted an examination of the OVS 1.3.0.2 pursuant to Section 1105-A(a) of the Election Code, 25 P.S. § 3031.5(a). The Examiner performed the examination commencing on August 14, 2017, in Room 114A of the Commonwealth Keystone Building, 400 North Street, Harrisburg, Pennsylvania. Jonathan Marks Commissioner of the Bureau of Commissions, Elections and Legislation; Jessica

Myers, Deputy Director, Office of Policy; Kathleen Kotula, Deputy Chief Counsel, Office of Chief Counsel; and Sindhu Ramachandran, Voting Systems Analyst, represented the Secretary of the Commonwealth. Chris Ortiz, Director, Business Development and Certification, and McDermot Coutts, Director, Software Development, represented Unisyn. Additional staff members from the Department also attended the examination. The examination was open to the public and was videotaped by Department staff. The Examiner concluded that the OVS 1.3.0.2 does not comply with Section 1107-A(3), 25 P.S. § 3031.7(3), of the Pennsylvania Election Code because the OVI-VC did not accurately implement the Pennsylvania Method (PA Method) of straight party voting.

Thereafter, Unisyn incorporated a fix for the PA method anomaly that was identified during the OVS 1.3.0.2 examination and re-submitted the new release, OpenElect 1.3.0.2A (OVS 1.3.0.2A), to both the U.S. Election Assistance Commission (EAC) for federal approval and the Department for state certification. The system components remained the same and the only change in the new release was the enhancement of the OVI-VC software to handle the PA Method accurately. The Examiner performed a follow-up examination of OVS 1.3.0.2A on December 14, 2017, at SLI Global Solutions located at 4720 Independence Street, Wheat Ridge, Colorado. Department staff observed the examination via web conference. The examination was videotaped by SLI and the video is on file at the Department.

II. THE OPENELECT 1.3.0.2A VOTING SYSTEM

OVS 1.3.0.2A is a paper based voting system that provides end-to-end election support; from defining an election to generating final reports. The system is comprised of both precinct and central count tabulators and a Ballot Marking Device as an ADA component.

The following is a description of the OVS 1.3.0.2A components drawn from Section 2.0 (System Overview) of the Test Report for Examination of OpenElect 1.3.0.2A (Report id - PUV-307-FTR-01), prepared by the Examiner.

OpenElect Central Suite (OCS)

The OCS System supports elections on the OVO, OVI-VC and OVCS systems. It includes Ballot Layout Manager, Election Manager, Election Server, Tabulator Client, Tabulator Server, Adjudicator, and Tabulator Reports. In addition, the OCS includes the Software Server (SS) system for updating and validating the OVO and the OVIVC (voting device) software.

OpenElect Voting Optical (OVO)

The OVO is a full-page dual-sided optical scan precinct scanner that scans and validates voter ballot pages and provides a summary of all ballot pages cast. The OVO consists of the following components:

- Personal Computer (PC) – The Computer component (with a touch panel display) has pre-installed server software that manages data and communication and client software that provides a user interface for voting and maintenance. A new election loaded via the Election Server or manually via a Transport Media (TM) sets passwords, parameters, and ballot styles for that election. (Valid ballots for a poll location are reinitialized or set on Election Day startup by scanning a ballot header card).
- Transport Media (TM) – 1 GB or larger USB thumb drive that provides the means of transporting audit, optional ballot page images and vote files from the precinct on Election Night to Election Headquarters where the central count system resides.

OpenElect Voting Interface (OVI-VC)

The OVI-VC is a ballot marking device (BMD) that supports both ADA and Regional Early Voting requirements. The OVI-VC has a 15-inch display and consists of the following components:

- Personal Computer (PC) – The Computer component (with a touch panel display) has pre-installed server software that manages data and communication and client software that provides user interfaces for voting and maintenance. A new election loaded via the Election Server or manually via a Transport Media (TM) sets passwords, parameters, audio, and ballot styles for that election.
- Transport Media (TM) – A USB device with 1 GB or larger storage that provides the means of transporting audit files to the OCS system.

- Printer – 82.5 mm thermal receipt printer that is connected to the PC to print OVI Ballots and reports at the OVI.
- UPS - Uninterruptible power supply, provided as part of the system.

OpenElect Voting Central Scan (OVCS)

The OVCS units that reside at election headquarters are designed to read absentee, or provisional ballots. The OVCS also captures write-in data images and produces a Write-In Image Report for manual processing upon request. The OVCS system consists of the following components:

- PC Desktop – A desktop PC configuration with the following minimum characteristics: PC: 1.8 GHz Processor, 2 GB RAM, 250GB (or larger) Hard Drive, USB Ports, Network Interface Port (Ethernet), CDRW/DVD, Video Port 16:9 LCD/Monitor Keyboard and Mouse
- Canon DR-X10C Scanner: a COTS scanner used to provide ballot scanning and image transfers to the local OVCS Workstation

The following is a listing of the software/firmware components that comprise the entire Unisyn 1302A system:

A. Firmware/Software

Commonwealth of Pennsylvania State Certification of Unisyn OVS 1.3.0.2.A	
Firmware/Software	Version
Ballot Layout Manager (BLM)	1.3.0
Election Manager (EM)	1.3.0.2
Software Server (SS)	1.3.0
Election Server (ES)	1.3.0
Tabulator Client (TC)	1.3.0
Tabulator (Tab)	1.3.0
Tabulator Reports (TR)	1.3.0
Adjudicator	1.3.0
Scriptor	1.3.0.2
Validator	1.3.0.2
Common (Library)	1.3.0

OCS Installer	1.3.0
Regkey Builder	1.3.0
Logger (Library)	1.3.0
OpenElect Voting Optical (OVO), Rev A&E	1.3.0
OpenElect Voting Central Scan (OVCS)	1.3.0
OpenElect Voting Interface (OVI-VC), Rev. A&B firmware	1.3.0.2. A

Additional COTS software and firmware included in the system has been defined as part of the EAC system certification scope added to this report as Attachment A.

B. Peripherals

The peripheral used during the examination included

Unisyn supplied

- Headphones for OVI
- Sip-N-Puff for OVI
- ATI keypad for OVI

COTS Equipment

COTS Equipment	Make	Model
3 x Transport Media	STEC	Thumb Drive (UFD) 1GB Capacity
2x Thumb Drives	PNY	USB 16 GB
Network Switch	Linksys	SR2024 Business Series 24-Port 10/100/1000 Gigabit Switch
ADA Voting Booth	American Made Election Equipment (AMEE)	Model 2000

C. Test Support materials

Test support materials utilized during the examination included:

- 82.5mm thermal receipt paper for printing ballots on the OVI, to be processed by the OVO and OVCS.
- Ballot stock, for printing of ballots to be processed by the OVO and OVCS

Election definitions are created utilizing OCS and loaded to OVO, OVI-VC and OVCS using transport media. During an election, a voter may be presented with a blank,

pre-printed paper ballot with the offices to be elected or directed to the OVI-VC ballot marking device to mark and print ballots. Once the voter has made his or her selections, the ballot is either scanned and tabulated by the OVO optical scanners at the precinct and retained in a ballot box, or, it is retained in a ballot box for scanning centrally at the county election office using the OVCS. After close of polls data from OVO (precinct scanner) and OVCS (central scanner) are read into OCS and results are tabulated.

III. EXAMINATION APPROACH, PROCEDURES AND RESULTS

A. Examination Approach

To ascertain whether OVS 1.3.0.2A can be safely used by voters at elections in the Commonwealth and meets all the requirements of the Pennsylvania Election Code, the Examiner developed test protocols for the examination. The initial examination of OVS 1.3.0.2 determined that the system did not comply with Section 1107-A(3), 25 P.S. § 3031.7(3), since the OVI-VC component did not appropriately perform the PA Method. The Examiner then performed a follow-up examination of OVS 1.3.0.2A to confirm that the PA Method anomaly identified on OVI-VC was corrected and the system complies with all the requirements of the Pennsylvania Election Code. The examination approach followed for OVS 1.3.0.2 and 1.3.0.2A is discussed in the below sections.

OVS 1.3.0.2 Examination Approach

The test protocols separated the requirements of Article XI-A of the Pennsylvania Election Code, sections 1101-A to 1122-A, 25 P.S. §§ 3031.1 - 3031.22, into six main areas of test execution: (1) Source Code Review; (2) Documentation Review; (3) System Level Testing; (4) Security/Penetration Testing; (5) Privacy Analysis and (6) Usability Analysis.

Source Code Review was performed prior to the examination to determine if there are any vulnerabilities found that would warrant additional security examination.

Documentation Review was performed to verify that the portions of the Pennsylvania Election Code, which reference documentation detail, are sufficiently met by the Unisyn

OVS 1.3.0.2 documentation. The Examiner validated compliance of the system to the following sections of the Election Code during the documentation review.

- 1105-A(a), 25 P.S. § 3031.5(a), requiring that an electronic voting system has been examined and approved by a federally recognized ITA;
- 1107-A(11), 25 P.S. § 3031.7(11), requiring an electronic voting system to be suitably designed in terms of usability and durability, and capable of absolute accuracy;
- 1107-A(13), 25 P.S. § 3031.7(13), requiring an electronic voting system to correctly tabulate every vote;
- 1107-A(14), 25 P.S. § 3031.7(14), requiring an electronic voting system to be safely transportable; and
- 1107-A(15), 25 P.S. § 3031.7(15), requiring an electronic voting system to be designed so voters may readily understand how it is operated.

System Level Analysis examined the Unisyn OVS 1.3.0.2 voting system in terms of conducting an election. The Examiner created election definitions using OCS and populated the voting devices (OVO, OVI-VC and OVCS) with election definitions using transport media. Ballots were marked, manually as well as via the OVI-VC BMD, then tabulated through the OVO and OVCS. The OVI-VC BMD, the OVO and OVCS were all exercised to verify that they meet all pertinent requirements of the Pennsylvania Election Code. The test cases were designed to ascertain compliance to the below sections of the Election Code

- 1101-A, 25 P.S. § 3031.1, requiring an electronic voting system to provide for a permanent physical record of all votes cast;
- 1107-A(2), 25 P.S. § 3031.7(2), requiring an electronic voting system to permit voting on both candidates and ballot questions, according to the official ballot;
- 1107-A(3), 25 P.S. § 3031.7(3), requiring an electronic voting system to permit straight party voting, including the "Pennsylvania method" of straight party voting;
- 1107-A(4), 25 P.S. § 3031.7(4), requiring an electronic voting system to permit a voter to vote for candidates of all different parties, and write-in candidates;
- 1107-A(5), 25 P.S. § 3031.7(5), requiring an electronic voting system to permit a voter to enter write-in votes;

- 1107-A (6), 25 P.S. § 3031.7(6), requiring an electronic voting system to permit a voter to cast votes for candidates and ballot questions he or she is entitled to vote for, and prevents a voter from casting votes the voter is not entitled to vote on;
- 1107-A(7), 25 P.S. § 3031.7(7), requiring an electronic voting system to prevent over-votes;
- 1107-A(8), 25 P.S. § 3031.7(8), requiring an electronic voting system to prevent a person from casting more than one vote for a candidate or question, except where this type of cumulative voting is permitted by law;
- 1107-A(9), 25 P.S. § 3031.7(9), requiring an electronic voting system to permit voters to vote in their own parties' primaries, and prevents them from voting in other parties' primaries, while also permitting voters to vote for any nonpartisan nomination or ballot question they are qualified to vote on; and
- 1107-A(10), 25 P.S. § 3031.7(10), requiring an electronic voting system that registers votes electronically to permit voters to change their votes up until taking the final step to register the vote, and for systems that use paper ballots or ballot cards, permits a voter to get a new ballot in the case of a spoiled ballot, and to mark and cancel the spoiled ballot;
- Portions of 1107-A(16), 25 P.S. § 3031.7(16), requiring an electronic voting system which provides for district-level tabulation to include (1) a public counter to register how many ballots are submitted to be counted; (4) will not tabulate an over-vote, with an option to notify a voter of an over-vote if used during voting hours; and (5) generates a printed record that counters are set to zero before voting commences; and
- Portions of 1107-A(17), 25 P.S. § 3031.7(17), requiring an electronic voting system which provides for central-count tabulation to (2) preclude tabulation of an over-vote; and (3) indicate that counters are set to zero before processing ballots, either by district or with the capability to generate cumulative reports.

The Examiner also used the System Level Testing to further evaluate the design and accuracy aspects of the system as required by 1107-A(11), (13) 25 P.S. § 3031.7(11), (13) through his use at public demonstration, even though the requirements were already validated by reviewing EAC certification reports.

The Security/Penetration Analysis examined the voting system's compliance with the requirements of the Pennsylvania Election Code by analyzing physical security procedures and impoundment of ballots. Precinct tabulation devices were installed for delivery to the precinct, and the Examiner analyzed the pertinent security procedures performed on each

device to ascertain compliance to 1107-A(12), 25 P.S. § 3031.7(12), requiring an electronic voting system to provide acceptable ballot security procedures and impoundment of ballots to prevent tampering with or substitution of any ballots or ballot cards. The Examiner also used the security analysis phase of testing to validate compliance to parts of 1107-A(16), (17) 25 P.S. § 3031.7(16), (17) that relates to system security.

The Privacy Analysis examined the voting system's compliance to Section 1107-A(l) of the Election Code, 25 P.S. § 3031.7(1) requiring that an electronic voting system provide for absolute secrecy of the vote, by analyzing how the polling place devices met the pertinent privacy requirements.

The Usability analysis evaluated the compliance of the voting system to 1107-A(14), (15) 25 P.S. § 3031.7(14), (15). The results from the tests were used by the Examiner to supplement his conclusions from the documentation review phase.

OVS 1.3.0.2A Examination Approach

OVS 1.3.0.2.A was a release to correct the PA Method anomaly noted by the Examiner during the OVS 1.3.0.2 examination held during the week of August 14, 2017. The Examiner evaluated the changes submitted by Unisyn and developed test protocols to validate the modification to OVI-VC resolved the PA Method anomaly and to ensure that that the modified system maintained compliance with all the Election Code requirements. The Examiner and Department agreed that the test approach must include Source Code Review and System Level Testing. Documentation review, Security/Penetration, Privacy and Usability analysis results were leveraged from OVS 1.3.0.2 examination since those aspects of the system remained unaffected by the isolated code changes to OVI-VC.

Source code review was done to determine if there were any vulnerabilities that warrant additional testing. System Level Testing examined OVS 1.3.0.2A in terms of conducting a general election and closed primary election. The election runs were to (a) test and confirm that the anomaly identified during OVS 1.3.0.2 examination was remediated and (b) to perform regression testing of all components of the system. The election runs

allowed the Examiner to ascertain that the compliance to the Election Code requirements determined during the System Level Testing of OVS 1.3.0.2 is maintained in the new release.

B. Examination Process and Procedures

The examination process and procedures followed for OVS 1.3.0.2 and OVS 1.3.0.2A examinations are listed in the below sections. The final determination in this report is based on the combined analysis of the results and conclusions from both examinations.

OVS 1.3.0.2 Examination

The public examination portion commenced on August 14, 2017, at the Commonwealth Keystone Building, Room 114A, 400 North Street, Harrisburg, Pennsylvania. The examination lasted approximately four days. Members of the public were allowed as observers for the examination. The Examiner performed System Level Testing, Security/Penetration Testing and Privacy and Usability Analysis during the examination. Source code and Documentation review were completed prior to the public examination at SLI lab facilities.

Unisyn supplied all the hardware equipment required for the examination. All software and firmware necessary to perform the examination was received directly from the Voting System Test Laboratories(VSTL) that tested the voting system for EAC certification. The trusted build of the software and firmware for each device being evaluated were installed by the Examiner during the public examination, using the appropriate media for installation.

The Examiner created the election definition using OCS and prepared the precinct tabulation device OVO, ballot marking device OVI-VC and central scanner OVCS using transport media. The polling place was set up using OVO and OVI-VC. A primary and general election was then run using OVO, OVI-VC and OVCS. Hand marked and OVI-VC ballots were processed using OVO and OVCS. Results were then tabulated using OCS and validated against expected results.

Unisyn 1302A examination

The follow-up examination commenced on December 14, 2017, in Lab 5, 4720 Independence Street, Wheat Ridge, Colorado, and was observed by Department staff in a conference room in BCEL, 210 North Office Building, 410 North Street, Harrisburg, Pennsylvania. Unisyn supplied all the hardware equipment required for the examination. All software and firmware necessary to perform the examination was received directly from the VSTL that tested the voting system for EAC certification. The Examiner used the trusted build acquired for OVS 1.3.0.2 examination for all components other than OVI-VC, since the EAC campaign for the OVS 1.3.0.2A, built only the OVI-VC executable. A primary and general election was then run using OVO, OVI-VC and OVCS. Results were then tabulated and validated against expected results. The Examiner performed the Source Code Review before the witnessed examination at SLI Global solutions facility.

C. Examination Results

On September 13, 2017, the Examiner issued his draft report for the testing of OVS 1.3.0.2 with a recommendation that the system is not in compliance with Section 1107-A(3), 25 P.S. § 3031.7(3) of the Pennsylvania Election Code and the PA Method concern must to be resolved before the system can be used for elections in Pennsylvania. The Examiner report indicated successful completion of tests executed to ascertain compliance to all other requirements mandated by the Pennsylvania Election Code. The Examiner report for OVS 1.3.0.2 (Test Report – PUV-306-FTR-01) included details of the test cases, execution and successful completion. The following section is a summary of the results of the examination as set forth in fuller detail in the Examiner's Report.

OVS 1.3.0.2 examination results

1. Source Code Review

Source Code Review for OVS 1.3.0.2 was performed, with a focus on determining whether any vulnerabilities could be found. The Examiner reported that the code review was completed with no malicious software, cryptographic software, process control or password

management vulnerabilities being found. The Examiner concluded that no deficiencies were found during source code review.

2. Documentation Review

The Documentation Review testing performed by the Examiner demonstrates that the OVS 1.3.0.2 meets the relevant requirements of the Pennsylvania Election Code. The Examiner reviewed both the “Test Report for EAC 2005 VVSG Certification Testing of Unisyn Voting Solutions OpenElect 1.3.0.2 Voting System” and “Test Report of EAC 2005 VVSG Certification Testing Performed on Unisyn Voting Solutions OpenElect 1.3 Voting System” from which the OVS 1.3.0.2 system was derived.

The review of the EAC test reports by the Examiner and the EAC certifications submitted by Unisyn satisfy the requirements of Section 1105-A(a) of the Election Code, 25 P.S. § 3031.5(a); the OVS 1.3.0.2 has been examined and approved by a federally recognized independent testing authority (ITA), or VSTL as such authorities are now called, as meeting the applicable performance and test standards established by the federal government.

The design requirements of Section 1107-A(11), (14) of the Pennsylvania Election Code, 25 P.S. § 3031.7(11), (14) are met by the combination of EAC hardware Non-Operating Environmental Tests, which included: bench handling, vibration, low temperature, high temperature, humidity and product safety tests. The system accuracy testing during EAC certification testing provided confirmation of system accuracy as required by Section 1107-A(11), (13) of the Pennsylvania Election Code, 25 P.S. § 3031.7(11), (13) .

The system summative usability test reports were accepted by the EAC as part of the Federal Certification. This along with the Examiner’s use of the system demonstrates that the system can be readily learned and hence satisfied the usability requirement of Section 1107-A(15) of the Pennsylvania Election Code, 25 P.S. § 3031.7(15).

3. System Level Testing

As set forth in the examination approach, System Level Testing was divided into two separate tests, a primary election and a general election. The ballots defined had contests with voting variations supported in Pennsylvania.

A closed primary election consisting of two parties, two precincts (one of which was a split precinct), and 13 contests was run utilizing OVO, OVI-VC, OVCS and OCS. The Examiner validated compliance of the system to Sections 1107-A, 25 P.S. §§ 3031.1, 3031.7(2), (5), (6), (7), (8), (9), (10), (11), (13). No issues or anomalies were experienced during these tests, and the objective criteria established in the test protocols were met.

A general election consisting of two parties, two precincts (one of which was a split precinct), and 20 contests was run utilizing OVO, OVI-VC, OVCS and OCS. The Examiner examined the compliance of the system to Sections 1107-A, 25 P.S. §§ 3031.1, 3031.7(2), (3), (4), (5), (6), (7), (8), (10), (11), (13). All the test cases except the test case to test PA method on OVI-VC completed successfully.

Examiner included test cases to validate sections of 25 P.S. § 3031.7(16) and (17) that mandate voting systems to generate zero proof reports and correctly handle over-votes during the election runs. Rest of the requirements of 25 P.S. § 3031.7(16) and (17) were validated by the Examiner during the Security/Penetration Analysis.

Election definitions for both primary and general elections were created within OCS and transport media was created to populate OVO, OVI-VC and OVCS. Polls were opened and ballots were marked manually and using OVI-VC BMD and processed through the OVO and OVCS. The Examiner used English, Spanish and Chinese ballots for the test. Reports were generated after closing polls and results were validated against expected results. Each specific hardware and software component was tested for compliance with the required sections of the Election Code.

The OVS 1.3.0.2 is a paper based system and paper ballots provide a permanent physical record of each vote cast adhering to 1107-A(1), 25 P.S. § 3031.1.

The primary and general election definitions were created using OCS and loaded to

polling place devices, which provided assurance that the system can perform ballot creation activities. The Examiner successfully added contests, referendum questions and retention contests with appropriate candidates and choices. The OVO, OVI-VC and OVCS components of the OVS 1.3.0.2 successfully permitted votes for "1 of 1," "N of M," and "Question" contests for a standard and ADA voting session in compliance with Section 1107-A(2), 25 P.S. § 3031.7(2).

Each of the applicable components of OVS 1.3.0.2 allowed the test voter to cast a write-in vote and demonstrated compliance with Section 1107-A, 25 P.S. § 3031.7(5).

OVS 1.3.0.2 meets the requirements for Section 1107-A(6), 25 P.S. § 3031.7(6) because the test voters cast votes on different ballot styles for candidates and questions and the OVI-VC displayed only contests that the voter was entitled to vote.

The system compliance to Section 1107-A(7), 25 P.S. § 3031.7(7) was demonstrated since OVO has the capability to indicate overvotes for any office and the voter or poll worker has the ability to choose "Ignore Validation" and cast the ballot with overvotes if the voter decides so. OVI-VC did not allow overvotes. The Examiner also noted that the system allowed undervotes, but warned the user about the undervote if configured to do so.

The successful validation of the election results shows that central automatic tabulating equipment OVCS and precinct tabulator OVO includes the capability to reject all choices recorded on the ballot for an office or question if the number of choices exceeds the number for which the voter is entitled to vote adhering to Section 1107-A, 25 P.S. § 3031.7(8).

The OVS 1.3.0.2 complies with Section 1107-A, 25 P.S. § 3031.7(9), because test voters in the closed primary election were only able to vote for candidates seeking nomination from their party and the referendum questions.

Adherence to Section 1107-A, 25 P.S. § 3031.7(10) was demonstrated for both ADA and standard voting sessions. OVI-VC allowed the voters to review their ballots before printing for tabulation on OVO or OVCS. The Examiner attempted to change votes on

OVI-VC for candidates within the contest, as well as after leaving the contest and then returning to other contests and while reviewing the summary screen. The tests demonstrated that OVI-VC allowed changing the selections until the voter decides to print the ballot. The OVO precinct scanner of OVS 1.3.0.2 provided voter with a message screen when ballot contained errors such as overvotes or undervotes were present. The voter is then presented an error report with contests where the tabulator detected errors. The voter can either accept the ballot with errors or fill out another ballot with corrections.

Accuracy requirements of 1107-A, 25 P.S. § 3031.7(11) and (13) that were ascertained by reviewing EAC test reports were further validated by the successful tabulation and validation of the primary and general elections run by the Examiner.

Examiner validated via test cases during the primary and general election that the tabulating devices OVO and OVCS generated zero proof reports only before ballots were cast, system rejected all votes for the contest in an overvote situation and produced a results report, as required under Sections 1107-A(16) and (17), 25 P.S. § 3031.7(16) and (17). The Examiner confirmed that the zero-proof report cannot be generated on demand after a ballot is cast.

Ballots were marked by hand including write-in votes during the general election to examine the system's ability to properly enact the PA method. The OVO and OVCS both demonstrated compliance to Sections 1107-A, 25 P.S. § 3031.7(3) and (4). The Examiner attempted to use the OVI-VC BMD using the straight party voting option to mark the ballots. The device handled the marking appropriately when the contest had the full slate of candidates for a political party. It was identified that if the contest had less than the full slate of candidates for a political party, the OVI does not clear the choices that have been preselected by the "straight party" option as required by the PA Method. It allows the voter to add to the existing selections until the "vote for #" is reached. The Examiner determined that the OVI-VC does not comply with 1107-A, 25 P.S. § 3031.7(3).

4. Security/Penetration Analysis

The Examiner adopted a strategy to review each pertinent requirement for this test individually and then created test cases to address it in either a documentation review, a functional test, or both.

OVO and OVI-VC were configured for delivery and operation at a polling place including all seals and locks recommended by the manufacturer. The OVCS was configured for operation in a county office. The Examiner performed a physical inspection of the devices including ports, outer case and memory devices to confirm that they are all secure and the locks and seals are tamper proof and evident. The Examiner also examined the OVO and OCS for password management of administrative functions and ensured that system counter cannot be reset by unauthorized persons. In addition, the Examiner also reviewed “Unisyn System Security Specification” document for ballot security procedures at the polling place and central location to ensure that the manufacturer recommends the required steps for configuring the OVS 1.3.0.2 securely for Election. Based on the tests the Examiner concluded that that the system complies to 1107-A, 25 P.S. § 3031.7(12).

The Examiner included test cases during the Security/Penetration analysis phase of the testing to evaluate the security requirements mandated by Section 1107-A(16), (17) 25 P.S. § 3031.7(16), (17). The Examiner validated that the OVO had a visible public counter and the system prevented authorized and unauthorized users any access to vote data while polls are open. Tests were done to determine that USB ports do not allow any data or information to the OVO and no maintenance, poll worker and administrative accessible screens allow tampering of the tabulating element. The system did not allow polls to be open without running zero proof report and the content of report showed that all candidate positions, each question and the public counter were all set to zero. The functionality of the system to generate the close of polls report was verified and the report contents were analyzed to ensure that it contains total number of ballots tabulated and total number of votes for each candidate and question on the ballot. Based on the above tests and the test cases executed while running the elections, the Examiner concluded that OVS 1.3.0.2 complies to all requirements mandated by 25 P.S. § 3031.7(16), (17).

5. Privacy Analysis

Examiner reviewed and inspected the privacy aspects of OVS 1.3.0.2 system to determine compliance to Section 1107-A of the Election Code, 25 P.S. § 3031.7(1). The Examiner determined that OVI and OVI-VC at the polling place complies to 25 P.S. § 3031.7(1) by review of system documentation and physical inspection. OVCS system was physically examined by the Examiner for adequate visual secrecy. The Examiner also verified that no voter data, including stored ballot images are tied back to any specific voter, in a manner that would compromise voter secrecy.

6. Usability Analysis

The Examiner determined that OVS 1.3.0.2 demonstrated compliance to the usability requirements of Section 1107-A of the Election Code, 25 P.S. § 3031.7(14) and (15) by reviewing appropriate EAC certification reports and from his experience of using all the functionalities of the system during the examination.

OVS 1.3.0.2A Examination Results

As identified in the test approach section of this document the follow-up examination of OVS 1.3.0.2A included Source Code Review and System Level Testing.

1. Source Code Review

Source Code Review for OVS 1.3.0.2A was performed, with a focus on determining whether any vulnerabilities could be found. The Examiner noted that the only code being affected by the OVS 1.3.0.2A release was related to the OVI-VC BMD. It was concluded that the code review was completed with no malicious software, cryptographic software, process control or password management vulnerabilities being found. The Examiner concluded that no deficiencies were found during source code review.

2. System Level Testing

The System Level Testing was divided into two tests, a primary election and general election. The Examiner included test cases to specifically test the PA method anomaly identified during OVS 1.3.0.2 testing as part of the general election.

A closed primary election consisting of two parties, two precincts (one of which was a split precinct), and 15 contests was run utilizing OVO, OVI-VC, OVCS and OCS. The Examiner examined the compliance of the system to Sections 1107-A, 25 P.S. § 3031.1, 3031.7(2), (5), (6), (8), (9), (10), (11), (13), and (17). No issues or anomalies were experienced during these tests, and the objective criteria established in the test protocols were met.

A general election consisting of two parties, two precincts (one of which was a split precinct), and 12 contests was run utilizing OVO, OVI-VC, OVCS and OCS. The Examiner examined the compliance of the system to Sections 1107-A, 25 P.S. § 3031.1, 3031.7(2), (3), (4), (5), (6), (7), (8), (10), (11), (13), (16) and (17). The objective criteria established in the test protocols were met.

Election definitions for both primary and general elections were created within OCS and transport media was created to populate OVO, OVI-VC and OVCS. Polls were opened and ballots were either marked manually or using OVI-VC BMD and processed through the OVO and OVCS. Reports were generated after closing polls and results were validated against expected results. Each specific hardware and software component was tested for compliance with the required sections of the Election Code.

Ballots were marked on OVI-VC examine the ability to properly enact the PA method. The test cases included different voting patterns that selected either a candidate from the same political party, a different political party or a write in when the contest had a full slate of candidates or less than full slate of candidates. The OVI-VC did not allow the voter to add additional candidates until the “vote for #” was reached, but cleared the existing selections as required for proper demonstration of the PA method. Ballots were hand marked with similar voting variations and all ballots were tabulated on OVO and OVCS. The votes were tabulated accurately following the PA method rules. The Examiner

concluded that the OVS 1.3.0.2A complies to Section 1107-A, 25 P.S. § 3031.7(3) since the components OVI-VC, OVO and OVCS all handled the PA method test cases done as part of the general election test appropriately.

The Examiner confirmed with appropriate test cases and voting patterns that OVS 1.3.0.2A maintains compliance to Sections 1107-A, 25 P.S. §§ 3031.1, 3031.7(2), (4), (5), (6), (7), (8), (9), (10), (11), (13), (16) and (17) via tests cases in a similar manner as done during the OVS 1.3.0.2A examination.

The Examiner also noted that the paper ballots will allow recounts as required by Sections 1107-A, 25 P.S. § 3031.17.

OVS 1.3.0.2A was certified by EAC on March 15, 2018 and hence complies to Section 1105-A(a) of the Election Code, 25 P.S. § 3031.5(a) which requires that a voting system must be examined and approved by a federally recognized independent testing authority (ITA), or VSTL as such authorities are now called. The final EAC certification scope is added to this report as Attachment A.

Additional Security/Penetration Analysis, Privacy and Usability results were not conducted during the OVS 1.3.0.2A examination since the test cases validated during these tests were not affected by the isolated modification done to the OVI-VC to adequately handle the PA method.

The Examiner identified that the following

- 25 P.S. § 3031.2;
- 25 P.S. § 3031.3;
- 25 P.S. § 3031.4;
- 25 P.S. § 3031.6;
- 25 P.S. § 3031.8;
- 25 P.S. § 3031.9;
- 25 P.S. § 3031.10;
- 25 P.S. § 3031.11;

- 25 P.S. § 3031.12;
- 25 P.S. § 3031.13;
- 25 P.S. § 3031.14;
- 25 P.S. § 3031.15;
- 25 P.S. § 3031.16;
- 25 P.S. § 3031.18;
- 25 P.S. § 3031.19;
- 25 P.S. § 3031.20;
- 25 P.S. § 3031.21; and
- 25 P.S. § 3031.22

within Article XI-A of the Pennsylvania Election Code, sections 1101-A to 1122-A, 25 P.S. §§ 3031.1 – 3031.22. are not applicable to the current examination, as each deal with non-functional testing aspects of acquisition, use and maintenance aspects of a voting, that a jurisdiction would be tasked with following.

After all the testing activities, the Examiner concluded that the OVS 1.3.0.2A demonstrates compliance to all requirements as delineated in Article XI-A of the Pennsylvania Election Code, sections 1101-A to 1122-A, 25 P.S. §§ 3031.1 – 3031.22. The Examiner noted that the conclusion was drawn based on the examination of OVS1.3.0.2A in conjunction with the OVS 1.3.0.2 examination.

D. Observations

During the examination, and in the review of documentation, the Examiner and/or Department staff notes the following observations:

1. The Examiner and Department staff noted while using the OVI-VC that, in a contest that allowed for multiple choices, with a mixture of ballot candidates and write-ins, after the voter makes the allowed number of choices, when an additional write-in candidate is entered all previously selected choices are deselected, the write-in candidate names remain displayed, though unmarked.
2. Unisyn OVS 1.3.02A does not support cumulative voting.
3. The system allows a configuration where the “Ignore Validation” checkbox on

OVO will always display when a ballot is cast. This may cause the voter to bypass validating the ballots for overvotes before casting.

4. The configuration of the system complying to the Pennsylvania Election Code requirements including the PA method will require the use of appropriate selections of configurable parameters.

IV. Conditions for Certification

Given the results of the examination that occurred in August and December 2017 and the findings of the Examiner as set forth in his reports, the Secretary of the Commonwealth certifies the OVS 1.3.0.2A subject to the following conditions:

A. Pennsylvania counties using the OVS 1.3.0.2A must comply with the Directive Concerning the Use, Implementation and Operations of Electronic Voting Systems by the County Boards of Elections issued by the Secretary of the Commonwealth on June 9, 2011. In particular, Pennsylvania counties must adhere to item four (4) of the directive when setting up and positioning the OVI-VC ballot marking component with ADA support in the polling place to assure compliance with the constitutional and statutory requirements that secrecy in voting be preserved (*see* Pa. Const Art. VII § 4; and Section 1107-A(l) of the Election Code, 25 P.S. § 3031.7(1)).

B. No components of the OVS 1.3.0.2A shall be connected to any modem or network interface, including the Internet, at any time, except when a standalone local area wired network configuration in which all connected devices are certified voting system components. Transmission of unofficial results can be accomplished by writing results to media, and moving the media to a different computer that may be connected to a network. Any wireless access points in the district components of OVS 1.3.0.2A, including wireless LAN cards, network adapters, etc. must be uninstalled or disabled prior to delivery or upon delivery of the voting equipment to a county board of elections.

C. Because OVS 1.3.0.2A is a paper-based system, counties using the OVS 1.3.0.2A must comply at a minimum with Section 1117-A of the Election Code, 25 P.S. §

3031.17, that requires "statistical recount of a random sample of ballots after each election using manual, mechanical or electronic devices of a type different than those used for the specific election." This audit must be conducted via a manual count of the voter marked paper ballots exclusively. Counties must include in the sample ballots marked by ADA compliant components. Counties are advised to consult the Directive Concerning the Use, Implementation and Operations of Electronic Voting Systems by the County Boards of Elections issued by the Secretary of the Commonwealth on June 9, 2011 and any future revisions that may apply to audits of electronic voting systems.

D. All jurisdictions implementing the OVS 1.3.0.2A need to carry out a full Logic and Accuracy test on each device without fail and maintain evidence of Logic and Accuracy testing in accordance with the statutory requirements for pre-election and post-election testing. The Department does not recommend automated Logic & Accuracy (L&A) testing, and discourages the use of preprinted ballots provided by vendors. Counties must ensure that the L&A test cases include all applicable scenarios of PA straight party method identified in Attachment C to the Directive for electronic voting systems published by BCEL on September 11, 2017.

E. In addition, pursuant to the Directive on Electronic Voting Systems issued by the Secretary of the Commonwealth on August 8, 2006, the Directive Concerning the Use, Implementation and Operation of Electronic Voting Systems by the County Boards of Elections issued on June 9, 2011 and section 1105-A(d) of the Pennsylvania Election Code, 25 P.S. § 3031.5(d), this certification and approval is valid only for OVS 1.3.0.2A. If the vendor or a County Board of Elections makes **any** changes to the OVS 1.3.0.2A Voting System subsequent to the date of its examination, it must **immediately** notify both the Pennsylvania Department of State and the relevant federal testing authority or laboratory, or their successors. Failure to do so may result in the decertification of the OVS 1.3.0.2A Voting System in the Commonwealth of Pennsylvania.

F. OVS 1.3.0.2A is a paper-based system and hence, implementation of the system for precinct or central count scanning is scalable. Jurisdictions should calculate the

number of voting booths necessary to accommodate the number of registered voters in a precinct to avoid long lines. Jurisdictions must include the OVI-VC as an ADA compliant device in configuring a precinct polling place. Jurisdictions must also take into consideration that OVO allows 5,000 ballots per session after which a new TM needs to be inserted to continue tabulation.

G. All jurisdictions implementing the OVS 1.3.0.2A must ensure that no default passwords are used on any devices and that all passwords are complex and secured. Counties must implement an audit process to review and ensure that no default passwords are used upon equipment install/reinstall and routinely change passwords to avoid any password compromise. The passwords and permissions management must at a minimum comply to Section C of the Guidance on electronic Voting System Preparation and Security, September 2016 and any further directives and guidance issued by the Secretary.

H. All jurisdictions implementing the OVS 1.3.0.2A must implement administrative safeguards and proper chain of custody to facilitate the safety and security of electronic systems pursuant to the Guidance on electronic Voting System Preparation and Security, September 2016.

I. Jurisdictions implementing the OVS 1.3.0.2A with the Central Count Tabulator as the primary system where votes are counted only at the central counting location using OVCS, must comply with Section 301(a) of Help America Vote Act of 2002. The mandate requires counties using central count paper based systems to develop voting system specific voter education programs that inform voters of the effect of over voting, and instruct voters on how to correct a ballot before it is cast, including instructions on obtaining a replacement ballot. Additionally, the mandate requires that the central count voting system must be designed to preserve voter confidentiality.

J. All jurisdictions implementing OVS 1.3.0.2A must configure the OVO precinct tabulation device to “Show Validation Checkbox When Alert Detected”. This must be done to ensure that the system does not show the “Ignore Validation” option that allows a voter or poll worker to ignore ballot validation on OVO before the voter inserts the ballot

first time, thus allowing the voter to cast the ballot without validation.

K. All jurisdictions implementing OVS 1.3.0.2A must work with Unisyn to ensure that only the certified system configuration is installed on purchase or anytime a system component is replaced. The certification scope of the system has been added as an Attachment A to this report.

L. All jurisdictions implementing OVS 1.3.0.2A must ensure the accuracy of the instructions in the audio file with voter instructions used on OVI-VC.

M. OVI-7 is not certified for use in Pennsylvania. This device was not presented for certification by Unisyn.

N. Jurisdictions can make use of the Adjudicator functionality if necessary to evaluate questionable ballots, contests or selections to determine voter intent. Any decisions made during review of the ballot must be agreed upon by a team of at least two reviewers authorized by the election official. The election official can also consult the paper ballot to assist with determinations made during adjudication. In the event of a recount, the voter verified paper ballots must be used for the count.

O. Unisyn must work with jurisdictions to ensure that the system is configured to comply with all applicable requirements of PA Election Code delineated in Section Article XI-A of the Pennsylvania Election Code, sections 1101-A to 1122-A, 25 P.S. §§ 3031.1 – 3031.22

P. Jurisdictions using the services of an outside vendor for election preparation activities must work with the vendor to ensure that vendor systems used for ballot definition activities are considered part of the voting system. The systems used for ballot definition must be configured securely following conditions outlined in this report and following any Directives and Guidance issued by the Secretary. Any data transfer between the vendor and county must be done using encrypted physical media or secure file transfer process. The file transfer and download must be tracked and audited to make sure that data has not been accessed by unauthorized personnel. The county must work with the vendor to harvest and

safekeep log files created during the election preparation activities.

Q. All jurisdictions implementing the OVS 1.3.0.2A must implement system under this certification and must comply with the conditions found in this report, and any directives issued by the Secretary of the Commonwealth regarding the use of this System, in accordance with Section 1105-A(a)-(b) of the Election Code, 25 P.S. § 3031.5(a)-(b).

V. Recommendations

- A. All jurisdictions implementing OVS 1.3.0.2A Voting System should ensure that the system is correctly set up pursuant to all the recommendations of the Directive Concerning the Use, Implementation and Operations of Electronic Voting Systems by the County Boards of Elections issued by the Secretary of the Commonwealth on June 9, 2011 and Guidance on Electronic Voting System Preparation and Security, September 2016.
- B. All jurisdictions implementing OVS 1.3.0.2A should take appropriate steps to ensure that voter education is part of the implementation plan.
- C. All jurisdictions implementing the OVS 1.3.0.2A should ensure that precinct election officials and poll workers receive appropriate training and is comfortable using the system.
- D. All jurisdictions considering purchase of the OVS 1.3.0.2A should review the System Limits as mentioned in the EAC certification scope added as Attachment A to this report.
- E. The Secretary recommends that Unisyn and counties work with the Department on any changes to their voting equipment including, but not limited to, purchase and upgrades.
- F. Secretary recommends in-house ballot definition activities at county location whenever possible. If an external vendor location is used the county should implement checks and balances to ensure that election data including ballot definition files and audit logs stored on devices outside of the county is protected from unauthorized access.

VI. Conclusion

As a result of the examination, and after consultation with the Department's staff and the Examiner, the Secretary of the Commonwealth concludes that the OVS 1.3.0.2A can be safely used by voters at elections as provided in the Pennsylvania Election Code and meet all of the requirements set forth in the Code, **provided the voting system is implemented with the conditions listed in Section IV of this report.** Accordingly, the Secretary certifies OVS 1.3.0.2A for use in this Commonwealth.

The OVI-VC ballot marking device can accommodate 78 voters with disabilities during an election day or 150 voters when used as the primary voting system. OVO, precinct tabulator allows a maximum of 5,000 ballots cast per session after which the units will need to have another TM will need to be inserted to continue the tabulation process. The recommended batch size for the OVCS, central optical scan device is 100 ballots.

Attachment A – EAC Certification Scope



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The EAC certification document attached above can also be accessed at
[“https://www.eac.gov/voting-equipment/openelect-1302a/”](https://www.eac.gov/voting-equipment/openelect-1302a/)



United States Election Assistance Commission



Certificate of Conformance

Unisyn OpenElect 1.3.0.2.A (Modification)

The voting system identified on this certificate has been evaluated at an accredited voting system testing laboratory for conformance to the 2005 *Voluntary Voting System Guidelines (2005 VVSG)*. Components evaluated for this certification are detailed in the attached Scope of Certification document. This certificate applies only to the specific version and release of the product in its evaluated configuration. The evaluation has been verified by the EAC in accordance with the provisions of the *EAC Voting System Testing and Certification Program Manual* and the conclusions of the testing laboratory in the test report are consistent with the evidence adduced. This certificate is not an endorsement of the product by any agency of the U.S. Government and no warranty of the product is either expressed or implied.

Product Name: OpenElect

Model or Version: Version 1.3.0.2.A (Modification)

Name of VSTL: SLI Compliance

EAC Certification Number: 04211950-1.3.0.2.A

Date Issued: 03/15/2018

A handwritten signature in black ink, appearing to read "BDL".

Executive Director

Scope of Certification Attached

Manufacturer: *Unisyn Voting Solutions, Inc.*
System Name: *OpenElect Voting System 1.3.0.2.A*
Certificate: *04211950-1.3.0.2.A*

Laboratory: *SLI Compliance*
Standard: *VVSG 1.0 (2005)*
Date: *03/15/2018*



Scope of Certification

This document describes the scope of the validation and certification of the system defined above. Any use, configuration changes, revision changes, additions or subtractions from the described system are not included in this evaluation.

Significance of EAC Certification

An EAC certification is an official recognition that a voting system (in a specific configuration or configurations) has been tested to and has met an identified set of Federal voting system standards. An EAC certification is **not**:

- An endorsement of a Manufacturer, voting system, or any of the system's components.
- A Federal warranty of the voting system or any of its components.
- A determination that a voting system, when fielded, will be operated in a manner that meets all HAVA requirements.
- A substitute for State or local certification and testing.
- A determination that the system is ready for use in an election.
- A determination that any particular component of a certified system is itself certified for use outside the certified configuration.

Representation of EAC Certification

Manufacturers may not represent or imply that a voting system is certified unless it has received a Certificate of Conformance for that system. Statements regarding EAC certification in brochures, on Web sites, on displays, and in advertising/sales literature must be made solely in reference to specific systems. Any action by a Manufacturer to suggest EAC endorsement of its product or organization is strictly prohibited and may result in a Manufacturer's suspension or other action pursuant to Federal civil and criminal law.

System Overview:

The Unisyn OpenElect Voting System 1.3.0.2.A, herein referred to as OVS 1.3.0.2.A, is a modification to the certified OVS 1.3.0.2. The OVS 1.3.0.2.A Voting System is a paper-ballot based optical scan voting system consisting of four major components:

1. OpenElect Central Suite (OCS)
2. OpenElect Voting Optical (OVO)
3. OpenElect Voting Interface (OVI-VC)
4. OpenElect Voting Central Scan (OVCS)

The Unisyn OVS 1.3.0.2.A voting system Technical Data Package (TDP) was the source for much of the information in this document.

OpenElect Central Suite (OCS)

The OCS consists of the eight components running as either a front-end/client application or as a back-end/server application: Ballot Layout Manager (BLM), Election Manager (EM), Election Server (ES), Tabulator Client (TC), Tabulator, Adjudicator, Tabulator Reports (TR) and Software Server (SS).

OpenElect Voting Optical (OVO)

The OVO device is a precinct-level optical scan ballot counter (tabulator) designed to perform the following major functions: ballot scanning, tabulation, and second chance voting.

The OVO is a full-page, dual-sided optical scan ballot system which scans and validates voter ballots and provides a summary of all ballots cast. The election is loaded from the OVS Election Server over a secure local network or via a USB thumb drive. On Election Day, an OVO at each polling location scans and validates voters' ballots, and provides precinct tabulation and reporting. The OVO unit is also paired with the OVI-VC for early voting to scan and tabulate early voting ballots. OVO units can also be used at election headquarters to read absentee, provisional, or recount ballots in smaller jurisdictions.

OpenElect Voting Interface (OVI-VC)

The OVI-VC supports both ADA and Early Voting requirements. The OVI-VC enables voters during early voting to cast regional ballots and voters with special needs to prepare their ballots independently and privately on Election Day. The OVI-VC unit features a 15-inch full-color touch-screen display. The OVI-VC will present each contest on the correct ballot to the voter in visual and (optionally) audio formats. The voter with limited vision navigates through the ballot using the audio ballot and the ADA keypad or touchscreen input to make their selections. The voter validates his or her selections by listening to the audio summary, printing the ballot, and inserting it into the OVO.

The OVI-VC facilitates special needs voters through a variety of methods including wheelchair access, sip & puff, zoom-in ballot function, and audio assistance for the visually impaired. The OVI-VC provides for write-in candidates when authorized by the jurisdiction. Voters input candidates' names via the ADA keypad, touchscreen or sip & puff device. Each OVI-VC can support multiple languages for both visual and audio ballots, allowing the voter to choose their preferred language.

OpenElect Voting Central Scanner (OVCS)

The OVCS resides at election headquarters designated to read absentee, provisional, or recount ballots in large jurisdictions, or read the entire election's ballots at a central count location in smaller jurisdictions. The OVCS also captures write-in data images and produces a write-in image report for manual processing upon request. The OVCS system consists of the following components: OVCS Workstation and Canon DR-X10C Scanner.

Certified System before Modification:

Unisyn Voting Solutions OpenElect 1.0

Certificate ID: UNS10121966-OE

Unisyn Voting Solutions OpenElect 1.0.1

Certificate ID: UNS10121966-OE-WI

Unisyn Voting Solutions OpenElect 1.1

Certificate ID: UNS10121966-OE-1.1

Unisyn Voting Solutions OpenElect 1.2

Certificate ID: UNS10121966-OE-1.2

Unisyn Voting Solutions OpenElect 1.3

Certificate ID: UNS04211950-1.3

Unisyn Voting Solutions OpenElect 1.3.0.2

Certificate ID: UNS04211950-1.3.0.2

Anomalies and/or Additions addressed in OpenElect 1.3.0.2.A:

The OVS 1.3.0.2.A is a modification of the OVS 1.3.0.2 system. The only change made to the functionality of the voting system was the update concerning the Pennsylvania Straight Party Method of voting. There were no changes made to the system limits, the software system functions, or the supported languages of the voting system. These remain unchanged from the previously certified version.

Mark Definition:

The Unisyn Open Elect system will consistently recognize a 1mm wide line across the full length of the target area. Marks must be made with a marking device with sufficiently low reflectance in the visible red band and is of sufficient density/color such that the scanner registers it as black. Most blue, black and green ballpoint pens and markers also meet necessary reflectance requirements and may be used.

Tested Marking Devices:

- BIC Grip Roller
- EF Felt Tip Pen

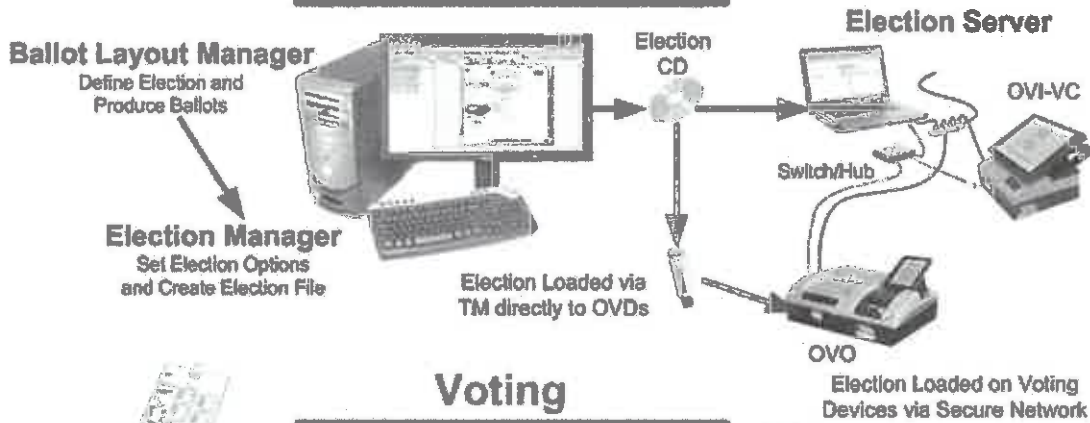
Language capability:

System supports Armenian, Cambodian, Chinese (Cantonese and Mandarin dialects), English, Japanese, Korean, Russian, Spanish, Tagalog, and Vietnamese.

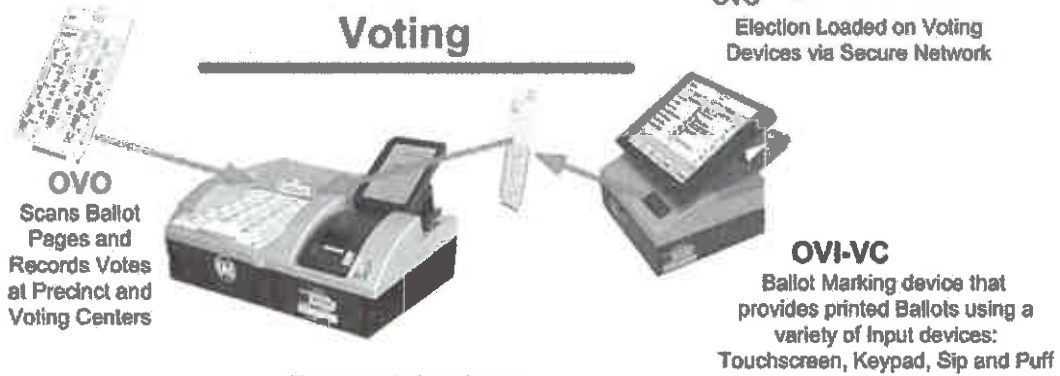
Components Included:

This section provides information describing the components and revision level of the primary components included in this Certification.

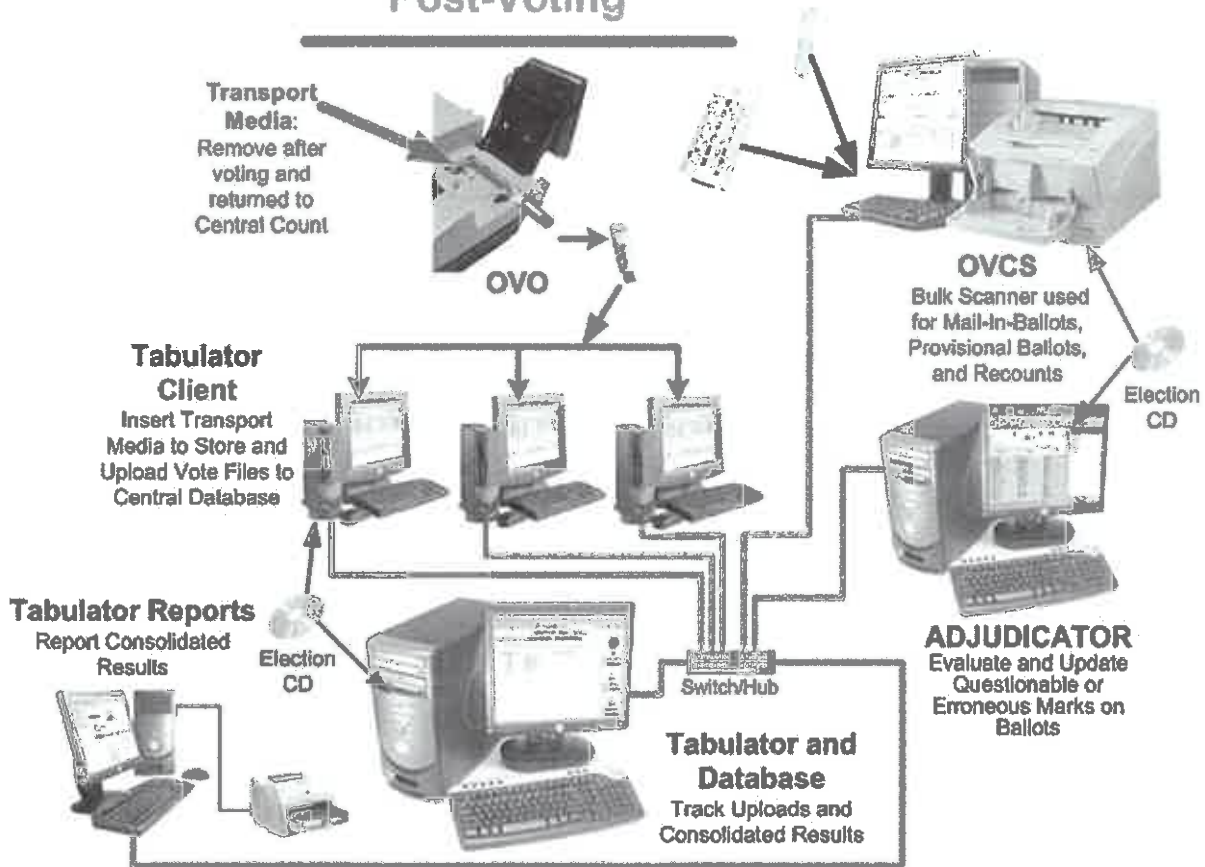
Pre-Voting



Voting



Post-Voting



System Component	Software or Firmware Version	Hardware Version	Operating System or COTS	Comments
OVO	1.3.0	Rev A, E	Linux CentOS 5.0, 6.3	
OVI-VC	1.3.0.2.A	Rev A, B	Linux CentOS 5.0, 6.3	
OVCS	1.3.0	ImageFORMULA DR-X10C	Linux CentOS 5.7, 6.5	
Adjudicator	1.3.0			
Ballot Layout Manager	1.3.0			
Common (Library)	1.3.0.2			
Election Manager	1.3.0.2			
Election Server	1.3.0			
OCS Installer	1.3.0.2			
Regkey Builder	1.3.0.2			
Software Server	1.3.0			
Tabulator	1.3.0			
Tabulator Client	1.3.0			
Tabulator Reports	1.3.0			
OVCS Application	1.3.0			
OVI-VC Firmware	1.3.0.2.A			
OVO Firmware	1.3.0			
Scripter	1.3.0.2.A			
Validator	1.3.0.2.A			
Logger (Library)	1.3.0.2			
COTS Components				
CentOS Linux	5.0, 5.7, 6.3, 6.5			
Java JRE + Unlimited Cryptographic Extension	1.6.0_02			
Apache Tomcat Application Server	6.0.13			
MySQL Database	5.0.45-7, 5.1.71-1			
JasperReports	2.0.5			
Desktop for non-redundant solutions		Dell OptiPlex		
Desktop for redundant		Dell Precision		

System Component	Software or Firmware Version	Hardware Version	Operating System or COTS	Comments
solutions				
Canon Scanner		Canon DR-X10C		
Transport Media		STEC- Industrial Grade		
Laptop		Dell Latitude	COTS	

System Limitations

This table depicts the limits the system has been tested and certified to meet.

Characteristic	Limiting Component	Limit	Comment
Maximum Elections	BLM	8	
Maximum Precincts	BLM	2000	
Maximum Splits per Precinct	BLM	9	
Maximum Districts	BLM	400	
Maximum Contests per District	BLM	20	
Maximum Parties	BLM	24	
Maximum Parties in primary	BLM	12	
Maximum Parties w/ Straight Ticket	BLM	12	
Maximum District types	BLM	25	
Maximum Languages	BLM	15	
Maximum Ballot styles per Election	BLM	400	
Maximum Contests per Election	BLM	150	
Maximum Measures per Election	BLM	30	
Maximum Instruction Blocks per Election	BLM	5	
Maximum Headers per Election	BLM	50	
Maximum Candidates per Contest	BLM	120	
Maximum Ballot Pages	BLM	3	
Maximum Votes for N of M	BLM	25	
Maximum Ballot sheets per OVO	BLM	5000	
Maximum Units simultaneously loading	BLM	20	
Maximum Precincts initialized per OVO on Election Day	BLM	30	
Maximum Precincts initialized per OVI-VC on Election Day	BLM	2000	
Maximum Precincts initialized per OVO/OVI-VC in early voting	BLM	2000	
Maximum 11" Ballot positions	BLM	38 x 3	Limit
Maximum 14" Ballot positions	BLM	50 x 3	Limit
Maximum 17" Ballot positions	BLM	62 x 3	Limit
Maximum 19" Ballot positions	BLM	70 x 3	Limit

Functionality

2005 VVSG Supported Functionality Declaration

Feature/Characteristic	Yes/No	Comment
Voter Verified Paper Audit Trails		
VVPAT	No	Not applicable
Accessibility		
Forward Approach	No	
Parallel (Side) Approach	No	
Closed Primary		
Primary: Closed	Yes	
Open Primary		
Primary: Open Standard (provide definition of how supported)	Yes	A registered voter may vote in any party primary regardless of his own party affiliation
Primary: Open Blanket (provide definition of how supported)	No	
Partisan & Non-Partisan:		
Partisan & Non-Partisan: Vote for 1 of N race	Yes	
Partisan & Non-Partisan: Multi-member ("vote for N of M") board races	Yes	
Partisan & Non-Partisan: "vote for 1" race with a single candidate and write-in voting	Yes	
Partisan & Non-Partisan "vote for 1" race with no declared candidates and write-in voting	Yes	
Write-In Voting:		
Write-in Voting: System default is a voting position identified for write-ins.	Yes	
Write-in Voting: Without selecting a write in position.	No	
Write-in: With No Declared Candidates	Yes	
Write-in: Identification of write-ins for resolution at central count	Yes	
Primary Presidential Delegation Nominations & Slates:		
Primary Presidential Delegation Nominations: Displayed delegate slates for each presidential party	Yes	
Slate & Group Voting: one selection votes the slate.	No	
Ballot Rotation:		
Rotation of Names within an Office; define all supported rotation methods for location on the ballot and vote tabulation/reporting	Yes	Top to Bottom By Precinct grouping
Straight Party Voting:		
Straight Party: A single selection for partisan races in a general election	Yes	

Feature/Characteristic	Yes/No	Comment
Straight Party: Vote for each candidate individually	Yes	
Straight Party: Modify straight party selections with crossover votes	Yes	
Straight Party: A race without a candidate for one party	Yes	
Straight Party: "N of M race (where "N">1)	Yes	
Straight Party: Excludes a partisan contest from the straight party selection	Yes	
Cross-Party Endorsement:		
Cross party endorsements, multiple parties endorse one candidate.	No	
Split Precincts:		
Split Precincts: Multiple ballot styles	Yes	
Split Precincts: P & M system support splits with correct contests and ballot identification of each split	Yes	
Split Precincts: DRE matches voter to all applicable races.	No	
Split Precincts: Reporting of voter counts (# of voters) to the precinct split level; Reporting of vote totals is to the precinct level	Yes	
Vote N of M:		
Vote for N of M: Counts each selected candidate, if the maximum is not exceeded.	Yes	
Vote for N of M: Invalidates all candidates in an overvote (paper)	Yes	
Recall Issues, with options:		
Recall Issues with Options: Simple Yes/No with separate race/election. (Vote Yes or No Question)	Yes	
Recall Issues with Options: Retain is the first option, Replacement candidate for the second or more options (Vote 1 of M)	Yes	
Recall Issues with Options: Two contests with access to a second contest conditional upon a specific vote in contest one. (Must vote Yes to vote in 2 nd contest.)	No	
Recall Issues with Options: Two contests with access to a second contest conditional upon any vote in contest one. (Must vote Yes to vote in 2 nd contest.)	No	
Cumulative Voting		
Cumulative Voting: Voters are permitted to cast, as many votes as there are seats to be filled for one or more candidates. Voters are not limited to giving only one vote to a candidate. Instead, they can put multiple votes on one or more candidate.	No	
Ranked Order Voting		
Ranked Order Voting: Voters can write in a ranked vote.	Yes	
Ranked Order Voting: A ballot stops being counting when all ranked choices have been eliminated	Yes	
Ranked Order Voting: A ballot with a skipped rank counts the vote for the next rank.	Yes	

Feature/Characteristic	Yes/No	Comment
Ranked Order Voting: Voters rank candidates in a contest in order of choice. A candidate receiving a majority of the first-choice votes wins. If no candidate receives a majority of first choice votes, the last place candidate is deleted, each ballot cast for the deleted candidate counts for the second-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	Yes	
Ranked Order Voting: A ballot with two choices ranked the same, stops being counted at the point of two similarly ranked choices.	Yes	
Ranked Order Voting: The total number of votes for two or more candidates with the least votes is less than the votes of the candidate with the next highest number of votes, the candidates with the least votes are eliminated simultaneously and their votes transferred to the next-ranked continuing candidate.	Yes	
Provisional or Challenged Ballots		
Provisional/Challenged Ballots: A voted provisional ballots is identified but not included in the tabulation, but can be added in the central count.	Yes	
Provisional/Challenged Ballots: A voted provisional ballots is included in the tabulation, but is identified and can be subtracted in the central count	No	
Provisional/Challenged Ballots: Provisional ballots maintain the secrecy of the ballot.	Yes	
Overvotes (must support for specific type of voting system)		
Overvotes: P & M: Overvote invalidates the vote. Define how overvotes are counted.	Yes	Supported. Overvotes are tabulated for each office as an Over / Under Vote report in Vote Tabulation
Overvotes: DRE: Prevented from or requires correction of overvoting.	No	
Overvotes: If a system does not prevent overvotes, it must count them. Define how overvotes are counted.	No	
Overvotes: DRE systems that provide a method to data enter absentee votes must account for overvotes.	No	
Undervotes		
Undervotes: System counts undervotes cast for accounting purposes	Yes	Supported. Undervotes are tabulated for each office as an Over / Under Vote report in Vote Tabulation

Feature/Characteristic	Yes/No	Comment
Blank Ballots		
Totally Blank Ballots: Any blank ballot alert is tested.	Yes	
Totally Blank Ballots: If blank ballots are not immediately processed, there must be a provision to recognize and accept them	Yes	
Totally Blank Ballots: If operators can access a blank ballot, there must be a provision for resolution.	Yes	
Display/Printing Multi-Lingual Ballots		
Spanish	Yes	
Armenian	Yes	
Alaska Native (Other Group specified)	No	
Aleut	No	
Athabascan	No	
Eskimo	No	
Native (Other Group Specified)	No	
Cambodian	Yes	
Chinese (Cantonese and Mandarin)	Yes	
Filipino (Tagalog)	Yes	
Japanese	Yes	
Korean	Yes	
Russian	Yes	
Vietnamese	Yes	
Apache	No	
Cent/So American	No	
Cheyenne	No	
Chickasaw	No	
Choctaw	No	
Navajo	No	
Other Tribe-Specified	No	
Paiute	No	
Pueblo	No	
Seminole	No	
Shoshone	No	
Sioux	No	
Tohono O'Odham	No	
Tribe not specified	No	
Ute	No	
Yaqui	No	
Yuman	No	
Demonstrates the voting system capability to handle the designated language groups		
Default language (English)	Yes	

Feature/Characteristic	Yes/No	Comment
Secondary language using a Western European font	Yes	
Ideographic language (such as Chinese or Korean),	Yes	
Non-written languages requiring audio support	Yes	

