

FINAL STAFF RECOMMENDATION

VOTING EQUIPMENT AND TABULATION SYSTEM – SUMMER 2022



The Cuyahoga County Board of Elections plans to fully implement the new voting equipment and tabulation system prior to the May 2, 2023 Primary Election.

SUBMITTED BY THE CUYAHOGA BOARD OF ELECTIONS

Chairperson, Jeff Hastings

Member, Inajo Davis Chappell

Member, Lisa M. Stickan

Member, Terence M. McCafferty

Director, Anthony W. Perlatti

Deputy Director, Anthony N. Kaloger

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I. Executive Summary

The Cuyahoga County Board of Elections (CCBOE) began researching options for a new paper-based voting equipment and tabulation system in December of 2017. In total five (5) vendors were approved by the Ohio Secretary of State (SOS). Out of those five, three (3) vendors – Clear Ballot Group, Election Systems & Software (ES&S) and Hart InterCivic – took the step to complete an initial informational survey, thus entering the selection process.

Over the course of the next four years, the CCBOE undertook a thorough evaluation of all three vendors. The goal was to obtain a voting system with the best in election software and security, an improved election management system (EMS), the introduction of ballot-on-demand printing in the Early In-Person (EIP) voting process, and enhance the voting experience, including for voters with disabilities.

This was the ideal time to research a new voting equipment and tabulation system. First, while our existing voting system is still secure and effective, it is nearing the end of its life cycle. Second, with the passage of [Ohio Senate Bill 135](#) in 2018, Cuyahoga County was allotted \$10.4 million dollars towards the purchase of a new voting system (with funds available until June 30, 2023). This significantly reduces the financial cost to the county, as approximately 90% of the final purchase price will be covered by state funds.

The selection process included onsite visits from each vendor, including two demonstrations for the public and another for the ADA community, a virtual security summit, multiple written responses to questions, and additional feedback gleaned from other counties who are already using the new voting equipment and tabulation systems being considered. After taking into consideration all this information, the CCBOE recommends **Clear Ballot** as the voting equipment and tabulation system vendor to serve the voters of Cuyahoga County starting in 2023.

While all three vendors presented very strong products that would improve upon our existing voting system, Clear Ballot stood out in several significant ways. First, their products were overwhelmingly favored by the Voting Equipment and Tabulation System Committee and the CCBOE staff. Surveys conducted during the public demonstrations also showed that voters preferred the Clear Ballot product (see [Appendix J](#) for survey results).

Additionally, the election management system (EMS) and ballot adjudication software stood out among the other vendors, positioning it well for the technological advances that are already upon us in election administration. Finally, the Clear Ballot voting equipment is very intuitive to set up and use, which is important to the success of our poll workers on Election Day.

The CCBOE plans to fully implement the new voting equipment and tabulation system prior to the May 2, 2023 Primary Election. This implementation horizon provides the agency with needed time to plan for the new product to ensure a smooth transition.

II. Voting Equipment and Tabulation System Committee

From the commencement of the acquisition process in late 2017 to the present, a committee of staff and board members have worked on various aspects of this project.

Subcommittee

- Inajo Davis Chappell, Board Member
- Lisa M. Stickan, Board Member
- Tony Perlatti, Director
- Tony Kaloger, Deputy Director
- Peter James, Election and Compliance Administrator
- Robin Roy, Chief Information Officer
- Brian Cleary, Ballot Department Manager
- Jessica King, Ballot Department Assistant Manager
- Steven Machoukas, Ballot Department Assistant Manager
- Victor Rush, Election Support Manager
- Rebecca Brake, Election Officials Department Manager
- Michael Cannavino, Electronic Pollbook Coordinator

Larger Committee

- Mary Hannah Boyer, Information Systems Database Analyst
- Willie Brown, Election Support Department Supervisor
- Matthew Fratiani, Ballot Department Supervisor
- Richard Kline, Ballot Department Supervisor
- Joshua Fossie, Ballot Department Supervisor
- Cory Milne, Candidate and Petitions Services Department Supervisor

III. Introduction

The CCBOE currently employs a voting equipment and tabulation system (ES&S) that uses a combination of electronic and paper technology. Ballots are marked by voters and then digitally scanned to tabulate the votes. The use of physical paper ballots means our elections are easily auditable, which provides an additional measure of security that is visible, reliable, and preferred by Cuyahoga County voters.

Every 10-15 years, the physical voting equipment needs to be replaced to keep up to date with technological advancements. The CCBOE's current voting equipment and tabulation system, purchased in 2009, is nearing the end of its recommended life cycle and is due to be replaced. As a result, in 2017 the CCBOE began the years-long process to procure a new voting system.

For the past 13 years, the CCBOE has carefully maintained its voting equipment, and software upgrades have been kept current to provide a secure and efficient voting experience from start to finish. The current voting system utilizes optical scanners (DS200), high-speed digital scanners (DS850), a ballot-marking device (the AutoMARK) and an EMS (Electionware), all purchased from ES&S.

- **Optical Scanners** are used at polling locations on Election Day and in our EIP voting center to scan paper ballots. The CCBOE currently owns 1,200 DS200 optical scanners.
- **ADA ballot-marking devices** are used at polling locations and our Early In-Person voting center to assist voters who are unable to mark a paper ballot without assistance. The CCBOE currently owns 500 AutoMARK ballot-marking units.
- **High-speed Digital Scanners** are used for the central scanning of Vote-by-Mail and provisional ballots. The CCBOE currently owns seven (7) DS850 scanners.
- **An Election Management System (EMS)** is used to create secure election databases, create, and tabulate ballots, program voting equipment, and generate election reports.

Voting Equipment and Tabulation System Acquisition Funding

In 2018, the Ohio legislature passed [Ohio Senate Bill 135](#), which allocates funding to all 88 Ohio counties for the purchase of new voting systems. Counties received a base allocation determined by the SOS, and an additional allocation based upon the number of registered voters in the county as of July 1, 2017. Following this [funding formula](#), Cuyahoga County was allocated **\$10,425,888.60**. The Department of Administrative Services solicited pricing from potential vendors and released bid requirements based on input from the SOS and the Voting Machine Acquisition Advisory Committee, a bipartisan committee of state and local officials created to advise and assist the SOS during this process.

This legislation represents an important opportunity for the CCBOE to consider different voting systems currently certified by the state of Ohio and determine which option is best suited for its county given the unique obstacles it faces, which include its significant size and diverse voting population. By offsetting a cost that would ordinarily be borne by the county budget alone, the funding provided by the Ohio legislature will enable the CCBOE to replace its outdated voting equipment, upgrade its EMS, and improve the overall voter experience.

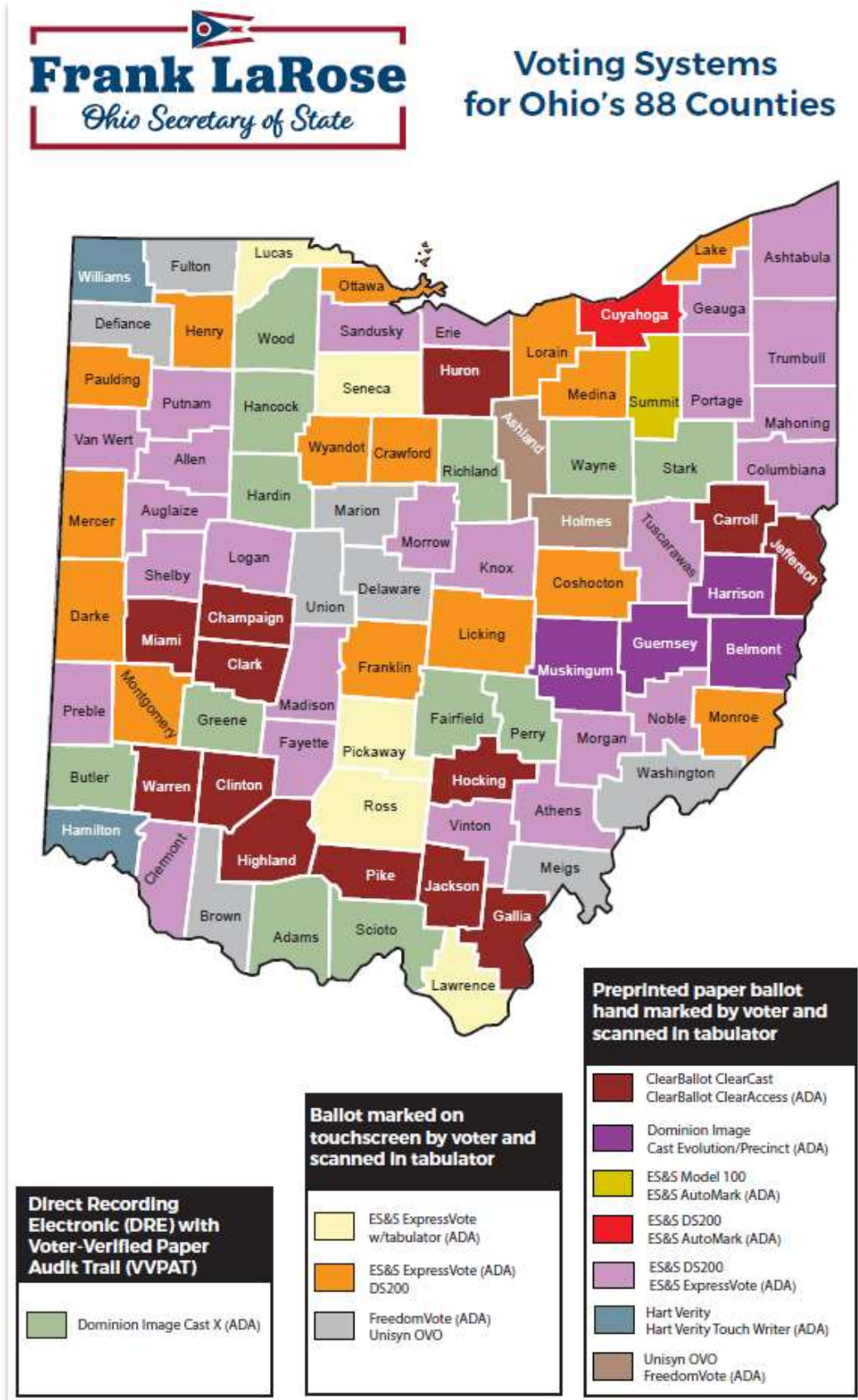
Available Certified Voting Systems

To be available for use in Ohio, a voting system must be certified by the [U.S. Election Assistance Commission \(EAC\)](#). This is the federal agency charged with assisting states and counties in conducting secure and reliable elections, and by the State of Ohio in accordance with [R.C. 3506.05](#) of the Ohio Revised Code and the certification standards adopted by the [Ohio Board of Voting Machine Examiners \(BVME\)](#).

Currently there are five (5) companies that offer voting equipment and tabulation systems certified for use in the state of Ohio:

- [Clear Ballot Group](#)
- [Dominion Voting](#)
- [Election Systems & Software \(ES&S\)](#)
- [Hart InterCivic](#)
- [Unisyn Voting Solutions](#)

The voting systems in Ohio's 88 counties as of June 2022:



To pass Ohio certification, each voting system undergoes rigorous testing by federally-certified test laboratories following steps outlined in [Section 111:3-9](#) of the Ohio Administrative Code. The [extensive testing criteria](#) the Ohio Board of Voting Machine Examiners (BVME) uses to inspect voting systems includes:

- System overview
- Hardware configurations and opening procedures
- EMS – system setup and configuration – General & Primary elections
- Construction and security of voting machine – hardware construction, hardware test results, and security measures
- Voting and tabulation functional testing
- Warranty/Bond/Service
- Miscellaneous/General Properties

All certified voting equipment falls into one of three (3) categories:

1. Direct Recording Electronic (DRE) with Voter-Verified Paper Audit Trail (VVPAT);
2. Ballot marked on touchscreen by voter and scanned into a tabulator; and
3. Preprinted paper ballot hand marked by voter and scanned in tabulator.

The CCBOE's current voting equipment – the DS200 and AutoMARK – use paper ballots marked by the voter and scanned into the tabulator.

IV. Selection Parameters

The CCBOE strives to be a national leader in election administration, and is eager to take advantage of this opportunity to provide voters of the county with the most up to date, efficient, and secure voting system currently certified in Ohio. The goal is to obtain a voting system with the best in election software and security, an improved election management system (EMS), the introduction of ballot-on-demand printing in the Early In-Person (EIP) voting process, and enhance the voting experience, including for voters with disabilities.

Before undertaking the implementation of a new voting system, the CCBOE had to determine which vendor can best meet the needs of its county, as identified below:

1. Functionality
2. Voter Interface
 - a. Simple, easy to follow instructions
 - b. Aesthetically pleasing
3. Hardware Components
 - a. Physical setup
 - b. Ancillary items
4. Software
5. Pre/Post-Election Process
 - a. Election import/creation
 - b. DIMS (voter registration system) upload/download
 - c. Audit logs
6. Ease of Poll Worker/Physical Set-up
7. Election Official/Staff Training and Related Materials
 - a. Materials available, clarity/effectiveness of instruction
8. Customer Service/Company Profile/Current Customer Experiences
9. Security
10. Cost Analysis
 - a. Initial investment
 - b. Maintenance costs

V. Selection Process

Outline of the Acquisition Process

December 2017: Vendor Demonstration Day for Northeast Ohio Counties

The CCBOE hosted an Equipment Vendor Demonstration on December 6, 2017. The boards of elections of multiple counties located throughout northeast Ohio were invited to participate. Each of the five participating vendors were allotted one hour to provide a brief presentation followed by a Q&A session. This was the first step in what became a five-year selection process. (see [Appendix B](#) for a more detailed summary)

October 2018: Initial Vendor Survey

Following the Vendor Demonstration Day in December 2017, we asked each vendor to complete an initial informational survey to aid in our review process. We received responses from three vendors: Clear Ballot Group, Elections Systems & Software, and Hart InterCivic. (see [Appendix C](#) for survey responses)

January 2019: Individual Vendor Demonstrations for Cuyahoga County



Hart InterCivic



ES&S



Clear Ballot

The three voting system vendors who completed the initial vendor survey in October 2018 were invited to the CCBOE in January 2019 to demonstrate the functionality of their products. Demonstrations took place over three days. Each vendor had one full day to present their tabulation system, both the hardware and software.

The morning portion of the vendor's demonstration was open to the public. This session covered an overview of the company, a security presentation, and a physical demonstration of their optical ballot scanner and ADA ballot-marking unit. The afternoon portion focused on the software and election setup of the tabulation systems. This session was closed to the public so

staff could evaluate the systems and ask detailed and system-specific questions that pertain to the CCBOE. (see [Appendix D](#) for a more detailed summary and survey responses)

All three vendor public presentations were recorded and can be viewed on the CCBOE YouTube channel:

- [Clear Ballot](#)
- [ES&S](#)
- [Hart InterCivic](#)

April 2019: Additional Survey Responses From Each Vendor

After the individual vendor demonstrations, CCBOE staff had additional questions for the three vendors that participated. An "Additional Information Survey" was sent to each vendor; the survey consisted of 25 general questions and an additional set of vendor-specific questions to collect more detailed information about each system. (see [Appendix E](#) for survey results)

June 2019: Individual Election Set-Up Vendor Demonstrations

The three tabulation system vendors were invited back to the CCBOE in June 2019 for a demonstration on election coding, election setup and breakdown, and the unique features of each vendor's optical scanner, ADA ballot-marking device, and central count equipment. The CCBOE provided the parameters and all necessary data to create a mock gubernatorial primary election and the vendors were asked to work with our Information Systems (IS) Department to translate the data into the formats used by their EMS.

The mock election included a variety of challenging election scenarios that may occur over the lifetime of the voting equipment and tabulation system, including multiple-candidate contests, multiple vote-for choices in a single contest, write-in options, lengthy ballot issues, and instances of contests with no valid candidates. Each of the three vendor simulations included system competency testing for a variety of tasks like coding all necessary ballot styles; performing basic logic and accuracy testing (L&A) of equipment; performing early voting and Vote-by-Mail scanning; and simulating Election Night through uploading media, adjudicating remake and write-in votes, generating reports, and creating web uploads of results.

Each vendor had approximately four days to present their voting system to BOE staff who were able to operate and practice using both the voting equipment and the tabulation system. Many operational questions and issues were addressed by these hands-on demonstrations. (see [Appendix F](#) for a more detailed summary and survey responses)

October 2019: Onsite Visits to Other Counties

To gather more information about the two vendors the CCBOE does not currently use – Clear Ballot Group and Hart InterCivic – several committee members visited two other Ohio counties who had already implemented the new voting equipment of the two vendors. CCBOE staff visited Warren County (Clear Ballot Group) on October 17, 2019, then traveled to Hamilton County (Hart InterCivic) the following day.

This was a successful trip, as getting the perspective of other Ohio counties who are currently using the voting equipment and tabulation system of vendors the CCBOE is considering but has never done business with previously was invaluable. It was also beneficial that the Directors of Warren County (Brian Sleeth) and Hamilton County (Sherry Poland) are two of the most respected election officials in the state and the current President and Vice President, respectively, of the Ohio Association of Election Officials (OAEO). (see [Appendix G](#) for more details on these site visits)

January 2020: ADA and In-Person Voting Equipment Demonstration

The CCBOE hosted an ADA and In-Person Voting Equipment Demonstration on January 10, 2020 to exhibit and evaluate the user interface of the physical voting equipment available from each of the three vendors. Interested stakeholders, including community partners, advocacy groups and persons with disabilities, had the opportunity to interact with the physical voting equipment in person, ask equipment vendors and CCBOE staff questions, and provide feedback to the County.



The event was set up as an open house and guests were able to vote sample ballots in a mock election that simulated the Early In-Person voting process. In particular, the event focused on the functionality of the ADA ballot-marking devices. Approximately 70 people attended the open house, representing more than 20 different organizations, including persons with disabilities advocacy groups, voter advocacy groups, and the Board's community partners. Also, in attendance were employees from the CCBOE and representatives from the SOS.

At the conclusion of the event, attendees were invited to complete a brief survey for each vendor that asked participants to rate their experience using the ADA ballot-marking and ballot-scanning devices. The CCBOE received insightful feedback from the ADA community regarding

the ballot marking devices and voter advocacy groups had an opportunity to interact with representatives from the equipment vendors and CCBOE staff. Several people in attendance commented that they found the event educational and were glad to have been invited into the acquisition process. Additionally, it gave the CCBOE another opportunity to interact with the vendors, ask questions, and contemplate how the voting equipment and tabulation system will suit the election needs of Cuyahoga County. (see [Appendix H](#) for a more detailed summary along with survey responses)

February 2021: Virtual Security Summit

The CCBOE hosted a virtual (Zoom) Security Summit on Feb. 5, 2021 to review and evaluate the security of each vendor's voting equipment and tabulation system. Each vendor presented materials related to the hardware and software security of their certified voting systems available for purchase.

The virtual event consisted of two separate sessions:

1. Voter advocacy groups, the media, and interested stakeholders were invited to the morning session, which consisted of three 20-minute presentations made by each vendor. Audience participants were invited to ask questions and provide feedback to the CCBOE by sending an email to electioninfo@cuyahogacounty.gov. A video recording of this session is available for public viewing on our [YouTube page](#).
2. The afternoon session was a private presentation for board personnel, county IT professionals, and elected officials and included a live Q&A with each vendor to explore additional confidential proprietary security topics in more detail.

Vendors discussed a variety of security measures they deploy to protect their voting equipment and tabulation software from cyber and physical tampering. The physical security of the voting equipment is protected using physical locks, tamper-resistant seals, and routine equipment inspections. Vendors also discussed the physical security of their own corporate offices, the conducting of routine background checks on all employees, and their efforts to maintain the integrity of their manufacturing and transportation supply chains. Each vendor also confirmed their programming and systems development is done by full-time employees based in the United States.

Additionally, all vendors emphasized that neither their ballot scanners nor the EMS itself are ever connected to the internet, ensuring that no hackers can access our systems remotely. Instead, all data transfers are done using physical memory sticks, hardened computers, and unique encryption keys that prevent manipulation of program and election data. At the conclusion of

the event, the IT security professionals in attendance confirmed that there were no red flags and each vendor had satisfactorily answered all the technical security-related questions they had been asked. (see [Appendix I](#) for a more detailed summary of the event)

March 2021: Feedback from other Counties

The CCBOE conducted a series of Zoom conference calls with several counties that recently purchased new voting equipment from one of the three vendors under consideration. The objective of these calls was to evaluate the equipment performance and customer service provided by the three vendors to these counties during the 2020 General Election cycle specifically, and how the product performed under the pressure of a typical election cycle in general.

The inter-agency conversations covered a wide range of topics, including the county's initial decision-making process, the quality of training and support provided by the vendor during the delivery and initial testing of the new equipment, as well as the public and elected official response. After hearing from colleagues well versed in election administration, staff also gained valuable insight into the functionality of the voting equipment.

Ultimately, these calls afforded staff the opportunity to learn from the experiences of similarly situated counties and gave the selection committee greater confidence in the relative strengths and weaknesses of each vendor's product prior to making a final recommendation.

The CCBOE spoke to eight counties that currently use one of the three vendors under considering:

Clear Ballot Group

- Warren County, OH
- Clark County, OH
- Bucks County, PA

ES&S

- Franklin County, OH
- Lucas County, OH
- Lorain County, OH

Hart InterCivic

- Hamilton County, OH
- Oakland County, MI

May 2021: Voting Equipment and Tabulation System Election Demonstration

The CCBOE hosted a Voting Equipment and Tabulation System Election Demonstration event on May 27, 2021. The Election Demonstration focused on the experience of the general voter utilizing the certified voting equipment available from the three vendors being considered.

Event attendees included poll workers and poll worker trainers, voter advocacy groups, community stakeholders, board staff and the public. The event was separated into two sessions. In the morning, poll workers and trainers had the opportunity to test the voting equipment. Additionally, vendors demonstrated the set-up and tear-down process of the equipment for this group, since workers will be responsible for setting up and taking down the equipment at the polling locations and trainers would need to instruct them how to do so.



The second session was for voter advocacy groups, community stakeholders and the public. CCBOE board members and staff attended this session as well, as the final selection of voting equipment impacts the entire agency.

All attendees were able to cast a voted sample ballot on each of the three vendor's ballot scanner and ask questions of the vendor representatives. Attendees were asked to complete a survey evaluating the relative performance of each of the three vendor's voting equipment. The CCBOE received valuable responses from the attendees, giving a full perspective of both the voter's and the Election Day worker's experience with each vendor's equipment. The demonstration also served as an opportunity for the CCBOE staff to gain further insight on the technical capabilities of the equipment.

(See [Appendix J](#) for survey results, and the [CCBOE YouTube channel](#) for a video recap.)

VI. Company Profiles

Clear Ballot

"Clear Ballot was founded in 2009 with the mission to provide technology to empower our customers to improve democracy. Clear Ballot entered the elections industry as an audit provider and has expanded to Vote-by-Mail and in-person elections. We have attracted talent from technological firms across the country as well as individuals with key elections experience. Clear Ballot currently employs approximately 70 people.



Since our inception, we have been working with jurisdictions across the country to provide independent, automated audits. Following feedback and encouragement from our audit customers, Clear Ballot developed a paper-based voting system comprised of reliable off-the-shelf components to create an easy to use and maintain voting system.

Our audit technology is the foundation of our current tabulation software and remains the only solution to scan and analyze high-resolution ballot images, allowing elections officials to visualize voter intent. This aids officials in understanding how votes were tabulated and gives the opportunity to implement more efficient processes to improve their elections. Overall, our solutions give jurisdictions more confidence in their election results.

Clear Ballot expanded rapidly to the Northwest, where over 60% of Oregon and Washington now uses the ClearVote system. Clear Ballot has expanded its in-person voting system to include states such as Wisconsin, Pennsylvania, and Ohio. Clear Ballot is the first and only vendor to conduct an audit of 100% of ballots cast in a statewide election. This was first done in Maryland, where every state and federal election since the 2018 General Election has been fully audited. Clear Ballot has since added South Carolina which also now conducts a 100% statewide audit." -- *excerpt from initial survey response.*

ES&S

"ES&S is the largest elections-only company in the world and has been providing election equipment, software, and services for nearly four decades. Our corporate headquarters is located in Omaha, Nebraska. The company employs more than 450 election professionals located in eight operating locations across the United States.



Our team is composed of seasoned, highly skilled experts whose sole mission is to support our customers from start to finish. ES&S has supported more than 100,000 binding elections in the last decade alone and prides itself as having a single focus of ensuring our customers' elections are safe, secure, and successful." -- *excerpt from initial survey response.*

Hart InterCivic

"Hart is expertly qualified to provide the full scope of products and services required by this solicitation. Founded more than 100 years ago in 1912, Hart is now a nationally recognized leader in election innovation, serving around 800 jurisdictions, with exceptional customer relationships and superior service.



Hart is the voting system solution provider for two statewide systems, including Hawaii and Oklahoma. We also provide full-service voting solutions on a similar scale to two of the five largest counties in the United States (Harris County, Texas and Orange County, California).

Customer satisfaction is a hallmark of Hart's performance, with 94 percent of customers rating their experience as "excellent" or "above average." In our 2018 customer satisfaction survey, 92% of Hart customers rated our service as excellent or above average; and 92% said they would recommend us to an industry colleague.

Hart's team of over 100 employees include 46 technical team members directly involved in election management system development and implementation. These professionals include experienced project managers, training specialists, systems and software architects, software engineers, mechanical engineers, electrical engineers, quality assurance specialists, product managers, supply chain and manufacturing managers, customer support consultants, technicians, technical publication specialists and other experts." -- *excerpt from initial survey response.*

Company Comparison

	Clear Ballot	ES&S	Hart
Headquarters	Boston, MA	Omaha, NE	Austin, TX
Number of Full Time Employees	67	473	108
Number of Contracted Employees	3	478	25
Number of Full Time Developers on Staff	15	37	46
Number of Contracted Developers on Staff	0	23	10
Staff Members Based in Ohio	6	7	0
Election Jurisdictions (Customers)	105	1,833	750

Current Ohio Customer Base Before Cuyahoga Selection

	Clear Ballot	ES&S	Hart
Ohio Counties Using Voting Equipment	13	47	2
Precinct-Based Scanner Units in Service on Election Day (Ohio)	634	4,373	Over 800
High-Speed Scanners in Service on Election Day (Ohio)	17	72	5
ADA Units in Service on Election Day (Ohio)	425	11,414	Over 400

VII. Certification

What follows is a timeline showing when each vendor had a version of their voting system certified by both the Federal Election Assistance Commission (EAC) and the Ohio BVME:

Clear Ballot

- **v1.4** – Certified in 2018. Initial version certified.
- **v1.5** – Certified in January 2019. New design for precinct tabulator, addition of ballot box options, improvements to ballot programming, addition of Ohio specific reports.
- **v2.0** – Certified in August 2020. Revamped database structure to allow for continuous improvement in ballot processing times, commercial off-the-shelf hardware updates, enhanced security features.
- **v2.2 (current)** – Certified in December 2021. New precinct tabulator hardware and ballot box options, new ADA hardware and casing options, ballot scan time improvements, improvements to language options in ballot programming software, write-in vote processing tool and multi-card ballot tracking options.

ES&S

- **EVS 6.0.0.0** – EAC certified July 2018, Ohio certified August 2018. Introduced ElectionWare Reporting module as Election Reporting Manager (ERM) replacement, optimization enhancements, and customer feedback improvements on all product lines.
- **EVS 6.0.2.0** - EAC certified October 2018, Ohio certified January 2019. Provided Electionware optimization enhancements.
- **EVS 6.0.3.0** - EAC certified July 2020, Ohio certified August 2020. Provided Electionware optimization enhancements.
- **EVS 6.0.4.0** – EAC and Ohio certified May 2019. Provide Electionware optimization enhancements, enhance security by implementing BitLocker and Toolbox-Media Restore, and replacement of end-of-life components (printers, UPS, etc.).
- **EVS 6.0.6.0** – EAC certified December 2021, Ohio certified January 2022. Update EMS to Windows 10/Server 2016 operating system, certify the new DS950 High-Speed Tabulator for counties operating on the EVS 6.0.x.x releases, and provide Electionware optimization enhancements.
- **EVS 6.1.0.0** – EAC certified September 2019, Ohio certified October 2019. Update EMS to Windows 10/Server 2016 operating system, introduce Touchscreen Ballot which allows

users to lay out how content is viewed on the ExpressVote, optimization enhancements, and customer feedback improvements on all product lines.

- **EVS 6.1.1.0** – EAC certified July 2020, Ohio certified August 2020. Provide Electionware optimization enhancements.
- **EVS 6.2.0.0** – EAC certified December 2021, Ohio certified January 2022. Certify the new DS950 High-Speed Tabulator for counties operating on the 6.1.x.x releases, Risk Limiting Audit support, optimization enhancements, and customer feedback improvements on all product lines.

Hart InterCivic

- **Verity Voting 2.3** – EAC certified March 2019, Ohio certified June 2019. Features include new hybrid device, increased physical security, RLA support, new languages, increased system limits, new device features and improvements, and improved workflows.
- **Verity Voting 2.4** – EAC certified February 2020, Ohio certified June 2020. Features include software security enhancements, COTS updates, device and software improvements, interface improvements, and new write-in dashboard and efficiencies.
- **Verity Voting 2.6** – EAC certified April 2021, Ohio certified December 2021. Features include updates from Verity 2.5, two new devices, ballot building flexibility, new ballot box cart, overall software /firmware improvements, new OS, and support for up to 10 voting types.
- **Verity Voting 2.7** – EAC and Ohio certified June 2022. Features include COTs updates, new languages and importable language packs, alias functionality enhancements, concurrent write-in assignment, software dashboard improvements, increased long-form ballot text support, and configuration management.

VIII. Financial Analysis

State Funding

In 2018, the Ohio legislature passed [Ohio Senate Bill 135](#), which allocates funding to all 88 Ohio counties for the purchase of new voting equipment and tabulation systems. Counties will receive a base allocation determined by the SOS, and an additional allocation based upon the number of registered voters in the county. Following this funding formula, Cuyahoga County received \$10,425,888.60. The Department of Administrative Services solicited pricing from vendors and released bid requirements based on input from the SOS and the Voting Machine Acquisition Advisory Committee, a bipartisan committee of state and local officials created to advise and assist the SOS during this process.

Table A: State-Funded Items

Items listed in Table A below are eligible to be paid for by the state under the Voter System Acquisition Program. The \$10,425,888.60 allocated to the CCBOE can only be used to purchase items in Table A. If the cost of any item or service from Table A exceeds the amount of the CCBOE allocation, that cost must be paid for by local funds. It’s important to note that based upon the quantities of items the CCBOE selected to purchase, all three vendors final quotes came under the allocated fund for Table A.

Table B: Non-State Funded Items

As part of the Voter System Acquisition Program, vendors were required to provide *fixed* pricing for additional items and services for a set period (expiring on June 30, 2022). Items listed in Table B below are **not** eligible to be paid for by the state. The cost of any item or service selected from Table B must be paid for by county funds.

Note: The CCBOE will need to purchase additional ancillary items and services that are not listed under Tables A and B. Some of these purchase determinations are vendor specific and staff will move forward in obtaining pricing upon receiving board approval of a selected vendor. Examples of additional ancillary items are storage carts, canvas ballot bags, temporary staffing for acceptance testing, current equipment disposal, and power strips to name a few.

Table A

Item	Unit Cost
High-Speed Scanner (for Central Count of Absentee Ballots)	\$
Software for High-Speed Scanner	\$
Licensing and Support for Software for High-Speed Scanner – Years 1-5 and billed with hardware	\$
Workstation for High Speed Scanner (i.e., laptop/desktop, monitor, etc.)	\$
Memory Device or Drives for Use of High-Speed Scanner (itemized by storage capacity)– device must have 5 year (or greater) useful life and a specialized device for voting machines (e.g., not a common flash drive)	\$
Security Devices (e.g., keys, locks, etc.) for High-Speed Scanner – lock must have 5 year (or greater) useful life and a specialized device for voting machines (e.g., not a common lock)	\$
Precinct-Based Voting Equipment (i.e., Precinct-Count Optical Scanners, Marking Devices/Touchscreen Interfaces for Hybrid Units, Direct Recording Electronic Units [DREs])	\$
Software for Precinct-Based Equipment	\$
Licensing and Support for Software for Precinct-Based Equipment – Years 1-5 and billed with hardware	\$
Voter Privacy Screens	\$
Memory Device or Drives for Precinct-Based Voting Equipment (itemized by storage capacity) – device must have 5 year (or greater) useful life and a specialized device for voting machines (e.g., not a common flash drive)	\$
Security Devices (e.g., keys, locks, etc.) for Precinct-Based Voting Equipment – lock must have 5 year (or greater) useful life and a specialized device for voting machines (e.g., not a common lock)	\$
Starter Cartridge for Printer (If needed) for Precinct-Based Equipment for initial use	\$
Batteries, Chargers, Power Strips, Cords, Cables, Routers (Necessary for the Configuration and Operation of Precinct-Based Voting Equipment, High-Speed Scanner, ADA-Accessible Voting Equipment, or Workstations) – only the amount necessary for initial set-up and operation.	\$
Accessible Ballot Marking Device - ADA	\$
Stand for Accessible Ballot Marking Device – ADA – if necessary part of voting machine	\$
Printer - Accessible Ballot Marking Device - ADA	\$
Starter Cartridges for Accessible Ballot Marking Device Printer – ADA – for initial use	\$
Stand for Printer - Accessible Ballot Marking Device – ADA – if necessary part of voting machine	\$
Accessible Voting Booth - ADA – if necessary part of voting machine	\$
Accessibility Aids - ADA (e.g., jelly switches, headphones, microphone, keyboards, etc.) – if 5-year (or greater) useful life.	\$
Software for Accessible Ballot Marking Device - ADA	\$
Licensing and Support for Software for Accessible Ballot Marking Device – ADA – Years 1-5 and billed with hardware	\$
Memory Devices or Drives for Use of Accessible Ballot Marking Device – ADA (itemized by storage capacity)	\$
Security Devices (e.g., keys, locks, etc.) for Accessible Ballot Marking Device – ADA	\$
Election Management and Ballot Definition Software	\$
Voice Synthesis Software, If Priced Separately (For Creation of Audio Ballot for Sight-Limited Voters)	\$
Licensing and Support for Election Management and Ballot Definition Software – Years 1-5 and billed with hardware	\$
Server for Election Management and Tabulation Systems (for purposes of creating standalone network of workstations)	\$
Workstation/Server for Election Management and Ballot Definition Software	\$
Tabulation Software	\$
Licensing and Support for Tabulation Software – Years 1-5 and billed with hardware	\$
Workstation/Server for Tabulation Software	\$
Ballot Printer	\$
Software for Ballot Printer	\$
Workstation for Ballot Printer Software (i.e., laptop/desktop, monitor, etc.)	\$
Licensing and Support for Software for Ballot Printer – Years 1-5 and billed with hardware	\$
Starter Cartridges for Ballot Printer – for initial use	\$
Warranty on Any and All Hardware – Years 1-5 and billed with hardware	\$
Delivery, Shipping of Equipment to Board of Elections' Office or Facility	\$
Voting System Deployment (e.g., software installation and configuration, acceptance testing, etc.)	\$
Setup of Equipment at Board of Elections' Office	\$
Logic and Accuracy Testing Prior to First Election	\$
TOTAL one (1) each of all State-Funded Items	\$

Table B

Transport Bags or Cases for Accessible Equipment - ADA	\$
Licensing and Support for Software for High-Speed Scanner - Extended - Years 6-10	\$
Additional Toner, Ink, Cartridges for High-Speed Scanner	\$
Licensing and Support for Software for Precinct-Based Equipment - Extended - Years 6-10	\$
Ballot Box or Bag for Precinct-Based Equipment	\$
Transport Bag or Case for Precinct-Based Equipment	\$
Additional Consumables for Initial Use of Precinct-Based Voting Equipment (e.g., paper ballots, rolls, or cards, etc.)	\$
Licensing and Support for Software for Accessible Ballot Marking Device - ADA - Extended - Years 6-10	\$
Licensing and Support for Election Management and Ballot Definition Software - Extended - Years 6-10	\$
Licensing and Support for Tabulation Software - Extended - Years 6-10	\$
Licensing and Support for Software for Ballot Printer - Extended - Years 6-10	\$
Warranty on Any and All Hardware - Years 6-10	\$
Maintenance on Any and All Hardware unless specified in above table - Years 1-5	\$
Maintenance on Any and All Hardware - Years 6-10	\$
Preventative Maintenance on Hardware (e.g., cleaning, lubrication, replacement of parts, labor, etc.) unless specified in above table - Years 1-5	\$
Preventative Maintenance on Hardware (e.g., cleaning, lubrication, replacement of parts, labor, etc.) - Years 6-10	\$
Phone Support (i.e., a board of elections may contact a designated individual or Helpdesk for assistance with troubleshooting issues)	\$
Online Support (i.e., a board of elections may submit issues via an online portal hosted by the voting system's vendor)	\$
On-Site Repairs to Hardware (as opposed to having to ship equipment off-site)	\$
Software Upgrades	\$
Pre-Election Support (e.g., setup of election management software; pre-election programming and setup of ballots; configuration of reports, etc.)	\$
Creation of Test Deck (for pre-election testing)	\$
Cost of Printing Test Deck (per sheet using ballot printer system)	\$
Cost of Printing Test Deck (per sheet using print vendor)	\$
Setup, Configuration, and Printing Fees for Ballot Stub Barcode	\$
Pre-Election Setup for Ballot Printer System	\$
Ballot Processing Fees (per sheet or per ballot style) for Ballot Printer System	\$
Assistance with Deployment of Equipment to Polling Locations	\$
Training of Board of Elections' Staff	\$
Training Materials for Precinct Election Officials	\$
Training of Precinct Election Officials	\$
Training Videos for Precinct Election Officials	\$
Demonstration Videos for Voters	\$
Project Management (i.e., project plan and work schedule for deployment; issue identification and resolution; performance measurement against project plan; risk management strategy; quality management plan; resource allocation plan; configuration management plan; and issue management)	\$
Election Day Support (e.g., phone support; dispatch and onsite incident resolution, etc.)	\$
Election Night Support (e.g., on-site or remote assistance with tabulation and results reporting, etc.)	\$
Post-Election Support (e.g., on-site or remote assistance with official canvass of election, etc.)	\$

Required Number of Units

High-Speed Scanners

[Advisory 2017-04](#) recommends (*but does not require*) each county have at least one high-speed optical scanner for each 75,000 registered electors. The CCBOE, with its current high-speed scanners, can scan 1,200 folded sheets per hour. This number is important, as expected scanning time and resources (both equipment and staff) are based on this benchmark. The number of high-speed scanners the CCBOE would purchase is dependent on the speed of the scanners offered by the three vendors. As such, the CCBOE would purchase the following:

- *Clear Ballot (ClearCount)* – 12 high-speed scanners (2 of which would primarily serve as backup units and/or during high-volume even-year elections)
- *ES&S (DS950)* – Seven (7) high-speed scanners (2 of which would primarily serve as backup units and/or during high-volume even-year elections)
- *Hart InterCivic (Verity Central)* – 12 high-speed scanners (2 of which would primarily serve as backup units and/or during high-volume even-year elections)

Precinct-Based Scanners & ADA Units

The CCBOE currently uses the following Election Day equipment allocation formula:

- Optical Scanner
 - o One (1) per precinct in multi-precinct locations
 - o Two (2) per polling location in single-precinct locations
- ADA Ballot-Marking Device
 - o One (1) per polling location

The CCBOE is planning for up to 300 polling locations. With the number of single-precinct polling locations varying by election, to ensure it has enough precinct-based scanners on Election Day, the CCBOE is ordering the following quantities of optical scanners:

- 1,050 optical scanners to be deployed to polling locations.
- 25 to be utilized in the Early In-Person voting center.
- 25 to serve as backup units on Election Day and as training units for poll worker training.

For ADA ballot-marking devices, the CCBOE is ordering the following quantities:

- 300 ADA ballot-marking devices to be deployed to polling locations.
- 10 to be utilized in the Early In-Person voting center.
- 40 to serve as backup units on Election Day and as training units for poll worker training, and to accommodate the future fluctuations of polling locations.

Election Management System (EMS)

To efficiently manage the creation of the multitude of ballot styles the CCBOE has for countywide elections, and accurately and expeditiously tabulate the results on Election Night, the CCBOE requires the following:

- One (1) Election Management and Ballot Definition Software license
- One (1) Tabulation Software license
- Two (2) Election Management and Tabulation System Servers
- Four (4) Workstations

On-Demand Printers

There are two (2) types of On-Demand Printers that the CCBOE utilizes – one for the Ballot Department to print ballots on demand, and the second type will be utilized in the Early In-Person voting center.

- Two (2) high-capacity printers to be used by the Ballot Department.
- Twenty-five (25) ballot-on-demand printers for Early In-Person voting (22 to be used for 44 regular check-in stations, two (2) for ADA check-in stations, and one (1) for curbside voting).
- Seven (7) to be used at zone stations throughout the county to potentially print Election-Day ballots on an emergency basis.

Warranties and Installation

Warranties for years 1-5 of the voting equipment and tabulation system are listed as Table A items. To extend the warranties for years 6-10 (and beyond), the cost is listed under Table B.

Cost Analysis

Based on the pricing and available items to purchase outlined in the [State Funding portion](#) of this Financial Analysis section, the CCBOE Voting Equipment and Tabulation System Committee meticulously went through each vendor's Table A and Table B pricing (negotiated through the State and is uniform for all 88 Ohio counties). Across several meetings, email communications, and phone conversations with each vendor, the CCBOE was able to determine the exact quantities of each item (in both Table A and Table B) that it would purchase from each of the three vendors. These quantities, and cost, are included below.

Clear Ballot Table A (State-Funded)

Item	Quantity	Unit Cost	Total
Hardware			\$8,877,700
Precinct Scanner	1100 Units	\$5,400	\$5,940,000
ADA Unit	350 Units	\$4,750	\$1,662,500
Barcode Scanner for ADA Unit	350 Units	\$500	\$175,000
Additional ADA Printer	14 Units	\$700	\$9,800
High-Speed Scanner	12 Units	\$40,000	\$480,000
Ballot-on-Demand (BOD) Absentee Printer	4 Units	\$19,200	\$76,800
Early In-Person (EIP) BOD Printer (1 st Station)	1 Unit	\$9,600	\$9,600
EIP Printer <i>(additional)</i>	31 Units	\$5,000	\$155,000
Standard Warranty Plus	1476 Units	\$250	\$369,000
Software			\$634,120
Tabulation Software	1 Unit	\$317,060	\$317,060
Ballot Creation Software	1 Unit	\$317,060	\$317,060
Licensing & Support			
Precinct Scanner	1100 Units	Included	Included
ADA Unit	350 Units	Included	Included
High-Speed Scanner	12 Units	Included	Included
BOD Absentee Printer	2 Units	Included	Included
EIP BOD Printer	32 Units	Included	Included
Professional Services			
Implementation and Training		Included	Included
PURCHASE PRICE			\$9,511,820

Clear Ballot Table B (County-Funded)

Item	Quantity	Unit Cost	Total
Equipment Supplies			\$30,800
Additional USB Drives	2200 Units	\$14	\$30,800
Support (May 2, 2023 support included with Table A purchase)			\$25,500
Pre-Election	15 Days	\$1,700	\$25,500
Training			\$0
Included			
PURCHASE PRICE			\$56,300

ES&S Table A (State-Funded)

Item	Quantity	Unit Cost	Total
Hardware			\$8,260,725
Precinct Scanner	1100 Units	\$4,670	\$5,137,000
ADA Unit	350 Units	\$2,864	\$1,002,400
High-Speed Scanner	7 Units	\$115,770	\$810,390
BOD Printer	36 Units	\$3,795	\$136,620
Warranty	1457 Units	Varied	\$1,174,315
Software			\$156,430
Tabulation Software		Included	Included
Ballot Creation Software	1 Unit	\$15,395	\$15,395
Voice Synthesis Software (<i>Spanish</i>)	1 Unit	\$7,325	\$7,325
Server	2 Units	\$9,314	\$18,511
Workstation	4 Units	\$4,636	\$12,779
BOD Printer Software	36 Units	\$2,845	\$102,420
Licensing & Support			\$800,360
Precinct Scanner	1100 Units	\$320	\$352,000
ADA Unit	350 Units	\$220	\$77,000
High-Speed Scanner	7 Units	\$6,300	\$44,100
BOD Printer	36 Units	\$7,380	\$265,680
Tabulation Software		Included	Included
Ballot Creation Software	1 Unit	\$61,580	\$61,580
Professional Services			\$268,375
Delivery of Equipment	All Units	\$37,950	\$37,950
Voting System Deployment	1494 Units	Varied	\$195,475
Setup at CCBOE	10 Days	\$1,795	\$17,950
L&A Testing First Election	10 Days	\$1,700	\$17,000
PURCHASE PRICE			\$9,485,890

ES&S Table B (County-Funded)

Item	Quantity	Unit Cost	Total
Equipment Supplies			\$8,310
Toner/Ribbon/Paper Rolls		Varied	\$6,240
ADA Card Stock		Varied	\$2,070
Support (May 2, 2023 support included with Table A purchase)			\$27,750
Pre-Election	15 Days	\$27,750	\$27,750
Training			\$14,800
Board Staff	6 Days	\$1,850	\$11,100
Poll Workers/Trainers	2 Days	\$1,850	\$3,700
PURCHASE PRICE			\$50,860

Hart InterCivic Table A (State-Funded)

Item	Quantity	Unit Cost	Total
Hardware			\$8,056,151
Precinct Scanner	1100 Units	\$3,942	\$4,336,200
Ballot Box	1100 Units	\$445	\$489,500
Verity Mobile Ballot Box Cart	1100 Units	\$699	\$768,900
Verity Mobile Ballot Box Cart Cover	1100 Units	\$49.99	\$54,989
Secure Ballot Transport Bag	1100 Units	\$50	\$55,000
Memory Drive	4400 Units	\$45	\$198,000
Miscellaneous Hardware		Varied	\$32,844
ADA Unit	350 Units	\$2,902	\$1,015,700
Transport Bag	350 Units	\$85	\$29,750
Booth for Verity Touch Writer w/ Access	350 Units	\$315	\$110,250
Printer & Stand	350 Units	\$375	\$131,250
ADA Aids		Varied	\$35,830
Memory Drive	700 Units	\$45	\$31,500
High-Speed Scanner	12 Units	\$7,700	\$92,400
Workstation	14 Units	\$4,000	\$56,000
Memory Drive	400 Units	\$45	\$18,000
On-Demand Ballot Printing	32 Units	\$4,199	\$134,368
Absentee/Warehouse Printer	4 Units	\$3,080	\$12,320
EIP (and other uses) Printer	48 Units	\$325	\$15,600
Workstation/Server for Tabulation Software	4 Units	\$4,000	\$16,000
Workstation/Server for Ballot Creation Software	6 Units	\$4,000	\$24,000
Warranty	1898 Units	Varied	\$397,750
Software			\$188,652
High-Speed Scanner	12 Units	\$11,550	\$138,600
Tabulation Software	4 Units	\$2,888	\$11,552
Ballot Creation Software	4 Units	\$9,625	\$38,500
Licensing & Support			\$1,209,650
Precinct Scanner	1100 Units	\$699	\$768,900
ADA Unit	350 Units	\$607	\$212,450
High-Speed Scanner	12 Units	\$12,265	\$147,180
BOD Printer	32 Units	\$874	\$27,968
Tabulation Software	4 Units	\$3,067	\$12,268
Ballot Creation Software	4 Units	\$10,221	\$40,884
Professional Services			\$127,065
Delivery of Equipment	19 Trucks	\$3,135	\$59,565
Voting System Deployment	45 Days	\$1,500	\$67,500
PURCHASE PRICE		\$9,581,518 (\$8,363,869 w/discount)	

Hart InterCivic Table B (County-Funded)

Item	Quantity	Unit Cost	Total
Preventative Maintenance			\$75,000
Preventative Maintenance (<i>Years 1-5</i>)	50 Days	\$1,500	\$75,000
Equipment Supplies			\$36,705
Toner	32 Units	\$165	\$5,280
Barcode Scanner for ADA Unit	75 Units	\$419	\$31,425
Support (<i>May 2, 2023 support included with Table A purchase</i>)			\$2,530
Pre-Election	1 Unit	\$2,530	\$2,530
Training			\$0
N/A			
PURCHASE PRICE			\$114,235

Note: The below costs do *not* include the additional ancillary items that are to be determined.

Summary

Clear Ballot

- Table A - \$9,511,820
- Table B - \$56,300

ES&S

- Table A - \$9,485,890
- Table B - \$50,860

Hart InterCivic

- Table A - \$9,581,518 (*\$8,363,869.80 w/discount*)
- Table B - \$114,235

IX. Final Recommendation

Over the course of nearly five years, CCBOE staff completed a systematic review of the current voting equipment and tabulation systems available for purchase from each of the three vendors under review: Clear Ballot Group, ES&S, and Hart InterCivic. Departments from across the agency came together to evaluate each voting system on a wide-ranging set of criteria, while considering how the CCBOE's constituents – the voters of Cuyahoga County – would benefit from this acquisition.

An important consideration was given to how each vendor's equipment would fit into the CCBOE's pre-existing election operations; a complex operation that has been developed and improved over the course of dozens of elections and has made Cuyahoga County a leader in Ohio election administration. However, the staff was also looking to see certain improvements and additional features in the technology that exists in our current voting equipment and tabulation system and has created time-consuming workarounds.

These technological improvements would not only improve the efficacy of our current election operation procedures but also help ensure the CCBOE stays on the cutting edge of election systems technology and voting equipment. Ultimately, the CCBOE staff determined that **Clear Ballot** would be the vendor best suited to meet the needs of Cuyahoga County voters. While all three vendors offer many of the improvements and features staff was seeking, Clear Ballot has consistently proven to be the best option over the course of this evaluation process, both in terms of technological enhancements and the willingness to adapt and customize their product to precisely fit the needs of Cuyahoga County.

(See [Appendix A](#) for a comparison of the three vendors against the baseline of the CCBOE's current voting equipment and tabulation system).

Precinct-Based Scanner

A significant factor in the decision-making process was the user interface of the vendor's physical voting equipment and how easy (or not easy) it was to interact with. CCBOE staff noted the simplicity of Clear Ballot's instructions and the ease by which they were able to set up the precinct-based scanners. This was also noted by poll workers that participated in an election demonstration of each vendor's voting equipment. The large, easy to navigate screen of Clear Ballot's precinct-based scanner ClearCast Go should significantly shorten the learning curve for both voters and poll workers when switching to new voting equipment.

Clear Ballot demonstrated its willingness and ability to take feedback and make improvements to its product with ClearCast Go. For example, when first testing this product, the CCBOE noted the

amount of time it took to scan one ballot sheet was too long. Clear Ballot fixed this issue in its newest release of ClearCast Go (v.2.2), as was noted by Warren County (an Ohio customer). Second, the CCBOE was concerned about the durability of the precinct-based scanner due to the case it was transported and housed in. As a result of this critique, Clear Ballot created what is called ClearCast Go and Ballot Box Bundle, which includes a *rugged* ballot box (or “roadie case”). This design propelled Clear Ballot to having the most durable, stackable, and stable precinct-scanner among the vendors considered.

Finally, ClearCast Go has a simple, secure function to suspend voting at the end of each day during the Early In-Person voting period, which was not true for all the vendors.



ClearCast Go



ClearCast Go and Ballot Box Bundle

ADA Voting Unit

One aspect of the selection process where Clear Ballot stood out above the competition was ClearAccess, their ADA voting unit. This was evident in feedback from staff and poll workers, as well as participants in the [ADA and Early In-Person Voting Equipment Demonstration](#).

It was important to the CCBOE to have a self-contained unit (as the current AutoMARK is) to make it easier for poll workers to set up properly. Unlike our current system, no additional tables or stands are needed for operational use.

It was also essential the ADA voting unit print a full undifferentiated paper ballot (i.e., a paper ballot that is the same size and marked in the same way as a paper ballot completed by hand) so

that the ballot cannot be traced to an individual voter. This is something that not all the other vendors could accomplish.

Lastly, ClearAccess can read a barcode (or QR code) printed from Tenex's electronic pollbooks, which would be a useful feature if the CCBOE uses pollbooks to check-in voters during early-person voting. This code would then be scanned by a poll worker (or the ADA voter) at the ClearAccess unit, ensuring the proper ballot style is presented to the voter.



ClearAccess



ClearAccess Rugged Ballot Box

High-Speed Scanner

The high-speed (central count) scanners for all three vendors performed well during testing. One advantage of ClearCount, Clear Ballot's high-speed scanning system, is that all supplemental and replacement parts can be purchased commercially off-the-shelf (COTS). This isn't the case with the CCBOE's current product. This will enable the CCBOE to more quickly, and at a lower cost, purchase replacement parts or entire units.

Tests conducted on the high-speed scanners demonstrated the scanning speed of ballots was equal if not greater than the other vendors. Additionally, results from the scanning can be networked to a central server, making the recording of votes easier.



High-Speed Scanner

Election Management System (EMS), Ballot Creation and Tabulation Software

One of the most significant factors in the CCBOE's final recommendation was Clear Ballot's EMS, which includes both ballot creation (ClearDesign) and tabulation software (ClearCount). These software features of the voting system more than any other aspect stood out above the competition. Clear Ballot, which started in the elections industry as a company with cutting-edge audit software, demonstrated its technological expertise with this package of software. Their ability and willingness to customize and adapt quickly to a changing election environment positions Clear Ballot well to grow and advance in the industry.

Consistently over the course of the evaluation process, Clear Ballot earned high marks from CCBOE staff for the functionality of its EMS. While all three vendors offer improvements to software the CCBOE is currently using, the Ballot Department staff noted, "Clear Ballot's EMS is the easiest to use and gives us the most options in ballot creation and formatting...The ballot layout software is very intuitive. [The] steps are simple to follow." (*Ballot Department New Equipment Acquisition Summary*).

Some of the features of ClearDesign and ClearCount cited by the Ballot Department staff include:

- A browser-based system (the only vendor to offer this) is reflective of how current applications work in any business setting. The big advantage to this is having multiple screens open at one time, allowing easy transition of data from one process to another.
- The built-in features are very intuitive and allow a user of any skill level to use.
- The ballot adjudication system enables a user to see all ovals from a specific race on a single screen to determine the confidence with which each oval position was counted. This will enable staff to view all ovals in a close race to prepare for recounts and audits.

- The tabulation system is very similar to what is currently used, with additional features such as the ability to turn off tabulation during the 28-day scanning window to speed up initial Vote-by-Mail reporting on Election Night.
- The Clear Ballot software can generate a sequential stub number on a ballot stub during on-demand printing, which not all other vendors can execute. Having this ability is important in the event the CCBOE needs to print ballots on an emergency basis on Election Day and get them out to a polling location quickly (instead of relying on the print vendor) is extremely important. This can't be done if a sequential stub number is unable to be printed on the ballot stub.



ClearDesign



ClearCount

Logic and Accuracy (L&A) Testing

An unheralded but extremely important process that must be performed before every election is L&A testing. The CCBOE has developed specific testing procedures and established timelines for conducting L&A with its current voting system. With this time-tested process serving as the benchmark to evaluate the three vendors, Clear Ballot emerged as the system best suited to meet the CCBOE's L&A needs.

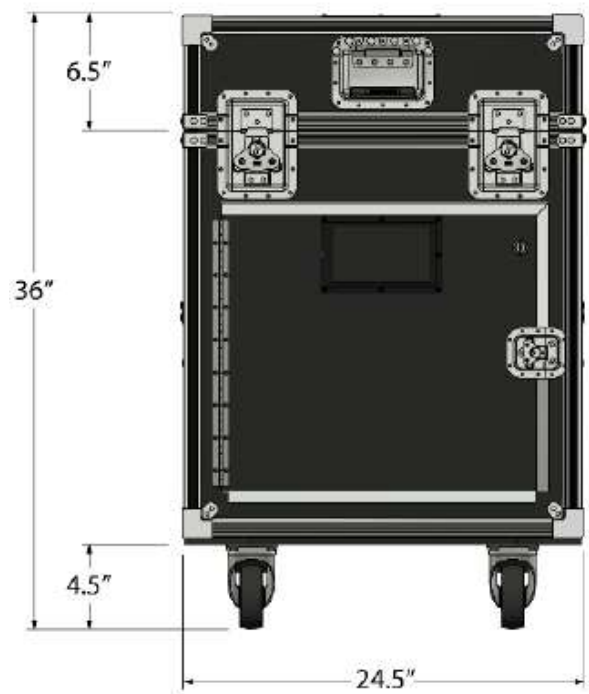
With ClearCast Go and ClearAccess attached to a stable case, it will be easy to stage for L&A testing, with no additional assembly or tables required. This would not be true with the other two vendors. Additionally, the Clear Ballot system fits seamlessly into existing L&A testing procedures and timelines, while at least one of the other vendors would require an additional test deck to be created and an additional round of L&A testing performed. The election cycle provides tight timelines for these processes.

Storage and Transportation

There are several ways in which the design of Clear Ballot's voting equipment bested the competition when it comes to storing and transporting the units, and more importantly, improves upon these same qualities over the CCBOE's current equipment.

ClearCast Go and ClearAccess are housed within *rugged* cases that have a very similar footprint, which means the units can be uniformly stored without having to make any significant changes to warehouse storage configurations. The rugged cases also allow for the stacking of the equipment, if necessary, which is very helpful during non-countywide elections, when floor space is more limited in the warehouse on Election Night than it is during a countywide election (when all voting equipment is deployed at polling locations).

The smaller size and rugged design of Clear Ballot's voting units will also make them easier to transport. This is obviously important when the voting equipment is delivered to voting locations by the dozens in large trucks. It will also be significant for poll worker training. The CCBOE has not brought voting equipment to training locations since 2016, but this will change starting in 2023, when all poll workers will need to be trained on the new voting equipment. Ease of transport and storage (at the training locations) will certainly be an asset.



Finally, the ballot box compartment in ClearCast Go is larger than the current DS200, allowing for additional storage of supplies when delivered to polling locations. In fact, Clear Ballot tested the dimensions of this storage area to ensure the CCBOE's current supply packing methods could continue with little to no adjustments.

Current Customer Experiences

All three vendors have strong customer service ratings and positive reviews. Clear Ballot has a 99% customer retention rate.

Below are some select testimonials about Clear Ballot:

"Clear Ballot has proven to be a professional and knowledgeable partner in providing our voters with a comprehensive, paper verifiable voting solution. We are especially impressed by the team they have amassed. Their roster includes both high-end technicians as well as staff who have actually worked as elections officials. It is a well-rounded and responsive team. We really enjoy working with them."

- Gail Humphrey, Chief Clerk, Bucks County, Pa.

"Clear Ballot's strongest area is its tabulation software system, due to their years of experience working with large counties in all Vote-by-Mail states. This is particularly true with their history as an audit company."

- Brian Sleeth, Director, Warren County, Ohio

"ClearDesign and ClearCount were the most powerful and compelling election management software solutions I reviewed during the county's voting system search. The browser-based UI is novel, but not just for novelty's sake – it is intuitive, forgiving, and flexible. There is much potential for the software to continue to evolve and improve."

- Forrest K. Lehman, Director of Elections and Registration, Lycoming County, Pa.

"We chose the ClearVote system because it will greatly improve the flexibility, efficiency, and transparency of the elections process in Clinton County. From ballot creation and tabulation to post-election auditing, this system offers us the increased administrative oversight and tools to better ensure the accuracy, security, and integrity of our elections."

- Shane Breckel, Director of Elections, Clinton County, Ohio

"The ClearCast tabulators are great, and each new version is even better. Clear Ballot took direct feedback from our municipal clerks and election inspectors on the tabulators, and soon rolled out a new version of ClearCast. Almost every suggested improvement from Sheboygan County was implemented into the new version. Clear Ballot has good equipment, with simple programming, and quality customer support on the back end. Thank you, Clear Ballot!"

- Jon Dolson, County Clerk, Sheboygan County, Wisconsin

Security

As was highlighted in [Section V on the February 2021 Virtual Security Summit](#), the IT security professionals in attendance, which included Jeremy Mio, Cuyahoga County's Information Security Officer, and Robin Roy, the CCBOE Chief Information Officer, confirmed there were no red flags and each vendor had satisfactorily answered all the technical security-related questions they had been asked.

It's important to emphasize that all voting equipment vendors certified to do business in Ohio must design ballot scanners and EMS systems that are never connected to the internet. This ensures hackers cannot access these systems to alter the voting process in any way.

To be available to purchase, all Ohio vendors must be certified both federally (Election Assistance Commission) and the Ohio BVME, and must pass a supplemental wireless transmission test, which was newly added by the SOS in the summer of 2021.

Below is a summary of when each vendor had their most recent version of their voting system certified by all three of these standards:

Vendor	EAC Certification	Ohio Certification	Supplemental Wireless Transmission Testing
Clear Ballot	Completed Dec. 23, 2021	Completed Jan. 5, 2022	Completed August 2021
ES&S	Completed Dec. 23, 2021	Completed Jan. 5, 2022	Completed November 2021
Hart	Completed April 20, 2021	Completed Dec. 14, 2021	Completed Dec. 14, 2021

Voluntary Voting System Guidelines (VVSG)

[Voluntary Voting System Guidelines](#) (VVSG) are a set of security specifications and requirements against which voting systems can be tested to determine if the systems meet required standards. Some factors examined in these tests include basic functionality, accessibility, and security capabilities. HAVA mandates that EAC develop and maintain these requirements.

All three vendors are compliant with the current VVSG 1.0 guidelines. They are all prepared to transition to the future VVSG 2.0 guidelines, which are expected to be finalized in the next two years.

Purchase Price

State-Funded Purchase

The cost of the voting equipment hardware (precinct-based scanners, ADA units, high-speed scanners, and ballot-on-demand printers), along with supporting software and licensing (years 1-5) is included in Table A costs, which are covered by state funds. All three vendors came comfortably under the \$10,425,888.60 allocated to Cuyahoga County, so in terms of any cost to the CCBOE or Cuyahoga County, it does not apply for Table A purchases. Under the terms of SB 135 a board of elections can purchase from any certified vendor and is not constricted to select the vendor who submits the lowest Table A quote.

County-Funded Purchase

In addition to the Table B items, the CCBOE will be seeking county appropriations to cover such items as the disposal of existing equipment, additional staffing to prepare and test the new equipment, training for election officials and ancillary items needed for the new voting equipment.

Final Question

The CCBOE wouldn't be doing its due diligence if it didn't address all matters related to each of the vendors. In the case of Clear Ballot, one question that merited further scrutiny is their ability to handle a customer the size of Cuyahoga County.

Clear Ballot is currently used by 13 Ohio counties (not counting Cuyahoga County). This is a noteworthy achievement, as Clear Ballot didn't have a single Ohio county as a customer before 2018. Nationally, it has a footprint in 12 states and a total customer base of 35.5 million registered voters (which is 1 in 5 US voters) that is impacted by at least one of Clear Ballot's products. It currently has a warehouse facility in Wilmington, Ohio, and a warehouse in northeast Ohio is likely with Cuyahoga County as a customer.

Clear Ballot also has six full-time employees located in Ohio, including two former Ohio board of elections Directors:

- Keir Holeman – VP of Tech Services (Former Warren County Director)
- Adam Booth – Customer Success Manager (Former Columbiana County Director)
- Steve Witham – Ballot Design & Field Support
- Dylan Sleeth – Sr. Field Support Engineer
- Thomas Daugherty – Field Support Engineer

- Kevin McNally – Field Support Engineer

This is a greater full-time presence than either of the other vendors offer.

Cuyahoga County would be Clear Ballot's largest county that uses precinct-based scanners. Its current largest jurisdiction is Bucks County (Pa.) with 500,000 registered voters. It should be noted that when the CCBOE partnered with ES&S in 2008, it was their largest county at the time as well.

It's important to note that Clear Ballot has King County (Wash.) as a customer, which has over 1.4 million registered voters. While Washington is a Vote-by-Mail state, it uses the same ballot creation (ClearDesign) and tabulation software (ClearCount), as well as the same ADA unit (ClearAccess) the CCBOE would purchase. Clear Ballot also conducts audits for New York City, seven of the eight largest counties in Florida, and statewide in Maryland and South Carolina.

The CCBOE sees Clear Ballot as a growing company that greatly values what it means to have the CCBOE as part of their business portfolio. The expectation is this will continue moving forward. The CCBOE fully expects Clear Ballot to more than meet the demands of this large implementation in 2023, and continue to demonstrate the creativity, innovation, and customization it has shown throughout the selection process.

Next Steps

If Clear Ballot is approved as the next voting equipment and tabulation system vendor for Cuyahoga County, there are several steps that must be taken to complete the acquisition process and allow the CCBOE to implement the voting system for the May 2, 2023 Primary Election.

These include:

- **August 22, 2022** – The CCBOE board votes to approve the recommendation of Clear Ballot as the new voting equipment and tabulation system vendor for Cuyahoga County. The board also authorizes the Director and Deputy Director to engage in negotiations on a contract with Clear Ballot, with the assistance of the county prosecutor.
- Following the approval of the vendor recommendation by the board on August 22, 2022, the CCBOE will engage in the following steps. Additional board action will be at a meeting to be determined, tentatively no later than October 12.
 - The CCBOE requests a proposal and draft contract from Clear Ballot, as instructed in [Advisory 2018-04](#) (Voting Equipment Acquisition Program). Upon receipt, the proposal and draft contract are:

- Submitted to the SOS for review.
- Reviewed by the Director and Deputy Director, in consultation with the county prosecutor.
- The CCBOE submits the text of a Resolution and Sublease-Purchase Agreement to Trevor McAleer, Legislative Budget Advisor, Cuyahoga County Council. A template resolution and sublease-purchase agreement have been provided by the SOS.
- Technical Advisory Committee (TAC) – This committee is composed of various county agencies (including the CCBOE’s Robin Roy). They meet to review the technical components of county purchases. TAC will have a preliminary meeting, followed by a second meeting where it approves the new voting system.
- A list of ancillary items with approximate cost is provided to the board members for review.
- The proposal and contract from Clear Ballot, following the conclusion of negotiations involving the Director and Deputy Director, is provided to board members for review.
- No later than November 8, 2022, County Council will conduct a 3rd Reading on the purchase of a new voting equipment and tabulation system from Clear Ballot.
- The delivery of new voting equipment delivery begins in January of 2023.
- Existing voting equipment, if not sold to another Ohio board of elections, will be disposed of following disposal guidelines detailed in the Ohio Election Official Manual.
- **May 3, 2022** – The new voting equipment and tabulation system will be implemented for the first time in the May 3, 2022 Primary Election.

X. Appendix

A. Vendor Comparison to Existing CCBOE Voting Equipment and Tabulation System

Priority Assessment Row numbers in yellow indicate a high-priority assessment by staff.	Scoring · 1 = Highest rated for that item · 2 = Middle rated for that item · 3 = Lowest rated for that item Scores are a comparison between vendor	Precinct Ballot Scanners: The voters scan their voted ballot into this machine. · Clear Ballot - ClearCast Go · ES&S - DS200 · Hart InterCivic - Verity Scan	ADA Ballot Marking Device: Persons with disabilities can mark their ballot with this device. · Clear Ballot - ClearAccess · ES&S - ExpressVote · Hart InterCivic - Verity Touch Writer	Election Management & Central Count Scanners: · Clear Ballot - ClearDesign & ClearCount · ES&S - ElectionWare & DS950 · Hart InterCivic - Verity Build & Central Scanner
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Category	Staff Assessment of Current Equipment	Clear Ballot	ES&S	Hart InterCivic
1	Precinct-Based Scanning Device	1 <u>Feature to Keep:</u> Convenient PEO Set Up - Current DS200s are “plug & play.” Quick and easy for PEOs to set up prior to the polls opening.	2 ES&S’s DS200 is unchanged, requiring no alteration to current plug & play set up. The unit remains non-compliant with ADA height standards.	3 Hart’s Verity Scan display screen is detachable and must be inserted and locked into the cradle by PEOs on Election Day.
2		1 <u>Feature to Keep:</u> Transport Case - Current DS200s are durable enough to securely transport and store at polling locations.	2 ES&S’s DS200 light plastic construction storage compartment is easy to move.	3 Hart’s collapsible ballot box may not be durable enough to withstand transport and storage needs.
3		1 <u>Problem Encountered:</u> Early In-Person Voting - Election workers must open and close the election each morning/night.	1 ES&S has an option to turn off the code required to open/close the polls.	3 Hart always requires codes to be entered each day to open/close the polls.

4		<u>Problem Encountered:</u> Saving Ballot Images - Saving ballot images currently takes a long time when closing the polls. This is relevant to tabulating write-in votes.	1	Clear Ballot's ClearCast Go ballot image saving process performed well during testing.	3	ES&S's precinct-based scanner took longer than the other precinct-based scanners to save ballot images during testing.	1	Hart's Verity Scan ballot image saving process performed well during testing.
5	ADA Ballot Marking Devices	<u>Problem Encountered:</u> ADA Setup - AutoMARKs are simple to connect but are extremely heavy and require a separate table.	1	Clear Ballot's ClearAccess device is self-contained, on four (4) wheels, requiring no tables, separate stands, or lifting for the PEO and requires only one (1) power cord to plug in.	2	ES&S's ExpressVote machines require a separate tabletop or stand. Have only one (1) power cord to plug in. Ballot printer is fully incorporated into the device.	3	Hart's Verity Touch Writer devices require a collapsible leg stand, stand-alone printer, separate printer table, and several cords to connect.
6		<u>Feature to Keep:</u> Uniform Ballot Formatting - No differentiation between standard paper ballots and ADA printed ballots.	1	Clear Ballot's ClearAccess unit prints a full ballot summary sheet to be scanned by an ADA voter.	3	ES&S's ExpressVote uses a smaller ballot style, making an ADA ballot card different from regular paper ballots. Therefore, this ballot card is more identifiable to a particular voter.	1	Hart's Verity Touch Writer unit prints a full ballot summary sheet to be scanned by an ADA voter.
7		<u>Problem Encountered:</u> Ink Cartridges - AutoMARK ink cartridges frequently dry out and need to be replaced.	1	Clear Ballot's ClearAccess uses toner, which lasts longer than ink.	1	ES&S's ExpressVote uses a thermal printer, which does not use ink.	1	Hart's Verity Touch Writer uses toner, which lasts longer than ink.
8	Central Count Scanners	<u>General Information:</u> Central Count Scanners	1	Clear Ballot's ClearCount performed well during testing and supplemental and replacement parts can be purchased commercially off-the-shelf (COTS).	1	ES&S's DS950 performed well during testing but supplemental and replacement parts are proprietary and can't be purchased commercially off-the-shelf (COTS).	1	Hart's Central Scanner performed well during testing and supplemental and replacement parts can be purchased commercially off-the-shelf (COTS).

9	Election Management and Ballot Creation Software (EMS)	<u>Feature to Keep:</u> Uniform Ballot Formatting / Ballot-on-Demand Barcode Printing - Ability to print a barcode on the ballot stub <i>(Allows for in-house ballot printing in small elections and the printing emergency ballots on Election Day).</i>	1	Clear Ballot's EMS has no issue printing barcodes on the ballot stub.	1	ES&S's EMS has no issue printing barcodes on the ballot stub.	3	Hart's EMS cannot print barcodes on the ballot stub.
10		<u>New Feature:</u> Ballot-on-Demand (BOD) Printers	1	Clear Ballot's BOD printing system works well and is compatible with our Early In-Person voting process.	3	ES&S's BOD printing system works well and is compatible with our Early In-Person voting process, but per-click and set-up fees increases the cost of their BOD printing system.	1	Hart's BOD printing system works well and is compatible with our Early In-Person voting process.
11		<u>Feature to Keep:</u> Write-in Adjudication - Current process provides a report that shows all write-ins on a race-by-race basis.	1	Clear Ballot's ClearDesign enables the user to view all oval positions for a specific race or ballots (all ovals at once or one at a time) based on the certainty by which the system counted them.	2	ES&S's ElectionWare provides a report that enables the user to see all write-ins on a race-by-race basis.	2	Hart's Verity Build provides a report that enables the user to see all write-ins on a race-by-race basis.
12		<u>Problem Encountered:</u> Remake Adjudication - Currently no way to look at any ballot ovals for remakes without looking at each individual ballot.	1	Clear Ballot's ClearDesign enables the user to view all oval positions for a specific race or ballots (all ovals at once or one at a time) based on the certainty by which the system counted them. This will allow the user to look at each oval to ensure all are accurate for a recount or audit.	2	ES&S's ElectionWare enables the user to view each ballot (one at a time) to determine that validity of each oval.	2	Hart's Verity Build enables the user to view each ballot (one at a time) to determine that validity of each oval.

13		<u>Feature to Keep:</u> Easy Navigation of Software - Importing data, laying out the ballot, creating USB sticks etc.	1	Easy to use for all staff. Simple navigation, intuitive features, with many customizable options.	2	Easy to use for all staff but more steps involved than the competitors.	3	Easy to use for all staff but is less customizable, has limited functionality and fewer system options.
14	Storage and Transportation	<u>Feature to Keep:</u> Warehouse Storage - Voting equipment fits into current warehouse space allotted for equipment storage.	1	Clear Ballot has a slightly larger case than currently used but units are stackable for more compact warehouse storage.	2	The current warehouse space can accommodate the DS200. The ExpressVote will take up less space but will require the procurement of new shelving.	3	Hart's Verity Scanner dollies have a much larger footprint than we currently use. Hart's Verity Touch Writer has several pieces but will require the procurement of additional shelving.
15		<u>Feature to Keep:</u> Transportation of Election Equipment to Polling Locations - The DS200 and AutoMARKs are easily rolled onto delivery trucks. <i>(No equipment stacking is permitted during transportation.)</i>	1	Clear Ballot voting equipment can be easily rolled onto the moving truck and provide additional storage and protection for the equipment.	2	ES&S's DS200 can be easily rolled onto the delivery truck and provide additional storage and protection for the equipment. The ExpressVote has its own carrying case that will have to be placed on a transport cart.	3	Hart's Verity Scan case was not originally designed to transport heavy materials, the dolly has added support but has questionable durability. Hart's Verity Touch has several pieces that will have to be placed on a transport cart.
16	L&A Testing and Setup	<u>General Information:</u> Warehouse and L&A Setup- Current - DS200s are self-contained mobile units that can be easily rolled requiring no additional assembly. AutoMARKs are set on tables for testing.	1	Clear Ballot's ClearCast Go scanner and ADA unit are attached to a stable case and can be easily staged for L&A testing. No additional assembly or tables required.	2	ES&S's DS200 units is attached and can be easily staged for testing. No assembly required. The ADA ExpressVote unit needs to be staged on tables but will be much lighter than the AutoMARKs.	3	Hart's Verity Scan is attached and can be staged using the dolly. The ADA unit will need to be set on stands or tables and connected to its designated printer during L&A testing.
17		<u>Feature to Keep:</u> L&A Testing Procedures and Timeline - The DS200 and AutoMARKs have effective L&A testing procedures and established timelines.	1	Existing L&A testing procedures and timelines can be used.	3	The ExpressVote would require an additional test deck to be created and an additional round of L&A testing that is currently not performed.	1	Existing L&A testing procedures and timelines can be used.

18	Company Service and Marketing and Maintenance	<u>General Information:</u> Company - ES&S is an established leader in election equipment.	3	Clear Ballot has provided audit services since 2009 and later expanded into voting equipment. It operates in 12 states and has over 70 employees. It has grown from zero (0) Ohio counties in 2016 to 13 currently.	1	ES&S is the largest election equipment vendor in the US, working in 42 with more than 450 employees. It has grown from 41 Ohio counties in 2016 to 47 currently.	2	Hart's election services have been around since the mid-2000's are used in 14 states with over 100 employees. Hart had two (2) Ohio counties in 2016 and continues to have two (2).
19		<u>General Information:</u> Marketing and Sales Presentation	3	Possesses a growing marketing and sales team.	2	Possesses a professional marketing and sales team.	1	Hart InterCivic made excellent marketing and sales presentations.
20		<u>General Information:</u> Vendor Interaction During Selection Process and Product Enhancements	1	As a growing company Clear Ballot has demonstrated a willingness to work with Cuyahoga to customize their product to our needs and has been receptive to suggested improvements.	3	ES&S is a large company that balances their hardware and software configurations across 42 states.	2	Hart InterCivic was originally reluctant to modify its products to meet Cuyahoga's operational needs. Midway through the selection process they began to make enhancements to their products and improved their sales service.
21	Ancillary Items	<u>Problem Encountered:</u> Expensive Ancillary Items - Items such as memory sticks, paper rolls, batteries, etc., are only available from vendor at a high cost.	1	Clear Ballot ancillary items are not proprietary and can therefore be purchased at lower cost from third-party vendors.	3	ES&S's ancillary items are proprietary and cannot therefore be purchased at lower cost from third-party vendors.	1	Hart's ancillary items are not proprietary and can therefore be purchased at lower cost from third-party vendors.
22	System Security	<u>Feature to Keep:</u> Election Integrity - ES&S has provided a high standard for election security.	1	Physical equipment and tabulation software met or exceeded all security requirements.	1	Physical equipment and tabulation software met or exceeded all security requirements.	1	Physical equipment and tabulation software met or exceeded all security requirements.

B. December 2017: Vendor Demonstration Day for Northeast Ohio Counties

On Dec. 6, 2017, the CCBOE hosted Election Equipment Vendor Demonstration Day for northeast Ohio counties. This event brought together more than 50 election officials from across northeast Ohio to learn about the newest election equipment on the market. Participants were welcomed by then Director Pat McDonald before enjoying a robust day of vendor demonstrations and plenty of networking.

Director McDonald and fellow leaders came up with an idea to host a demonstration day with the passing of Senate Bill 135. The new legislation will allow for the allocation of funds to counties across the state for the purchase of new voting equipment beginning in 2018. "It is my hope that counties who are considering the acquisition of new voting equipment walked away from this event with a clear sense of direction on this important decision," said Director McDonald.

Arianne Morrow, who coordinated this event, is confident that attendees certainly did have a valuable learning experience. "A few attendees said this is exactly the type of event they were looking for. We provided a great working environment, and I truly believe everyone who attended learned something," said Morrow. She says the election officials were looking to casually engage with various vendors and see their product offerings as an initial step to making informed decisions down the road. Having the chance to discuss their findings, concerns, and ideas with colleagues from other boards of elections was a nice bonus.

Directors, Deputy Directors, board members, and staff attended from the following counties: Ashtabula, Columbiana, Geauga, Lake, Lorain, Mahoning, Medina, Summit, and Trumbull. The vendors that participated include Election Systems & Software (ES&S), Dominion Voting, Hart InterCivic, Clear Ballot, and Unisyn Voting Solutions.

C. October 2018: Initial Vendor Surveys

Clear Ballot

CLEAR BALLOT GROUP



Response to: Cuyahoga County Board of Elections

Voting Tabulation Equipment Survey



11/9/2018

Cuyahoga County, Voting Tabulation Equipment Survey

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Cuyahoga County, Voting Tabulation Equipment Survey

1. Provide a brief company history including the main business of your company, the length of time in business and number of employees.

Clear Ballot was founded in 2009 with the mission to provide technology to empower our customers to improve democracy. Clear Ballot entered the elections industry as an audit provider and has expanded to vote-by-mail and in-person elections. We have attracted talent from technological firms across the country as well as individuals with key elections experience. Clear Ballot currently employs approximately 50 people.

Since our inception, we have been working with jurisdictions across the country to provide independent, automated audits. Following feedback and encouragement from our audit customers, Clear Ballot developed a paper-based voting system comprised of reliable off the shelf components to create an easy to use and maintain voting system.

Our audit technology is the foundation of our current tabulation software and remains only solution to scan and analyze high resolution ballot images, allowing elections officials to visualize voter intent.

This aids officials in understanding how votes were tabulated and gives the opportunity to implement more efficient processes to improve their elections. Overall, our solutions give jurisdictions more confidence in their election results.

Clear Ballot expanded rapidly to the Northwest, where over 60% of Oregon and Washington now uses the ClearVote system. Clear Ballot has now expanded its in-person voting system to Wisconsin and Ohio. Ballot has also conducted audits for jurisdictions in New York, Florida, and Vermont. As of 2018, Clear Ballot remains the first and only vendor to conduct a 100% statewide audit and took place in Maryland, where every election since the 2016 General Election has been fully audited.

2. Provide a current list of customers who are using or have previously used your Tabulation system.

- Contact name, email and phone number
- Jurisdiction size
- Date of implementation
- Product(s) and quantities purchased
- What software and firmware versions are currently being used

See **Vendor Customer List Template** containing examples of customers in different states, in varying county sizes. Additional customer contact information can be provided if needed.



Cuyahoga County, Voting Tabulation Equipment Survey

3. Based on the Cuyahoga County data attached to the email, provide a cost estimative for your paper based tabulation system.
- At least two (2) precinct ballot scanners per polling location
 - One (1) ADA marking device per location
 - High Speed Ballot Scanners
 - Daily scan period typically six (6) hours per day over a seventeen (17) day period
 - Equipment Reserves (Backup Equipment) for election day
 - Training Equipment
 - NOTE: Approximately 5000 workers attend an election training session during a county-wide election.

See Attachment #1, Pricing Quote.

4. Provide a detailed description of hardware and network product(s) listed in the estimate provided. Please include:
- All relevant information, including physical descriptions, model numbers, and part numbers, concerning components such as, but not limited to, laptops, tablet computers, printers, cables, connectors, servers, internet connectivity, precinct ballot scanners, high-speed ballot scanners, ADA equipment, etc.
 - Whether a component is proprietary to the Vendor or whether the component is a commercial off-the-shelf product.
 - What is the capacity of all precinct ballot scanners? How are they stored/managed?
 - Are the precinct based scanners programmable for multiple precincts?
 - Specifically identify precinct scanner ballot box options.

See Attachment #2, Hardware and Network Products.

5. List any additional recommended hardware or software which is not required as part of the tabulation system.

There is no additional recommended hardware or software that isn't provided in the original system purchase.



Cuyahoga County, Voting Tabulation Equipment Survey

6. What is the throughput for each type of ballot scanner? Include the details for:

- All ballots sizes available
- Flat v. Folded ballots
 - NOTE: Our absentee ballots are folded three times prior to being sent out to the voters.

The table below presents the size range for all ballot sizes acceptable within each ClearVote component.

ClearVote Component	Size Range
ClearDesign	8.5"x 5" to 8.5"x 22"
ClearCount	8.5"x 5" to 8.5"x 22"
ClearCast	8.5"x 5" to 8.5"x 22"
ClearAccess	8.5"x 5" to 8.5"x 18"

The table below presents the average throughput of folded and unfolded ballots for the Fujitsu fi-6800 per hour, by size of card.

Card Size (inches)	Unfolded	Folded
8.5 x 5	7,900	7,085
8.5 x 11 (landscape)	5,500	5,000
8.5 x 11 (portrait)	5,000	4,500
8.5 x 14	4,150	3,730
8.5 x 17	3,350	3,020
8.5 x 22	2,640	2,380

The table below presents the average throughput of folded and unfolded ballots for the Fujitsu fi-6400 per hour, by size of card.

Card Size (inches)	Unfolded	Folded
8.5 x 5	6,000	5,500
8.5 x 11 (landscape)	3,620	3,100
8.5 x 11 (portrait)	3,100	2,600
8.5 x 14	2,930	2,450
8.5 x 17	2,450	1,900
8.5 x 22	2,240	1,740



7. Does the high-speed ballot scanner(s) have the ability to sort ballots as they are being scanned?

- **Write-ins, Remakes, Blank Ballots, etc.**

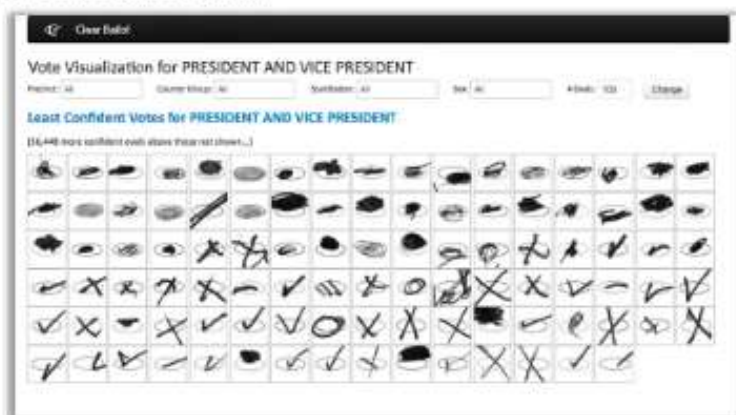
Yes, the ClearCount tabulation system digitally sorts all ballot images automatically as they are scanned. This captures and records undervotes, overvotes, write-ins, unreadable ballots and blank ballots. These can be sorted and displayed visually for digital adjudication. Physical sorting is not necessary with the ClearVote System. This ensures that we achieve maximum scanner throughput.

During tabulation, the ClearCount software classifies each vote target on each ballot as one of the following:

- A vote, if the voter makes a valid vote for a candidate.
- An overvote, if the voter selected more candidates than the vote rule allows.
- An undervote, if the voter selected fewer candidates than the vote rule allows and the candidate was not selected.
- A non-vote, when the voter casts a vote for another candidate. Non-votes are often reviewed in close contests for uncaptured intent. When voters do not follow ballot marking instructions, legacy voting systems ignore marks that are not compliant to marking rules. In very close contests, ClearCount brings instant visibility to any marks made within a contest field, bringing transparency where none existed with other systems.

By clicking a voter's mark, which is included in the report, officials can examine the ballot and adjudicate, if necessary.

The report below shows the Vote Visualization report for a single contest. A similar report can be generated for the entire election.



8. Do the ballot scanner(s) have the ability to save ballot images? If so, what is the capacity, methodology for saving images and how long does the import/export of these images take considering a county of Cuyahoga's size?

All ballot images are saved as they are scanned to ensure absolute transparency and auditability without slowing down the tabulation process. A 200 DPI greyscale image of the front and back of every ballot is taken upon tabulation.

The ClearCast precinct tabulator saves all scanned ballot images in duplicate on redundant 32GB USB sticks. Ballot images are transferred from USB drives to the ScanServer. The system consistently uploads 1000 images per minute at a consistent rate can be uploaded per minute. In ClearCount, our central count system, ballot images are saved automatically on the ClearCount ScanServer as they are scanned.

9. What is the expected life of all equipment?

- **Battery life**
- **Hardware (each piece of equipment)**

The battery life of all ClearVote equipment is 5 years. All offered hardware has an expected life of 10+ years.

10. What happens in the event of total loss of power? Is the data saved?

In the event of a total loss of power, no data is lost.

11. What type of ballot stock is required for use with your system. What size options are available?

The tables below present the recommended ballot stock options, as well as the available size options for each ClearVote component.

Paper Type	Weight Range
Cover Stock	60 lb. to 90 lb.
Index Stock	65 lb. to 90 lb.
Bond Ledger	32 lb. to 53 lb.

ClearVote component	Size Range
ClearDesign	8.5"x 5" to 8.5"x 22"
ClearCount	8.5"x 5" to 8.5"x 22"
ClearCast	8.5"x 5" to 8.5"x 22"
ClearAccess	8.5"x 5" to 8.5"x 18"



12. Describe the different levels/types of technical support provided during the initial implementation and for each election moving forward?

Clear Ballot will provide live help desk support to Cuyahoga County during the hours set forth in the agreement with the County. Support is available by phone, email, and web. Our call tracking system alerts support personnel upon receipt of a support case received by email or web. This highly effective, modern method ensures timely response to the support requests. Self-service support is available 24/7, we post all manuals, documentation, knowledgebase, and training videos on our support portal.

During implementation and during the first election, the Customer Success team will be on-site and in person in Cuyahoga. The Customer Success team provides tier 1 support in person and the Clear Ballot engineering team supports the success team remotely, effectively providing Cuyahoga with tier 2 and tier 3 support.

Following the implementation and for all subsequent elections, the Customer Success and Engineering teams provide remote support by phone, web and email, with extended hours of operation on election days. On-site support for subsequent elections is available and billable at our standard rates.

13. Do you have a standard implementation process or a list of tasks that must be completed during the implementation phases, who is responsible for those tasks and how long each task is expected to take in a county of our size?

- Mock elections/Pilot projects
- Resources available to be devoted to this process
- How many pieces of equipment would be provided for either process?

Clear Ballot's implementation process will be individually tailored for Cuyahoga County, while retaining a series of standard procedures used in all implementations. On day one, Cuyahoga County will receive one of Clear Ballot's experienced project managers. Clear Ballot's project managers are part of our Customer Success Team and average over 15 years of election experience, including large county and statewide precinct implementations.

The project manager will be joined by Clear Ballot field support engineers (FSE), a product integration lead, and experienced training specialists. The FSEs will inventory equipment, setup hardware, configure software, and complete quality assurance checklists for each system component. Clear Ballot's product integration lead will work closely with Cuyahoga County election and IT staff to integrate ClearVote into the existing operations and platforms.

A Project Team Kickoff will be the first part of the implementation, where your Clear Ballot project manager will customize our standard project implementation plan to meet Cuyahoga's needs. The plan will include Equipment Inventory and Delivery, Hardware and Software



Cuyahoga County, Voting Tabulation Equipment Survey

Installation, Final Acceptance Testing, Hardware and Software Training, Mock Election, and First Election Day Support.

Cuyahoga team members are responsible for attending regularly scheduled Project Team meetings, conducting Final Acceptance Testing, and learning the system through our hands-on training courses led by Clear Ballot training specialists. Clear Ballot encourages Cuyahoga County to invite IT personnel to familiarize themselves with the assembly and configuration process.

Clear Ballot will estimate and collaborate with Cuyahoga County to determine an exact timeline and scale the number of FSEs to fit Cuyahoga's schedule. A standard team of Clear Ballot FSEs can fully unpack, assemble, and configure the proposed 790 ClearCast Precinct Scanners, and 395 ClearAccess Accessible ballot marking devices in three (3) business weeks. This also includes the full implementation of eight (8) ClearCount scanners, the installation of servers for the election management systems for ballot layout and reporting software, and any additional accessories. If Cuyahoga needs the implementation to take less than three (3) business weeks, Clear Ballot will increase the size of the team to accommodate.

The ClearCast units will arrive fully assembled and pre-configured with all software by Clear Ballot prior to implementation. An FSE will unpack, setup, and inspect the units to ensure top quality, before going through final acceptance testing.

The ClearAccess units will require minor assembly and software installation upon arrival. A Clear Ballot FSE will assemble and inspect each unit, and fully install the ClearAccess software. The ClearAccess software can be installed in one (1) hour.

Following successful completion of all checklists for each component in the ClearVote system. Final acceptance testing criteria is defined by Cuyahoga, but typically would take fifteen (15) minutes per unit. and a successful end-to-end system test completed by FSEs, the Cuyahoga team would conduct their Final Acceptance Testing of the installed ClearVote system.

Clear Ballot's training program is hands-on, with classes that are tailored to fit your wide range of users. During the Project Kickoff Phase, Clear Ballot will work with Cuyahoga County to identify the County resources that should attend each of the training programs. Our trainings for the County IT team will begin during the hardware and server configuration phases. The election who run the election management processes will receive in-depth trainings in our ballot design software along with our results consolidation and reporting software which will require approximately five (5) full time days of training. The election staff who prepare the precinct and accessibility units for each election will receive election setup training on our ClearCast and ClearAccess units which will require one (1) day of training. The election staff who scan absentee ballots, will receive a one-day training course on our ClearCount central scanning units. These user specific training programs culminate with an end-to-end training session which will require one (1) full day of training.



Cuyahoga County, Voting Tabulation Equipment Survey

Clear Ballot offers two options for poll worker training, a train-the-trainer model and a full-service training program. Clear Ballot will work closely with Cuyahoga to determine which model is preferred or if a mixed approach is best. Both options include training materials customized for Cuyahoga County and easy to use quick guides for opening and closing the polls. Clear Ballot believes that ongoing training is an important part of continued success. While our extensive and tailored training program during the implementation will set the County up for success, we also offer an extensive continuing education program, both remote and in person, which is available to county election officials and poll workers.

Clear Ballot's implementation includes a mock election to test the end-to-end configuration of the ClearVote system. The mock election includes ballot layout in ClearDesign, prepping ClearCast and ClearAccess units with the election data, and the use of poll workers who have gone through Clear Ballot's training program. The duration of a mock election varies based on ballot complexity and number of votes cast.

Clear Ballot knows that no county is identical, and thus your Project Manager will tailor our standard implementation plan to fit the needs of Cuyahoga County. Clear Ballot team members will work closely with Cuyahoga County election staff to properly install and integrate the ClearVote system into your environment within a timeframe that meets Cuyahoga's schedule. Our training program will create a knowledgeable election staff and our support of your team will extend well beyond the first election.

14. Provide a copy of the standard acceptance testing process and procedures for all components of the tabulation system.

See Attachment #3, Standard Acceptance Testing Procedure.

15. Are sample L&A Testing procedures available?

- **Does your system generate a test deck? If so, is it customizable?**
- **Is ballot adjudication available with your system?**

Yes, Clear Ballot has tools to generate automated and customizable test decks. For example, Clear Ballot worked with King County, Washington to build a test deck with the following [criteria](#). The tool also creates a results file to confirm the expected results after scanning. All ballots can be adjudicated digitally using the ClearCount software.



16. What end user training is available?

- Train the Trainer, BOE Staff, PEOs
- Cost, length (hours per "class"), class size

Proposed Baseline Training Outline

Clear Ballot has a variety of training opportunities for Board of Election Staff and Precinct Election Officers, as well as "Train the trainer programs" should Cuyahoga County wish to utilize them.

The courses recommended for implementation of Clear Ballot in Cuyahoga County are as follows, though many additional training opportunities are available for various audiences and level of detail.

All training is at a rate of \$1,500 per instructor per day.

Audience	Course	Length	Max Students
BOE Staff	ClearDesign	3 days	8
BOE Staff	ClearCount	3 days	8
BOE Staff	ClearCast and ClearAccess	1 day	25
Train the Trainer	ClearCast and ClearAccess	1 day	25
PEOs	ClearCast and ClearAccess	0.5 days	30



17. Can you provide us with training documentation and if your system is purchased will you allow us to use your stock photos and edit your procedural documentation to be tailored for use in Cuyahoga County?

Yes, documentation on each course as well as training guides, videos and sandboxes will be made available upon signing. See below for descriptions of each training course.
Clear Ballot will allow documents to be tailored for use in Cuyahoga County.

ClearVote course descriptions

ClearVote™

Overview of the ClearVote™ System

Overview of ClearVote system architecture, Commercial Off The Shelf (COTS) hardware components and all software components comprising the voting system.

ClearDesign™ and ClearCount™

ClearDesign

Ballot preparation, including creating an election template designing and laying out ballots, formatting, proofing ballot styles, printing ballots; and exporting ballot PDF proofs, ballot definition files (BDFs) and accessible definition files (ADFs).

ClearCount™

Overview of system, election and user administration, election reports, election activity logs, and ClearCount system log. Overview of ballot scanning ScanStation operation and maintenance. Topics include initializing ScanStation, ballot scanning, resolving ballot jams, scanner routine cleaning, and consumable replacement.

ClearAccess™ and ClearCast™

ClearAccess and ClearCast: Operation and Maintenance

Overview of requirements for equipment configuration and maintenance. Topics include warehouse logistics, handling, storage, how to clean and prepare systems for elections, equipment staging procedures for delivery to polls; basic maintenance and post-election procedures. The course also covers replacing consumables, preventive maintenance, system diagnostics and firmware upgrade. This course is designed to train your IT team members how to properly prepare and deploy to your voting locations ahead of elections as well as collecting and storing devices in between elections.



Cuyahoga County, Voting Tabulation Equipment Survey

ClearAccess and ClearCast: How These Are Used During Elections

Overview of how to set up and use the ClearAccess and ClearCast units at the polls. Course covers the operation of precinct equipment, opening and closing of polls, issuing ballots, using audio headphones, sip and puff, keypad, and touchscreen for casting ballots. This course is designed to train the trainers on your team. Those trainers would then train poll workers at each of your voting locations.

18. Provide a list of known anomalies with the system (technical bulletins released) in all versions of the hardware, firmware, and software of certified product.

- Include details of any material defects or failures of any part of the system along with the election jurisdiction in which the defect or failure was discovered, the nature of the defect or failure, how it was discovered and resolved.

There have been no anomalies in any of our implementations. We consider an anomaly to be when the operational results of the election have been called in to question or malfunctions lead to widespread disruption for election workers and voters alike.

19. Is your system compatible with the CCBOE's current voter registration system and Electronic Pollbook systems and has this compatibility been tested and/or used in other election jurisdictions?

- Can the system be updated to be compatible with future voter registration systems the CCBOE may obtain?
- Describe the middleware system that is used in between the tabulation system DIMS/Precinct Central (Tenex).
- Is it compatible with the certified Remote Marking Systems? Cuyahoga uses Democracy Live specifically

Clear Ballot has communicated with Tenex, and both parties are currently in the process of developing a way for Tenex to print barcodes that are acceptable in ClearAccess. Clear Ballot will also provide necessary support to integrate our ballot on demand capabilities with the Tenex pollbook should the County wish to pursue that option.

Clear Ballot will work with any voter registration systems the County may obtain to ensure compatibility.

Clear Ballot can add DIMS support to our ballot import functionality using the ClearDesign software.

Clear Ballot supports 70+ ballot proofing reports which Democracy Live can use to import ballot data.



20. Does the system have the ability to be re-configured and customized to accommodate needs that change or evolve overtime, especially those required by new laws?

Yes, ClearDesign allows for Clear Ballot customers to independently customize and configure the system's software to fit their needs. Clear Ballot also offers software support services where any necessary changes can be completed by a Clear Ballot technician. All hardware upgrades and modifications can be completed by Clear Ballot to meet the County's needs.

21. Do you have a standard maintenance and upgrade schedule for new system releases and patches, including any additional costs associated with maintenance and upgrades or equipment repairs?

Clear Ballot software updates are included in the cost of your annual software maintenance agreement. We typically certify one major and one minor release annually. When to deploy each update will be determined by a mutual agreement between Clear Ballot and Cuyahoga County. The County can choose to upgrade their software themselves, or they can hire Clear Ballot Customer Success to perform the upgrade for them at standard billable rates.

22. Provide details of the Audit logs generated by each part of your system.

- Are all user actions logged?
- Are the audit logs unencrypted and able to be printed and exported?
- What is the default format?

All user activity on the server, including actions that may be indicative of system tampering such as failed logon attempts, is logged. The log files are appended and are never modified.

The ClearCount system maintains two log files. The system log records all activity on the voting equipment, that is, login attempts, activation/de-activation, the occurrence and the resolution of errors, power failures, and power restorations. The election log records all election-related events, for example, uploading ballot images from individual ScanStations, adjudication of individual ballots, and removal of ballot images and information. Both logs are unencrypted and can be printed and exported as a CSV file for analysis.

All audit logs are viewable in a browser interface from a computer.



23. Briefly describe all results reports the system can generate and provide sample copies of such reports.

- Can customized reports be designed and will our staff have the ability to customize without vendor involvement?
- Are the reports searchable or available to be exported into other document formats?
- Can the reports easily be exported for web viewing?
- What is the standard/default format used?

Users of the Clear Ballot ClearCount software can independently create fully customizable election specific reports that are exportable on three standard formats:

- Web reports – Operational and results reports that are viewed via browser windows, and can be copied, saved and printed
- PDF reports – Fully customizable results reports that viewable and downloadable as PDF files
- Exported reports – Reports that are only viewable after downloading

Users will be able to filter data, select columns to display, and sort the data to meet County reporting needs. All reports are read-only.

For each election, ClearCount displays a Dashboard that summarizes key statistics about the election operations.

The Dashboard offers a drop-down menu for accessing several election reports.

Below is a sample of our options, we also offer the ability to create an XML export with one click.

The screenshot shows the Clear Ballot ClearCount software interface. At the top, there's a navigation bar with 'Clear Ballot' and 'Reports for us, abatecounty, 2016'. Below this is a 'Clear County, General Election Dashboard'. The dashboard is divided into several sections: 'Election Data', 'Ballot Scanning Operations', and 'Visual Resolution of Unreadable Cards'. The 'Reports for us, abatecounty, 2016' dropdown menu is highlighted with a red box, showing a list of reports including 'Statement of Votes List', 'Statement of Cards Count', 'Ballot List', 'Conflicts Report', 'Statement of Votes List with Precincts', 'Generate PDF Report...', 'Card Inventory', 'Station Activity Log', 'Card Resolution', 'Count of Unreadable Cards', 'Card Location', and 'Generate XML Report File'. The dashboard also displays various statistics such as 'Open date', 'Tabulation date', 'Tabulation software version', 'Ballot count', 'Cards scanned', 'Cards not scanned', 'Cards automatically adjudicated', 'Pages in need of review', 'Unreadable cards', 'Pages scanned (ballots and new ballots)', and 'Cards that are fully known'. The 'Visual Resolution of Unreadable Cards' section shows a table with columns for 'Unreadable card images needing resolution', 'Unreadable cards resolved & adjudicated', 'Unreadable unreadable cards found by reviewing to be read', 'Unreadable resolved as a manual', and 'Unreadable cards'. The 'Card Resolution' section shows a table with columns for 'Cards automatically adjudicated' and 'Cards manually adjudicated'. The 'Adjustments to card count for Unreadables & Modifications' section shows a table with columns for 'Unreadable cards', 'Entered as a new ballot', 'Entered additional cards in multiple overlapping cards', 'Adjustment to card count from visual resolution', and 'Final Total Card Count'.



Cuyahoga County, Voting Tabulation Equipment Survey

Users can filter the fields by the selected filter options. Filter options include, but are not limited to:

Precinct



Clear Ballot Reports for cu_yahocounty_2015g

Clear County, General Election, Dec 03 2015

Statement of Cards Cast with Precincts

Precinct: 03 County Group: 03 Election: 03 Navigation: 03 Ball: 03 Change

Show / Hide columns

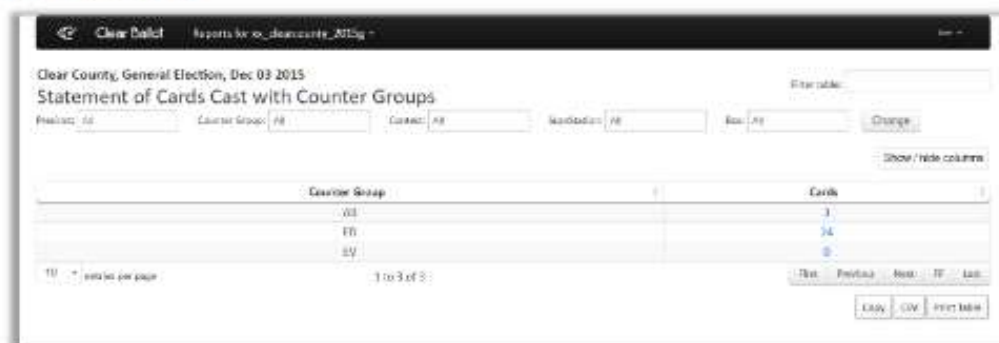
Precinct	Cards	Ballots
03 (Lorain-Madison)	3	3
03 (Lorain-Madison)	3	3
03 (Lorain-Madison)	3	3
03 (Lorain-Madison)	3	3
03 (Lorain-Madison)	3	3
03 (Lorain-Madison)	3	3

10 records per page 1 to 5 of 5

App Remove Add 0 0 0 0 0 0

Copy CSV Print Table

Counter Group



Clear Ballot Reports for cu_yahocounty_2015g

Clear County, General Election, Dec 03 2015

Statement of Cards Cast with Counter Groups

Precinct: 03 County Group: 03 Election: 03 Navigation: 03 Ball: 03 Change

Show / Hide columns

Counter Group	Cards	Ballots
03	3	3
03	3	3
03	3	3
03	3	3
03	3	3
03	3	3

10 records per page 1 to 3 of 3

First Previous Next 03 Last

Copy CSV Print Table



Cuyahoga County, Voting Tabulation Equipment Survey

Contest

Clear Ballot Reports for ea_clearcounty_2015g - User

Clear County, General Election, Dec 03 2015

Contests Report

Product: All Counter Order: All Sort: All Change

Show / Hide columns

Contest	# Precincts	# Ballots	Valid	Blank	Over	Over			
				Valid	Valid	Voted	%	Margin	Margin %
Malden City County Judge (Single Precinct and Write-In)	2	14	12	0	1	7.14%	2	15.38%	David Wilson
County Parks Board (Clause 2 out of 8 vote)	5	27	25	2	2	7.41%	5	11.90%	Simon Fletcher, Adam Leary
Northern Clear County Judge	2	7	7	0	0	0	7	100.00%	Andrew Kim
Southern Clear County Judge	1	5	5	0	0	0	1	55.55%	Erly Mungen
Barren Clear County Judge	3	3	3	0	0	0	3	100.00%	Amelia Rogers
Barren Judge William S. Clark (Re-elected)	1	5	5	0	0	0	1	20.00%	No
Rural Rep. Maypole (y/n followed by vote)	4	27	26	1	0	0	4	15.38%	No
Write-In Subsequent Vote (Precinct Rotation)	5	27	26	1	0	0	5	19.23%	Rachel Taylor
Representative To The United States Congress (write-in only)	4	27	11	16	0	0			Write-In
U.S. Senator Vote (Single Vote - Precinct Rotation)	5	27	27	0	0	0	5	18.52%	Jonathan Jones

13 entries per page 1 to 13 of 14

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ScanStation

Clear Ballot Reports for ea_clearcounty_2015g - User

Clear County, General Election, Dec 03 2015

ScanStation Report

Show / Hide columns

Scan Station	Serial	Cards	Unreadable	%	Scanner Model	Scanner Serial	Start Scan Time	Scan Duration	Cards Per Hour
ScanStation005	2	27	0	0.00%	PaperStream IP R-7180-44	A200000380	2016-01-08 12:57:40	0:29:00	178

13 entries per page 1 to 1 of 1

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Copy CSV Print Table



Cuyahoga County, Voting Tabulation Equipment Survey

Card Inventory

Clear Ballot Reports for cu_yahocounty_2018g

Clear County, General Election, Dec 03 2018

Card Inventory Report

Printer: All Counter Group: All Connect: All Scan Station: All Ser: All Change

SHOW / HIDE columns

BallID	Cards	Unavailable	%	Scan Station	Scanner Model	Scanner Serial	Start Scan Time	Scan Duration	Cards Per Hour	# Precision Stylus
A2-001	1	0	0.00%	ScanStation00	PaperStream IP H-7180-44	A200903380	2018-02-08 14:00:31	0:00:11	901	3
E2-001	12	0	0.00%	ScanStation00	PaperStream IP H-7180-44	A200903380	2018-02-08 14:00:24	0:00:19	2,402	4
E5-001	11	0	0.00%	ScanStation00	PaperStream IP H-7180-44	A200903380	2018-02-08 13:57:40	0:00:21	1,800	7

1 to 3 of 3

Print Preview Help IT List

Copy Clear Print Table

Generate a PDF report

Clear Ballot Reports for cu_yahocounty_2018g

Clear County, General Election, Dec 03 2018

Generate PDF Report

Structure

Report Type:

Type of Graphics:

Level of Detail:

☐ Sort chronology (first order print data first)

☐ Hide Counter Group subtotals

☐ Hide Groups and Subtotals subtotals

☐ Hide Totals

☐ Hide Headers Report

☐ Hide sub-headers

☐ Redact Small table Subtotals

☐ Hide Warnings about uncounted ballots

Page Size:

Page Width:

Page Height:

Labels

Output PDF name (optional):

Report Title:

Default Name:

Report content (optional):

Date format (optional):

Page footer (optional):

Filters

Printer:

Counter Group:

Connect:

Scan Station:

Ser:



Cuyahoga County, Voting Tabulation Equipment Survey

The default selection for all filtering options is **All**, except when they are preselected to show a specific set of data. All ClearCount reports can be shared with stakeholders in an election as the tabulation process progresses. ClearCount provides users with several reports for communicating election data. Report data is stored on the ScanServer, but users can access all reports via an election administration station.

24. Do you provide printing services for a county of our size?

Clear Ballot provides enormous flexibility when it comes to printing ballots. Clear Ballot works with print vendors and allows counties to choose any print vendor they want. We require a quick and easy certification process for printers to make sure the ballots they print will scan accurately. The ClearVote system supports the widest range of paper stocks. A variety of commercially available papers, in different weights, has been tested and used successfully with the ClearVote system.



TABULATION EQUIPMENT SURVEY

TABULATION VENDOR INITIAL SURVEY

1. Provide a brief company history including the main business of your company, the length of time in business and number of employees.

ES&S RESPONSE

ES&S is the largest elections-only company in the world and has been providing election equipment, software, and services for nearly four decades. Our corporate headquarters is in Omaha, Nebraska. The company employs more than 450 election professionals located in eight (8) operating locations across the United States.

Our team is composed of seasoned, highly skilled experts whose sole mission is to support our customers from start to finish. ES&S has supported more than 100,000 binding elections in the last decade alone and prides itself as having a single focus of ensuring our customers' elections are safe, secure, and successful.

2. Provide a current list of customers who are using or have previously used your Tabulation system.

- Contact name, email and phone number
- Jurisdiction size
- Date of implementation
- Product(s) and quantities purchased
- What software and firmware versions are currently being used

Please use attached excel spreadsheet "Vendor Customer List Template".

ES&S RESPONSE

ES&S supports 95,955 precincts among 3,300 clients in 42 states. Please see the attached **Vendor Customer List** for an overview of ES&S customers with more than 200,000 registered voters using the same voting system solution that we are proposing to the County, which includes Electionware, DS200, DS850 and ExpressVote units.

3. Based on the Cuyahoga County data attached to the email, provide a cost estimative for your paper based tabulation system.

- At least two (2) precinct ballot scanners per polling location
- One (1) ADA marking device per location
- High Speed Ballot Scanners
 - Daily scan period typically six (6) hours per day over a seventeen (17) day period
- Equipment Reserves (Backup Equipment) for election day
- Training Equipment
 - NOTE: Approximately 5000 workers attend an election training session during a county-wide election.

Please attach a separate document for this response.

ES&S RESPONSE

For a cost estimative for our paper-based tabulation system, please see the included file named **Question 3 Response**, which has been provided as a separate document as required.

4. Provide a detailed description of hardware and network product(s) listed in the estimate provided. Please include:

- All relevant information, including physical descriptions, model numbers, and part numbers, concerning components such as, but not limited to, laptops, tablet computers, printers, cables, connectors, servers, internet connectivity, precinct ballot scanners, high-speed ballot scanners, ADA equipment, etc.
- Whether a component is proprietary to the Vendor or whether the component is a commercial off-the-shelf product.
- What is the capacity of all precinct ballot scanners? How are they stored/managed?
- Are the precinct based scanners programmable for multiple precincts?
- Specifically identify precinct scanner ballot box options.

Please attach a separate document for this response.

ES&S RESPONSE

For this response, please see the included file named **Question 4 Response**, which has been provided as a separate document as required.

5. List any additional recommended hardware or software which is not required as part of the tabulation system?

ES&S RESPONSE

ES&S proposes additional third-party EMS software for networking DS850 units to more efficiently accommodate the County's numerous and often large elections.

6. What is the throughput for each type of ballot scanner? Include the details for:

- All ballots sizes available
- Flat v. Folded ballots
- NOTE: Our absentee ballots are folded three times prior to being sent out to the voters.

ES&S RESPONSE

THROUGHPUT AND BALLOT SIZES AVAILABLE

PRECINCT COUNT BALLOT SCANNER – DS200

The DS200 nominal processing speed (scan, image, tabulate) in ballots per minute (bpm): 11 inches - 12 bpm; 14 inches - 11 bpm; 17 inches - 10.5 bpm; 19 inches - 10 bpm.

The DS200 was designed to provide a very cost-effective, efficient tabulator for smaller jurisdictions. The DS200 can be used as a central scanner, or precinct-based scanner, as ballots are manually fed into the machine, which scans, images and tabulates the ballot with the average throughput of approximately 10-12 ballots per minute or 720 ballots per hour and 5,760 ballots per 8-hour day.

CENTRAL COUNT BALLOT SCANNER – DS850

At three times the speed of any other tabulator, the DS850 is unbeatable in throughput. The following actual expected throughput numbers are based on actual ballots processed per hour on election night recounts/canvasses.

The DS850 does not stop for write-ins or double-picked ballot sheets. Its intelligent design and clear and simple processes virtually eliminate scanning errors.

	Current Speed Target (ballots/min)	Theoretical Throughput (per Hour)	Actual Expected Throughput (per hour)
11"	368	22,080	11,500
14"	303	18,180	10,350
17"	258	15,480	9,400
19"	235	14,100	8,870

Chart Assumptions:

Transport Speed = 86 in/sec

Load Time = 30 sec
Unload Time = 30 sec

FLAT VERSUS FOLDED BALLOTS

The **DS200** has been uniquely designed to accept ballots that have been folded, those with creases, ballots with stubs torn off, irregularities, and otherwise damaged ballots. The scanner's paper transport safely guides folded ballots through the read heads to avoid paper jams or misreads.

The **DS850** was designed with a series of patent-pending TruGrip™ composite rollers that apply constant pressure to folded ballots throughout the entire tabulating process without losing speed. The DS850 processes flat/non-folded ballots at the same speed as folded ballots.

7. Does the high speed ballot scanner(s) have the ability to sort ballots as they are being scanned?

- Write-ins, Remakes, Blank Ballots, etc.

ES&S RESPONSE

Yes, the DS850 is capable of out-stacking ballots with exceptions (including write-ins, remakes, blank ballots, etc.) without stopping the processing of ballots. The DS850 sorts counted or uncounted ballots into three configurable sorting bins without stopping or slowing throughput.

8. Do the ballot scanner(s) have the ability to save ballot images? If so, what is the capacity, methodology for saving images and how long does the import/export of these images take considering a county of Cuyahoga's size?

ES&S RESPONSE

BALLOT IMAGES

Yes. The **DS200** and **DS850** can save ballot images.

During the election setup in Electionware, the user may decide to use the Capturing Image feature to save all ballot images, no ballot images, or only those ballot images with write-ins.

When ballots are scanned, depending on the Electionware programming, the **DS200** can store a graphic image of the scanned ballot, including write-in text, on the system's USB media device. When the scanner detects a write-in vote, the system stores the write-in ballot image under a special file name to identify the image as a write-in ballot. Ballot images can be reviewed in Electionware. Ballot images can be filtered by various attributes, including displaying only ballots containing write-ins. The Cast Vote Record for the ballot image can be viewed beside the ballot image. Furthermore, Electionware can output a spreadsheet with an entry for each hand-written write-in snippet of the image containing the voters' marks.

The **DS850** stores the front and back side image in a standard compressed CCITT T.4 bi-level TIFF image that can be viewed using commercial off-the-shelf (COTS) software.

CAPACITY AND METHODOLOGY

The internal memory of the **DS200** is 2 GB RAM. The DS200 comes with Delkin USB Industrial Single-Level Cell (SLC) commercial grade flash drives.

The DS200 stores all cast vote records, ballot images (front and back sides), election definition files, and audit data to a removable USB media device that has a standard storage capacity of 4 GB (8 GB or larger drives available, if necessary). On average, a 4GB USB media device will hold approximately 12,000 ballot images.

The **DS850** has capacity for 9,990 precincts, 40 ballot styles per precinct in a Ballots-by-Style election. It contains 1 TB HDD and holds approximately 5 million ballot images and related data.

The ballot Cast Vote Record (CVR) contains the ballot vote data in an .XML file that can be read with a COTS reader. The image files can also be exported in .PDF files for archival or public review.

IMPORT/EXPORT TIME

Import and export times will vary based on what images are being retained, the size of the images and the number of ballots on the USB media devices. Using no images creates the fastest export and import times. Saving all images create the longest import and export times.

DS200 USB media devices with approximately 2,000 ballot images typically imports into Electionware in approximately 10 seconds. Since the USB media devices always have the images there is no export time.

DS850 export the data to the USB media device. The DS850 only exports batches of ballots that have not been previously exported. QA testing showed the following central scanner export times.

2,000 ballots – 2 batches of 1,000

52 seconds to get from the DS850 export to completion on the server

17 seconds to load into Electionware – 5 secs per batch (commit to load complete status)

Ran election results – all defaults – 10 seconds

Cleared Results

2,000 ballots – 20 batches of 100

1:49 to get from the DS850 export to completion on the server

21 seconds to load into Electionware – 1 sec per batch (commit to load complete status)

Ran election results – all defaults – 9 seconds

Cleared Results

2,000 ballots – 400 batches of 5

21:59 to get from the DS850 export to completion on the server (took about 3-4 secs per batch)

24 mins to load into Electionware – 3-4 secs per batch (commit to load complete status)

9. What is the expected life of all equipment?

- Battery life
- Hardware (each piece of equipment)

ES&S RESPONSE

LIFE EXPECTANCY

ES&S designs and manufactures its voting equipment (**including all hardware, firmware, and software**) to withstand normal use without deterioration and without excessive maintenance cost for a **minimum lifecycle of 15 years**.

ES&S ensures that certified repair and replacement parts are always readily available. ES&S' strong financial standing, vast supplier relationships, large customer base, and extensive research and development capability provide a foundation for long-term availability of our products and parts for our customers.

Because ES&S designs and owns all rights to the design and manufacturing of our voting system units, tight control is possible. ES&S uses long-life, industrial components that allow many years of general availability and much longer with end-of-life buying arrangements.

We follow all Voluntary Voting System Guidelines; therefore, our voting systems are HAVA-compliant their entire expected lifecycle.

BATTERY LIFE

DS200

- ✓ The DS200 contains an internal backup battery that maintains the system in the case of a power failure during the election process. The battery is a 21-volt, 10 cell lithium-ion battery that needs no special maintenance. The battery obtains its charge automatically from the system power supply any time the unit is plugged in – a separate charging device isn't required. It ensures complete protection from power failure and provides a **minimum of three to four (3-4) hours** of normal operation in the event of a power failure.
- ✓ The DS200 Coin Cell Motherboard Battery can last **up to five (5) years** before replacement is required if the battery has been properly maintained and stored.
- ✓ The DS200 Internal Rechargeable Lithium Ion Backup Battery can last **up to five (5) years** before replacement is required if the battery has been properly maintained and stored.

EXPRESSVOTE

- ✓ If external power is lost, the ExpressVote seamlessly reverts to a backup battery that allows it to operate normally for **at least two to four (2-4) hours**. This battery backup is fully integrated into the unit and includes the ability to print the VVPAT. When the battery gets low, the system will initiate a graceful shutdown before the battery is fully exhausted to ensure no ballots are being scanned or data is being written to the USB media device during shutdown of the unit. When power returns, a recovery procedure allows voting to continue where it left off.

CAPACITY AND METHODOLOGY

The internal memory of the **DS200** is 2 GB RAM. The DS200 comes with Delkin USB Industrial Single-Level Cell (SLC) commercial grade flash drives.

The DS200 stores all cast vote records, ballot images (front and back sides), election definition files, and audit data to a removable USB media device that has a standard storage capacity of 4 GB (8 GB or larger drives available, if necessary). On average, a 4GB USB media device will hold approximately 12,000 ballot images.

The **DS850** has capacity for 9,990 precincts, 40 ballot styles per precinct in a Ballots-by-Style election. It contains 1 TB HDD and holds approximately 5 million ballot images and related data.

The ballot Cast Vote Record (CVR) contains the ballot vote data in an .XML file that can be read with a COTS reader. The image files can also be exported in .PDF files for archival or public review.

IMPORT/EXPORT TIME

Import and export times will vary based on what images are being retained, the size of the images and the number of ballots on the USB media devices. Using no images creates the fastest export and import times. Saving all images create the longest import and export times.

DS200 USB media devices with approximately 2,000 ballot images typically imports into Electionware in approximately 10 seconds. Since the USB media devices always have the images there is no export time.

DS850 export the data to the USB media device. The DS850 only exports batches of ballots that have not been previously exported. QA testing showed the following central scanner export times.

2,000 ballots – 2 batches of 1,000

52 seconds to get from the DS850 export to completion on the server

17 seconds to load into Electionware – 5 secs per batch (commit to load complete status)

Ran election results – all defaults – 10 seconds

Cleared Results

2,000 ballots – 20 batches of 100

1:49 to get from the DS850 export to completion on the server

21 seconds to load into Electionware – 1 sec per batch (commit to load complete status)

Ran election results – all defaults – 9 seconds

Cleared Results

2,000 ballots – 400 batches of 5

21:59 to get from the DS850 export to completion on the server (took about 3-4 secs per batch)

24 mins to load into Electionware – 3-4 secs per batch (commit to load complete status)

9. What is the expected life of all equipment?

- Battery life
- Hardware (each piece of equipment)

ES&S RESPONSE

LIFE EXPECTANCY

ES&S designs and manufactures its voting equipment (**including all hardware, firmware, and software**) to withstand normal use without deterioration and without excessive maintenance cost for a **minimum lifecycle of 15 years**.

ES&S ensures that certified repair and replacement parts are always readily available. ES&S' strong financial standing, vast supplier relationships, large customer base, and extensive research and development capability provide a foundation for long-term availability of our products and parts for our customers.

Because ES&S designs and owns all rights to the design and manufacturing of our voting system units, tight control is possible. ES&S uses long-life, industrial components that allow many years of general availability and much longer with end-of-life buying arrangements.

We follow all Voluntary Voting System Guidelines; therefore, our voting systems are HAVA-compliant their entire expected lifecycle.

BATTERY LIFE

DS200

- The DS200 contains an internal backup battery that maintains the system in the case of a power failure during the election process. The battery is a 21-volt, 10 cell lithium-ion battery that needs no special maintenance. The battery obtains its charge automatically from the system power supply any time the unit is plugged in – a separate charging device isn't required. It ensures complete protection from power failure and provides a **minimum of three to four (3-4) hours** of normal operation in the event of a power failure.
- The DS200 Coin Cell Motherboard Battery can last **up to five (5) years** before replacement is required if the battery has been properly maintained and stored.
- The DS200 Internal Rechargeable Lithium Ion Backup Battery can last **up to five (5) years** before replacement is required if the battery has been properly maintained and stored.

EXPRESSVOTE

- If external power is lost, the ExpressVote seamlessly reverts to a backup battery that allows it to operate normally for **at least two to four (2-4) hours**. This battery backup is fully integrated into the unit and includes the ability to print the VVPAT. When the battery gets low, the system will initiate a graceful shutdown before the battery is fully exhausted to ensure no ballots are being scanned or data is being written to the USB media device during shutdown of the unit. When power returns, a recovery procedure allows voting to continue where it left off.

- ☛ The ExpressVote Coin Cell Motherboard Battery should be replaced every **four to five (4-5 years)**.
- ☛ The ExpressVote Internal Rechargeable Lithium Ion Backup Battery should be replaced every **five (5) years**.

DS850

- ☛ The DS850 is certified with a COTS UPS (Uninterruptible Power Supply). In the event of external power failure, the DS850 automatically transitions to being powered by the UPS. When running on UPS power, the tabulator will complete any ballot scanning that is taking place at the time of power transition. From there, the operator can save the current results and print any desired reports. The operator can then shut the unit down manually, or the unit will automatically and gracefully shut down when the UPS battery is exhausted. The UPS battery has an average life of **three to five (3-5) years**, depending on usage.
- ☛ The DS850 internal Motherboard Coin Cell Battery can last **up to five (5) years** if it has been properly maintained and stored.

10. What happens in the event of total loss of power? Is the data saved?

ES&S RESPONSE

In the event of a total loss of power, the DS200 and ExpressVote **seamlessly revert to an internal backup battery**. The DS850 automatically transitions to being powered by an **Uninterruptible Power Supply**. **Data is saved.**

11. What type of ballot stock is required for use with your system. What size options are available?

ES&S RESPONSE

ES&S recommends that Cuyahoga County use CountRight™ Digital Ballot Stock. Other non-proprietary stock may be used, but it **must** strictly adhere to ES&S' ballot code stock specifications to ensure proper tabulation of the voter's ballot. ES&S recommends the use of ballot stock containing the same specifications found in our CountRight Digital Ballot Stock with our tabulators.

CountRight is available to the County in two ways. First, as the only authorized distributor of CountRight ballot stock, Veritiv, North America's largest paper distributor, offers CountRight parent sheets and rolls in a variety of sizes and formats. Second, ES&S stocks and markets CountRight Digital Ballot Stock in various sizes and formats. This pre-cut stock is blank with no pre-printing.

Ballot Specifications	
Grain Direction on Finished Ballot	Long
Basis Weight	80# text weight (36.2874 kg)
Thickness	0.0061 in. (0.014595 cm)

Smoothness	130 Sheffields
Moisture	5.5 percent
Opacity	97.0
Brightness	92 to 94
PPI	338

Tolerances	
Band Width	8.5 in. (+.027, -.02)
Ballot Length	11, 14, 17, 19 in. (+/- 0.03)
Ink Density	1.15 to 1.25 wet ink density; 1.10 to 1.15 dry ink density
Oval Thickness	The printed oval line thickness must be within the range of 0.004 inches to 0.006 inches.

12. Describe the different levels/types of technical support provided during the initial implementation and for each election moving forward?

ES&S RESPONSE

IMPLEMENTATION SUPPORT

ES&S provides implementation support via our project management team.

Project/Account Managers (PM/AM) Heather Scott and Kyle Weber shall be responsible for the overall planning, communication, management and coordination of ES&S services. The PM/AM will be the liaison for Cuyahoga County with ES&S as it pertains to all products, services and obligations set forth in the Agreement.

Ultimately, the measure of success in a new voting system implementation is a successful election. Our proven project management approach instills confidence and provides tools and training to ensure you are prepared for each Election Day. ES&S will provide all related aspects of project management to ensure a smooth and successful implementation, which ultimately means trouble-free elections.

All our projects involve several key steps that we manage well. At ES&S, we adhere to the Project Management Body of Knowledge, or PMBOK, project management best practices. Our PMP-certified personnel are committed to ensure our team follows the standards and framework of the Project Management Institute in every step of the project implementation.

PMBOK is recognized worldwide as the best-practices guide to the project management knowledge, skills, techniques and tools known to achieve success. Among other implementation areas, PMBOK provides guidance in organization, planning, staffing, implementation and controlling of a project. ES&S uses the standards and framework of PMBOK to guide our practices. We then build on PMBOK using the lessons learned over approximately 40 years of implementing voting systems to ensure every implementation is a success. Our customized implementations include extensive customer communication, touch points, mutual reporting, ongoing evaluation, and follow-up to ensure we meet each customer's unique requirements and needs.

The project team will employ our vast network of subject matter experts company-wide to provide quality support and sound project management. As a leader in the elections industry, ES&S has implemented thousands of customers. We take every effort to ensure every implementation is a smooth process and that you and your staff are fully prepared throughout each step of the process.

Please see the **Implementation Timeline & Narrative** included as **Appendix A**.

ELECTION DAY SITE SUPPORT

ES&S can provide contracted Election Day support. Representatives can be available to Cuyahoga County before, during, and/or after the election. These support representatives will fulfill your needs at the time, which could include assisting with election administration, procedural guidance, hardware and software operation, Election Day call center staffing, as roving troubleshooters during Election Day, and election night accumulation of results. They also will liaison with the ES&S Help Desk, if necessary.

HELP DESK

Our ES&S Help Desk forms our single-point support system for all aspects of your total system. The Help Desk is staffed with experienced hardware and software technical support representatives who stand ready to resolve any issue you have, whether for the polling place/early voting site equipment, absentee voting system, election management and voter registration system, or electronic poll books.

TECHNICAL SUPPORT

The ES&S Technical Support Team ("Help Desk") offers multiple support channels to assist customers with issues and concerns ranging from simple "how-to" questions to complex functional inquiries. Customers who purchase and maintain ES&S hardware maintenance and software license support services through ES&S agreements automatically receive on-call telephone support.

Your call to the Technical Support Team during our hours of operation will immediately be answered by an expert hardware or software technician who will answer your questions and/or begin resolution of your issue. ES&S uses remote support tools like WebEx as well as Team Viewer and GoToAssist to provide over-the-shoulder assistance when needed. We track all questions or concerns and their resolution to provide continuity of service.

ISSUE RESOLUTION

During Election Day activities, our Technical Support Team is ready to help on its extended-hour schedule (for a 24-hour period beginning at 4 a.m. Central) to meet the various poll open and closing times for our

customers across the United States. During any General Election, ES&S augments our technical support team to further ensure that your issue will receive an immediate response when you contact the Help Desk.

During non-election periods, the Technical Support Team can be reached on weekdays between 7 a.m. to 7 p.m. Central Time. After hours, a representative will return your call as soon as possible, but no later than the next business day.

When a planned system maintenance event is scheduled on evenings, weekends, or holidays, ES&S recommends that Cuyahoga County notify their account manager, who can inform the Technical Support Team to expect potential service calls, ensuring the most rapid response possible.

TOLL-FREE PHONE SUPPORT

Our dedicated toll-free customer support telephone number is 877-ESS-VOTE (877-377-8683). The support line is open 24 hours a day, 7 days a week. Technical Support Team hardware and software technicians will immediately respond to your call during our business hours from 7 a.m. to 7 p.m. (Central Time), Monday through Friday. After hours or during weekend/holidays, Cuyahoga County can leave a message 24/7 and a representative will return your call as soon as possible, but no later than the next business day.

Furthermore, your account manager may be contacted by cell phone 24x7x365. Your account manager will provide Cuyahoga County and its agencies with redundant sources to help you resolve any issue you may have during after hours, weekends, and holidays.

EMAIL SUPPORT

Customers can communicate directly with specialized ES&S support and technical representatives.

ES&S CUSTOMER PORTAL

Cuyahoga County will receive login credentials to the ES&S customer portal. The portal contains copies of all user documentation, including administrator and operator manuals and product advisories. The portal also provides access to request forms and a link to the ES&S supply store website.

I 3. Do you have a standard implementation process or a list of tasks that must be completed during the implementation phases, who is responsible for those tasks and how long each task is expected to take in a county of our size?

- *Mock elections/Pilot projects*
- *Resources available to be devoted to this process*
- *How many pieces of equipment would be provided for either process?*

ES&S RESPONSE

Please see the **Implementation Timeline & Narrative** included as **Appendix A** for tasks, responsible parties, length of tasks, mock elections and resources available.

ES&S will work with Cuyahoga County to determine specific quantities for any requested mock/pilot elections. ES&S will provide all necessary election equipment to demonstrate a successful mock/pilot election.

14. Provide a copy of the standard acceptance testing process and procedures for all components of the tabulation system.

ES&S RESPONSE

Please see **Appendix B** for **Acceptance Checklists**.

In addition, and for the benefit of the County, ES&S has included a copy of its standard Voting System **Sales Order Agreement** ("ES&S Standard Agreement") in **Appendix C**, which provides for the purchase and license of ES&S' voter tabulation system products and services. ES&S Standard Agreement has been designed specifically for the purchase of ES&S' voting system products and services by a customer and contains those provisions specific to such voting system purchase. Please note that the content of this Tabulation Equipment Survey and all provisions of the successful proposal deemed pertinent by the parties may be easily incorporated into ES&S' Standard Agreement.

15. Are sample L&A Testing procedures available?

- Does your system generate a test deck? If so, is it customizable?
- Is ballot adjudication available with your system?

ES&S RESPONSE

L&A TESTING

Please see **Appendix D** for **Sample L&A Testing Procedures**.

DS200

Cuyahoga County Election Staff/ES&S will test the ballot tabulation and mechanical scanning functions of the DS200 during Logic and Accuracy (L&A) testing by feeding an audited stack of pre-marked ballots (the test deck) through the scanners and comparing the resultant scanner totals to the expected test deck totals.

Prior to starting the DS200 L&A testing, an equipment pre-test will be run on each tabulator to verify the equipment status (battery charged, paper roll changed, ink dauber changed, touch screen calibrated, correct date and time setting).

After the pre-test, each tabulator will be powered up and the election qualification code and definition loaded. As the unit boots up, a Configuration report, Ballot Status and Accounting report, and Zero report will print. The tester will verify that no votes are present on the unit; if votes are present, they must be cleared prior to starting the L&A.

When the tester is ready to begin testing the paper ballot portion of the L&A, the test deck ballots are fed into the DS200. Once done, the polls on the DS200 are closed by pressing the Polls Closed button inside the

access door. The unit will automatically print a Results Report and the tester will verify the results with the known results from the pre-marked deck.

The ExpressVote can be used to print vote summary cards of each style and use these to run logic and accuracy tests on ES&S tabulators.

To complete the end-to-end testing, the results on each of the USB media devices are read into Election Reporting Manager (ERM) to validate the pre-marked results with the results achieved from the reporting software. When L&A testing is complete, each scanner should be cleared of all vote totals, a Zero report run to validate the results cleared, and the unit locked and sealed for transport to the polling place. This level of testing ensures the integrity of the entire system.

EXPRESSVOTE

The ExpressVote can be used to print vote summary cards of each style and use these to run logic and accuracy tests on ES&S tabulators.

Self-diagnostic tests verify that firmware is properly installed upon system startup. Initial reports identify the installed election program and firmware versions. Any errors loading system firmware or election programming result in equipment shutdown with a clear error message.

DS850

Before using the DS850 in a live election, ES&S recommends testing to ensure the election has been coded and ballots printed correctly, and that the scanners/tabulators correctly read votes in each possible voting target. In addition, we recommend testing your process for collecting results from your tabulators and entering them in Electionware.

ES&S recommends testing every ballot style in use for an election, as well as testing every voting target on each of those ballot styles. Ballots can be hand marked, or test decks can be marked with a pre-generated sequence using Electionware.

ES&S will work with Cuyahoga County to develop and refine the specific L&A testing protocols to be followed.

The DS850 requires approximately 1-hour to complete L&A testing, depending on the complexity and size of the election.

TEST DECK

Yes. Our **Automated Test Deck Creation module** found within Electionware Toolbox software provides a spreadsheet chart of predetermined results as well as a set of PDF files with pre-marked ovals. The information needed to create the test deck comes directly from the Electionware election definition.

The canvass style spreadsheet chart includes easy-to-identify marks plus overvotes, as well as all election-specific candidate names. Benefits of using ES&S' Test Deck feature includes significant time and costs savings for clerks because manual creation is eliminated, as well as removing the potential for human error from the equation.

Additionally, Electionware Toolbox is able to create automated logic and accuracy test scripts that can be run on the tabulators. These automated scripts can also be supplemented with **customizable** manual logic and accuracy testing if desired. Once testing is complete, the system requires that all test data – automated, manual, or a combination – is cleared from the system in order to prepare for Election Day.

BALLOT ADJUDICATION

Our system offers both electronic and physical adjudication.

ELECTRONIC ADJUDICATION

Electronic adjudication enables an adjudication team to review images of ballots that include exceptions like overvotes, undervotes, marginal marks, blank ballots, and write-ins. You will have all the functionality of the DS850 as well as electronic adjudication.

The adjudication functionality will be intuitive so that the adjudication team will need minimal training to use it. For example:

- The user interface will enable viewing of the ballot image along with the Cast Vote Record (CVR) data that show how the ballot was tabulated.
- The user interface will make it easy to find exceptions, move through contests, and see what was changed compared to how the ballot was originally counted.
- Users will be able to zoom into areas of ballot images, print, and save them.
- Users will be able to update a ballot's status during the adjudication process (not reviewed, reviewed with changes, reviewed with no changes, on hold)
- Users will be able to both use write-in candidate names set in the system and to add write-in candidates "on the fly" and then assign that name to additional ballots
- Users will be able to easily match a physical ballot with the on-screen image

PHYSICAL ADJUDICATION

Our system allows for smooth, continuous ballot scanning while doing the bulk of the adjudication work on the front end to save election staff time and energy on the back end. This will ultimately result in counties processing more ballots with fewer staff in a shorter amount of time.

- Two-thirds less adjudication time. With the DS850 and DS200 you will spend dramatically less time adjudicating ballots. Incomplete voter marks, voter intent and poorly printed ballots commonly cause problems for election administrators. Our patented technologies – Intelligent Mark Recognition (IMR™) and Positive Target Recognition and Compensation (PTRAC™) – solve this problem by ensuring even the most problematic ballots are read accurately, consistently and automatically. They protect voter intent and greatly reduce the amount of time in review and adjudication. The number of ballots that need to be reviewed are reduced by up to 68 percent with the DS850 compared to other systems.

- PTRAC's sophisticated image processing algorithms start by using the ballot's timing marks to quickly create an evaluation window where the oval for each contest is expected to be. Because ballots can skew, stretch, and crumple, PTRAC positively locates every individual oval on the ballot, moving the ballot image as necessary. In other words, our tabulators don't just look where the ovals should be, but find where they are located. Next, PTRAC leaves just the voter's marks visible by detecting the exact center of the oval and digitally removing the oval perimeter line. All that remains is the voter's mark.

Once the voter mark has been identified, our IMR technology takes over. It recognizes traditional marks and non-traditional voter marks (such as X's, checkmarks, and diagonal slashes) with unparalleled accuracy. IMR considers not just pixel count, but also the shape of each mark, its pattern, and the mark's intent. It also avoids getting fooled by inadvertent marks such as smudges or stains and looks for patterns to determine voter intent. The result is a dramatic increase in throughput and accuracy, while leaving fewer ballots for election personnel to review.

Another option to help with adjudicating ballots is our "Scan Sort Setting" option that is available on the DS850. This function allows for the sort functions to be turned off for the next "run of ballots." For example, if a ballot is run through and is outstacked for being an overvote, the ballot will be reviewed and deemed whether it is a true overvote or needs to be adjudicated. If it is deemed to be a true overvote, you simply put the ballot(s) back on the tabulator and enable "Scan Sort Setting" which will turn off the sorts for the next run. The ballots are processed at 300 per minute and all the races will be tabulated EXCEPT for the overvoted race in question. This feature was designed to save time and energy for election officials.



The DS850 provides greater flexibility for election workers by providing three separate sorter bins. These bins can be configured to sort specific types of ballots for further review, write-in votes, overvotes, blank ballots, or other exception ballots without slowing down. The throughput is unmatched in the market today and will allow the City to ultimately get results faster on and before Election Day.

The highly scalable DS850 high-speed tabulator will allow the County to keep up with the ever-increasing vote-by-mail population with the least amount of equipment. A single DS850 can do the work of multiple machines that would be required from our competition.

The DS850 will process nearly 9,000 19-inch double-sided ballots per hour, including previously folded ballots – three times the speed of any other tabulator. Not only will you get results faster, but scanner operator time and labor costs will be reduced significantly. What used to take days will now only take hours in most cases.

16. What end user training is available?

- *Train the Trainer, BOE Staff, PEOs*
- *Cost, length (hours per "class"), class size*

ES&S RESPONSE

Each of our end user training courses equips participants with the knowledge and skills to train election staff. Additional training is available, if needed, for \$1,700 per day.

For associated costs of end user training, please see our included **Pricing**.

Course description	Course pre-requisite(s) and audience
DS200 Operations Course	
Course Length – ½ Day	
<p>This course introduces election personnel to the DS200 precinct scanner and tabulator. Successful participants gain the knowledge, skills, and abilities to operate the ES&S DS200 precinct ballot tabulation system.</p> <p>Covered topics include:</p> <ul style="list-style-type: none"> • In-depth overview of the DS200 tabulator, including hardware components, ballot boxes, setup, battery, and charging. • Pre-election preparation requirements. • Election Day operations, including opening and closing the polls for Early Voting and Election Day, scanning voted ballots, and transmission of election results. • Troubleshooting procedures. 	<p>Pre-Requisite(s):</p> <ul style="list-style-type: none"> • None <p>Audience:</p> <ul style="list-style-type: none"> • Election staff <p>Number of Participants:</p> <ul style="list-style-type: none"> • 1 - 20
ExpressVote BMD Operations Course	
Course Length – ½ Day	
<p>This course introduces election personnel to the ES&S ExpressVote Universal Voting System that is used to mark ballots. Successful participants gain the knowledge, skills and abilities to operate the ExpressVote system.</p> <p>Covered topics include:</p> <ul style="list-style-type: none"> • In-depth overview of the ExpressVote, including hardware components, setup, battery, and charging. • Pre-election preparation requirements. 	<p>Pre-Requisite(s):</p> <ul style="list-style-type: none"> • None <p>Audience:</p> <ul style="list-style-type: none"> • Election staff <p>Number of Participants:</p> <ul style="list-style-type: none"> • 1 - 20

<ul style="list-style-type: none"> • Election Day operations including marking the vote summary card and how the device meets usability and disability standards. • Troubleshooting procedures. 	
DS850 Operations Course	
Course Length – 1 Day	
<p>The ES&S DS850 course gives election personnel a nuts and bolts introduction to the high-speed central scanner and tabulator. Covered topics include:</p> <ul style="list-style-type: none"> • Overview of the machine • Cleaning the machine • Scanner setup and pre-Election Day testing • Printing reports • Election Day preparation • Scanning ballots 	<p>Pre-Requisite(s):</p> <ul style="list-style-type: none"> • None <p>Audience:</p> <ul style="list-style-type: none"> • Election staff <p>Number of Participants:</p> <ul style="list-style-type: none"> • 1 - 10
Electionware Course	
Course Length – 5 Days	
<p>The Electionware course will provide election personnel with general knowledge of the ES&S Electionware election management system. The participants will be able to capture and design ballot layout, program election hardware, and produce summary and customized election reports for your election.</p> <p>In the Electionware modules, the facilitator will provide the participants with the knowledge, skills, and abilities to:</p> <ul style="list-style-type: none"> • Define - Build, store, and update all election-related information (i.e., precincts, districts, offices, candidates, referenda) in one database. • Design - Create an election ballot layout for Paper, Touch Screen, and Accessible Ballot. • Deliver – Configure election tabulation equipment, as well as package media for Election Day. • Results – 	<p>Pre-Requisite(s):</p> <ul style="list-style-type: none"> • None <p>Audience:</p> <ul style="list-style-type: none"> • Coding staff <p>Number of Participants:</p> <ul style="list-style-type: none"> • 1 - 10

<ul style="list-style-type: none">- Accumulate election results, generate and display standard and customized reports, in both paper and electronic formats.- Review and adjudicate ballot images, as well as, manage write in reviews.- Manage Provisional ballots.• Manage - Manage user account and security access for Electionware software.	
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17. Can you provide us with training documentation and if your system is purchased will you allow us to use your stock photos and edit your procedural documentation to be tailored for use in Cuyahoga County?

ES&S RESPONSE

If awarded this contract, ES&S will provide training documentation to the County upon delivery and implementation. In the event the County purchases and licenses ES&S' voting system, ES&S will agree to allow the County to use ES&S' photos as well as tailor ES&S' procedural documentation for use solely within Cuyahoga County provided the County maintains all copyright, trademark, patent or other intellectual or proprietary rights notices that are set forth on the documentation.

18. Provide a list of known anomalies with the system (technical bulletins released) in all versions of the hardware, firmware, and software of certified product.

- Include details of any material defects or failures of any part of the system along with the election jurisdiction in which the defect or failure was discovered, the nature of the defect or failure, how it was discovered and resolved.

ES&S RESPONSE

ES&S is not aware of any failures and/or defects with EVS 6.0.0.0 since its EAC certification approval in July 2018. No technical bulletins or product advisories been necessitated for the hardware, firmware, or software versions of this certified product.

EVS 6.0.0.0 was successfully used in 19 Utah counties during the State's 2018 Primary Election using the same configuration being offered in this proposal. This solution will be used again by the Utah counties in the November 2018 General Election.

Additionally, EVS 6.0.0.0 also was used in Johnson County, Kansas, during the State's 2018 Primary Election in a different configuration than that being proposed, which included the ExpressVote Tabulator in its first election use in a large county wide election. While no failures were experienced, and the elections results were secure and accurate, ES&S was dissatisfied with the performance of the Electionware Results reporting module that resulted in the County's ability to report the results to the public in a timely manner.

Once the issues encountered by Johnson County were identified and corrected, ES&S submitted the updated Results module software to the Election Assistance Commission (EAC) for certification on September 5. EVS 6.0.2.0 received federal certification from the EAC on October 4, followed by state certification from the Kansas Secretary of State's Office on October 11.

No other components of the EVS 6.0.0.0 system were necessary to be modified in the certification of the EVS 6.0.2.0 release. ES&S has applied for Ohio state certification of EVS 6.0.2.0 and anticipates final approval to be granted by 2019. For further details, complete results of the EAC testing of EVS 6.0.2.0 are available on their website.

19. Is your system compatible with the CCBOE's current voter registration system and Electronic Pollbook systems and has this compatibility been tested and/or used in other election jurisdictions?

- Can the system to be updated to be compatible with future voter registration systems the CCBOE may obtain?
- Describe the middleware system that is used in between the tabulation system DIMS/Precinct Central (Tenex).
- Is it compatible with the certified Remote Marking Systems? Cuyahoga uses Democracy Live Specifically

ES&S RESPONSE

COMPATIBILITY

Our proposed solution is compatible with the CCBOE's current voter registration system.



For the purposes of activating a voting session, the ES&S ExpressVote Universal Voting Device has been integrated with the following Pollbooks used in Ohio:

- ✔ ExpressPoll Tablet, EZRoster Version 3.2.2.0 (ES&S)
- ✔ ExpressPoll Tablet, EZRoster Version 3.3.1.0 (ES&S)
- ✔ ExpressPoll Tablet, EZRoster Version 3.5.0.0 (ES&S)
- ✔ ExpressPoll Tablet, EZRoster Version 3.7.0.0 (ES&S)
- ✔ VoteSafe Electronic Pollbook (VOTEC)
- ✔ KNOWiNK Poll Pad (KNOWiNK)
- ✔ Precinct Central Touchpad (Tenex)

If the State has additional specific integration requirements, we are available for further clarification.

COMPATIBILITY WITH FUTURE VOTER REGISTRATION SYSTEMS

ES&S will work with the County to ensure compatibility of our system with future voter registration systems the CCBOE may obtain.

MIDDLEWARE SYSTEM

DIMS exports raw data regarding contests, candidates, precincts, districts, etc. Electionware imports that raw data saving keyboard time. Electionware is used to complete the election building process. Users export data out of Electionware. Tenex software imports the data from Electionware.

Ultimately, the voter checks into the Tenex pollbook. The pollbook produces a voter receipt document with a barcode that can be scanned by the ExpressVote to choose a ballot style.

CERTIFIED FOR REMOTE MARKING SYSTEMS

ES&S agrees and will comply.

20. Does the system have the ability to be re-configured and customized to accommodate needs that change or evolve overtime, especially those required by new laws?

ES&S RESPONSE

Yes. ES&S continually upgrades and scales our systems and products to conform to both federal guidelines and state law requirements. Throughout the years, our scalable technology has allowed ES&S to build and adapt systems to conform to and be federally certified to meet the increasing technology demands of the 1990 FEC, 2002 NASED, and 2005 EAC Voluntary Voting System Guidelines, while also meeting the demands of state certification requirements.

When federal guidelines and state law changes require new releases of our products, ES&S works with our customer base to develop federal and state certification timelines and upgrade strategies to ensure that the upgrades occur around the election calendars of the jurisdictions.

21. Do you have a standard maintenance and upgrade schedule for new system releases and patches, including any additional costs associated with maintenance and upgrades or equipment repairs?

ES&S RESPONSE

During the warranty period and thereafter so long as the County continues to subscribe to and pay for the post-warranty software license, maintenance and support services from ES&S, ES&S will provide upgrades, new releases and maintenance patches to ES&S' proprietary software, along with appropriate documentation, on a schedule defined by ES&S without additional charge. Any hardware or third-party software upgrades required as a result of these upgrades will be borne by the County at pricing to be provided by ES&S. Additional fees may apply for assistance with EMS network and update installations and for training the County on the updates, if such training is requested by the County. When ES&S determines that an update is needed for a customer, ES&S will notify the customer through email.

Upon a request to ES&S to receive the new release files, the new software release will be delivered to the customer via DVD media. If there is a desire to upgrade to the new software release, your ES&S Account Manager will work with you to coordinate a time to perform the upgrade. To ensure a certified, hardened, and secure configuration of the Election Management System (EMS), it is highly recommended to engage ES&S Technical Services to perform all EMS installations and upgrades. Installation services can occur either on-site at the customer location or through an off-site installation with the EMS equipment being shipped to the ES&S Technical Services lab for configuration. An ES&S technician will build the EMS systems and ensure that they are built in the configuration that meets State and Federal certification guidelines for the specific release, as well as do full end-to-end testing to ensure functionality. ES&S Technical Services provides post-installation documentation that includes installation checklists, information regarding system specific configurations, and network diagrams when appropriate.

New versions of voting system firmware will also be delivered to the customer. Upgrading voting systems consists of inserting the new firmware into the equipment, via a USB media device, while the equipment is powered down. Once the device is inserted and the unit is powered on, the firmware will load on the equipment.

If an upgrade requires advanced operations, an ES&S field service technician will arrange with each customer to go on-site or to a central location and install the upgrades. Advanced upgrades are usually performed during a preventative maintenance event and are covered under annual license agreements.

After the initial warranty period, ES&S offers hardware extended maintenance packages:

Extended Warranty with Annual Maintenance: Under the Extended Warranty with Annual Maintenance Program, ES&S provides a routine preventative maintenance service event every year. This on-site event includes the inspection, cleaning, calibration, and testing of covered equipment and all labor and parts except for consumable items. Our ES&S technicians carry the diagnostic programs, specialized tools, certified spare parts, and test ballots needed to service and test the product per hardware specifications and the maintenance agreement. Under this maintenance program, hardware repairs are covered when failures are system-related.

Extended Warranty with Biennial Maintenance: Includes the same features as the Extended Warranty with Annual Maintenance Program, except that the routine preventative maintenance service event occurs every other year rather than annually.

All maintenance programs include use of certified replacement parts, repairs by certified technicians, priority status for repair services, technical Help Desk support, and one annual invoice for budgeting peace of mind.

For further details, please see the **Appendix C** for the **Sales Order Agreement**.

22. Provide details of the Audit logs generated by each part of your system.

- Are all user actions logged?
- Are the audit logs unencrypted and able to be printed and exported?
- What is the default format?

ES&S RESPONSE

All user actions are logged and can be printed or exported.

Audit logs from the hardware components can be exported in a common industry format that could be used for third-party log aggregation, and additionally can be imported into Electionware and exported as a PDF.

DS200

The DS200 audit log report lists all events — including errors, alarm conditions, ballot-handling exceptions, and user-initiated functions — that occur on the system from the time an election worker inserts the terminal's USB media device into the machine until it is removed. Each event appears in the audit record with a date/timestamp.

EXPRESSVOTE

The ExpressVote maintains an audit log or operations log that records all significant operational events, including election-related events, errors and operator interactions with the device, that have occurred on the unit. The operations log provides both critical and non-critical status messages. These incidents are tagged with the time and date the incident occurred.

DS850

The DS850 records errors and major events, tagging these incidents with the date and time the incident occurred.

ELECTIONWARE

Electionware maintains an Election Audit Events log for every action the user performs within the application. Additionally, an Admin Audit Events log is maintained, which stores all events that are generated when an election is not currently open. Both logs use date/timestamps to track each event, as well as the name of the user who performed the action.

The Election Reporting Manager (ERM) System Log records all activities performed within the application. This log uses date/timestamps to track each event, as well as the User ID of the person who performed each action.

23. Briefly describe all results reports the system can generate and provide sample copies of such reports.

- Can customized reports be designed and will our staff have the ability to customize without vendor involvement?
- Are the reports searchable or available to be exported into other document formats?
- Can the reports easily be exported for web viewing?
- What is the standard/default format used?

ES&S RESPONSE

Customized reports can be designed without vendor involvement. Reports are searchable and can be exported in other formats. Reports can be easily exported for web viewing.

The **standard/default format used** in the Electionware reporting software produces reports in ASCII, CSV, XML, HTML, PDF, RTF, and XLSX (Excel). Excel files can be imported into Access.

ES&S' election results reporting program generates comprehensive paper and electronic reports for election officials, candidates, and the media that meet federal and state requirements. Report editing features enable the user to read data from the tabulators, customize report formats, and generate accurate election results. It is highly flexible, providing a library of on-demand report types (election district, summary – with or without group details, canvass, and log) that can be customized to meet Cuyahoga County's needs. It stores election district-level results into up to 14 user-defined groups (such as absentee, Election Day, and provisional reporting). Cuyahoga County can create reports that contain all applicable election districts or contests, or the County can select the election districts and/or contests to be included. For any summary report, Cuyahoga County can control whether counts for overvotes and undervotes are included. The County can specify that the report display vote results as a percentage of votes cast, or as a percentage of eligible voters. This wide array of user-configurable election reports, displays, and results files can be exported in different formats to create custom reports. It can also display updated election totals on a monitor as results are received from polling locations, as well as rolling up countywide results. The display program scrolls automatically through the live results with a user-definable time delay. It has several export capabilities that will allow results to be posted on a website. The State may create ad hoc reports, filtering certain election districts and/or contests as needed, which may be saved for re-use for various elections.

The reporting modules of Electionware also produce additional ways to view final election results, such as viewing the ballot images alongside their Cast Vote Records, and you can view images of the write-ins. Electionware's Election Results - Summary Report can be viewed and saved in XML or HTML format. This report contains the results of all loaded ballots. Electionware can be used to export election data and voting results as XML or CSV files, which can be used to filter data and create customized reports.

24. Do you provide printing services for a county of our size?

ES&S RESPONSE

ES&S and Marketing Communication Resource, Inc. (MCR), our partner printer, welcome the opportunity to continue to provide printing services to Cuyahoga County.



DETAILED RESPONSE

DETAILED RESPONSE: TABULATION VENDOR | INITIAL SURVEY

1. Provide a brief company history including the main business of your company, the length of time in business and number of employees.

Hart is expertly qualified to provide the full scope of products and services required by this solicitation. Founded more than 100 years ago in 1912, Hart is now a nationally recognized leader in election innovation, serving more than 800 jurisdictions, with exceptional customer relationships and superior service.

Hart is the voting system solution provider for two statewide systems including the State of Hawaii and the State of Oklahoma. We also provide full service voting solutions on a similar scale to two of the five largest counties in the United States (Harris County, Texas and Orange County, California).

Customer satisfaction is a hallmark of Hart's performance, with 94 percent of customers rating their experience as "excellent" or "above average." In our 2018 customer satisfaction survey, **92% of Hart customers rated our service as excellent or above average; and 92% said they would recommend us to an industry colleague.**

Hart's team of 80 employees includes 42 technical team members directly involved in election management system development and implementation. These professionals include experienced project managers, training specialists, systems and software architects, software engineers, mechanical engineers, electrical engineers, quality assurance specialists, product managers, supply chain and manufacturing managers, customer support consultants, technicians, technical publication specialists and other experts.



2. Provide a current list of customers who are using or have previously used your Tabulation system.

- Contact name, email and phone number
- Jurisdiction size
- Date of implementation
- Product(s) and quantities purchased
- What software and firmware versions are currently being used

Please use attached excel spreadsheet "Vendor Customer List Template".

Yes, Hart complies with this requirement. Please see the Excel spreadsheet title **Vendor Customer List**, in our response.

3. Based on the Cuyahoga County data attached to the email, provide a cost estimative for your paper based tabulation system.

- At least two (2) precinct ballot scanners per polling location
- One (1) ADA marking device per location
- High Speed Ballot Scanners
 - Daily scan period typically six (6) hours per day over a seventeen (17) day period
- Equipment Reserves (Backup Equipment) for election day
- Training Equipment
 - NOTE: Approximately 5000 workers attend an election training session during a county-wide election.

Please attach a separate document for this response.

Yes, Hart complies with this requirement. Please see the **Cost Estimate** included with our response in which we have addressed the points of this requirement.



4. Provide a detailed description of hardware and network product(s) listed in the estimate provided.

Please include:

- All relevant information, including physical descriptions, model numbers, and part numbers, concerning components such as, but not limited to, laptops, tablet computers, printers, cables, connectors, servers, internet connectivity, precinct ballot scanners, high-speed ballot scanners, ADA equipment, etc.
- Whether a component is proprietary to the Vendor or whether the component is a commercial off-the-shelf product.
- What is the capacity of all precinct ballot scanners? How are they stored/managed?
- Are the precinct based scanners programmable for multiple precincts?
- Specifically identify precinct scanner ballot box options.

Please attach a separate document for this response.

Yes, Hart complies with this requirement. Please see the section titled **Verity Voting System** in our response in which we have addressed the points in this requirement.

5. List any additional recommended hardware or software which is not required as part of the tabulation system?

There are no unnecessary components, neither hardware nor software, listed in our proposal. All of the components identified in the section titled **Verity Voting System** are required as part of the tabulation solution we have defined for Cuyahoga County.

6. What is the throughput for each type of ballot scanner? Include the details for:

- All ballots sizes available
- Flat v. Folded ballots
- NOTE: Our absentee ballots are folded three times prior to being sent out to the voters.

In Hart's response in the section **Verity Voting System**, we have introduced two digital scanning solutions: Verity Scan; and Verity Central. Verity Scan is a precinct digital scanning solution for paper ballots. Verity Central is a high-speed central ballot scanning and adjudication solution.



Please see the section **Verity Voting System** for a full explanation of scanning technology proposed for Cuyahoga County.

To respond to this question of the County survey, we have compiled the relevant specifications from each of the Verity scanning solutions.

THROUGHPUT

Verity Scan Digital Ballot Scanning/Tabulation

- Minimum of 10 sheets per minute; real-world processing speed surpasses the minimum.
- Scans both sides of ballot
- User inserts ballot in any orientation
- Consistent throughput regardless of ballot fold lines, creases and wrinkles

Verity Central High-speed Scanner and Vote Capture/Adjudication

- 130 sheets per minute, which is 7,800 pages per hour
- Scans both sides of ballot
- User scans ballots in batches
- Consistent throughput regardless of ballot fold lines, creases and wrinkles

BALLOT SIZES

Verity support ballots of the following sizes:

- 8 ½ x 11-inch
- 8 ½ x 14-inch
- 8 ½ x 17-inch
- 8 ½ x 20-inch
- 11 x 17-inch (Verity Central only)

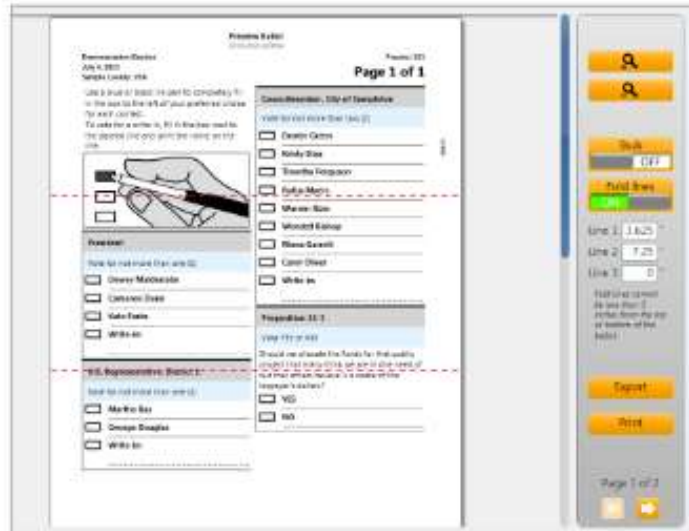
FLAT V. FOLDED BALLOTS

Hart recognizes that absentee ballots used in Cuyahoga County are folder three times prior to being sent out to voters. Verity is a robust system that can accommodate fold lines.

Fold lines do not affect the ability of Verity's vote counting devices to read ballots. Our commercial-off-the-shelf scanners process folded ballots reliably and efficiently. Hart recognizes that "real world" ballots that must be processed by high-speed scanners typically have fold lines and are often returned to the central office in less than pristine condition. Accordingly, a significant portion of our Quality Assurance testing for high-speed scanners is designed to replicate these conditions, including fold lines.



For Verity users who wish to be extra-cautious about fold lines, Verity does have an innovative feature in the software that allows Verity Data and Verity Build to display ballot previews with fold marks, according to measurements input by the user, based on the folding pattern that will be used. Through the use of this feature, if fold lines pass through any target area boxes, users can take the additional caution of "nudging" ballot layouts.



The screenshot displays the Verity software interface. The main window shows a ballot preview with fold lines indicated by dashed red lines. The ballot is titled "Primary Election" and "Page 1 of 1". It includes sections for "Candidate", "Ballot Number", and "Ballot Type". The "Candidate" section lists names like "Carter, James" and "Harris, John". The "Ballot Number" section has a field for "Ballot Number (1-100)". The "Ballot Type" section has a dropdown menu. The "Ballot Preview" section shows a visual representation of the ballot with fold lines. The right-hand side of the interface features a control panel with buttons for "Search", "Print", "Fold Lines", and "Ballot Preview". It also includes input fields for "Line 1", "Line 2", and "Line 3", and a "Page 1 of 1" indicator.



7. Does the high speed ballot scanner(s) have the ability to sort ballots as they are being scanned?

- Write-ins, Remakes, Blank Ballots, etc.

In Hart's response in the section **Verity Voting System**, we provide a detailed introduction to the **Verity Central** high-speed central ballot scanning and adjudication solution.

In response to this question in the survey, we note that Verity Central allows for easy resolution of all voter intent issues onscreen, contest-by-contest, with clear color-code flags and consistently easy-to-understand plain language instructions.

The County will enjoy the following benefits Verity Central solution:

- **Next-generation digital scanning and online adjudication system.** Others will tout their "all-new digital scanning systems" with great new features like onscreen adjudication and COTS scanners, but we introduced digital scanning and onscreen adjudication over a decade ago. What other vendors call "auto-adjudication" or "visualization" is **not** true onscreen adjudication. Only Verity provides unique contest-by-contest resolution for all voter intent issues with clear, color-coded flags, and Verity's consistently easy-to-understand, plain-language instructions. Verity builds on the lessons learned from the past ten years and the result is the easiest, most transparent, and most efficient high-speed scanning system available.
- **True onscreen adjudication.** What other vendors call "auto-adjudication" or "visualization" is not true onscreen adjudication. Only Verity enables you to easily resolve all voter intent issues onscreen, contest-by-contest, with clear, color-coded flags and Verity's consistently easy-to-understand, plain-language instructions.
- **Transparency and easy auditability.** With an unmatched variety of image filters, you easily locate exactly the ballot images you want. Plain-language notes clearly show exactly how voter selections are recorded.
- **No presorting.** Scan multiple precinct styles and/or multiple languages in the same batch, in any orientation.
- **No outstacking and rescanning.** With Verity Central, there's no extra work – just an easy, efficient workflow. Preserve your ballots in their original form, with minimal handling.
- **No-wait scanning.** Verity Central scans without tabulating, so you can start scanning weeks before polls close on Election Day. No more late nights at the scanner.

- **Cost-effective scalability.** Choose the right Hart-integrated COTS scanner for your jurisdiction's size, budget and need for speed. You get industry-best scanning technology with the assurance of Hart support – and EAC certification.
- **Reduced training time.** User-friendly interface has the same look-and-feel as other Verity Voting system components, for shorter training time and lower training costs.
- **Versatile for long-term value.** Verity Central is part of the holistic, scalable Verity Voting solution that can adapt as your needs change.
- **Centralized, fine-tuned control of adjudication rules.** You can control/limit the conditions that determine which mismarks will be accepted and will not require adjudication.
- **Accelerated adjudication.** The ability to apply “accept” functionality to batches means you can choose, for example, whether overvotes will be accepted upon scanning, reducing the number of ballots that must be adjudicated unnecessarily. You can also set Verity to “accept” (auto-resolve) specific types of conditions/classes of marks by batch, on a selective basis.
- **Faster adjudication of damaged contests.** A **Ballot Review** screen speeds the scanning process, with fewer interruptions and fewer “bad ballots” to be investigated.
- **Faster, more selective reviews/recounts.** Filters for specific marked contests enable quick review of exactly the information needed – for example, if an attorney for a candidate says, “I need to see the ballot images for every time someone voted for this candidate, in that particular race.”
- **Speedier navigation and fewer keystrokes for adjudicators.** **Previous** and **Next** buttons on the adjudication screen work like “Previous unresolved” and “Next unresolved.”
- **Quickly find “needles in the haystack” ballots.** User-friendly combinations of different filters enable you to easily find types of ballots that can be difficult to locate.

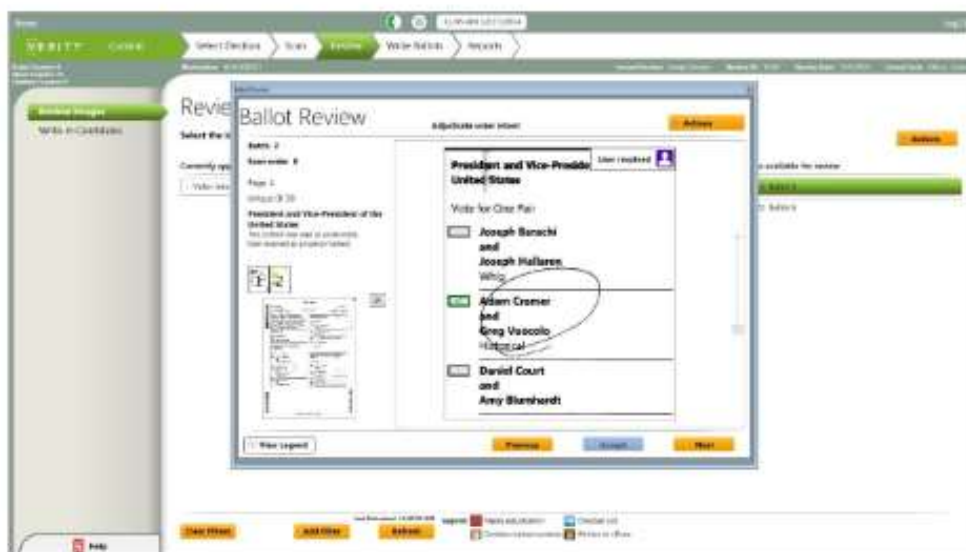
WRITE-IN BALLOTS/ADJUDICATION



Verity Central includes unique onscreen, color-coded ballot adjudication features that increase the efficiency and accuracy of ballot adjudication and make it unnecessary to alter the original paper ballot in any way.



Verity Central identifies ballots requiring adjudication, including ballots with write-ins, according to parameters set by the state election code and local election officials. Adjudication occurs by reviewing the ballot's digital image on the computer screen to record write-in votes or to reject voter write-in entries. As issues are resolved, election officials use a simple menu-driven interface to make and record decisions. An audit log, including the user ID, records all resolution decisions, providing a complete record of the adjudication process.



SORTING OPTIONS FOR BALLOT PROCESSING BY PRECINCT, OUTSTACKING/SEPARATION OF WRITE-INS, AMBIGUOUS MARKS AND BLANK BALLOTS



Verity Central has powerful capabilities that greatly accelerate the processing of ballots, even in situations where older, traditional systems have no other option but to reject ballots that contain overvotes, write-ins, or other conditions that prevent the ballot from being read. In other words, where older systems rely on time-consuming "outstacking," physical segregation of ballots, and the need to perhaps re-make ballots, Verity Central handles such situations far more efficiently and elegantly, through the user of digital image management.



With Verity, it is only under circumstances where a ballot literally cannot be imaged for exceptional reasons (due to a defaced bar code, for example) that Verity Central is unable to read the ballot. In such exceptional circumstances, Verity Central continues scanning a batch without interruption, and the Scan Batch report identifies specific ballots in the batch that could not be read, with a plain language message to the operator. In addition, the reasons for the rejection, as well as the scan sequence number, are identified in an easy-to-read Batch Scan report.

Verity operates with an efficiency that sets it apart from older, non-digital approaches. Instead of forcing users to outstack and hand-count ballots with questionable voter marks, as is the case with older systems, with Verity Central, you can easily adjudicate ballots with questionable marks by means of the innovative Verity Central onscreen adjudication process. This process color-codes contests with marks that require attention (overvotes, undervotes, invalid marks, blank ballots, etc.) and enables authorized users to determine the disposition of unresolved marks without needing to handle the original marked ballot or re-make and re-scan outstacked ballots. In this way, Verity Central greatly boosts efficiency and accelerates reporting.

NO PRE-SORTING OF BALLOTS

With Verity, there is no need to pre-sort the ballots; Verity sorts them digitally, minimizing paper handling. You simply feed stacks of ballots, batched as you wish, into the high-speed scanner. Once you scan your ballots, you can immediately put them away for storage. Highly accurate software filters enable you to quickly retrieve high-quality digital images of exactly the ballots you need, if needed.



Ballots with questionable marks can be easily adjudicated with the innovative Verity Central onscreen adjudication process.

WARN ABOUT BLANK BALLOT



Verity Central scans and records blank ballots, while flagging the ballot as needing adjudication because of an undervote condition.

8. Do the ballot scanner(s) have the ability to save ballot images? If so, what is the capacity, methodology for saving images and how long does the import/export of these images take considering a county of Cuyahoga's size?

Yes, Both Verity Scan and Verity Central have the ability to save ballot images.

Images are stored on the removable storage drive and, for transparency, can be accessed outside of Hart software on any PC. Standard file management guidelines will apply regarding storage and export time.

If the user selects the appropriate option in Verity Build (the ballot definition application), Verity Scan will automatically save ballot images for each scanned ballot to the vDrive (removable storage media). These images are accessible directly from the vDrive and do not require any specific import or export procedures or proprietary software in order to view the ballot images.

VERITY SCAN

Verity Scan has an onboard memory capacity of 8 GB, enough to store 10,000 single-sheet ballots per voting event.

Alerts if memory capacity is being reached

Verity Scan alerts poll workers if the memory capacity is being reached. Internal memory as well as the removable memory together contain enough space to accept as many as 10,000 single-sheet ballots per voting event.

VERITY CENTRAL

Verity Central automatically saves ballot images for each scanned ballot to the election database. Using the Verity Central software, these ballot images may be filtered by ballot contents, precinct, and various other ballot attributes and may be viewed directly in the user interface. Verity Central can store up to 1,000,000 ballot images per voting event.



9. What is the expected life of all equipment?

Verity is the only all-new, fully integrated voting system in the marketplace. With Verity, you get a voting system that is early in its lifecycle; you are investing in the future of elections for all stakeholders. Because you are selecting the voting equipment that will support your elections for many years to come, it is critically important that you choose a system that is **early in its product lifecycle – a system built to accommodate change.**

New hardware. All the proposed hardware is the most flexible, cost-efficient elections hardware available today. Verity equipment is compact – **easy to store and easy to transport in ordinary vehicles.**

New software. The all-new Verity Voting system is a holistic, integrated system that streamlines election management end-to-end. We designed Verity from the ground up to be easy to use by everyone across the entire elections process: **easy to set up, easy to learn, and easy to use.**

New supply chain. Because Verity is an all-new, modern system that employs the latest technologies and components, the U.S.-based supply chain is robust and well-positioned for years of service and support.

New services. Built on a foundation of best-in-industry services, as evidenced by our off-the-charts customer satisfaction and customer retention ratings, our implementation, training and support for Verity are newly-conceived yet incorporate best practices developed over more than 100 years.

Adaptable for the future. Verity is adaptable – able to accommodate flexible ballot layout, vote centers, precinct voting, convenience voting, ranked choice voting, emergency voting locations, and more, future-proofing the State's investment.

Secure and transparent. Verity's design incorporates the latest best practices, protecting data and enabling efficient, transparent audits – not a black box.

- **Battery life**

The projected life of batteries is from 3 to 5 years depending on storage, recharge cycles, and mechanical use conditions.

- **Hardware (each piece of equipment)**

Verity hardware has a lifecycle starting at ten years of anticipated use for successful elections.

10. What happens in the event of total loss of power? Is the data saved?

In the event of a loss of power, your data remains secure and saved. Hart has years of working with poll workers and listened to their concerns when we developed Verity.

Troubleshooting and resolving issues at the polling place is quick and simple.

In the event of a power disruption, all images and cast vote records remain saved on the vDrive and on the internal memory of the Verity Scan device. Verity Scan includes an onboard internal battery capable of providing backup power for a minimum of two hours. While one battery is in use, an extra battery can be recharging at a nearby electrical outlet, ensuring a reliable source of continuous power for the unit. In case of battery failure, poll workers can simply replace the battery – not the entire device.

Data protection in the event of a power failure

In the event of a power disruption, all images and cast vote records remain saved on the vDrive and on the internal memory of the Verity Scan device. Verity Scan includes an onboard internal battery capable of providing backup power. If power has not been restored by the time the backup battery has been fully discharged, Scan commences a graceful shutdown process. Once power is restored, the device can be rebooted and resume normal operations. All cast vote records and ballot images are maintained on the vDrive and on the hard drive of the Scan device.



11. What type of ballot stock is required for use with your system. What size options are available?

Verity uses plain paper readily available anywhere from various suppliers, not proprietary stock. Verity does not require any markings not necessary for ballot identification or tabulation. COTS blank paper can be used to print ballots for your Verity Voting system, and our recommendation is to use 28#/70# bond paper composed of virgin wood fiber with no recycled content. The following additional specifications apply to the type and composition of the recommended paper:

- Finish: Smooth Xerography
- Sheffield: 100-120 Brightness: 91-94
- Florescent level: 4%
- Moisture content: 4.5%
- Packaging: Moisture resistant ream wrap
- Tolerance for trim and squareness: +/- 0.025"

BALLOT SIZES

- 8 1/2 x 11-inch
- 8 1/2 x 14-inch
- 8 1/2 x 17-inch
- 8 1/2 x 20-inch
- 11 x 17-inch (Verity Central only)

12. Describe the different levels/types of technical support provided during the initial implementation and for each election moving forward?

Hart has always been a service-centered election company – a trusted partner with an impeccable reputation. With the Verity family of technology, we extend that service-centric focus to you. Verity embodies best practices for security, accuracy, and reliability – for every component and for all data – backed by our extensive, proven support capabilities.

- **Technical support** – Hart support personnel are fully trained in the technical aspects of Verity technology and are supported by technical team of experts at our Customer Support Center.
- **Project management** – Hart Project Managers **listen** to our customers and are intent on meeting your expectations.
- **Training and documentation** – Hart’s professional educators have experience in elections procedures, instructional technology, software application training, working with adult learners, and training for diverse backgrounds. Our customer training program is designed to ensure that election officials can manage elections from end-to-end, with as much - or as little - help as you wish.

Hart has successfully implemented Verity Voting for jurisdictions of all sizes. This experience, along with our established implementation methods, means we will lead you through a successful transition to the new system. We see to it that every aspect of Verity Voting is functioning to specification and that your people are trained for competent and confident performance - both during implementation and through your first election. We have a reputation for quickly and thoroughly addressing customer concerns, and support is available from our knowledgeable Customer Support Center 24/7.

We are committed to implementing your new voting system as efficiently as possible, while taking the time to ensure success.

“The largest reason Lubbock’s County Commissioners chose Verity is the great customer service Hart has given us for more than 11 years. We know from experience that the products Hart builds do what they’re supposed to do. The choice is a good one, not just from a mechanical perspective, but from a person-to-person one.”

– Dorothy Kennedy, Elections Administrator, Lubbock County, Texas



CUSTOMER SUPPORT CENTER

Hart support personnel are fully trained in the technical aspects of the Verity system and are further supported by technical staff at Hart's Customer Support Center. During and after implementation, the Hart Customer Support Center serves as a comprehensive information source and your primary support resource.



Hart's Customer Support Center has been providing technical and daily process support to our customers across the U.S. since 2002. Our Customer Support Center gets high marks from our customers for being prompt, courteous and always ready to assist. We get the highest approval ratings in the industry, in great part due to our excellent customer support.

Hart provides elections personnel a consistent source for 24/7 help from a knowledgeable Customer Support Consultant via phone or email through our Customer Support Center and Hartline tracking system. Using

these resources, you can submit incidents, requests for repairs, change requests, and enhancement requests around the clock.

Customers of Hart have access to a Knowledge Base series of articles that support continuous education in elections management and Hart voting technology. Our webinar series additionally opens an accessible way for our customers to connect with our experts and intermittently refresh technical knowledge.

The Hart Customer Support Center staff is available live via phone from 7 a.m. to 7 p.m. Central, Monday through Friday. You can also reach a representative outside of these hours by leaving a voicemail. The receipt of a voicemail triggers a call forward to a Customer Support Center staff member, so callers receive prompt service. During major election events, Hart provides extended Customer Support Center hours.

"When I looked for a company that could lead us as we step into the future, Hart was that company. I have observed the various election providers in meetings and demos, and Hart is the company that has the strength – not just in equipment, but in knowledge of elections – to take us to the next level of efficiency and service to our voters."

– Yvonne Ramon, Elections Administrator, Hidalgo County, Texas; 345,162 Registered Voters

13. Do you have a standard implementation process or a list of tasks that must be completed during the implementation phases, who is responsible for those tasks and how long each task is expected to take in a county of our size?

- Mock elections/Pilot projects
- Resources available to be devoted to this process
- How many pieces of equipment would be provided for either process?

Yes, Hart has a proven, refined implementation approach defined in four phases that will benefit the County in numerous ways. The phases are explained in detail below and accompanied by a general timeline for implementation for your reference. Training is a key stage in the implementation of Verity Voting and at the close you will gain experience in a mock election on your new system. Hart will deploy a team of experienced professionals to support implementation of Verity in the County; we have provided an organizational chart naming the Hart representatives who will facilitate smooth implementation.

Implementing Verity is a process in which Hart engages closely with the County, and authorized representatives, using the County's own Verity Voting system. Hart will consult with the County to determine the quantities of equipment to deploy during implementation.





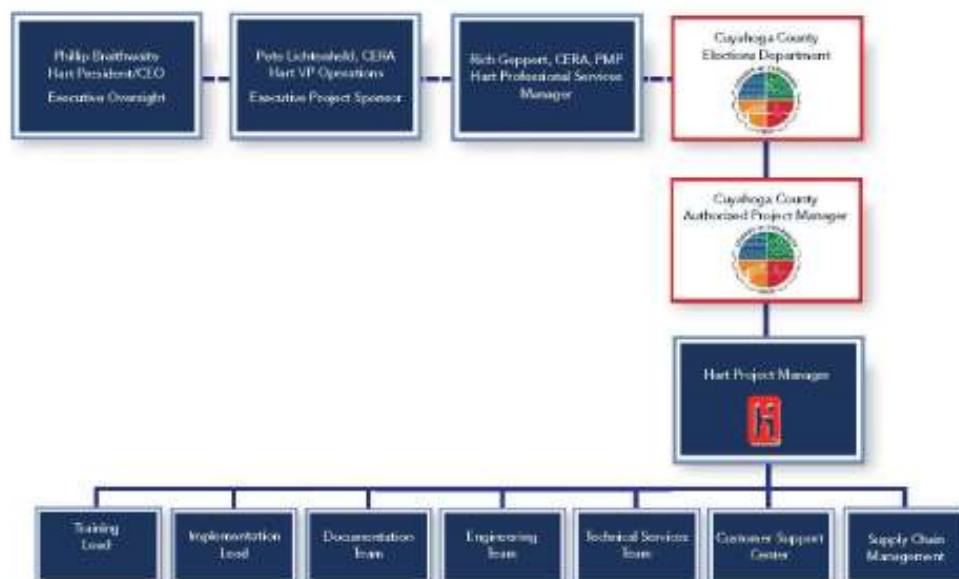
PROJECT ORGANIZATIONAL CHART

As shown in the organizational chart provided in our response, personnel for the County project will include the following Hart representatives:

Phillip Braithwaite, Hart President and CEO will provide Executive Oversight of the project. Mr. Braithwaite leads Hart's mission to provide secure and trusted election solutions through the company's integrity, transparency, efficiency, tenacity, creativity, and dedication to the customer.

Peter Lichtenheld, CERA, Vice President, Operations, as Executive Project Sponsor, will oversee and coordinate accurate delivery of customer-critical services. His management of Professional Services, Ballot Production Services, Technical Services, Product Management and the Customer Support Center is key to exceptional support.

Rich Geppert, CERA, PMP, Hart Professional Services Manager ensures ample project management resources throughout the County's implementation phases. He oversees Hart project managers, trainers, and consultants, in addition to providing oversight and general direction to all Hart voting system implementations.



IMPLEMENTATION APPROACH

Implementing a new voting system is a significant change for all stakeholders, including election managers, elections office staff, poll workers, and voters. When implementing the Verity Voting system, Hart uses a project management approach based on the Project Management Institute (PMI) framework. We have honed this approach over many years of managing election technology deployments, applying best practices and lessons learned to develop a unique methodology that has served our customers well since 2001.

Based on the change management expertise we have gained by implementing voting systems for large and small jurisdictions across the U.S., we propose a phased implementation approach. This approach minimizes risk and positions your jurisdiction for a trouble-free Verity implementation.

We manage projects in four overlapping phases:

- Phase I: Planning
- Phase II: Implementation
- Phase III: Go-Live
- Phase IV: Support

Phase I: Planning

This phase begins with the creation of our proposal and negotiation of the contract, in which we work with the jurisdiction to define and plan the project scope and our approach to its implementation. Once the contract is awarded, the Hart project manager reviews the final proposal and contract; then begins scheduling project setup and initiation activities. The project manager coordinates a project kickoff meeting with your jurisdiction's designated project manager and team, and begins compiling the following components of the comprehensive Project Work Plan and Schedule:

- **Scope definition.** Summary of the scope of the project as defined in the final proposal and contract documents, identifying all the components necessary to meet your jurisdiction's requirements
- **Project Team.** Identification of key individuals, including their roles and responsibilities
- **Communication Plan.** Project team members and management staff contact information, proposed schedule and format for regularly scheduled project



management meetings, escalation protocol for critical communications, and proposed schedule and format of written communications such as meeting notes, required reports, and other materials

- **Schedule.** Identification of timeframes and key milestones
- **Test Plan.** Procedures for ensuring that the software integration operates successfully in your jurisdiction's environment
- **Quality Management Plan.** Identification of performance standards, triggers, remedies, and escalation protocol
- **Change Control Plan.** Procedures for identifying, reviewing, and approving changes to the Project Work Plan and Schedule
- **Integration Plan.** Identification of required work packages and processes based on defined scope, as well as any related requirements and expectations including shipping and delivery, asset management, system acceptance, deployment planning, on-site support, equipment retrieval (post-election), equipment processing (post-election) and equipment maintenance
- **Migration Plan.** Roadmap for efficiently incorporating Verity into your election processes
- **Risk Management Plan.** Initial identification of known risks, risk mitigation strategies and contingency plans
- **Issue Management Plan.** Procedures for identifying, tracking, and resolving project issues, such as escalation protocol and identifying known open issues
- **Training Plan.** Refinement of proposed training plan, including identification of attendees for each course, coordination of logistics, and localization of training curriculum

The Project Work Plan and Schedule provides guidance for managing the project and developing detailed activities, tasks, and timelines. The Project Work Plan and Schedule is revised as necessary to properly manage the project. A working draft of the Project Work Plan and Schedule is reviewed in the project kickoff meeting to promote the refinement and mutual acceptance of the plan.

The Hart project manager is responsible for engaging the resources necessary to execute the Project Work Plan and Schedule, and for the implementation of custom processes needed to meet your requirements.

Successful deployment of a new system depends on a mutual understanding of your current processes and objectives. Therefore, we engage your jurisdiction's elections

staff in collaborative planning. This enables us to establish a detailed Integration Plan that addresses all aspects of the project. The results of the collaborative planning activities are used to develop a Migration Plan, which defines each step necessary to incorporate the use of the Verity Voting system in your jurisdiction's election process, while addressing risk areas and carrying out mitigation activities defined by the Risk Management Plan.

Phase II: Implementation

This phase includes placing orders, delivering equipment, your acceptance of equipment, storing equipment, and completion of third-party warranty information. During this phase, Hart's project manager works closely with your jurisdiction's team to implement the Project Work Plan and Schedule, identify and resolve issues, manage risks, monitor Hart's performance, and ensure clear communication with the entire project team.

This phase also includes initial on-site training of your jurisdiction's staff. Other key activities include initial system configuration, acceptance testing, and preparation of voter education materials (if applicable). All these activities continue through the first scheduled election.

Phase III: Go-Live

Following acceptance testing, the project enters Phase III: Go-Live, which includes election-specific data management, deployment plans, voter education, final training, Election Day field support, Election Night reporting, data archiving and management, post-election auditing, and storing equipment in preparation for the next election on the calendar.

During this phase, the Hart project manager focuses on helping you run a successful and controversy-free election and preparing you and your team for future successful, independently-managed elections. Upon completion of your jurisdiction's first election, Hart's project manager coordinates with your jurisdiction's team to prepare and conduct a project review and debrief – a detail-oriented meeting which summarizes and documents the success of the election, the accuracy of the Project Work Plan and Schedule, the project team's performance, project highlights, key issues and their resolution, lessons learned and best practices, and recognition of key contributions. Additionally, Hart's project manager makes certain that you and your team are ready for the next phase of the implementation: Support.



Phase IV: Support

During and after implementation, the Hart Customer Support Center serves as a comprehensive information source and support resource. The Hart project manager coordinates with the Customer Support Center as needed throughout the implementation. Once implementation is complete, the Customer Support Center becomes the primary support resource for you and your staff.

Hart provides customers with a consistent source for 24/7, real-time help from a knowledgeable customer support consultant via phone or email through our Customer Support Center and Hartline tracking system. Using these resources, you and your jurisdiction's elections staff can log problems and find their solutions, register change and enhancement requests, and submit equipment for repairs – any time day or night.

BENEFITS TO CUYAHOGA COUNTY

Hart's approach will benefit the County:

Maximizes efficiency and minimizes risk. Based on our change management expertise gained by implementing voting systems for large and small jurisdictions, our phased approach minimizes risk and positions your jurisdiction for a trouble-free implementation.

Minimizes training required – everyone up to speed fast. Verity's integrated, intuitive, user-friendly interfaces and workflows minimize training requirements – saving the County time and money.

Enables the County to conduct elections independently. Hands-on training courses emphasize real-world activities, enabling the County to independently conduct successful elections with minimal support from Hart.

Project management from a team with boots-on-the-ground experience. Our team has deep experience implement voting systems of all sizes according to the best practices of our proven implementation process.

14. Provide a copy of the standard acceptance testing process and procedures for all components of the tabulation system.

Hart has extensive experience partnering with both State and local-level jurisdictions of a variety of sizes to support user acceptance testing. We recognize the importance of this process in accomplishing customer goals. Not only will the County verify that all equipment is received in good working order, but it will also be the first real opportunity that the County staff will have to interact with the equipment on a large scale.

For this reason, Hart has defined a standard set of procedures and documentation that can be used as the starting point for planning and executing this process.

Hart's project manager and subject matter expert will work with the County team to plan the user acceptance test (UAT). The team will review the standard set of procedures, analyze space and resource requirements, and mutually determine the final set of procedures and documentation to be used.

In addition to supporting the planning process, Hart's project manager and subject matter expert will oversee onsite support for the actual UAT events as they occur. Typically, project managers assigned to individual implementations help with managing workflow, answering functional and procedural questions, and providing troubleshooting assistance during UAT, if required.

SYSTEM ACCEPTANCE AND FUNCTIONALITY TEST PROCEDURES

The following steps represent a high-level description of the typical UAT process.

1. Set up teams and assignments for each member within each team.
Teams will vary per implementation, and they will vary depending on the task – an initial acceptance test is much more involved than later functional tests.

Assignments might include:

- Unloading trucks
- Unboxing equipment
- Setting up booths
- Testing (inspect) booths, affixing S/N
- Moving booths to testing area



- Taking down booths
 - Testing and labeling battery packs
 - Testing voting devices
 - Adding equipment to local inventory list
 - Testing and loading caddies
2. Set up an area where booths will be inspected, and S/N labels will be affixed to booths.
 3. Assign Verity Key to devices to be tested.
 4. Perform booth functionality testing per the checklist.
 5. Check all devices for shipping damage/exterior damage.
 6. Check all ports for obstructions or damage.
 7. Turn the voting devices over onto a soft cloth or cardboard. Test and connect battery packs.
 8. For Verity Scan devices, set up and test ballot box(es). Set the Scan onto its ballot box.
 9. Insert an unvoted Test vDrive into the voting device.
 10. Turn the voting device on and observe the screen to confirm battery power.
 11. Connect the voting device with the AC power cable and observe the screen to confirm AC power.
 12. Perform calibration testing for each voting device touch screen.
 13. Perform scanner head calibration testing for each Scan.
 14. Check the clock and set the time and time zone.
 15. Display and confirm the software version number.
 16. Continue to Open Polls.
 - a. Test the poll worker button during this process.
 - b. Test the printer during the process.
 17. Add a voter and vote a ballot.
 - a. Print a ballot on the Touch Writer.
 - b. Scan a ballot on Verity Scan.



18. Test the Access interface on the Touch Writer (vote a ballot using the buttons).
19. Test the Access interface's headphone functionality on Touch Writer.
20. Test the Access interface's dual switch functionality on the Touch Writer.
21. Close or suspend polls and use the button on the report printer to advance the printer paper.
22. Power off the voting devices.
23. Remove tapes.
24. Document the test using the functionality logs or a similar checklist.
25. Verify the quantity of each product.

County staff members participate in acceptance testing of software and/or hardware upgrades, using standard testing scripts that Hart provides.



15. Are sample L&A Testing procedures available?

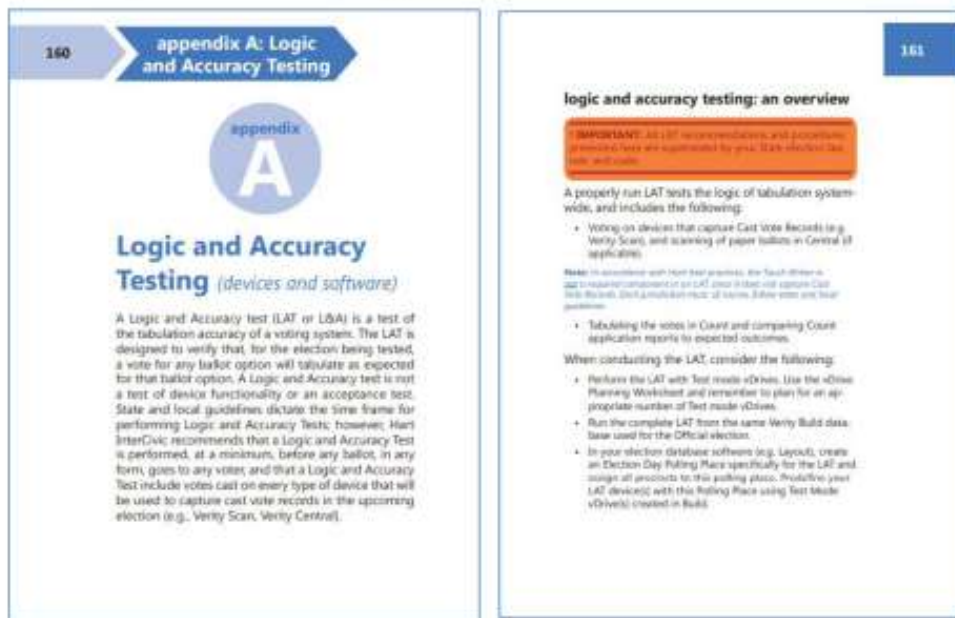
- Does your system generate a test deck? If so, is it customizable?
- Is ballot adjudication available with your system?

Yes. L&A procedures are documented in manuals and can be adapted to Ohio law and product requirements.

The Verity Voting system generates a test deck that is customizable to your requirements.

Ballot adjudication is performed from the Verity Central high-speed scanner and ballot adjudication system.

Sample manual pages addressing Logic and Accuracy Testing are provided as a view into the level of documentation the County can anticipate receiving with implementation of Verity Voting.



16. What end user training is available?

- Train the Trainer, BOE Staff, PEOs
- Cost, length (hours per "class"), class size

Training is provided to Cuyahoga County as part of your Verity implementation package.

The Hart curriculum has been tested through many successful elections with millions of votes cast. Thousands of election officials and poll workers have experienced first-hand how the Hart curriculum provides the skills needed to master essential tasks from ballot preparation to voting equipment setup to Election Night tabulation and reporting.

While our training solution always begins with a proven standardized curriculum, the curriculum is also continuously refined and tailored to meet the changing needs of Verity Voting system customers.

TRAINING MATERIALS

Training courses include operations manuals, training manuals, and a variety of other media, including graphic presentations. All these are designed with a single objective: to help trainees achieve proficiency and self-sufficiency in the tasks required to conduct a smooth, successful election with the Verity Voting system.

Hart supplies these materials to the County in PDF format, for on-screen use and for printing as needed. We also provide standard third-party manuals and paperwork/system documentation with third-party hardware.

PLANNING THE TRAINING PROGRAM

To tailor the standard curriculum to local requirements, the Hart trainer and project manager perform a training needs assessment as part of the implementation business process analysis (BPA) and variance analysis. The goal in performing this assessment is to identify how best to bridge the gap between existing elections procedures and training, and the requirements of the new Verity Voting system implementation. In this joint activity, **Hart and the County will mutually determine the appropriate size of classes.**

Typical audiences include permanent and temporary election office staff, information technology (IT) personnel, warehouse staff, and poll worker trainers.



After reviewing the findings of the training needs assessment and variance analysis, the trainer revisits the training plan from the original proposal in order to meet the customer's training needs. Our experienced trainers then identify options for where, when, and how initial training services are conducted. Hart also offers options for follow-up training sessions, including onsite classes, training in Users Group meetings, computer-based instruction, or online training utilizing Web conferencing.

TRAIN THE TRAINER

Hart has presented Train-the-Trainer sessions in hundreds of jurisdictions across the country since 2002. We have trained hundreds of trainers and tens of thousands of poll workers. Our Train-the-Trainer program starts with all trainees taking the Polling Place Operations course, and then we dive into our training methodology, give trainees the knowledge of the voting system, go into the presentations, flow and agenda of the Polling Place Operations course, and finally practice, practice, practice training others.

STAFF TRAINING

Staff training is a particular strength Hart brings to your implementation and ongoing operation of your new voting equipment.

Hart's training program ensures that permanent and temporary elections office staff, technical troubleshooters and poll workers have the skills required for the County to quickly get up and running with the new voting System – and the ability to provide ongoing, independent, consistently successful elections.

Every member of our friendly, knowledgeable training staff has experience in elections procedures, instructional technology, software application training, and working with adult learners from diverse backgrounds and with variable educational backgrounds. In addition, Hart's comprehensive curriculum has been tested through many successful elections with millions of votes cast, helping ensure that the County's elections staff will be able to confidently implement, manage and operate the Verity voting system.

Hart will provide the following courses for elections staff:

Course	Description	Duration
Verity Management and Best Practices	Elections staff managers and IT personnel learn how to manage Verity software user permissions and security and transparency options. Attendees also learn overall best practices for use with the Verity system and how to handle PC setup and software upgrades.	4 hours
Verity Data Operator	Elections staff who will work with the Hart ballot production specialist learn how to import data, design, and lay out ballots according to State and County guidelines and for the best voter experience.	2 days
Verity Build Operator	Elections staff learn how to generate ballot databases, program/configure elections for Verity Touch Writer ballot marking devices, Verity Scan, and Verity Central, and print files for offsite printer(s). Elections staff also learn how to create polling place device media.	4 hours
Verity Polling Place Operations	All attendees of any other course participate in the operational aspects of the Verity Scan and the Verity Touch Writer as they are used in the polling place.	2 hours
Assisting Voters with Disabilities	For elections staff trainers and any other attendees who want to know best practices for working with voters with disabilities who use the Verity polling place equipment.	1 hour
Verity Polling Place Train the Trainer	Elections staff trainers who will train poll workers get methodology, skills and practice, practice, and practice teaching the Polling Place Operations course for poll worker audiences.	2 days
Verity Scan for By-Mail Operator	For State and Local elections staff. Covers central scanning operations using Verity Scan devices and processing and adjudication of ballots.	1 hour
Verity Central Operator	Elections staff learn central scanning operations with high-speed scanners, and processing and adjudication of ballots according to applicable guidelines.	1 day



Course	Description	Duration
Verity Count Operator	Elections staff learn how to perform logic and accuracy testing, tabulating results, and generating results reports and exports	4 hours
Support Procedures	Warehouse, management, and IT staff learn how to service and maintain the Verity equipment and system, including acceptance testing, regular equipment maintenance including device calibration, equipment troubleshooting, field and local help desk guidance, and more.	2 days

TRAINING AVAILABLE AFTER IMPLEMENTATION

The type of training required for system upgrades and/or enhancements varies according to the complexity and scope of the system change. Hart provides updated or new documentation with every upgrade. When we perform an upgrade on-site, we provide in-person “delta” training – instruction in the new procedures and interfaces. If training is needed for more minor changes, we deliver that via webinar. We will work with the County to determine, for each instance, which of the various available options best serves you.

TRAINING FOR LOGIC AND ACCURACY TESTING

The Verity Build Operator course teaches elections staff how create a test deck. Logic and accuracy testing procedures are specific to the jurisdiction and vary according to the rule and code of that jurisdiction. The Hart project manager and the jurisdiction’s elections administrator will establish the logic and accuracy testing procedures for the specific jurisdiction, typically during a process analysis. The procedures that are typically part of any logic and accuracy test (voting ballots, tabulation, and reconciliation) are covered as part of device and software training courses.



17. Can you provide us with training documentation and if your system is purchased will you allow us to use your stock photos and edit your procedural documentation to be tailored for use in Cuyahoga County?

Yes, Hart will supply training documentation to the County and allow use of Hart stock photos.

The County will also be granted the right to edit procedural documentation from source files upon agreement by signed affidavit stating that Hart branding will be removed from documentation published by the County.

18. Provide a list of known anomalies with the system (technical bulletins released) in all versions of the hardware, firmware, and software of certified product.

- Include details of any material defects or failures of any part of the system along with the election jurisdiction in which the defect or failure was discovered, the nature of the defect or failure, how it was discovered and resolved.

There are no known anomalies in Verity Voting as proposed for Cuyahoga County, Ohio.

As a partner in ensuring smooth elections in the County, *if anomalies are identified* Hart issues service bulletins via email. Sent from our Customer Support Center, bulletins provide updates and alerts regarding our products and services.



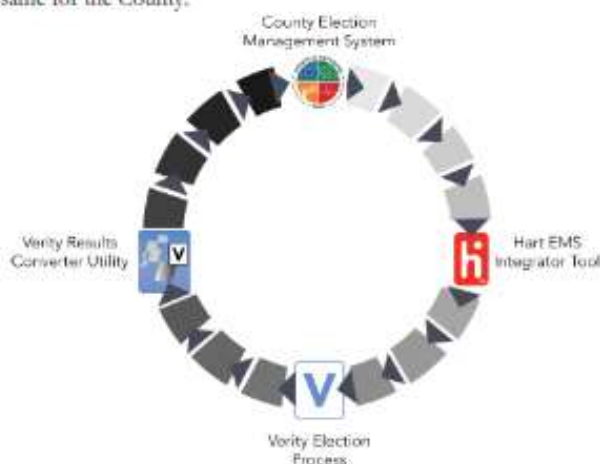
19. Is your system compatible with the CCBOE's current voter registration system and Electronic Pollbook systems and has this compatibility been tested and/or used in other election jurisdictions?

- Can the system be updated to be compatible with future voter registration systems the CCBOE may obtain?
- Describe the middleware system that is used in between the tabulation system DIMS/Precinct Central (Tenex).
- Is it compatible with the certified Remote Marking Systems? Cuyahoga uses Democracy Live specifically

Yes, Verity is compatible with the system in use in the County. Hart has experience in the State of Ohio and has been working with Hamilton County for many years; the County is planning implementation of Verity Voting in January 2019. To date, we have integrated with the Tenex pollbook system in Hamilton County.

Hart routinely engages with best-in-class providers, including Democracy Live. The same election definition from Verity can be "ported" to a third-party accessible remote marking system with minimal re-work or duplication. Verity includes the ability to import a file containing a marking pattern for a ballot and then print a Verity ballot marked with that pattern. This allows remote marking systems to integrate with Verity (which is otherwise a kiosk, air-gapped system).

We are experienced with creating custom middleware on both ends of the system and can do the same for the County.



SEAMLESS EMS INTEGRATION

Verity eliminates manual steps, simplifying import of election data for ballot layout and election definition as well as export of election results for statewide reporting.

20. Does the system have the ability to be re-configured and customized to accommodate needs that change or evolve overtime, especially those required by new laws?

Yes, Hart will always work with you to accommodate the laws of the State of Ohio to ensure compatibility with Verity Voting. We will pursue customizations determined to be necessary and note that changes will be assessed with consideration for State of Ohio certification requirements.

Verity is flexible enough to **leverage new technologies over time** and includes all the functionality dictated by federal certification requirements.

Verity is a common platform and incorporates universal design across all devices. Key hardware components of the Verity Voting system use common parts and are integrated into the entire system design, to provide adaptability, a robust supply chain, and efficient maintenance.

21. Do you have a standard maintenance and upgrade schedule for new system releases and patches, including any additional costs associated with maintenance and upgrades or equipment repairs?

Hart has established maintenance schedules for Verity devices – and they are listed on stickers inside the device case. Typically, maintenance tasks would be performed by the County.

Verity has been designed to require very little preventative maintenance. Hart will not need to perform any maintenance on your system, unless you choose to have us do so instead of doing it yourself. **This independence from your vendor results in options for efficiency and cost savings.**

Hart trains local jurisdiction technical staff to perform these simple, routine maintenance tasks, and we provide step-by-step instructions as part of your Verity documentation. Maintenance tasks for Hart-manufactured Verity components include:

- As needed – Clean display.
- Every 500 sheets – Clean scanner.
- Recommended annually – Calibrate touchscreen.
- Annually – Perform scanner calibration diagnostic procedure.
- Annually – If a screen protector is installed, check its condition.
- Every 3 years – Replace coin battery in tablet.
- Every 4 years – Replace rechargeable backup battery in tablet.



Third-party manufacturers provide maintenance for products such as high-speed scanners and printers that are included in your Verity configuration. Maintenance schedules for third-party products vary. Between visits from manufacturer-certified technicians, you perform only standard cleaning. Hart works with you to coordinate the third-party service contracts required for maintaining these third-party components.

ROUTINE AND PREVENTATIVE MAINTENANCE FOR VERITY COMPONENTS

Routine and preventative maintenance for Verity Scan

Maintenance Type	Action	Frequency
Routine	Clean display	As needed
Routine	Clean scanner	Inspect/clean scanner after every 500 sheets
Routine	Calibrate touchscreen	Annually
Routine	Check condition of screen protector (if installed)	Annually
Routine	Perform scanner calibration diagnostic procedure	Annually
Routine	Replace rechargeable backup battery	Every four years
Preventative	Replace coin battery in tablet	Every three years

Routine and preventative maintenance for Verity Touch Writer

Maintenance Type	Action	Frequency
Routine	Clean display	As needed
Routine	Calibrate touchscreen	Annually
Routine	Check condition of screen protector (if installed)	Annually
Routine	Replace rechargeable backup battery	Every four years
Preventative	Replace coin battery in tablet	Every three years

Preventative maintenance for the Canon DR-G1130 high-speed scanner

Hart has partnered with multiple vendors to provide a high-speed scanning solution. Preventative maintenance is typically performed on high-speed scanners according to a schedule based on the number of sheets scanned. The more sheets scanned, the more often preventative maintenance is performed.

For the Canon DR-G1130 high-speed scanner, preventative maintenance is performed by a technician certified by the manufacturer. Between scheduled preventative maintenance visits, the user performs only standard cleaning and light-duty maintenance typical of any device of this type.

22. Provide details of the Audit logs generated by each part of your system.

- Are all user actions logged?
- Are the audit logs unencrypted and able to be printed and exported?
- What is the default format?

The Verity solution ensures that auditing your election results is efficient and easy, with ready access to scanned ballot images, and granular focus on corresponding cast vote records, at the level you need.

Throughout all phases of operation, all Verity system components maintain complete audit logs. Every Verity device and application logs all user authorization/authentication, data entry, user interaction, and system events. Election managers can print or export audit logs from each device and application. Not every vendor's solutions include this comprehensive, built-in auditing capability.

PRINTABLE AND SEARCHABLE AUDIT LOGS

Verity ensures that auditing your election results is efficient and easy, with ready access to scanned ballot images, and granular focus on corresponding cast vote records, at the level you need.

Throughout all phases of operation, all Verity system components maintain complete audit logs. Every Verity device and application logs all user authorization/authentication, data entry, user interaction, and system events. You can print or export application logs from each device and application. In addition, all audit log reports can be easily exported in CSV format, which enables you to



easily analyze, search, and filter the reports through COTS third-party applications for purposes of data mining.

On Verity Touch Writer and Verity Scan voting devices, audit logs and cast vote records are redundantly stored to the vDrive and to a partition on the compact flash card. When the vDrive is read into the Verity Count tabulation and reporting application (or electronically transferred there via Verity Relay), the audit logs are transferred to the datastore for that election.

It is easy to access and print audit information about every component of the system in a highly readable format – audit information is not hidden in a “black box.”

AUDIT LOGS AND DETAILS

On the Verity Touch Writer voting device, audit logs are redundantly stored to the vDrive and to a partition on the compact flash card. The audit log for each device includes a record of each event occurring on the device, including:

- Date and time of the event
- Option selected by the voter where applicable
- Action performed on the unit
- Tabulation input events
- Device serial number.



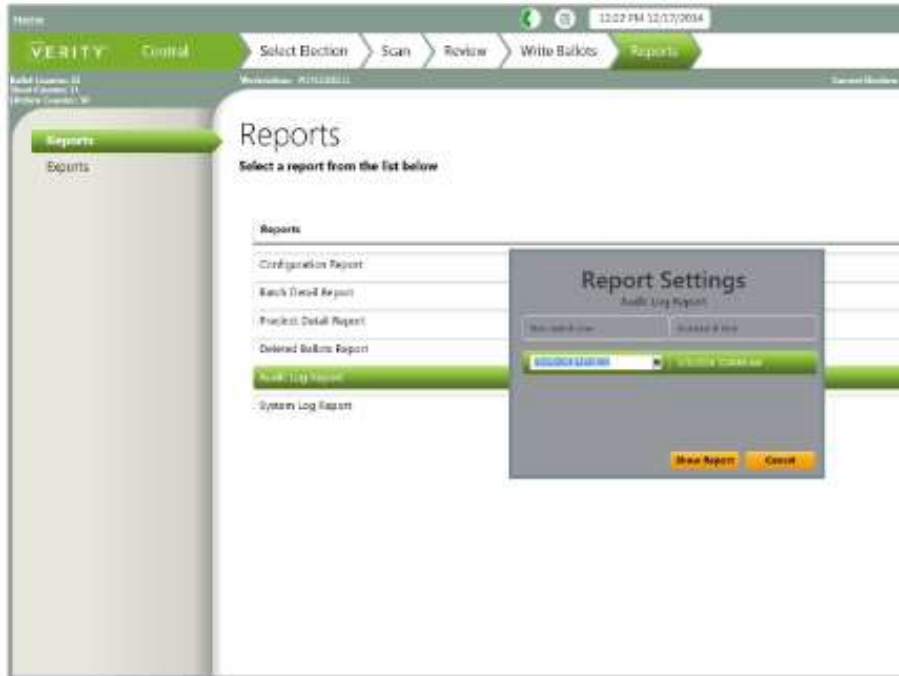
When the vDrive is read into the Verity Count tabulation and reporting application, the audit logs are transferred to the datastore for that election.

In addition, each device generates a QR code printed from the onboard thermal printer. This QR code has information embedded, including the destination of that device, the election loaded on the device, and the ID of the inserted vDrive.

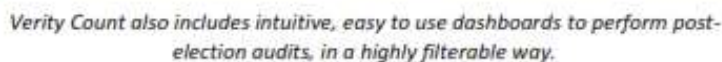
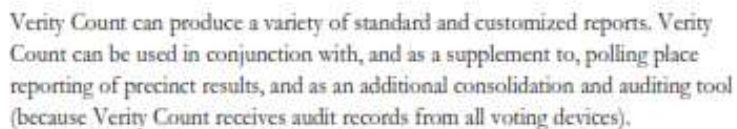


Verity Central's audit log includes the Verity user's login ID and a record of all resolution decisions, providing a complete record of the adjudication process.

Verity Central also supports highly filterable ballot image searches and access to original and annotated ballot images.



When all ballots have been scanned and resolved, Verity Central writes cast vote records (CVRs) to vDrive portable flash media. CVRs can then be tabulated in the Verity Count tabulation and reporting software.



Audit procedures are covered in the following training courses: Verity Count, Verity Central, Management and Best Practices.

23. Briefly describe all results reports the system can generate and provide sample copies of such reports.

- Can customized reports be designed and will our staff have the ability to customize without vendor involvement?
- Are the reports searchable or available to be exported into other document formats?
- Can the reports easily be exported for web viewing?
- What is the standard/default format used?

Verity's integrated reporting engine produces a variety of standard, pre-defined reports. You can also easily design user-friendly customized reports from within the application interface – without professional data processing assistance or the use of an external tool or report writer. Reports can be run at any time and printed directly to a connected commercial-off-the-shelf desktop printer or exported to searchable, re-purposable formats such as PDF, CSV and XLSX. While Verity is never connected to the Internet, as a user of Verity Voting, you will be able to export reports that may be published, at your discretion, to channels such as “the web”, as noted in the above question.

VERITY COUNT – STANDARD REPORTS



Verity Count (tabulation and reporting software) reports include the following standard reports:

- Canvass
- Cumulative
- Precinct
- Write-In Status
- Precincts Reporting
- Audit Log
- Flash Memory Device (vDrive) Status
- Device Log
- Voting Devices

Verity Count Reports		Sample County		Verity Count Reports	
Sample County		Sample County		Sample County	
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- Polling Places
- Alias
- Manual Vote Recording
- Residual Votes



Verity Build (election definition and deployment software) reports:

- Jurisdiction Configuration Report
- Polling Place List, Summary
- Polling Place List, with Details
- All Contests
- Contest Associations
- Ballot Style Associations
- Rotation Report
- Ballots Printed
- Flash Memory Devices (vDrives) Created



Verity Central (high-speed scanning and on-screen ballot adjudication) reports:

- Configuration
- Batch Detail
- Precinct Detail
- Deleted Ballots
- Audit Log
- System Log

CUSTOM REPORTS



You can easily design customized reports from within the Verity application interface -- without professional data processing assistance or the use of an external tool or report writer. Verity Count enables you to create custom reports based on filtered data (such as only certain precincts or contests).



24. Do you provide printing services for a county of our size?

In accordance with Ohio State law, a vendor must have a printing location in the State in order to handle this task. Hart does not meet this print vendor requirement.

There are multiple printers in Ohio capable of printing the Hart ballot. We will work with the County to identify the best possible solution.



Tabulation Equipment Vendor
Demonstration Survey Summary
January 15-17 2019

Survey Overview

The purpose of the Tabulation Vendor Demonstration survey was to gauge the initial reactions regarding the presentations of Tabulation System Vendors from CCBOE staff, County Council members, SOS representatives, Health and Human Services representatives, and Voting Rights Group representatives.

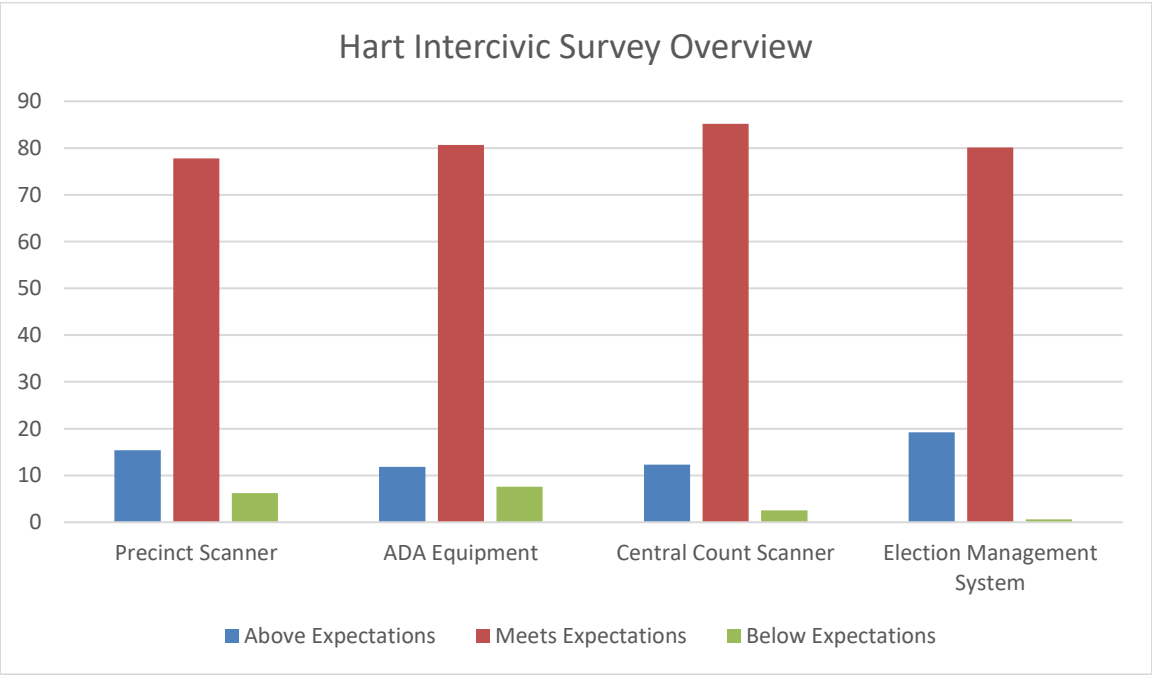
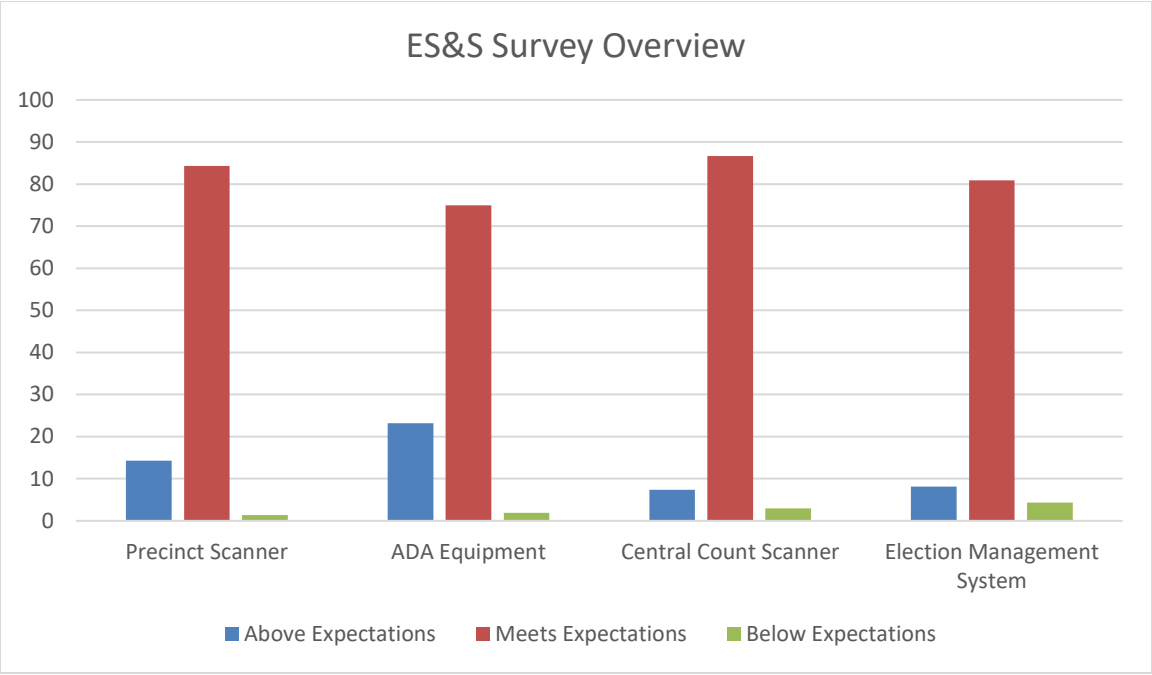
Three vendors participated in the vendor demonstrations – Clear Ballot, Election ES&S and Hart InterCivic. Each vendor had one full day to present their tabulation system. The morning session was open to the public. During this session each vendor gave a brief overview of their organization, a basic security presentation, a demonstration of the scanners and ADA equipment. The afternoon session was closed to the public to allow CCBOE staff the opportunity to ask specific questions concerning software and election set-up.

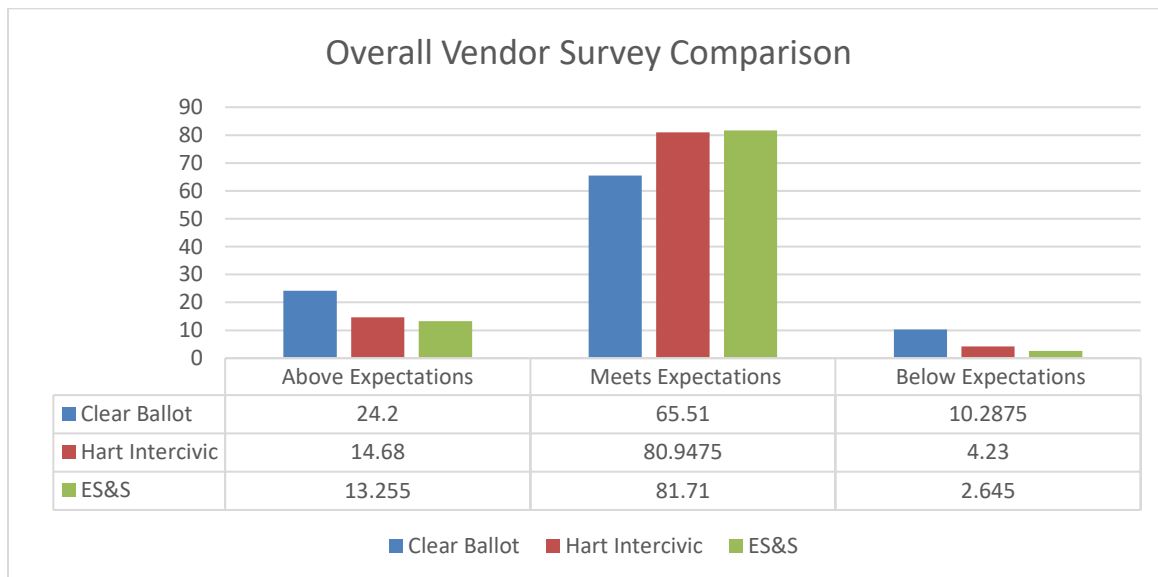
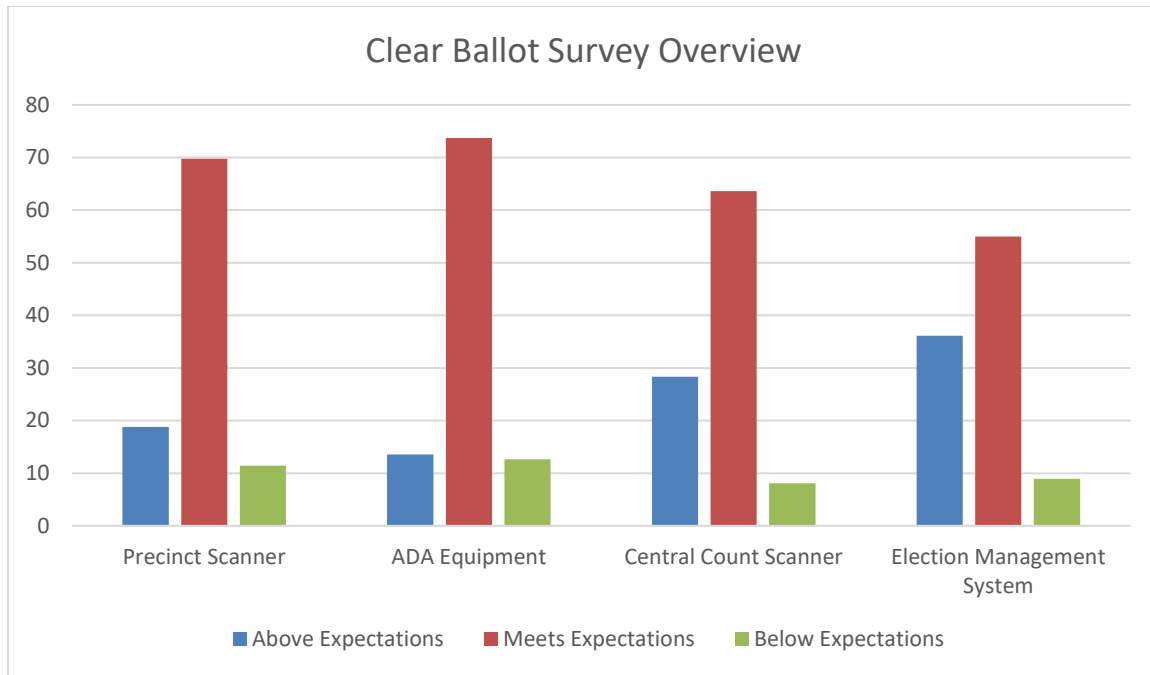
During the demonstrations the audience was looking for equipment features such as ease of use, software features, tabulation abilities and their auditing system. The participants were looking for improved ease of use for our county and its unique circumstances. Specifically in regards to size, volume of ballots cast, the ability to transport the equipment, conduct mandatory and comprehensive testing of the equipment and the ability to train the public and our Election Day Workers on the systems.

The participants were asked to respond to a survey about each vendor. There were 51 respondents for Hart InterCivic, 55 respondents for ES&S, and 50 respondents for Clear Ballot. The survey was broken down into four primary question sections:

1. Precinct Scanner
2. ADA Equipment
3. Central Count Scanner
4. Election Management System

With sub-sections that covered general questions, pre-election day questions and Election Day questions, the respondent notes in reference to each section are in appendices A-C. The individual rankings of each vendor are represented in the tables below.





Survey Summary

All three vendors have comparable scores and further exploration of their products, customer service, and ease of use will benefit Cuyahoga County in making a final decision on a Tabulation System Vendor.

E. April 2019: Additional Survey Responses From Each Vendor

Clear Ballot



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

- 1. Are there any RFP's you did not win outside of Ohio? If so, please provide the name of the election jurisdiction and the date the RFP was released.**

1. Cook County: July, 24th 2017
RFP# 1718-16167

2. Utah: May 12th, 2017
Solicitation #WA17018—Voting Equipment

3. North Dakota: June 18, 2018
RFP Number: 110.7-18-037

4. San Luis Obispo County: Sep. 13, 2017
RFP No. 1447

5. City of Chicago: July, 7th, 2017
RFP: Voting System

- 2. Have you been party to any litigation regarding any of your voting system (past or present)? Are there any lawsuits currently still outstanding? If yes, please provide the details.**

Clear Ballot has not and is not currently party to any litigation regarding our voting system. There have been no lawsuits or any litigation naming us as an involved party.

- 3. Are there any known anomalies with your system?**

We define an anomaly as when the operational results of the election have been called in to question or malfunctions lead to widespread disruption for election workers and voters alike. There have been no anomalies in any implementations of the ClearVote system.

- 4. What is your timeline from signing the contract to full implementation? What is your timeline for the delivery of all voting equipment? What is your timeline for staff training?**

A countywide ClearVote implementation in Cuyahoga County will take approximately 4-6 months. The project will be led by a Clear Ballot Senior Project Manager with extensive experience in implementing large, and statewide, voting systems. In addition to the Senior Project Manager, the project team will include a Clear Ballot Customer Success Manager, Field Support Engineers (FSEs), Operations Managers and Trainers. This cross-functional team approach will insure Cuyahoga clear and consistent communication, that scope is managed



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

and complete, and that the project is delivered in compliance with contract requirements completely to the County's satisfaction while on time and within budget.

The transition process will begin with approximately 3 weeks of project planning to define and verify project scope and schedule. In a transitions of this size and effort, every existing workflow in the County's election process will be reviewed along with contract requirements as part of a full analysis to determine project scope that all parties are in concord with. Our approach emphasizes thorough analysis in the planning stage to produce a gap analysis and logistical review in order to be certain that no process group or operational area is overlooked. The culmination of these efforts is a comprehensive countywide project plan, signed off on by the County.

Clear Ballot's approach to major projects like this transitions focus on early consideration of logistics. Proper space, resources, logistical procedures and operational definitions must be established early in the transition to produce efficient receiving, unpacking, inspection and Acceptance Testing workflows. These efforts keep the project on schedule. Efforts will involve review of the County's warehouse facilities, proposed procedures for removal and disposal of existing equipment, and centrally staging new equipment and identification of facility modifications that may be needed prior to the delivery to each jurisdiction. A checklist of each test point verified by Clear Ballot FSEs accompanies each unit for the County's inspection.

When effective receiving, inspection, and inventory procedures have been established, receiving of product will begin. In a large implementation, our goal is to get the county a complete end-to-end system as soon as possible, followed later by the bulk deliveries of the equipment quantities ordered for precinct deployment. This approach provides the county with the ability to have a complete system to facilitate training, promote familiarization, and allow test development at the earliest possible interval. Within one week of receipt of the equipment, our FSEs will deploy to inspect and set up the equipment in the County.

Acceptance Testing is then conducted by the Customer. In order to prepare the appropriate staff prior to performing User Acceptance Testing (UAT), Clear Ballot will training on the setup and end to end operation of the system. This comprehensive training for all county Election Administrators is provided utilizing in-person classroom-style instruction in a lab-type setting that promotes hands-on familiarization. These sessions will also include mock election exercises. The scope, class size, and scheduling of these sessions will be worked out in concert with the County and during the Planning Phase of the project.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

Clear Ballot will provide a proposed acceptance test protocol to the County for use as a reference in developing the official User Acceptance Testing procedure and related artifacts. Our approach centers on an end-to-end test of the system. We believe in promoting open discussion with the County to determine Clear Ballot's roles and responsibilities in supporting the County's User Acceptance Testing (UAT), and upon definition of those roles, our staff will adhere to their assigned duties in supporting the UAT process.

The overall process to stage and deploy bulk equipment shipments to Cuyahoga is estimated to take within 4 months following contract execution. This implementation timeline estimate is based on the total number of machines needed applied across the delivery, setup, training and User Acceptance Testing efforts. Clear Ballot will also aid the County in development of a countywide voter education marketing campaign which will familiarize and prepare your voters and poll workers for the new voting system. A key component of this program is to educate them on all the benefits and efficiencies that the new system will bring to the County. Printed materials, video content, and/or regional in-person events will be developed in partnership with County stakeholders to insure the appropriate messaging is being delivered and that voters appreciate the investment Cuyahoga County is making to improve elections. Clear Ballot's commercial off the shelf hardware, provides the best of breed scanners, printers, and computer hardware available in the market today with Technical Support provided by Clear Ballot and certified hardware vendors. It is our goal to build robust relationships and partnerships between Clear Ballot team members and all stakeholders at Cuyahoga County. Our partnership is going to be decades long and we know that building trust and communication structures are key to successful long term business relationships. Providing exceptional service is what sets Clear Ballot apart from our competitors, and we look forward to proving that from day one. We are committed to your success and satisfaction, and we look forward to providing the most modern, secure, and transparent voting system available to Cuyahoga County.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

5. What is your testing process in addition to EAC testing requirements?

We embrace the concept of quality through continual improvement of our processes, procedures, and responsibilities for achieving quality objectives. Our business follows Lean principals, and uses OKRs (Objectives and Key Results) and KPIs (Key Performance Indicators) to measure the performance of the most important elements of our QMS process. Security-control related KPIs that we track include:

- Zero defects
- Zero security incidents
- Customer satisfaction scores

Additionally, Clear Ballot Group requires an annual mandatory internal security training for all employees and contractors. Topics covered include:

- Social Engineering
- Passwords
- Physical Security
- Data Handling
- Compliance

6. How do we import election information from our VR system (DIMs) to the tabulation system (Districts, Precincts, Offices, Candidates, Issues, Locations, etc.)?

The ClearDesign election preparation and ballot layout component can import the election definition from most voter registration systems using some of the more common formats in the industry. This import includes the parties, districts, precincts, splits, contests, candidates, questions, including the question text, and vote centers. The ClearDesign system can also import the voter registration counts by party and split. All entities (districts, precincts, split, contest, etc.) keep the primary import key (importID) in a separate field which is then passed on to ClearCount and can be exported with the results for transmission to the state.

7. Are you willing to work with CCBOE to create a tool to import data from our voter registration system into your election system (if there is not one available currently)?

While ClearDesign already accepts most industry standards, Clear Ballot will work with any voter registration system that Cuyahoga County currently uses, or may use in the future, to ensure compatibility.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

8. Is there an option to proof all Spanish data in reports prior to the ballot layout?

Yes, proofing can occur prior to laying out ballots. The ClearDesign module is used to create or import the election definition, layout, proof and produce both paper and accessible ballots in all supported languages, including Spanish. Language information can be imported, or prepared for translation by clicking a single button. After translation, ClearDesign imports the language information with another single click. Changes will be reflected real time, and Spanish ballots can be proofed/previewed/edited instantly before printing. Proofing of Spanish data can be accomplished within the 'Contests with Ballot Text' report, which shows the exact ballot text for proofing. Final ballot proofing is simple, with the ability to print one copy of each style in each language watermarked for proofing. This also includes all device messages as well.

9. Do you keep your software current with Microsoft Operating System changes?

With each certification campaign we have adopted the newest version of Windows to run with our ClearVote system. We historically have introduced new certified versions of ClearVote once a year for state certification allowing counties to upgrade and benefit from the newest OS changes.

For customers looking to keep the software current without upgrading to the next certified version, we outline how they can update Windows Defender antivirus software regularly. We also provide information on how to install Windows patches in the rare case there is a major security issue discovered with a particular version of Windows. We certify and test ClearVote to a version of Windows and that is what we install with the system for maximum stability and reliability.

10. How frequent is the release of software updates/upgrades? Is there a cost for this service?

Clear Ballot software updates are included in the cost of your annual software maintenance agreement. We typically certify one major and one minor release annually which focus on product enhancements (User Experience generally remains the same to minimize effect on all stakeholders). When to deploy each update will be determined by a mutual agreement between Clear Ballot and Cuyahoga County. The County can choose to upgrade their software themselves, or they can hire Clear Ballot Customer Success to perform the upgrade for them at standard billable rates.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

11. How long would preventative maintenance take on the precinct scanner, ADA device and central scanner?

Preventive Maintenance on the ClearCast precinct scanner, Fujitsu central scanners (for tabulating Absentee ballots, for example), and ClearAccess stations and printers takes approximately 15 minutes per unit. Maintenance for each unit requires cleaning wipes and a supply of consumables such as printer toner, paper rolls and ballot stock. Each unit is cleaned using a cleaning wipe and inspected to make sure there is an adequate reserve of ballot stock and toner in ClearAccess printers and paper tape in ClearCast units. Fujitsu central scanners are recommended, by the vendor, to have an annual maintenance performed by a Fujitsu certified Service Engineer, the cost of which is covered under the scanner warranty and therefore comes at no cost to the county.

12. Would we be able to create election media for each of our polling locations in the county, run test ballots, and upload results using limited scanners (reusing the same scanners) for the different polling locations?

Yes. All election media is created with data for each polling location residing on it. The election media is set to specific polling locations directly on the tabulation machine during the programming/L&A process. The same scanners can be reused to set election media to any desired polling location. However, Clear Ballot would like to understand the entire testing process to ensure a mutual understanding of the goals of the county.

13. What are the security environments offered with the Tabulation Server and Workstations?

The Clear Ballot system is designed as an isolated, hard-wire connected, stand-alone network. Physical control of the hardware is the first and the most critical step to ensure security. The small physical footprint of each component facilitates secure storage (e.g., in locked cages or storage boxes) when the system is not in use. Because all election software resides on a single, powerful database server, the Clear Ballot software is delivered to the local network of password-protected computers on an as-needed basis.

When the system is in use, attacks are prevented by password-protected, role-based access controls. Additional security measures, called "hardening", prevent attacks by ensuring that only known software can be run on these computers and that unauthorized storage media are not recognized by the operating system. Preventing attacks on the integrity of the election is facilitated by a design that minimizes physical handling of the ballots. Additionally, because of



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

ClearVote's minimization of the handling of the physical ballots, the potential for human error or malicious attack is virtually eliminated.

The ClearVote system employs FIPS 140-2 certified cryptography throughout the system. All network traffic on the closed ClearDesign and ClearCount networks is encrypted with TLS/SSL. All election data, transferred to and used by the voting devices, that is stored on USB media drives, is encrypted with AES-256 or stronger encryption and signed and validated using SHA-256 HMACs.

Audit logs provide a detailed record of: all users who log in and when, all reports that are generated, and all human adjudication of ballots. Attempts of unauthorized users to log in are captured in these logs. Additionally, all media contents are digitally signed and verified. If any signatures are found to be invalid, the media is rejected, and the administrators are made aware of it.

The ClearVote system is U.S. EAC certified, it was thoroughly vetted for security, usability and accessibility. A rigorous security evaluation was performed by Pro V&V, an NVLAP accredited Voting System Testing Laboratory (VSTL), by a heavily accredited security team. Pro V&V also performed accessibility testing using standards set up by VVSG.

Finally, Clear Ballot does a comprehensive peer review of all source code prior to any new release to undergo certification. Our build process and development environment dependencies are thoroughly documented. Upon release of source code and documentation to the VSTL, the Lab performs independent compliance review and comprehensive security analysis based on the following standards:

United States Election Assistance Commission (EAC) 2005 Voluntary Voting Systems Guidelines (VVSG)

EAC Decision on Request for Interpretation (RFI) 2010-02 and

PEP 8 – Style Guide for Python Code (legacy.python.org/dev/peps/pep-0008/)

Once the software passes the above criteria, the VSTL independently generates a "Trusted Build" and archives the source code. The VSTL then provides a Test Report which includes the SHA-256 hashes of the Trusted Build(s) to ensure that election officials can verify that the software matches the System Identification Guide.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

14. Do you have a Disaster Recovery Plan for the Tabulation Server/Workstations without interruption?

Disaster Recovery Plan:

ClearVote is a paper-based system and, as such, the paper provides an important layer of disaster recovery protection.

ClearCount Disaster Recovery Plan: Central scanning results and card image files are stored in a centralized database that resides on the ScanServer as soon as tabulation of each batch of ballots is complete. No data is stored on a ScanStation client. This means that if any individual ScanStation computer fails, the jurisdiction need only re-scan the batch in progress. Finally, after each day's scanning, the election database (including ballot images) can be incrementally backed up to an external drive. The server is also installed on a RAID (Redundant Array of Independent Disks) so if one hard drive is compromised, the contents of the installation can be restored.

The Clear Ballot Disaster Recovery Plan details guidelines for determining plan activation, technical response flow and recovery strategy, guidelines for recovery procedures, as well as checklists outlining considerations for escalation, incident management, and plan activation.

Ultimately, Clear Ballot Group will work with Cuyahoga County to tailor a disaster recovery plan that meets state and county needs.

15. What is the standard capacity of one memory stick? Are there memory sticks with a higher capacity?

Clear Ballot provides 32GB encrypted memory sticks. Higher capacity memory devices should not be necessary but would be available upon request (and upon a certification campaign).

16. Are memory sticks only able to be uploaded into one results category?

Each memory stick is assigned to only one result category (counter group - Early Voting, Absentee, Election Day, Provisional, etc.) at the time of programming the ClearCast tabulators but they can be assigned to any counter group that the county wants to use it in.

17. Does the system provide election results in Excel format?

Yes, the election results can be exported in a .CSV file which can be easily read by and defaulted to open in Excel.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

**18. What methods are available to transfer the data from high speed scanners?
(Network/USB stick/other)**

ClearCount, Clear Ballot's tabulation and central scanning application has its own server/client network. ClearCount communicates within its network over encrypted Ethernet connections. Encryption and data integrity is provided by TLS/SSL. Ballot images and data from the high speed scanner are transferred directly over this network to the ClearCount server for tabulation.

19. What reports and formats (XML/txt) are available for the election results during the upload process? Can these be generated without stopping the upload process?

ClearCount generates an XML export containing all election data. The XML file is used to generate results files in a format required for state results uploads. The XML file is also suitable to populate ENR systems.

Reports can be generated periodically on Election Night without stopping the upload process. Extract reports can be run at any time during scanning, for example, to provide a statement of ballots cast or a scanner throughput reporting for monitoring operations, or to give preliminary results after polls close on Election Night. Running reports does not interrupt scanning. Until the polls close, no election results are available, only the number of votes cast.

All reports can be exported by pressing a button to select the desired export format. CSV and XML exports can be run at any time during scanning after the first ballot is scanned. Until a highly credentialed user enables them, no election results are available – only operational reports.

20. Do you have a dashboard to see the status of the tabulation process (Number of sticks uploaded, Number of sticks not uploaded, Number of precincts)?

Yes. There are multiple upload status screens to view what has been received and uploaded and what is still remaining. In addition to this the ClearVote system can produce reports of the tabulation and scanning process for each scanner. A user opens the election dashboard and clicks the # boxes scanned link. From the tab that opens, the data available includes links to the Ballot Images report; the number and percentage of unreadable ballots, the model and serial number of the scanner, the scanner start and end time; the duration of the scanning; the number of ballots scanned per hour; and the number of precincts in each scanned box of ballots. Additionally, most reports can be filtered to show results by scanner, precinct, district, date, etc.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

21. Does your system have page counters i.e. will it tell us how many pg. 1's, pg. 2's, etc. have been scanned for each precinct?

Currently, the ClearCount central reporting system is capable of displaying this information under 'Card Style' reporting. It is not, however, displayed directly on the the tabulators in each precinct. Providing this information directly on the tabulator reports has already been discussed and is on our road map.

22. How long would it take to backup/clear/restore 1,000,000 images?

The time it takes to back up depends upon the election size and ballot image size. Backups can be done incrementally every few hours or daily. Backing up an election consists of exporting it to an external drive and then securing that drive. Clear Ballot recommends a drive running at 7200 rpm. A 5400 rpm drive can be used, but backups will take longer. Backups comprise election-specific data, including related card image files and ClearCount election activity logs. Data and card image files are backed up to a folder named Backups/ElectionName. For large elections, use USB 3 connections (with a USB 3-capable drive and a USB 3-capable port) for best performance. USB 2 or USB 3 connections can be used to back up small and medium elections.

23. Is there a way to tabulate new ballots and then bring in Absentee results which have already been tabulated?

Currently our procedure would allow for a restore process of tabulated absentee results from a back-up of the election. Then additional ballots could be added to that. This is an area that Clear Ballot would welcome the opportunity to work with Cuyahoga County to meet your needs if necessary.

24. Does the tabulation system provide a Location based/City based test deck? We would like to generate our own test decks, what options are available to export data?

We understand that Cuyahoga County has a unique test deck design. We are committed to customizing a test deck process, including expected results, for Cuyahoga County that could be produced on site and printed in house or send to a commercial printer. We very much look forward to working with you on this project.

Clear Ballot already has tools to generate automated and customizable test decks. For example, Clear Ballot worked with King County, Washington to build a test deck with the following criteria. The tool also creates a results file to confirm the



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

expected results after scanning. Again, we welcome the opportunity to work with you on this.

25. How many days will be needed for Project Management and Training during and after the implementation period?

An implementation of the ClearVote system for Cuyahoga County, depending on the final scope of the project, will take approximately 6 months. Our approach involves utilizing Project Management early in the process to define requirements, which adds approximately 2 to 4 weeks of Project Management to the front of the project schedule. Thus the total Project Management during the implementation can run as much as 7 months. Typically after the Go Live, or the first Election, our Project Management Team will conduct a post-implementation Lessons Learned session and produce a report from this effort, adding an additional 2 to 4 weeks to the end of the project.

Clear Ballot has a variety of role-based training opportunities for Board of Election Staff (BOE Staff) and Precinct Election Officers (POEs), as well as "Train the Trainer" programs should Cuyahoga County wish to utilize them. Each course is delivered in person, includes hands on equipment exercises and is concluded by role-based documentation with pictures that documents procedures to follow before L&A, during L&A, before Election Day and on Election Day. Each document is provided to Cuyahoga County so they can adapt the documentation to meet their specific procedural requirements without having to author a similar document from scratch.

The courses recommended for implementation of Clear Ballot in Cuyahoga County are as follows, though many additional training opportunities are available for various audiences and level of detail?

Audience	Course	Length	Max Students
BOE Staff	Clear Design	3 days	8
BOE Staff	Clear Count	3 days	8
BOE Staff	Clear Cast/Clear Access	1 day	25
Train-the-Trainer	Clear Cast/Clear Access	1 day	25
PEOs	Clear Cast/Clear Access	.5 days	30



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

26. What is the timeline on a new precinct scanner? Will it be less expensive?

Clear Ballot is currently on track to have the new version of its precinct scanner certified by the end of 2019 for use by clients in the 2020 election cycle. This timeline is subject to change and Clear Ballot will keep Cuyahoga County updated on its progress and invite it into the process for feedback. Pricing has not yet been decided on the new version, but Clear Ballot guarantees the price of the system will not increase.

27. What is the timeline on a new ballot box?

The Ballot Box that was presented to Cuyahoga County is currently going through the certification process with a targeted completion in August 2019.

28. Can Clear Ballot fabricate a ballot container that is similar to the one we currently use?

Yes, Clear Ballot can be extremely flexible in the ballot box/container used because there is no separation component or firmware needed. Cuyahoga County should keep in mind that any new design or modification to the ballot box would need to go through a certification campaign, which will add time to the projected delivery date. Clear Ballot is willing to certify new system components for Cuyahoga County.

29. Is there another recommendation to set up the ADA unit?

Currently there is not another recommendation to set up the ClearAccess unit. However, Clear Ballot is currently developing an all-in-one ADA compliant ballot marking device that may be a better fit for Cuyahoga's preference. We would welcome Cuyahoga County's feedback on this device.

30. Is a backup battery needed for the ADA unit? Is a second one needed for the printer?

There is one (1) master UPS to power both the ADA unit and the printer for 2 hours. Most clients include this UPS as part of their emergency response plan in the event a location loses power.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

1. Are there any RFP's you did not win outside of Ohio? If so, please provide the name of the election jurisdiction and the date the RFP was released.

CONFIDENTIAL

2. Have you been party to any litigation regarding any of your voting system (past or present)? Are there any lawsuits currently still outstanding? If yes, please provide the details.

NONE

3. Are there any known anomalies with your system?

It was discovered that a specific configuration of EVS 6.0.0.0, used solely in Johnson County, Kansas, was not optimized for performance when uploading master media USB memory devices for the ExpressVote Tabulator into the Electionware Reporting module. This issue was remedied in EVS 6.0.2.0., which is currently certified in the State of Ohio.

4. What is your timeline from signing the contract to full implementation?
What is your timeline for the delivery of all voting equipment? What is your timeline for staff training?

ES&S prefers an implementation window of 90 to 120 days from signing of the contract to ensure a successful implementation, which will translate to a successful first use. Delivery timelines are based off total equipment footprint in conjunction with the Customer's preferred delivery rate. Our distribution team is committed to working with Cuyahoga County to identify a delivery timeline that will suite its needs and ensure all downstream implementation tasks can occur accordingly. ES&S also will work with the County to create a training schedule acceptable for both parties after the equipment has been delivered.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

5. What is your testing process in addition to EAC testing requirements?

ES&S has distinct and separate development and quality assurance departments. At different phases during the agile development process, developers will provide a build that will be subjected to thorough testing by the QA department. As an integral part of our certification testing process, ES&S has a dedicated team of quality assurance specialists whose primary responsibility is to conduct stress, volume, and regression testing for all hardware and software components of the system that will be certified by the VSTL, EAC, and the county certification bodies.

1	Developer test – both functional and automated unit testing
2	Quality Assurance Feature testing – software and firmware builds are dropped to QA to test features against functional requirements.
3	Full regression, integration, and volume testing – the entire system is tested to insure all previous and new features and products work properly.
4	Pre-federal cert testing – system testing to simulate the tests that the labs will run to insure that system do not experience issues at certification
5	Pre-state certification testing – state certification managers test the system against the certification requirements of target states to insure compliance with requirements.

The rigorous testing methodology allows us to completely test each new release from end-to-end before it is reviewed by the federal testing authorities. The testing plans are built to thoroughly stress each component to validate that the entire system meets or exceeds the VVSG requirements mandated by the EAC.

6. How do we import election information from our VR system (DIMs) to the tabulation system (Districts, Precincts, Offices, Candidates, Issues, Locations, etc.)?

Electionware features a robust import feature that allows a significant amount of election information to be imported with a single click of the mouse. Types of information that can be imported include Parties, Precincts, Districts, District-to-Precinct relations, Contests, Candidates, Ballot Questions, Polling Places, Poll-to-Precinct relations, and more. You may also import foreign language translations for all of these items. The import files themselves can be formatted as fixed length fields or can be delimited.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

Both ASCII and Unicode formats can be imported, which provides support for multi-byte character languages such as Chinese. Header rows are used to define the table and field names of the information contained in the import files. Because the import files can be viewed in Microsoft Excel, many of our customers perform spell checking in that program prior to performing the Electionware import.

All of the ballot question text and special formatting described above can be imported as part of Electionware's powerful import feature.

7. Are you willing to work with CCBOE to create a tool to import data from our voter registration system into your election system (if there is not one available currently)?

ES&S has worked with various Voter Registration (VR) programs to convert VR data elements into our Election Management System (EMS). As the current voting system vendor for the County and the national DIMS vendor, ES&S has vast experience importing data from the County's voter registration system into the County's election system.

8. Is there an option to proof all Spanish data in reports prior to the ballot layout?

Yes. Electionware provides a spreadsheet report showing all translations. This provides many options for translations. They can be validated within a single report if they have already been imported or manually proofing entered. You can also export a blank report of all English text to send the data to a translation service. The translator can enter the Spanish data in the Excel spreadsheet report, and then the Electionware user can simply import this text. This flexibility allows the County to either enter the Spanish text or have a translator do this work from Excel, which is widely known.

9. Do you keep your software current with Microsoft Operating System changes?

Microsoft operating system upgrades are typically provided along with new system features in subsequent and ongoing releases. However, these cannot be used until a new operating system is included in an EAC-certified release.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

10. How frequent is the release of software updates/upgrades? Is there a cost for this service?

ES&S will offer the County enhancements for security, performance, feature improvements, and hardware sustainability annually or more frequently as necessary.

As new EVS releases are certified and available in the State, ES&S Technical Services are available to perform EMS network upgrades to Cuyahoga County. As new EVS releases are certified, Technical Services can be enlisted to upgrade the County's EMS network. If Cuyahoga County decides to utilize ES&S for upgrade services, an implementation scope will be determined, and a network upgrade quote will be created and presented to the County for approval.

The upgrade process consists of completely reloading the EMS systems and installing and configuring the systems in a certified and hardened configuration. Prior to completing the installation, the entire EMS network is tested from end-to-end to ensure an operational EMS network. An installation checklist and network diagram are completed and delivered to Cuyahoga County at the end of the upgrade process. Additionally, the ES&S technician provides a brief EMS network walkthrough with the customer while on-site.

11. How long would preventative maintenance take on the precinct scanner, ADA device and central scanner?

ES&S designs central scanners and precinct equipment to provide less than a 5 percent probability that an unscheduled maintenance action will require more than 30 minutes to complete. Repairs done under our Extended Warranty with Biennial or Annual Maintenance are typically performed onsite. If the repair cannot be done onsite, or if a customer subscribes to the Extended Warranty without biennial or annual maintenance, repairs at the ES&S depot in Omaha are completed within 7-10 days of receipt.

12. Would we be able to create election media for each of our polling locations in the county, run test ballots, and upload results using limited scanners (reusing the same scanners) for the different polling locations?

Yes. Electionware media can be tested in this manner. We suggest each scanner be tested prior to an election, but for purposes of testing the results this is a common practice. The Toolbox software provides pre-marked test ballots and a spreadsheet showing the expected results based on the test deck created. This report may be compared with the results uploaded after feeding ballots through the tabulator. There is not a limit on the same scanner being used to upload results from different poll media.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

13. What are the security environments offered with the Tabulation Server and Workstations?

The Certified Election Systems & Software (ES&S) Election management System (EMS) environment operates on Windows 7/Server 2008 R2 operating system environment, which is configured in a hardened state through the certified build process. Specifically, hardening scripts lock down the EMS systems to increase security and allow only elections required functionality. Configuration settings are based on security best practices and recommendations from Federal and Industry Standards that provide specific and actionable ways to prevent malicious activity and improve the collective security of EMS systems. When an ES&S EMS system or network is hardened, the cybersecurity posture of the network is improved which lowers the risk to outside threats.

Hardening of the EMS helps conform to Federal and Industry Standards. This is accomplished by configuring and locking down multiple areas of the voting systems. Access and functionality is restricted to only that required to operate the voting systems. Examples of system hardening activities include:

- * Modifying the Windows registry
- * Configure Account Policies
- * Configure Local Policies
- * Configure Software restriction policies
- * Removes non-essential Windows components
- * Sets permissions on application folders
- * Configures group-based security permissions
- * Creates standard configuration of Windows network

The standard certified EMS network configurations consist of a standalone workstation or a client/server architecture. Both architectures are air-gapped, meaning they are on a closed network and there is no outside network connectivity to the EMS systems.

14. Do you have a Disaster Recovery Plan for the Tabulation Server/Workstations without interruption?

ES&S will work with Cuyahoga County to determine the best methods for backing up data, as well as tailoring a disaster recovery plan per industry best practices and County guidelines.

SERVER

Creating a backup of the election can be completed at any time in Electionware. Backup servers can be configured to enable failover capabilities in the event that the primary EMS server becomes inoperable. An Electionware backup restores items required to fully restore an election including election programming, ballot



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

design, tabulation equipment and media configuration, election results, and reporting data.

The Electionware EMS server is configured with RAID storage for redundancy and high availability of the system in the event of a drive failure. The server is also powered by redundant power supplies to have uninterrupted operation even during power supply unit failure.

WORKSTATION

Electionware based data backups can be created for each election and then restored at any time throughout the election process. Additionally, the EMS client/server network environment is designed to include multiple client workstations to establish a built-in client redundancy in the event that one of the workstation goes offline. In the event that an EMS client workstation becomes inoperable, Electionware functions can be resumed on another EMS client workstation that is connected to the EMS.

In a standalone EMS workstation environment, a backup EMS workstation can be built to allow for immediate failover if the need arises. An Electionware backup file can be restored to the standalone workstation's Electionware instance to resume election operations.

15. What is the standard capacity of one memory stick? Are there memory sticks with a higher capacity?

ES&S utilizes the Delkin USB 2.0 memory devices for the proposed solution. The DS200 and ExpressVote come with the 4GB USB memory devices and the DS850 comes with the 8GB USB memory devices.

The number of ballot images that can be saved to a USB memory device can vary greatly depending on the density of the ballot and ballot length. In real-life testing, ES&S achieved the averaged results below using two-sided ballot sheets.

Ballot Length DS200	Average ballot capacity for supported USB memory drive sizes	
	4GB	8GB
11-INCH	12,000	24,000
14-INCH	9,600	19,200
17-INCH	8,000	16,000
19-INCH	6,400	12,800

Based on the size of the County and the associated quantity of ballots and ballot images, ES&S recommends the County employ a networked solution for central scanners.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

For customers who are unable to network central scanners, ES&S is currently exploring and testing the options for 256GB USB memory devices.

16. Are memory sticks only able to be uploaded into one results category?

Reporting groups are used to categorize different groups of ballot styles (e.g., Federal, Absentee, Overseas, etc.) for statistical reporting purposes. They are ordinarily created in the Capture module while the election is being defined. However, if you need to assign poll media to a new reporting group, you can still add or edit a reporting group from the Reporting module. We also have the ability to upload multiple reporting groups on a single poll as an option. This functionality could be used on the central count so that Absentee, Early Vote and additional reporting groups can be scanned in one poll.

17. Does the system provide election results in Excel format?

Yes, the proposed voting system complies with this requirement. Electionware produces reports in ASCII, CSV, XML, HTML, PDF, RTF, and XLSX (Excel). Excel files can be imported into Access.

18. What methods are available to transfer the data from high speed scanners? (Network/USB stick/other)

ES&S high-speed scanners can transfer results via a closed network or using a USB memory device. In the event of an outage of either phone or cellular networks, the USB memory device containing the results can be manually processed into the reporting system to generate election night results. The DS850 central scanner tabulators also can be networked together on a LAN with the vote tabulator server for the collection and reporting of results.

19. What reports and formats (XML/txt) are available for the election results during the upload process? Can these be generated without stopping the upload process?

REPORTS

Electionware Results Reports include, but are not limited to:
Reporting

- Election Summary
- Precinct Summary
- Precinct/Split Summary
- Precinct Canvas Custom Table Report
- Precinct/Split Canvas Custom Table Report
- Poll Canvas Custom Table Report
- Ballot Style Canvas Custom Table Report



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

- Poll Canvas Custom Table Report
- Plain Text/ASCII Results Export File
- CSV Results Export File
- Enhanced XML Results Export File
- Standard XML Results Export File
- Custom (XSL) Results Export File
- Precinct Status Report
- Write-in Names Report
- Manual Entry Log Report
- Machine Logs
- Media Loaded Status Report
- DS450 Networked Results Status Report
- Double Vote Report

FORMATS

The Electionware Reporting module offers many different formats for election night exports, including XML, CSV, and TXT. Plus, it provides Cuyahoga County with the ability to customize election night exports based on your needs. These exports can be created on an as-needed basis or set to be updated on a specified timed interval.

20. Do you have a dashboard to see the status of the tabulation process (Number of sticks uploaded, Number of sticks not uploaded, Number of precincts)?

Electionware's Reporting Module is designed to display election totals on demand as results are received from polling locations. There are many helpful reports to display the current status of precincts, polls and media on election night:

- The Precinct Status Report displays the total number of precincts, the total number of precincts reporting and whether they are completely or partially reported.
- The Media Loaded Status Report displays each poll place name, equipment type, equipment serial number, data version, media serial number, media load time, and total ballot sheets cast for that poll. This report also provides a Total Poll Places Not Loaded as well as counts for Total Poll Places Loaded.
- Also, the DS850 Networked Results Status Report results transmitted via the SFTP server on the network into Electionware's Reporting Module.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

21. Does your system have page counters i.e. will it tell us how many pg. 1's, pg. 2's, etc. have been scanned for each precinct?

The DS200 scanner provides totals for each type or page. The Electionware Reporting module provides totals based on the first page cast in a multi-page ballot for each precinct.

ES&S is working to determine when this functionality can be added to a future

No. of Images	File Size	Total Data	Bus Speed	Time(in minutes)
1 million	300,000	300,000,000,000	20,000,000	USB 250
1 million	300,000	300,000,000,000	1,000,000,000	Gig Ethernet 5

release and what future release will include this functionality.

22. How long would it take to backup/clear/restore 1,000,000 images?

ES&S uses the industry's most compact image size to reduce the amount backup/clear/restore time. File size will vary based on ballot size and complexity. The 19-inch ballots create the largest images. Using a 19-inch ballot with average density creates an image size of about 300 kilobytes. Depending on the speed of the backup/clear/restore, the process will require.

23. Is there a way to tabulate new ballots and then bring in Absentee results which have already been tabulated?

Yes. The proposed solution will enable the County to tabulate new ballots and bring in Absentee results that have already been tabulated.

24. Does the tabulation system provide a Location based/City based test deck? We would like to generate our own test decks, what options are available to export data?

Electionware toolbox makes test decks based on selected precincts. If a location or city-based test deck is desired, simply choose the precincts that comprise that location and toolbox will generate the test ballots and expected results. Electionware's Toolbox application makes Logic & Accuracy testing simple. It can create marked test decks, ensuring accuracy and removing human error from the equation as well as generate a spreadsheet showing the expected results after running the test deck it creates. A voting pattern from 1 to x can be selected, and over votes, undervotes, and write-ins can also be pre-marked. The user can generate a selection of marked ballot styles, or the entire election. The information needed to create the test deck comes directly from the Electionware election definition.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

25. How many days will be needed for Project Management and Training during and after the implementation period?

Approximately 40 days will be required for Project Management during and after implementation, which amounts to 20 days per election in a double-election year. Approximately two (2) hardware training days and five (5) software training days will be required for Training.

Election Systems & Software, LLC, understands that a successful transition to new election technology depends on more than executing a logistics plan. A key element to success is ensuring you are empowered with the knowledge to administer the new system and carry out a trouble-free election. To make this transition successful, we emphasize on-site, hands-on training as a critical component of our overall implementation plan. Our training goal is to ensure a strong level of comfort and competency for your election staff and workers. ES&S is committed to maintaining our flexible approach in tailoring the right mix of products, training, support, and service to your jurisdiction.

While our goal with this initial on-site training is to ensure your autonomy in election operations, we understand your long-term needs may require a combination of continuing education courses and/or on-site support. Continuing education and site support needs fulfilled by our experienced training team can be coordinated and tailored to meet your unique Election Commission requirements. Any continuing education courses will be subject to negotiated fees.

26. What is the recommended procedure for ExpressVote L&A Testing? Is there something currently being worked on? If so, what is the estimated time frame?

The ExpressVote can be used to print vote summary cards of each style, which are used to run logic and accuracy tests on ES&S tabulators.

Furthermore, the ExpressVote can generate multiple marked test cards using the Voted Ballot Test feature. The Toolbox utility can be used to generate automated L&A for tabulation mode on the ExpressVote, which can be used for supplemental L&A testing. A standard automated test deck can be generated to be used as a guide (and expected results) for manual L&A testing.

Finally, prior to each election, the battery should be checked, and time/date settings confirmed. The System Readiness Report can be used to verify machine and election specifics. The election qualification code from USB media should be loaded on each ExpressVote to clear the unit and prepare it to accept the election definition. All ballot styles should be voted and subsequently tabulated. Results can then be compared to expected results before clearing results and deploying the ExpressVote units.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

An automated test deck generation feature for the ExpressVote BMD has been developed as part of EVS 6.1.0.0. This release is in final internal testing and is scheduled to begin EAC certification in the second quarter of 2019 and complete EAC certification in October 2019.

27. Is there a way to adjudicate ballots without tabulating results?

Yes. The DS850 uses real-time physical ballot adjudication. The DS850 allows ballots to be effectively sorted by user-specified criteria such as marginal marks, overvotes, undervotes, blank ballots and write-ins.

The DS850 offers the choice to identify these criteria before or after tabulation. Ballots must be scanned to be adjudicated. If sorted ballots are not tabulated, the user may review a batch of ballots before they are tabulated. When results are uploaded into Electionware from USB memory drives they are aggregated and tabulated.

28. What additional EVS updates are being developed? What is the timeline and what are the features?

ES&S is currently federally certifying EVS 6.0.4.0 with an expected completion date in May 2019. EVS 6.0.4.0 adds security updates for Electionware and the DS200 Precinct tabulator. The next planned release is EVS 6.1.0.0, which has as its primary deliverable an on-screen layout manager for the ExpressVote to allow up to four (4) columns of contests and candidates per screen. It is planned to be EAC certified in October of 2019.

ES&S typically releases several small releases and a large release each year, as well as state-specific releases for those states that do have their own certification process outside that of the EAC's program.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

- 1. Are there any RFP's you did not win outside of Ohio? If so, please provide the name of the election jurisdiction and the date the RFP was released.**

Outside of Ohio, Hart has participated in RFPs nationwide. In some jurisdictions, the RFP process is the preferred method of procurement. On occasion we are not the chosen vendor, and some examples include: Cook County, Illinois RFP 1718-16167 (May 2017); Caldwell County, Texas RFP #2 (February 2018); City of Philadelphia, Pennsylvania RFP Election System (November 2018).

- 2. Have you been party to any litigation regarding any of your voting system (past or present)? Are there any lawsuits currently still outstanding? If yes, please provide the details.**

No. Hart has not been involved in any litigation regarding our voting system and we do not have any lawsuits.

- 3. Are there any known anomalies with your system?**

We have reported three issues to the EAC, none of which impact the version of software that we are bringing to Ohio and Cuyahoga County.

- 4. What is your timeline from signing the contract to full implementation? What is your timeline for the delivery of all voting equipment? What is your timeline for staff training?**

Our timelines for implementation of the Cuyahoga County project are presently estimated as noted below:

Signing to full implementation: 43 days
Delivery of equipment: 13 days
Staff training: 25 days

We propose a phased implementation approach and introduced this in response to the County survey in October 2018. This approach minimizes risk and positions your jurisdiction for a trouble-free Verity implementation.

We manage projects in four overlapping phases:

- Phase I: Planning
- Phase II: Implementation
- Phase III: Go-Live
- Phase IV: Support



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

5. What is your testing process in addition to EAC testing requirements?

At Hart, we test our systems against the rigors of a well-defined Quality Management and Quality Assurance program. Our custom Quality Assurance methodology enables fast iterative development, while ensuring that a rigorous system integration is performed on the complete final product. These practices are embedded in a best-in-class quality management tool enabling Hart's processes to be efficient and traceable from requirements through test execution and defect management.

We have provided detail on our Quality Management System in an attached file. In addition to the EAC testing process, Verity is put through state testing in order to achieve certification. We have successfully achieved certification of our Verity Voting system in 14 states to date

6. How do we import election information from our VR system (DIMs) to the tabulation system (Districts, Precincts, Offices, Candidates, Issues, Locations, etc.)?

This is a customer by customer integration. Verity Data supports importing all breakdowns noted, and we typically build middleware to convert the VR system format into a format for Verity Data. We have done this with our legacy HVS product and are prepared to support Cuyahoga County.

7. Are you willing to work with CCBOE to create a tool to import data from our voter registration system into your election system (if there is not one available currently)?

Yes. This is part of our typical project management plan and part of the scope of the project.

8. Is there an option to proof all Spanish data in reports prior to the ballot layout?

Yes. Multi-languages ballots can be output for proof.

The ballot layout is available before entering any translations and throughout the translation process. We recommend using ballot previews to see the translation in the context of the ballot. However, if you prefer working off of a list you can do that using the translation interface or an export from the system.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

9. Do you keep your software current with Microsoft Operating System changes?

Verity's uses a version of Windows (Windows Embedded 7) that is different in many ways to standard Windows OS. Hart is a licensee of the Windows Embedded 7 operating system and builds the minimally required operating systems components in house needed to operate the voting system (a small subset of Windows components). Referred to as "surface attack reduction," in which only the minimally required components are utilized, and no more (all superfluous components are removed, Internet Explorer for example). This reduces the attack footprint and maintenance footprint required, and dramatically reduces the rate of necessary updates. If any important updates to the components in use by Hart InterCivic are released by Microsoft, they will be incorporated into the next system release.

10. How frequent is the release of software updates/upgrades? Is there a cost for this service?

Upgrades are not performed to a schedule; we upgrade based on need. There is no cost for upgrades unless the customer requests that Hart be on site to provide support during the upgrade. We provide instruction and all upgrades can be done independently of the vendor.

11. How long would preventative maintenance take on the precinct scanner, ADA device and central scanner?

Preventative maintenance is defined in a minimal set of operations that we recommend you work into your standard process. Hart trains local jurisdiction technical staff to perform these simple, routine maintenance tasks, and we provide step-by-step instructions as part of your Verity documentation. If you elect to perform all tasks, we estimate it will take approximately 20 minutes per Verity unit, per year.

Maintenance tasks for Hart-manufactured Verity components include:

As needed - Clean display.
Periodically between elections - Inspect and clean scanner (Verity Scan only).
Recommended annually - Calibrate touchscreen.
Annually - If installed, check condition of screen protector.
Annually - Perform scanner calibration diagnostic procedure (Verity Scan only).
Every 3 years - Replace coin battery in tablet.
Every 4 years - Replace rechargeable backup battery in tablet.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

12. Would we be able to create election media for each of our polling locations in the county, run test ballots, and upload results using limited scanners (reusing the same scanners) for the different polling locations?

Yes. Verity supports this process. A polling place can be configured so that all of the ballot styles in your election can be supported on a single device. Additionally, a single device can be configured to test a specific polling place and later used to test a different polling place in the test process.

13. What are the security environments offered with the Tabulation Server and Workstations?

Multiple security mechanisms prevent the modification of software or internal configurations at all times, and all Verity Voting software applications are installed in a secure “kiosk” mode that disallows user access to the operating system of the workstation on which the application is installed.

Verity user roles adhere to the principle of least privilege. Verity requires that all users have unique login credentials including but not limited to a unique username and unique password. Verity password complexity and login rules are configurable by the election official administering the system.

Verity employs powerful whitelisting technology to protect against malware and viruses. Typical anti-virus/malware solutions use “black listing” which checks applications against a list of known threats but cannot protect against unknown threats. Verity’s whitelisting approach only allows pre-approved software to run, which provides full protection against both known and unknown threats.

Verity’s best practices for security include:

- All applications are whitelisted and protect against both known and unknown threats.
- Secure BIOS (“verified boot software”) on devices.
- Only verified components can be executed.
- Intrusion detection – physical and application security.
- Flexible, strong role management.
- Data is signed to verify source.
- Two-factor authentication.
- NIST-validated encryption.
- Redundancy, randomization of cast vote records.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

14. Do you have a Disaster Recovery Plan for the Tabulation Server/Workstations without interruption?

We have established best practices for disaster recovery and will work with you to establish a disaster recovery plan that works for you.

PC workstations include RAID drives which provide continuous backup and redundancy for all data and recovery capabilities in the event of a hardware failure.

Backup is accomplished by copying election data and audit logs to a portable hard drive, which uploads the data to a storage array at the County office. Restore functions are built in to the applications.

15. What is the standard capacity of one memory stick? Are there memory sticks with a higher capacity?

The capacity of a Verity vDrive portable flash media device is 8GB. Higher capacity vDrives are not necessary. We selected the 8GB size in order to support the largest elections in the nation.

16. Are memory sticks only able to be uploaded into one results category?

Yes. Each memory stick has a Unique Identifier and cannot be read more than once in a tabulation task.

17. Does the system provide election results in Excel format?

Verity Count produces reports in PDF, CSV and XLSX formats. Additionally, Verity Count produces certain results reports (cumulative, canvassing, precinct) in HTML format.

18. What methods are available to transfer the data from high speed scanners? (Network/USB stick/other)

Verity vDrives are used in the Verity Voting system. These are portable flash memory drives.

Cast vote records and other election data are recorded on a portable vDrive flash memory device and digitally signed using FIPS 140-2 SHA-2 NIST-validated methods to ensure non-repudiation. At close of polls, the vDrive is removed from Verity Central by an authorized election official and delivered to the Verity Count tabulation workstation.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

19. What reports and formats (XML/txt) are available for the election results during the upload process? Can these be generated without stopping the upload process?

You can run reports while other stations continue to read-in vDrives (i.e., upload results).

20. Do you have a dashboard to see the status of the tabulation process (Number of sticks uploaded, Number of sticks not uploaded, Number of precincts)?

Yes. We have a user friendly dashboard that is visible while you are reading in vDrives and displays data to inform the user of progress, such as vDrives loaded and remaining, and precincts reported.

21. Does your system have page counters i.e. will it tell us how many pg. 1's, pg. 2's, etc. have been scanned for each precinct?

Verity has sheet counters that record the total number of sheets and we would consider enhancing our page counters based on your input in future updates.

22. How long would it take to backup/clear/restore 1,000,000 images?

As a working estimate, in the configuration proposed for Cuyahoga County, it will take approximately 4 hours to backup, clear or restore a quantity of 1,000,000 images. This number is achieved base on our proposed configuration for Verity Central for the County, which calls for 2 central scan servers.

There are several factors that can impact the length of time for these actions, including complexity and length of the ballot. Our best practice recommendations for the County are to archive, or backup, periodically, such as at the end of the day; and write cast vote records to a vDrive throughout the scanning process, which will serve as an additional incremental backup.

23. Is there a way to tabulate new ballots and then bring in Absentee results which have already been tabulated?

We reviewed Section 1.04 Official Canvass, which was provided by email on March 25, 2019, and we are confident that our system supports the process. Our tabulation system allows you to set up multiple tabulation tasks in a single election allowing you to tabulate new ballots and bring in your Absentee results which have been tabulated.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

- 24. Does the tabulation system provide a Location based/City based test deck?
We would like to generate our own test decks, what options are available to export data?**

Yes, with Verity Build, you will be able to produce your own test decks.

Verity Build, Verity's software application for election definition and ballot printing, enables the production of pre-marked, test decks for logic and accuracy testing. As an alternative to manually selecting desired precinct styles and quantities from the graphic user interface, Verity Build enables users to automate the printing process by importing a print queue file, which specifies ballots to be printed in batches. The print queue file can accommodate user-specified marking patterns for each contest on the ballots included in the print job.

- 25. How many days will be needed for Project Management and Training during and after the implementation period?**

We presently estimate 43 days for the implementation period. We will provide a complete draft project schedule within two weeks.

- 26. Is there a plan for a new ballot box?**

The current ballot box is certified at the federal and state level; we are evaluating options and seeking an optimal solution.

- 27. Can Hart Intercivic fabricate a ballot box similar to the one we currently use?**

Yes. We understand options are under evaluation for the County for an enhanced ballot box. Hart would be pleased to engage with the County on this and review alternative, optimal solutions for Cuyahoga County.

- 28. What counties currently use Unique ID? Was it available in previous versions of your system?**

Yes, Unique ID was available in previous version of the voting system, but serialized. Today the Unique ID is non-serialized. Use of Unique ID is a customer-level choice that we do not track. The Unique IDs is a security feature of the system that keep the voter's identity secret while preventing multiple scans of the same ballot image.



Cuyahoga County Tabulation Vendor – Additional Question Survey Responses

29. Is there a different ADA controller? Is a backup battery needed for the ADA printer?

The Verity ADA controller is our Audio Tactile Interface (ATI), certified for use with voting on Verity devices. Our ATI conforms with the requirements of the Americans with Disabilities Act and features: tactile buttons, a headphone jack for headphones, a jack for audio-tactile interfaces such as jelly switches and sip-and-puff interfaces.

A UPS is used to back up power on the printer.

30. If we chose a different high speed scanner would you be able to certify it to work with your system?

Hart regularly reviews COTS scanning solutions. A different high speed scanner would have to be certified with the voting system. Hart is interested in reviewing any comparable scanner identified by Cuyahoga County to assess for potential inclusion with the product in the future.

31. What criteria would a scanner need to become certified with your system?

We would need the time to certify a scanner should you determine that you have a preference for replacing the Canon DRG1130 Central Scanner proposed by Hart. Once the scanner is identified, Hart's QA team would need to qualify the scanner for use with the Verity Voting System and determine the requirements for supporting the scanner (driver, software changes, etc.). Once that process has been completed, the additional scanner would need to be approved by the EAC and by the State of Ohio.

32. Will there be a new version of your system that alerts the voter of indeterminate marks? If so, when?

Yes, our latest version of Verity that just completed certification (2.3) has the ability to turn on indeterminate marks. It is undetermined at this point when we will take it to Ohio for certification, but we will keep you informed.

33. Is Hart planning to allow more than 5 election results categories in the future?

If Cuyahoga County would like to use more than 5 election results types in Verity, we would be pleased to work with you to gather requirements and get this on our product roadmap.



Tabulation Equipment Summer
Vendor Demonstration Survey
Summary
June 2019

Survey Overview

This report summarizes the results of the Tabulation Vendor 2019 Summer Demonstration. To rate each vendor a process was established by which to evaluate the equipment and software offered by each of the three admissible Vendors – Clear Ballot, Election Systems and Software, and Hart InterCivic. The vendors were given four (4) days not to exceed five (5) days for their respective demonstrations in June of 2019.

Vendor	Demonstration Dates
Clear Ballot	June 4th - June 7th
ES&S	June 11th - June 14th
Hart InterCivic	June 25th - June 28th

This process included CCBOE staff from the Ballot, Absentee, Information Systems and Election Support departments evaluating each vendor based on the established demonstration criteria and a set of questions about the precinct scanner, ADA equipment, and central count scanner, and the set-up and breakdown of said equipment.

Background and Objectives

Ohio Senate Bill 135 allocated funding for the purchase of new voting systems to all 88 Ohio counties in 2018. The CCBOE has been diligent in its efforts to determine which voting system best meets the needs of the county's voters.

The objective of the survey was to learn more about the capabilities of the offered equipment and software. It was the expectation of the CCBOE that each vendor would prepare for the simulation by using the provided import data to create and test the election before arriving onsite; recommending and providing procedures and necessary checklists for conducting logic and accuracy testing of their equipment; and generating/printing a test deck for use during the simulation. This process was conducted by the vendor and CCBOE staff also tested the coding features to test the user interface.

Methodology

A testing plan was created and sent to each vendor. Recommended equipment was thoroughly and transparently tested using data simulating a gubernatorial primary election. The mock election scenario contained the city of Westlake and included situations such as multiple-candidate contests, multiple vote-for options in a single contest, write-in options, instances of contests with no valid candidates, and lengthy ballot issues. The CCBOE provided the parameters and all necessary data to create the election. Vendors were asked to work

with our IS Department to translate the data into the formats used by their election management system.

The simulation included: coding all necessary ballot styles; performing basic logic and accuracy testing of equipment; performing early voting/vote-by-mail scanning; and simulating election night through uploading media, adjudicating remake and write-in votes, generating reports, and creating web uploads of results.

Precinct Scanning Equipment			
2 General Use:	ES&S	HART InterCivic	Clear Ballot
Ease of Use	3.75	4.1	4.11
Ballot Scanning	3.25	4.2	3.89
Privacy of Use	3.38	3.9	3.67
Necessary Accessories	3.5	3.9	3.88
Scanner Case (for moving)	3.75	4.1	2.67
Ballot Bin	3.63	2.3	2.11
Data (Media) Storage	3.25	4.1	4.33
Battery Life (Replacement Cycle)	3.13	4	3.67
Durability	3.38	4.1	2.89
User Interface	3.5	4.2	4.22
Reports	3.25	3.9	4.11
Physical Security	3.5	4.2	3.89
Upgrades	3	4	3.89
Average	3.41	3.92	3.64
Precinct Scanning Equipment			
4 Pre-Election Day:	ES&S	HART	Clear Ballot
Long-term storage	3.5	3.9	3.67
Maintenance/Repair	3.38	4.2	4.00
Election Setup	3.25	4.1	3.67
Logic & Accuracy Testing	3.5	3.9	3.89
AC Requirements Prior to Election Day	3.25	3.67	3.78
Preparation Prior to Delivery	3.25	3.7	3.56
Transport to Polling Location	3.63	3.4	2.89
Average	3.39	3.84	3.64
Precinct Scanning Equipment			
6 Election Day:	ES&S	HART	Clear Ballot
Ease of Physical Setup	3.88	3.6	3.44
Items that require AC power	3.57	4.11	3.50
Number of cords required	3.71	3.89	3.50
Opening process	4	3.9	4.22
Processing a Regular Ballot	3.5	4.3	4.00

Processing a Write-In Ballot	3.38	4.3	4.33
Processing other ballot types	3.38	4.2	4.22
Clarity of Alert Messages	3.29	4.3	4.11
Overall, Voter Experience	3.5	4.3	4.11
Expected battery life of each unit	3	3.9	3.50
Saving votes/data/images	2.43	4.4	4.56
Closing Process	3.25	4.3	4.33
Physical tear down of equipment	3.38	3.8	3.44
Average	3.41	4.10	3.94
Overall Precinct Scanning Score	3.40	3.95	3.74
ADA Equipment			
8 General Use:	ES&S	HART	Clear Ballot
Ease of Use	3.5	3.7	4.00
Ballot Scanning	3.43	3.89	4.00
Privacy of Use	3.38	3.9	3.78
Necessary Accessories	3	3	2.89
Unit Case (for moving)	2.88	4	2.67
Battery Life (Replacement Cycle)	3	3.7	2.63
Durability	2.88	4.1	3.00
User Interface	3.38	3.7	4.00
Reports	3.14	3.7	3.78
Physical Security	3	4.1	3.78
Upgrades	2.71	3.9	3.75
Average	3.12	3.79	3.48
ADA Equipment			
10 Pre-Election Day	ES&S	HART	Clear Ballot
Long-term Storage	3.13	3.7	3.67
Maintenance/Repairs	3	3.67	4.00
Election Setup	3.38	4.1	4.11
Logic & Accuracy Testing	2.75	3.2	3.22
AC Requirements Prior to Election Day	3.14	3.67	2.78
Preparation Prior to Delivery	3.25	3.7	2.89
Transport to Polling Location	3	3.7	2.56
Average	3.09	3.68	3.32
ADA Equipment			
12 Election Day	ES&S	HART	Clear Ballot
Ease of Physical Set Up	3.63	3.8	2.75
Items that Require AC Power	3.43	3.67	2.25
Number of Cords Required	3.43	3.78	2.25
Opening Process	3.38	3.9	3.75
Marking a Regular Ballot	3	4	4.13

Marking a Write-In Ballot	3	4.1	4.00
Marking an Overvoted Ballot	3.43	4.1	3.86
Marking an Undervoted Ballot	3.13	4.1	4.00
Printing the voted ballot	3	4.2	4.00
Casting the voted ballot into the precinct scanner	2.88	4	4.25
Printing blank ballots (when ED supply is low)	2	3.9	3.75
Interaction with EPBs	2.86	3.89	4.13
Overall, Voter Experience	2.57	3.8	4.00
Expected battery life of each unit/accessory	3	3.56	2.75
Closing Process	3.14	4.1	4.00
Physical Tear down of Equipment	3.14	3.7	2.75
Average	3.06	3.91	3.54
Overall, ADA Equipment Score	3.09	3.75	3.44
Central Count			
14 General Use:	ES&S	HART InterCivic	Clear Ballot
Ease of Use	3.5	*	4.00
Necessary Accessories	3	*	3.63
Ballot Scanning (speed, sorting abilities)	3.5	*	4.11
Processing a Regular Ballot	3.63	*	4.22
Processing a Write-In Ballot	3.5	*	4.11
Processing an Overvoted Ballot	3.38	*	4.11
Processing an Undervoted Ballot	3.5	*	4.11
Processing a Ballot with Indeterminate Marks	3	*	4.22
Data (Media) Storage/Networking Capabilities	3.29	*	4.33
Items that Require AC Power	3.14	*	3.63
Number of Cords Required	2.86	*	3.78
Battery Backup	3	*	3.13
Durability	3.13	*	3.56
User Interface	3.14	*	3.78
Reports	3.29	*	4.11
Saving voted/data/images	3	*	4.33
Physical Security	3.29	*	3.63
Upgrades	2.71	*	3.63
Average	3.21	*	3.91
Central Count			
16 Pre-Election Day:	ES&S	HART	Clear Ballot

Long-term Storage	3.43	*	3.89
Maintenance/Repairs	2.86	*	3.88
Election Setup	3.29	*	4.13
Logic & Accuracy Testing	3.43	*	3.88
AC Requirements	3.29	*	3.75
<i>Average</i>	3.26	*	3.91
<i>Overall Central Count Score</i>	3.23	*	3.91

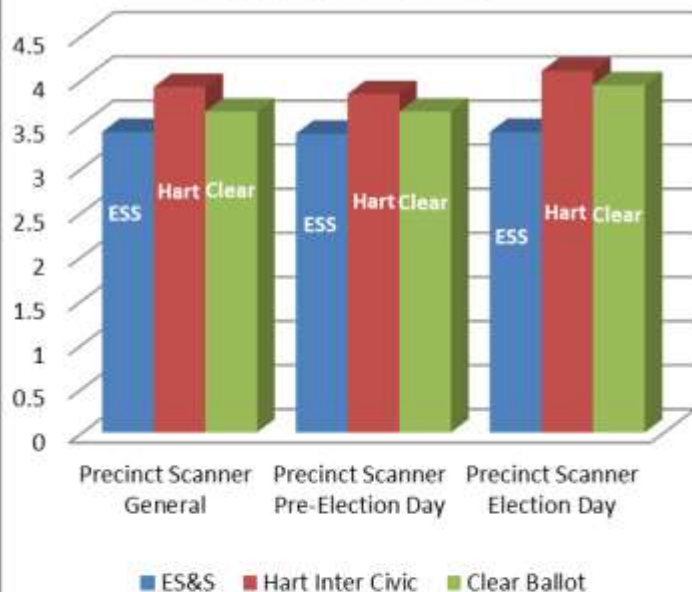
* Hart InterCivic was brought back for a demonstration of their central count system. At the subsequent demonstration, Hart's high-speed central count system was able to meet the requirements of the CCBOE.

Election Management System

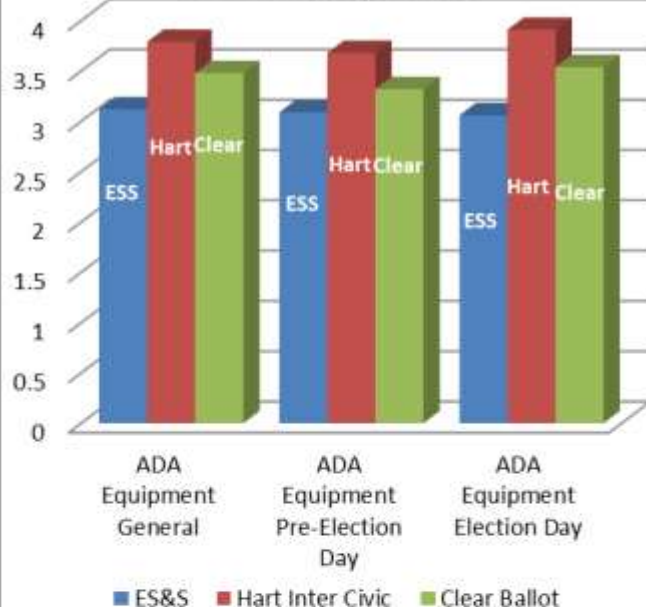
(Only responses from Ballot Department Managers, Supervisors and Program Coordinator were included in this category)

18 General Use:	ES&S	HART InterCivic	Clear Ballot
Election Setup	3	3.83	4.4
English and Spanish Support	3.2	4	2.8
Election Import from DIMS	3.2	3.67	3.6
Ballot Layout	2.4	3.5	4.4
Proofing/Reports	3	3.33	4.2
Test Deck Creation	2.6	3.33	3.2
Ballot On Demand Abilities	3.4	3.17	4
Media Creation	3.2	4	4.6
Results Management	3.2	3.83	4.4
Ballot Image Management	2.4	3.83	4.6
Results Verification	3.2	3.83	4.2
Write-in Processing	3.2	3.83	4.6
Remake Processing/Adjudication	2.8	4	4.6
Report Capabilities (Customization)	3	4	4
Transferring Data to Web	2.8	3.83	3.8
Security	3.2	4	3.8
On-site Support	3	3.33	3.4
Anomaly Notification	2.8	4	3.2
Upgrades	2.8	3.5	3.4
<i>Overall Election Management Score</i>	2.97	3.73	3.96

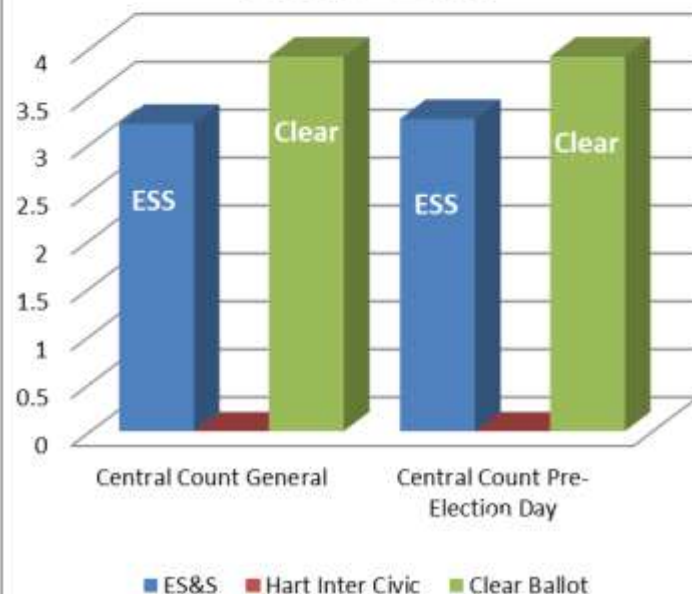
Precinct Scanner



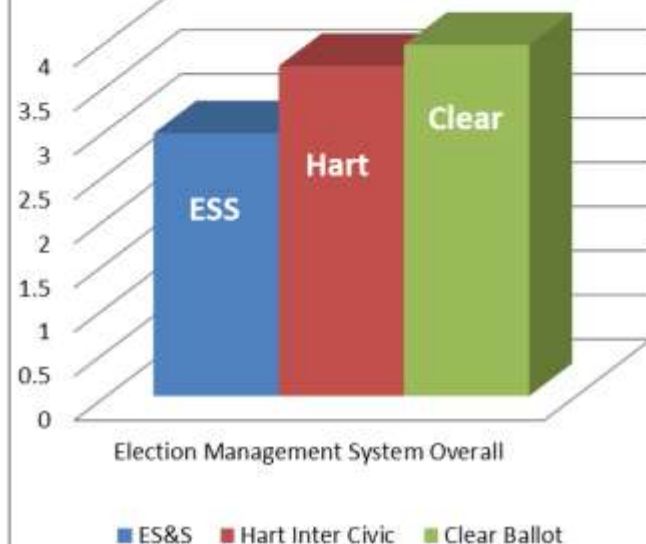
ADA Equipment



Central Count



Election Management System



	ES&S	Hart InterCivic	Clear Ballot
Precinct Scanner			
Precinct Scanner General	3.41	3.92	3.64
Precinct Scanner Pre-Election Day	3.39	3.84	3.64
Precinct Scanner Election Day	3.41	4.1	3.94
<i>Precinct Scanner Overall</i>	3.4	3.95	3.74
ADA Equipment			
ADA Equipment General	3.12	3.79	3.48
ADA Equipment Pre-Election Day	3.09	3.68	3.32
ADA Equipment Election Day	3.06	3.91	3.54
<i>ADA Equipment Overall</i>	3.09	3.75	3.44
Central Count Equipment			
Central Count General	3.21	*	3.91
Central Count Pre-Election Day	3.26	*	3.91
<i>Central Count Overall</i>	3.23	*	3.91
Election Management System			
<i>Election Management System Overall</i>	2.97	3.73	3.97

* Hart InterCivic was brought back for a demonstration of their central count system. At the subsequent demonstration, Hart's high-speed central count system was able to meet the requirements of the CCBOE.

Conclusion

In conclusion, the demonstrations were not meant to narrow down the vendors at this point in time, but rather to give the staff more information and hands-on experience to better understand their respective products.

G. October 2019: Onsite Visits to Other Counties

County Visit Summary

To gather more information about the two vendors the CCBOE does not currently use – Clear Ballot Group and Hart InterCivic – several committee members visited two other Ohio counties who had already implemented the new voting equipment of the two vendors. CCBOE staff visited Warren County (Clear Ballot Group) on October 17, 2019, then traveled to Hamilton County (Hart InterCivic) the following day.

Participants included:

Topics Discussed:

☐ High Speed Scanners

- ☐ *Organization of absentee ballots after received and opened*
- ☐ *Batch size and parameters (precinct, city, ward, other?):*
- ☐ *Ballot Throughput (Folded Ballots per hour): _____*
- ☐ *Ballot Jams*
- ☐ *Overall rate of jams encountered: _____*
- ☐ *Ballots Not Processed by Scanner (blank ballots, over voted ballots, indeterminate marks)*
- ☐ *On-screen Adjudication or other process*
- ☐ *How were remakes handled for any ballots that were adjudicated on screen?*
- ☐ *How are ballots received reconciled against ballots scanned?*
- ☐ *Report types, frequency, other required resources*
- ☐ *Ballot storage post scanning*

☐ Precinct/Location Scanners

- ☐ *Logic and Accuracy Testing*
- ☐ *Machine Allocation and Location Setup*
- ☐ *Technical or Mechanical Issues (Testing vs. Election Day)*

☐ In-Person Early Voting

- ☐ *Daily opening/closing procedures prior to Election Day*
- ☐ *Ballot on Demand printing process*
- ☐ *How is the process different than what will happen at 7:30pm on Election Night?*

☐ EPBs

- ☐ *How did the EPBs integrate with the tabulation equipment?*
- ☐ *Election Day at the Polls*
- ☐ *Early In-Person Voting*

☐ EMS

- ☐ *Data import, Ballot creation process*
- ☐ *Ballot tabulation process (reports, page counters)*
- ☐ *Helpful upgrades, missing features*

☐ General Questions

- ☐ *Which vendors were brought through the acquisition process?*
- ☐ *What, if any, were the key points that led to the final decision to choose your vendor?*
- ☐ *What was the initial public response to the new equipment?*
- ☐ *Are there any things you miss about your old system that you wish were included in your new system?*
- ☐ *What was the biggest surprise you have encountered to date?*
- ☐ *Do you have any general lessons learned that we should know about before we implement a new system in Cuyahoga?*
- ☐ *Were you able to purchase all the necessary hardware/software required to run a presidential election in your county with the funding allocated by the state in SB 135?*
- ☐ *Approximately how much did you spend on the Table B items (not funded by state allocations)?*
- ☐ *How many days did it take to intake/receive delivery of the equipment?*
- ☐ *Was the staff on site from the vendor adequate to handle the receipt of the equipment?*
- ☐ *What was the process to dispose of the old electronic voting equipment?*
- ☐ *Were there any unexpected costs associated with the initial implementation?*
- ☐ *How long did it take complete the acceptance and IV&V testing?*
- ☐ *Any general unforeseen issues, however minor, that should be considered?*

☐ *Miscellaneous Notes:*



Election Equipment Vendor Demonstrations Summary January 10, 2020

Cuyahoga County Board of Elections|

Election Equipment Vendor Demonstrations Summary

On January 10, 2020, the Cuyahoga County Board of Elections hosted an election equipment demonstration event to gather feedback for the purchase of new voting equipment and tabulation system.

About the Event

The event was set up like an open house and featured three equipment vendors. Guests were able to try out the equipment by voting sample ballots in a mock election that simulated the Early In-Person Voting process. This included the use of optical scanners and ADA ballot-marking devices. After visiting with each vendor, guests were invited to share their feedback via a survey.

Event Attendees

Approximately 70 people attended the open house, representing more than 20 different organizations. The event was well attended by persons with disabilities, advocacy groups and the CCBOE's community partners. Also in attendance were CCBOE staff and representatives from the SOS.

Organizations attending included:

- All Voting is Local
- Cleveland Hearing & Speech Center
- Cleveland Neighborhood Progress
- Cleveland Sight Center
- Cuyahoga County Board of Developmental Disabilities
- Cuyahoga County Health & Human Services
- Graystone
- League of Women Voters of Greater Cleveland
- LEAP
- Linking Employment, Abilities & Potential (LEAP)
- National Congress of Black Women-GCC
- National Federation of the Blind of Ohio
- Northeast Ohio Voter Advocates
- Office of the Ohio Secretary of State
- Policy Matters Ohio
- Services for Independent Living
- Tri-C

- UCP Greater Cleveland
- UCP Greater Cleveland
- Voter Engagement for Persons with Disabilities

The attendees were provided with the following survey and instructions.

Sample Instructions



**ELECTION EQUIPMENT
DEMONSTRATIONS OPEN HOUSE
JANUARY 10, 2020**


Welcome! Our goal is to obtain the best in election software and security tailored to meet the needs of our unique county, and to improve the voting experience from start to finish with updated equipment. Thank you for taking the time to join us and share your insight during this important process.



VISIT EACH VENDOR

Visit with all three equipment vendors for a simulated voting experience. See and touch the equipment, ask questions, and think about how the equipment would impact the voting experience. The three vendors include:

- Clear Ballot
- Elections Systems and Software (ES&S)
- Hart InterCivic



COMPLETE SURVEY

Your feedback is important to us! Please complete a brief survey for each vendor.

To request additional information about the acquisition process, or to provide in-depth feedback, please contact Cathy Goskey at cgoskey@cuyahogacounty.us.

Sample Survey

Vendor Logo

Voting
Equipment
Photo

1. How would you describe your interaction with the ADA ballot marking device?

☐ Very Good

☒ Good

☐ Neutral

☐ Poor

☐ Very Poor

2. How would you describe the transition from using the ADA ballot-marking device to printing your ADA ballot?

☐ Very Good

☒ Good

☐ Neutral

☐ Poor

☐ Very Poor

3. How would you describe your interaction with the ballot scanning device?

☐ Very Good

☒ Good

☐ Neutral

☐ Poor

☐ Very Poor

4. What is your overall opinion of the voting equipment you interacted with from
Vendor Name

☐ Very Good

☒ Good

☐ Neutral

☐ Poor

☐ Very Poor

COMMENTS/Suggestions:

Survey Responses

Attendees were invited to complete a brief survey for each vendor. The surveys asked participants to rate their experience using the ADA ballot-marking and ballot-scanning devices. Many people also provided comments regarding their experience using the ADA ballot-marking and ballot-scanning devices.

Clear Ballot Survey Responses

	1	2	3	4	5	6	7	8	9
How would you describe your interaction with the ADA ballot-marking device?	5	5	3	5	4	4		5	5
How would you describe the transition from using the ADA ballot-marking device to printing your ADA ballot?	5	4	4	3	4	4		5	5
How would you describe your interaction with the ballot-scanning device?	5	5	4	5	4	4	5	5	5
What is your overall opinion of the voting equipment you interacted with from Clear Ballot?	5	5	5	5	4	4	5	5	5
Comments	We need to think the needs of the next 10 years. Let's not buy an old system that has been tweaked EG: ES&S	Stylus needs to be adaptive if only option but liked finger sing in. Tray for input device - direct selection would be more beneficial than an external device - utilize touch . More visual instructions - Wordy.	I really like the control pad with Braille and auditory functions. Also like the scanner for QR code.	I really liked that this one pointed out errors and gave me a choice to return or submit as is. I also liked that it picked up a number of marks. I wonder if more overall votes can now be recorded with visible proof.	The clear count (clear audit) function is GREAT. Bottom-line: prefer ESS's new express vote, but would want clear count capability for the VBM ballots.	EPB were not accommodating especially for blind people who have not learned to sign their name.	#1 five except for the tear stub. #4 "I just did the printed form (not ADA) and liked the software to track over and under votes. The voter experience was OK but the big plus is the software for BOE to validate votes. *This one was the only one where I had to tear a stub off the bottom. Seems a problem as people might rip their ballot by mistake.	Only thing was they weren't able to print the QR code directly, but was probably just due to it being a demo.	I like the evolution from traditional ballot marking to tabletop ability.

10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Average
5	3	5	5	3	3	4	4	5	5	3	5	5	2		5	5	5	5	5	4	5	4.38
5	4	5	4	4	3	5	4	5	5	4	4	5	3		4	3	5	5	4	4	5	4.28
5	4	4	4	4	3	5	5	5	5	3	3	5	3	5	5	4	5	5	4	4	5	4.42
5	4	5	5	4	3	5	4	5	5	3	5	5	3	4	5	4	5	5	4	4	5	4.52
The best out of all three vendors. The assistants were very patient. Walked us through the process in the beginning. My friend liked how he could use the touchscreen and headphones. The screen's font size was the largest for people with visual impairments. Would recommend in the voting system over the county's current vendor.	Need a better system for preventing a provisional ballot getting scanned. Otherwise, a good product that is very user friendly for both voters and staff.	The ballot scanner could be a little easier to use. The ballot marker was excellent. "It made me feel part of the overall population". (Tony Kaloger assisted person)	Interesting and educational . (Tony Kaloger assisted.)															Manufactured in OH. Based in US. #1. VBM and Technologists. *Back end software. Prints entire ballot. No physical marking on ballot. I like the screen shots of the votes afterwards-credibility.		Font was excellent in extra large mode, headphones worked with touch screen; Ballot printed out fine; Ballot scanned perfectly; I would recommend this voting system.		
																						4.40

4.40

Elections Systems and Software Survey Responses

	1	2	3	4	5	6	7	8	9
How would you describe your interaction with the ADA ballot-marking device?	5	5	5	4	3	2	1	3	5
How would you describe the transition from using the ADA ballot-marking device to printing your ADA ballot?	4	4	5	5	5	3	3	4	5
How would you describe your interaction with the ballot-scanning device?	5	4	5	4	5	1	3	4	2
What is your overall opinion of the voting equipment you interacted with from ES&S?	5	5	5	3	3	2	2	4	2
Comments	Print outs (size) should be the same for everyone regardless of ability or disability.	*Needed a sleeve. Needs a privacy sleeve for the ballot as you walk it over to the scanner for voter. *Alert/Bell/Beep to let ADA voter know when ballot has been voted. *EPB were not accommodating, especially for blind people who have not learned to sign their name.	I prefer this system but would want Clear Ballot's clear count capability for VBM ballots.	Ease up on the tension on the buttons because he found them hard to press. Be mindful of the strength of peoples fingers. Ballot scanner was excellent way to drop in. (Tony Kaloger assisted person with cerebral palsy)	*Used my finger to select and it wasn't always responsive- might confuse the voter. The paper ballot was pretty standard. *I was a little confused about which system BOE would buy. If all voters us touch screen that could be good - though - what if printers malfunction? *Touch screen - not clear whether you touch the big space or the tiny [square with an X inside] at the top left of the space. #2 five (very good) because of touch screen for everybody.	(For #3) Didn't read my marks.	The machine for ADA gave me trouble. It didn't state to press into the center of the choice made. [box with NAME (press here)]. By default I pressed in the upper left corner, and nothing happened. By trial and error, I found I should push in the center. However, in Column 2, I pressed on that corner box again. This time it changed my vote in Column 1. Not good.	Ability to use finger to sign helpful. Not intuitive enough. Right arrow needs to be shown as enter button on screen voting choices need to be labeled - 4 choices - voting feed sources should have accessible position. *Navigation very difficult with typing more visual instructions - wordy.	

10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Average
5	5	2	4	3	3	4	5	5	5	5	4	3	5	4	4	5	4	5	5	5	3	4.06	
5	5	4	5	5	2	4	5	5	5	5	4	2	4	4	3	5	4	5	5	4	3	4.19	
5	5	4	4	5	3	4	5	4	5	5	4	3	4	4	3	5	4	5	5	4	3	4.06	
5	5	2	4	4	3	4	5	5	5	4	5	4	2	5	4	3	5	4	5	4	3	3.91	
The equipment provided a good test before the elections occur.	Attempting to enter a write in candidate using the console was too difficult and navigation was not intuitive. I also thought that the audio instructions were too complicated.	Improvement from the original marking design including a bigger screen and layout of buttons to mark selection. The paper backup of the ballot print out was helpful.				Impressed with the technology and freedom the ballot now gives ADA votes.. Scanned images of the ballots along with the backup system, battery life of up to four hours. Kiosk ability for all wheelchair heights.	Scanner is huge.	The vendor seemed to have the easiest process due to the ability to vote electronically.					Very interesting and educational. (Tony Kaloger assisted).					#3. Omaha, Nebraska. based in US Global supply chain. *You have to pick your own precinct. *Franklin County (uses them) *used more paper. *You can change text size you can choose color.	The BOD (Ballot on demand) paper is an odd size, that may cause voters to be concerned and wonder "is this a real ballot?"	Headphones only worked with direction arrows not with touchscreen; persons with visual impairments would have difficulty reading printed ballot; Feed in slot for ballot too wide; Fair			
4.06																							

4.06

HART InterCivic Survey Responses

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
How would you describe your interaction with the ADA ballot-marking device?	4	3		3	4		5	2	4		5	4	4	5	4		4		3	
How would you describe the transition from using the ADA ballot-marking device to printing your ADA ballot?	3	4		4	4		5	3	5		4	3	4	5	4		4		3	
How would you describe your interaction with the ballot-scanning device?	2	3	4	3	4		5	2	4		4	5	3	5	4		4		3	
What is your overall opinion of the voting equipment you interacted with from HART Intercivic?	3	3	4	4	4		5	3	4		5	5	4	5	4		4		4	
Comments						Enjoyed knowing that options are always on the table from traditional ballot marking to on-screen touch ability.			Very interesting, learned how to move through the voting process. Very educational! Tony Kaloger assisted this vision impaired gentleman with filling out the survey. (He had never voted at the polls, he always voted by mail).					Made in USA and US Based. #2. Used in Hamilton County.		For visually impaired people, the font size should be larger.		It caught my over vote but the instructions while thorough, were a bit overwhelming.	It is easier to have the arrows vs. the wheel for his motor skills. (Tony Kaloger assisted voter with survey).	I did not use ADA because not ADA and they were busy. I do like the ballot on demand, If it avoids provisional ballots for people who go to the wrong precinct. Ballot on Demand printing: Plus: Won't run out of ballots. Enables BOE to print if voter goes to wrong precinct if BOE wants to do that. Minus: Delay while ballot prints. What if the printer malfunctions? Also did not like filling in a square/rectangle instead of a circle. #3 but would rank higher if BOE uses ballot on demand feature to help people who come to wrong precinct.

20	21	22	23	24	25	26	27	28	29	30	Average
3	4	5	1	4	5	5	5	3	4	4	3.93
4	3	3	3	4	5	5	5	4	4	4	3.93
3	5	5	1	4	5	4	4	4	4	4	3.79
3	3	4	1	3	5	4	4	3	4	4	3.83
EPB not accommodating, especially for blind people who have not learned to sign their name. Process was confusing due to the wheel. After testing the ballot box it was clear. However, other persons with disabilities may be thrown off. Instructions were clear in the audio portion understandable, yet the process was not accommodating. Did not like small paper receipts because difficult for people to hold.	I don't like that the "bubbles" are square on their ballots. Ballot box is not conducive to transporting.		I filled out the ballot incorrectly (on purpose) to see what happened. The ballot was accepted. No errors indicated. The vendor stated the machine was set to accept all ballots. However, would each precinct know how to check if it's set correctly? Or to fix it if it isn't? Don't like that at all.	An external device is much harder to utilize than direct select. The voice commands and visuals were good and easily understood. More visual instructions.	I liked the ADA console with the click wheel, but would have preferred direct selection. Large boxes on standard ballot take a bit too much time to fill in, however, this ballot would be good for seniors who are voting.		The controller provided ease of use for a person with strength and dexterity difficulties. The print read out ballot was placed at a height to support persons utilizing wheelchairs.	Monitor was smaller than others.		Font should be larger; Printer shouldn't have problems; Paper ballot didn't feed straight in scanner; Good.	

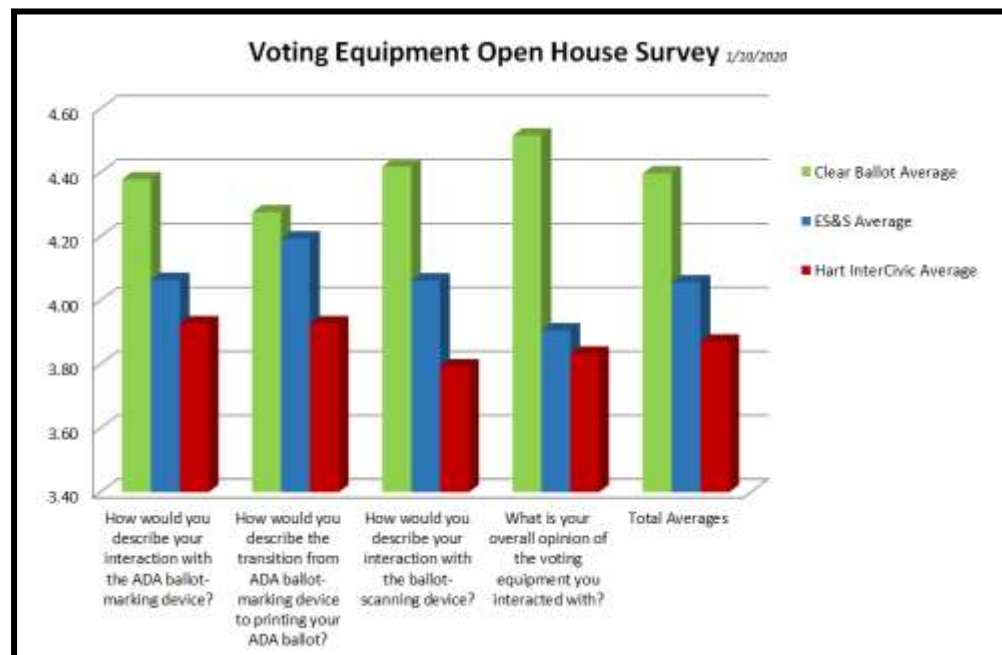
3.87

Results

This event was a success. The CCBOE received insightful feedback from the ADA community regarding the ballot-marking devices. The voter advocacy groups had good interaction with the equipment vendors and Board of Elections staff. Overall, it was an extremely positive event. Several people commented on how they found it educational and were very grateful that we invited them into the acquisition process and listened to their concerns. Additionally, it gave the Board's staff another opportunity to interact with the equipment vendors, ask questions and contemplate how the equipment will suit the election needs of Cuyahoga County.

	Clear Ballot Average	ES&S Average	Hart InterCivic Average
How would you describe your interaction with the ADA ballot-marking device?	4.38	4.06	3.93
How would you describe the transition from ADA ballot-marking device to printing your ADA ballot?	4.28	4.19	3.93
How would you describe your interaction with the ballot-scanning device?	4.42	4.06	3.79
What is your overall opinion of the voting equipment you interacted with?	4.52	3.91	3.83
Total Averages	4.40	4.06	3.87

Score Key: 5-Very Good, 4-Good, 3-Neutral, 2-Poor, 1-Very Poor



Conclusion

In conclusion, the demonstrations were not meant to narrow down the vendors at this point but rather to give the organizations and staff more information and hands on experience to better understand their respective product.



ELECTION EQUIPMENT SECURITY SUMMIT FEBRUARY 5, 2021

As a part of the ongoing voting equipment and tabulation system acquisition process, the CCBOE hosted a virtual Security Summit on Friday, Feb. 5, 2021. The event included virtual presentations from the three potential vendors, focusing on the hardware and software security of the certified voting tabulation systems available for purchase. The event had two sessions, a morning, and an afternoon session.

Morning Public Session

The Morning Session consisted of three 20-minute presentations from each vendor via Zoom Webinar.

- Prior to the event, we sent out 35 personal invitations including representatives from the League of Women Voters, NOVA, NAACP, Cleveland Votes, Policy Matters, the Cuyahoga County Democratic and Republican Parties, and Tri-C.
- In addition, public notices were posted on the CCBOE website, advertised on social media, and news releases were sent to all local media outlets.
- 26 people registered of which 15 attended.
- There were 55 people who observed the presentations.
 - 12 people from the invited outside groups.
 - 2 from The Secretary of State's Office.

- 20 Board of Elections staff.
- 20 YouTube views.
- County Information Security Officer Jeremy Mio attended in person.
- A recording of the Morning Session is available to the public on our website.

Afternoon Private Session

The Afternoon Session consisted of three separate sessions with each vendor including a 30-minute presentation followed by a 15-minute Q&A. This session included in-depth proprietary security information.

- 26 Individuals received a personal invitation including board members, County Council members, County IT professionals, and representatives from the SOS.
- 11 people registered of which 9 attended.
- There were 31 people who observed the presentations.
 - 2 from Cuyahoga County Agencies.
 - 4 from The Secretary of State's Office.
 - 2 Board Members.
 - 23 Board of Elections staff.
 - County Information Security Officer Jeremy Mio attended in person.

Content

During their presentations, the vendors discussed a variety of security-related topics including: their product's security features, corporate ownership, employee background checks, and other personnel policies. They also addressed issues like managing supply chain integrity and how they conduct their testing and certification.

During the Q&A, multiple questions were asked by Cuyahoga County's Information Security Officer, Jeremy Mio, and the CCBOE's Chief Information Officer, Robin Roy, providing technical expertise for the board. After the event concluded, they confirmed there were no red flags and each of the vendors had satisfactorily answered all the technical security questions.

Answers to some frequently asked questions from the Afternoon Session:

Where do the vendors do business?

- **Hart InterCivic**
 - 19 States
 - 2 Ohio Counties
- **ES&S**
 - 42 States
 - 46 Ohio Counties
- **Clear Ballot**
 - 13 States
 - 12 Ohio Counties

Where is your design, programming and development done? How about your manufacturing?

- **Clear Ballot:** The design, programming and development is done in the United States and with only full-time Clear Ballot employees. As a follow-up the CCBOE learned their manufacturing is done in Nashua, New Hampshire.
- **ES&S:** The design, programming, development is all done in the United States. The manufacturing is done by PIVOT International, a Kansas-based company. One of the manufacturing plants is in the Philippines but none of the software is loaded until it arrives in the USA.
- **Hart InterCivic:** All the design, programming, development, and manufacturing is done in Texas.

Have you ever had an election security breach?

- **Clear Ballot:** Never had a security breach.
- **ES&S:** Never had a security breach.
- **Hart InterCivic:** Never had a security breach.

Voting Equipment and Tabulation System Acquisition **Election Demonstration**



Survey Description

Event attendees were asked to complete a survey designed to assess specific criteria critical to the success of CCBOE election operations. All event attendees were asked to complete a general voter experience survey, and poll workers and trainers were asked to complete a supplemental, PEO-specific survey. The general voter survey asked participants to rate the performance of each of the three vendor's voting equipment on a scale of 1-4 (1 being poor, 4 being excellent) on several different parameters. The survey also asked participants to rank the three vendors in order of preference and included a comment section to explain their choice.

The PEO-specific survey, included as a supplement to the voter experience survey, was more in-depth and asks questions about the set-up, tear-down, and closing processes that would be performed by the poll workers on Election Day. To facilitate this assessment, each vendor was given approximately 20 minutes with a group of 8-12 poll workers, trainers, and CCBOE staff to present the set-up and tear-down procedures and have poll workers practice the steps with each vendor's equipment.

Below are the results of the two surveys. The first table represents the findings of the general voter experience survey. The second table displays the results of the PEO-specific survey:

Voter Experience (PEO/Trainer & Public) Summary Results

	Hart InterCivic (A)	ES&S (B)	Clear Ballot (C)
Q1. Overall Voting Experience	3.37	3.23	3.17
Q2. User-friendly Displayed Instructions	3.48	3.14	3.25
Q2c. Spanish Instruction Response (5 responses)	3.20	3.20	2.80
Q3. Ease of Scanning	3.52	3.41	3.26
Q4. Design and Appearance	3.31	3.06	3.34
Q5. Vendor Ranking	1.78	2.20	2.00
OVERALL Response Averages	3.42	3.21	3.26

PEO Experience Summary Results

(Note: Dark green = higher = excellent ratings, Dark Red = lower = poor ratings):

	Hart InterCivic (A)	ES&S (B)	Clear Ballot (C)
Q1. Overall Performance	3.49	3.19	3.42
Q2. Ballot Scanner: set-up process	3.38	3.19	3.47
Overall ease of set-up after brief demonstration	3.46	3.32	3.49
Size and weight of Ballot Scanner	3.36	2.92	3.31
Ballot Scanner case mobility	3.38	3.05	3.49
Ballot Scanner durability	3.23	3.26	3.46
Number of cords and accessories necessary	3.41	3.29	3.51
Number of equipment pieces requiring electricity	3.44	3.32	3.59
Q3. Ballot Scanner: tear-down and closing processes	3.40	3.29	3.53
Overall ease of closing after brief demonstration	3.44	3.24	3.54
Physical tear down of equipment	3.36	3.26	3.51
Access to memory drives	3.33	3.32	3.51
Access to ballot compartment	3.50	3.32	3.54
Generating and reading closing reports	3.37	3.34	3.56
Q4. Ballot Scanner: troubleshooting	3.47	3.10	3.40
Ease of fixing a ballot jam	3.53	2.92	3.43
Replacement of a malfunctioning Ballot Scanner	3.39	2.97	3.34
Ease of navigating the user interface	3.42	3.26	3.39
Clarity of alert messages and instructions	3.53	3.24	3.42
Q5. ADA Unit: set-up and tear-down processes	3.37	3.31	3.37
Overall ease of set-up after brief demonstration	3.36	3.42	3.47
Size and weight of ADA Unit	3.51	3.39	3.13
ADA Unit case mobility	3.44	3.34	3.42
ADA Unit durability	3.23	3.29	3.47
Number of cords and accessories necessary	3.21	3.26	3.47
Physical tear down of equipment	3.33	3.35	3.39
Ease of navigating the user interface	3.41	3.21	3.29
Clarity of displayed messages and instructions	3.44	3.21	3.29
OVERALL Response Averages	3.40	3.24	3.44