Project Summary and Update:
100% Independent Retabulation Election Audit, Leon County, Florida

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One important aspect and central value of election administration is transparency. Transparency promotes election integrity and helps ensure a fair and accurate election process that maintains voter privacy and minimizes the potential for fraud.[1] Election auditing is a critical component to election security and integrity. The purpose of postelection audits is to ensure that the equipment used to count ballots worked correctly and produced accurate results. When carried out correctly, audits can identify any counting errors in the voting system and are a deterrent against fraud.

Nearly all postelection audits conducted in the US today look at only a sample of the ballots and a single contest or a specific set of contests defined by statute. In general, the process involves comparing tabulated vote totals from a set of voting machines, precincts, or ballots with hand counts of the same unit. A double-count audit compares all the ballots in all the contests. The ballots are first tabulated on the official tabulator used to record votes and then run through a second tabulator by a different manufacturer to confirm the vote totals. Our project seeks to expand transparency by educating voters on the 100% double audits pioneered by Florida Leon County Supervisor of Elections Mark Earley. Leon County has roughly 203,000 active voters.[2]

Our project seeks to answer the following questions:
1. Do voting machines count well?
2. What is the value of postelection auditing of voting machines? What is the advantage of a double electronic audit? How do double audits compare to audits in use across states today? Does a double audit build trust in the system?
3. How should voters interact with their ballot to ensure an accurate count?
4. How is voter intent determined?

Research Design

We compare the vote totals from the Dominion ImageCast Evolution (ICE) Machine and the county's highspeed vote-by-mail (VBM) tabulator to the vote totals from the Clear Ballot ClearCount vote tabulator. The ClearCount tabulator is a browser-based central count tabulation system. It can tabulate ballots from all major voting systems certified in the state of Florida and offers an independent machine count audit. By independent, we mean that there is no hardware or software in-common between the first machine count done at the precinct, early voting site, or election center and the ClearCount machine count done almost immediately after the first machine count in the election center. Vote-by mail (VBM) ballots are processed in batches on both machines consecutively in the election center and in-person votes are tallied on the Clear Ballot machine the day after they are recorded in the precincts or early vote centers. In addition, Clear Ballot software offers a unique vote visualization tool that potentially allows auditors to find uncounted or incorrectly counted ballots.

We currently have data from the Leon County 2022 Primary Election. We will also be receiving data from the Leon County 2022 General Election. The data include: 1) an image copy of the front and back of all Leon County ballots. 2) the cast vote record, which is a comparison of the vote totals by contest between the Dominion and Clear Ballot machine counts, 3) the rankings from the Clear Ballot system for each oval from highest to lowest confidence, and 4) identification of under and over votes by the Clear Ballot system.

Results

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[1] See Huefner, Steven F., Daniel Tokaji, & Edward B. Foley. 2007. "From Registration to Recounts: The Election System of 5 Midwestern States," available at:
https://cpb-us-w2.wpmucdn.com/u.osu.edu/dist/b/90788/files/2021/05/From-Registration-to-Recounts.pdf.
[2] See: https://www.leonvotes.gov/ for recent data on voter registration.

In Leon County, ballots are read into the ClearCount vote tabulator over the course of the election. Once the election officially begins, Florida County Election Supervisors have the ability to process and record VBM ballots. Immediately after these ballots are processed by the Dominion High Speed Tabulators, they are taken to the ClearCount tabulator and processed a second time there. Ballots from early voting counted by the Dominion ICE tabulators are transported to the election center at the end of each day of early voting and processed the next morning at the election center. Ballots from Election Day are transported to the election center on election night and are inserted into the ClearCount tabulator for counting the next day.

In Figure 1, we show the dashboard from the Clear Ballot software that provides an overview of the election. For example, it shows the name and date of the election in the upper left-hand corner and provides a series of pieces of auditable information about the election, including the number of card styles (unique ballot combinations), the total number of contests, and the total number of parties.

ClearCount produces a confidence ranking for each oval on the ballot and in Figure 2, we show a screen shot of the rankings. Here we are looking at the 100 least confident ovals. The last oval is the least confident, the first oval is the 100th least confident oval. Within the software you can click on the ovals to pull up the ballot associated with that oval. In our case, we obtained the ranking and the ballot information and built a data set that describes the information produced by Clear Ballot. Additionally, we can look at contests that are defined as undervotes or overvotes to identify if these were correctly identified or if there were other markings on the ballot suggesting voter intent.

Table 2 shows the Cast Vote Record for the Democratic Gubernatorial primary contest. This is produced by the Clear Ballot software and summarizes the information between the two voting systems. These data can be used to identify likely ballots for further investigation and possibly adjudication, especially if the outcome is close. In that case, election administrators would focus their attention on both the under and over voted ballots to determine if there are any marks on the ballot that might allow them to determine voter intent.

In Figure 3, we show two ballots focusing on the 3-person school board race with candidates Marianne Arbula, Anthony DeMarco and Alva Swaffort Stephen. The ballot on the left represents the least confident ovals in this contest and the ballot to the right represents the most confident ovals. The ballot to the right has well and neatly colored ovals, while the ovals on the left are poorly filled in with the school board race showing most of the coloring on the outside of the oval. In this case, the ballot on the left was not counted by the Dominion machine, but Clear Ballot tabulator, which looks at the larger "contest zone", returned a vote for Arbula.

Finally, in Figure 4 we look at the confidence rankings by voting mode—election day, early in-person, or vote-by-mail. We expect that VBM should produce the lowest confidence scores because these ballots do not have the benefit of going through the vote tabulators to obtain feedback on the ballot quality. For example, if a voter overvotes a contest, the voting machine provides an error message to the voter so they can spoil their ballot and fix the problem. Figure 4 confirms our expectation. The density plot shows that VBM ballots have lower confidence scores relative to in-person balloting.

Future considerations

We are working on building a website that demonstrates the value of a 100% double audit. We plan to include images of both the primary and general election ballots. All ballots will be available for voter review. In addition, we will group under and over voted ballots and ballots where we were able to identify the discrepancy between counting machines for easy review. We will also include examples of ballots that show both high and low confidence to assist voters in understanding how best to complete their paper ballot to ensure accurate counting of their vote choices.

Figure 1. Image of ClearCount Software Dashboard

Leon County,FL, Primary Election, 8/23/2022

Dashboard

Election Data

Election Phase	scanning
Ballot type	Dominion
Approx ballot image dimensions	8.5" x 11.0"
# Card styles	816
# Contests	17
# Choices	59
# Parties	4
# Counter groups	3
# Precincts	136
# Precincts and card styles	816

Ballot Scanning Operations

Scan date	2022-08-05
Tabulation date	2022-09-09
Tabulator software version	Version 1.4.4 2018-02-16 16:39:40
# Scanners	3
# Boxes scanned	676
# Precincts scanned	135 out of 136
# Cards automatically adjudicated	66,806
# Pages judged to be non-ballots	676
# Unreadable cards (0.10% rate)	65
# Pages scanned (ballots and non-ballots)	67,547
# Cards that are fully blank	49

Visual Resolution of Unreadable Cards

Unreadable card images needing resolution	0
Unreadable cards resolved & adjudicated	65
Unvotable unreadable cards (could be resolved by rescanning 0 boxes):	
Occluded or incomplete unreadable images	0
Scanned unreadable images with multiple overlapping cards	0
Unreadable resolved as a non-ballot	0
Unreadable cards	65

Card Reconciliation

Comparison System

Total cards cast (paper & touch screen)	66,871	
Cards cast on touch screens	0	
Cards cast on paper		66,871

ClearBallot System

Cards automatically adjudicated	66,806
Initial tabulated card discrepancy	-65

Adjustments to card count for Unreadables & Modifications

Unreadable cards	+65	
Cards resolved as a non-ballot	0	
Cards (originally non-ballots) resolved as a ballot	0	
Estimated additional cards in multiple overlapping cards	0	
Adjustment to card count from visual resolution		+65

Final Total Card Count	**66,871**
Total Card Discrepancy	**0**

Card Discrepancy Analysis

# Ballot MatchPoint discrepancies	20
# Ballot MatchPoints	408
Maximum Ballot MatchPoint discrepancy	+1

Figure 2. Image from Clear Ballot Software Ranking Least Confident Votes
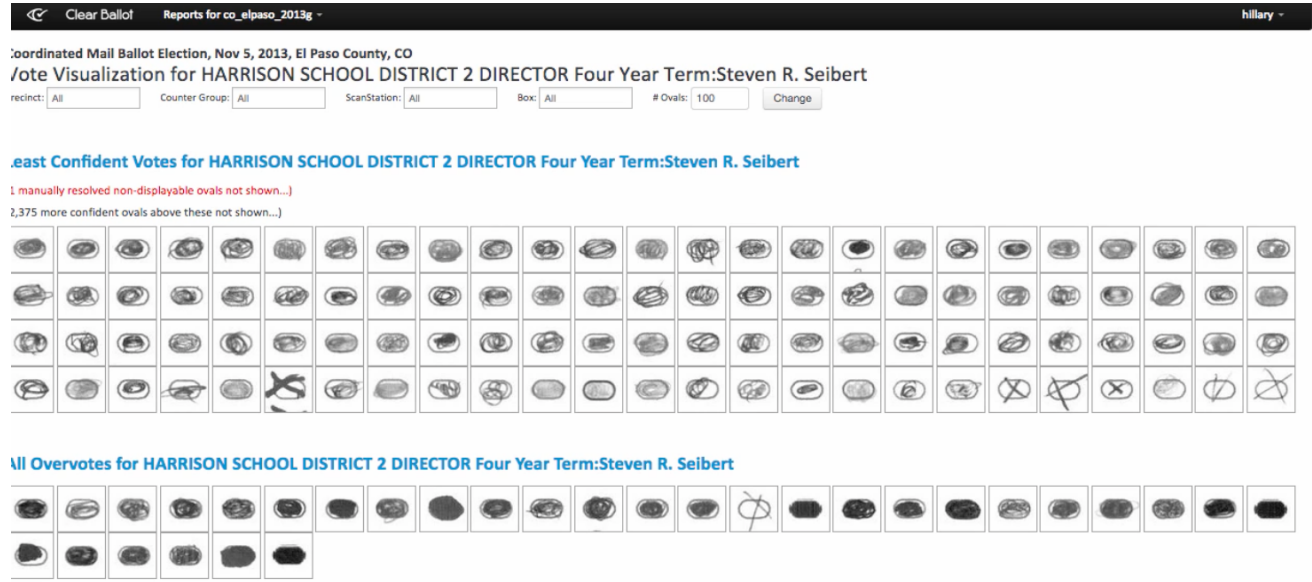
Table 2. Example of Cast Vote Record for Democratic Gubernatorial Contest.

Contest Order	Contest	Contest ID	Choice	Comparison System	This System	Dif-ference	Com-Parison System	This System	Dif-ference	Overvoted With Vote for this Choice	Undervoted Without Vote for this Choice	Ballots With Votes for Others
1002	Governor, (DEM) (Vote for 1)	6	Charlie Crist	41,226	41,226	0	24,083	24,084	1	19	472	16,651
1002	Governor, (DEM) (Vote for 1)	6	Nicole "Nikki" Fried	41,226	41,226	0	15,106	15,106	0	8	472	25,640
1002	Governor, (DEM) (Vote for 1)	6	Robert L. Willis	41,226	41,226	0	854	854	0	3	472	39,897
1002	Governor, (DEM) (Vote for 1)	6	Cadance Daniel	41,226	41,226	0	690	690	0	12	472	40,052

Figure 3. Example Ballots

| Least confident ovals | Most confident ovals |

Figure 4: Distribution of Oval Confidence for Crist by Vote Mode
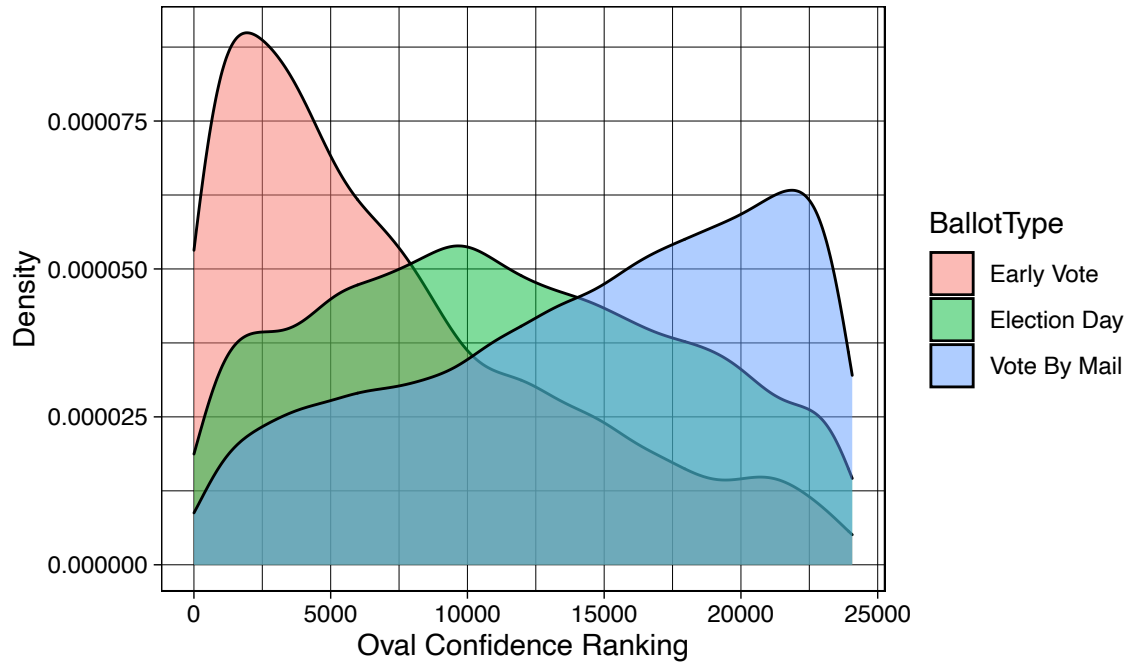
Note: Lower rankings are associated with more confidence in oval marking