

EXPERT REPORT OF RYAN MACIAS

I, Ryan Macias, declare under the penalty of perjury, that the following statements are true and correct to the best of my knowledge and information. I further declare that the following facts are based on the onsite review of the Pinal County voting system which took place on September 11 & 12, 2024, and interviews with the Pinal County V.O.T.E.S. staff. In preparing this declaration, I reviewed the “Report of Obvious Errors in the 2024 Primary Election” by Kevin Cavanaugh dated August 10, 2024, and related documents, as well as documents related to the 2024 Primary Election and voting system used in that election, which were provided to me by Pinal County V.O.T.E.S. department.

Introduction

1. I have been retained by Snell & Wilmer on behalf of the Pinal County in this matter to provide an expert opinion regarding the security and use of the voting system scanners and tabulators in the Pinal County 2024 Primary Election.
2. I am being compensated for my work in this case at an hourly rate of \$250.00 an hour for consulting fees, \$350.00 an hour for any testimony related to the matter, and \$175.00 an hour for travel time.
3. My curriculum vitae is attached to this report as **Attachment 1**.

Qualifications

1. I am the owner of RSM Election Solutions LLC, an election technology and security consulting and advising company organized in Washington, District of Columbia, registered as a foreign LLC in Texas, and operating out of Dallas, Texas. RSM Election Solutions LLC's core principle is Resiliency in the election infrastructure = Securing election technology + Mitigating risk to the democratic process.
2. I am a subject matter expert with 19 years of experience in election technology, security, administration, and policy. In this capacity, I have developed strategies and advised the election community on ways to build resiliency in the election infrastructure. I engage directly with election officials to identify risks to the election infrastructure and processes, as well as highlight mitigative measures, compensating controls, and best practices that election officials and private sector partners can implement to manage the risks.
3. I began my career with the California Secretary of State Office of Voting Systems Technology Assessment developing and implementing legislation, policies, and procedures on election technology and security, including serving as the technology lead for the Post-Election Risk-Limiting Audit Pilot

Program from 2011 to 2013.¹ In 2015, then Secretary of State Alex Padilla named me the California State Representative to the EAC's Standards Board.

4. Next, I worked for the U.S. Election Assistance Commission (EAC), where my last position held was the Acting Director of Voting System Testing and Certification Program, where I was the lead on modernizing the Voluntary Voting System Guidelines (VVSG), version 2.0,² which focus on ensuring all voting systems are secure, accurate, and accessible. I developed the 17-Functions process model that defined the scope of the VVSG 2.0 so that non-traditional election technologies could be tested to the same requirements as traditional voting systems. Further, in that role, I managed multiple voting system applications and testing campaigns. Further, as a Lead Auditor for International Standards Organization (ISO) 9001 Quality Management Systems and ISO/IEC 17025 Testing and Calibration Laboratories, I regularly performed audits on federally accredited voting systems testing laboratories (VSTLs) and registered voting system manufacturers.
5. I now work as an independent consultant. In this role, I have provided multiple export reports, opinions, and analyzed third-party reviews of election

¹ <https://www.sos.ca.gov/elections/ovsta/frequently-requested-information/post-election-auditing-regulations-and-reports/post-election-risk-limiting-audit-pilot-program-2011-2013>

² [https://www.eac.gov/sites/default/files/eac_assets/1/6/VVSGv_2_0_Scope-Structure\(DRAFTv_8\).pdf](https://www.eac.gov/sites/default/files/eac_assets/1/6/VVSGv_2_0_Scope-Structure(DRAFTv_8).pdf) (last accessed October 7, 2020).

“audits.” For instance, then Arizona Secretary of State Katie Hobbs named me as an expert observer to oversee and report on Cyber Ninjas' review of the Maricopa County ballots and election equipment from the 2020 General Election.³ I have authored the Rebuttal Report of the Allied Security Operations Group (ASOG) review of the Dominion Voting Systems Democracy Suite 5.5 voting system used in Antrim County, Michigan and served as an expert for the hand count audit and recount in Fulton County, Georgia. I also serve as an adviser and consultant to State voting system certification authorities.

Expert Testimony

1. In the past four years, I have provided testimony, declarations, affidavits, or expert opinions in Andy Kim, et al., v. Christine Giordano Hanlon, in her capacity as Monmouth County Clerk, et al. in the District Court of New Jersey Civil Action No.3:24-cv-1098(ZNQ)(TJB), Fulton County, Pennsylvania, et al., v. Secretary of the Commonwealth in the Commonwealth Court of Pennsylvania, Case #277 MD 2021 No. 3 MAP 2022, No. 3 MAP 2022 Appeal from the Order of the Commonwealth Court at No. 277 MD 2021 dated January 14, 2022, in the Supreme Court of Pennsylvania Middle District, Case # J-46-2022, Kari Lake v. Katies Hobbs, et al., in the Superior

³ <https://azsos.gov/about-office/media-center/documents/coliseum-observer-notes-2021>

Court of Arizona, Maricopa County, Case #CV 2022-095403, Timothy J. Kirkwood and Paul T. Prentice v. Board of County Commissioners, El Paso County, et. al. in the District Court of Colorado, Case #2022CV, Kari Lake, et al. v. Katie Hobbs, et al., in the United States District Court for the District of Arizona, Case #2:22-cv-00677, and Arizona Democratic Party and Steve Gallardo v. Karen Fann et al., Superior Court of the State of Arizona for the County of Maricopa County, Case #CV-2021-006646.

Expert Review

Scope of Review

1. I was retained to perform a review of the Pinal County voting system and operations to determine if there were any signs of irregularities that may have resulted in the 2024 Primary Election being conducted inaccurately or insecurely.
2. As part of this review, I advised Snell and Wilmer to retain Pro V&V, an EAC accredited VSTL to perform a technical assessment on the Pinal County voting system.
3. I performed an onsite assessment of Pinal County's voting systems and operations on September 11 & 12, 2024, at the Pinal County V.O.T.E.S. center located at 320 West Adamsville Road, Florence, AZ 85132.

County Voting System

4. Pinal County owns and operates the Election Systems and Software (ES&S) EVS 6.3.0.0 voting system. The EVS 6.3.0.0 voting system was federally certified by the United States Election Assistance Commission (EAC) on November 17, 2022.⁴ Further, the Arizona Secretary of State certified the EVS 6.3.0.0 voting system on May 25, 2023.⁵
5. The Pinal County configuration of the EVS 6.3.0.0 voting system uses a server client configuration, which is comprised of a Dell PowerEdge T430 Election Management System (EMS) Server and Dell OptiPlex 5050 EMS Workstation (i.e., client computer). Generally speaking, a server client configuration means that a user works off of the client computer, but accesses the data stored on the server. Pinal County staff log on to, and work off of, the client computer and access specific data from the server. For redundancy, there is a backup Dell PowerEdge T430 Election Management System (EMS) Server, which is maintained at a secure offsite location. Maintaining offsite backups is a best practice to build resilience in the election infrastructure in the event an issue arises where the original production server is unusable. The

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https://www.eac.gov/sites/default/files/voting_system/files/ESS%20EVS%206300%20Certificate%20and%20Scope%20of%20Conformance.pdf

⁵ https://azsos.gov/sites/default/files/2024-02/2024_0118_Official_Voting_Equipment_List.pdf

election management system is “used to design, develop and maintain election databases, perform election definition and setup functions, format ballots, count votes, consolidate and report results, and maintain audit trails.”⁶

6. The County also owns two Dell Latitude 540 laptops that run the EVS 6.3.0.0 Toolbox software. These two laptops are identified in an ES&S Purchase Order document from December 19, 2023, entitled “EVS 6.3.0.0 Toolbox PC System Purchas Order,” as well as in the Pinal County Finance Department’s PO Number 251230, dated February 5, 2024. According to the EVS 6.3.0.0 EAC Certification Test Report, “Electionware Toolbox is a set of utilities that can be integrated into the Electionware EMS to enhance the software usability experience and streamline various processes. For instance, the Toolbox laptops have add-on utilities like Test Deck, Text to Speech and Media Restore. Test Deck allows an election official to test the election on each machine that will be used for voting by, for instance, generating vote patterns which are then used for logic and accuracy testing. Additionally, a test pattern file can be created for the ExpressTouch, ExpressVote or ExpressVote XL that allows automated logic and accuracy testing on the universal voting machine. Text to Speech provides a simplified method for creating the audio files that make up the audible ballot. Media Restore is used to prepare ES&S-

⁶ <https://www.essvote.com/glossary/>

certified USB media flash drives for use with Electionware by securely clearing all data and then restoring to the FAT32 format.”⁷

7. As described, the Toolbox software on the two laptops is not used for running the scanners and tabulators. The County informed me that only one of the two Toolbox laptops was used in the 2024 Primary Election. Specifically, the County stated it used the Test Deck feature on that Toolbox laptop to generate the L&A data and Text to Speech for recording Spanish audio.
8. According to information obtained during the Technical Assessment, performed by Pro V&V, it was confirmed that the only ES&S software on the laptop was the ES&S Toolbox software, which does not operate the scanners and tabulators.
9. According to the County, the other Toolbox laptop was not used in the 2024 Primary Election, as it has not yet been opened from its original packaging from ES&S. As witnessed and documented by Pro V&V, me, and representatives from the County and Secretary of State’s office on the September 11-12, 2024, site visit, one of the laptops was still in its original box, locked in a security cage, and sealed with the original tamper-evident tape seal from ES&S.

10. Additionally, the County owns four DS950 scanner and tabulators and one DS850 scanner and tabulator. According to the Sales Order Agreement between ES&S and Pinal County that I reviewed, Pinal County procured the four DS950 scanners and tabulators in March 2024, with an expected delivery date in June 2024. Additionally, according to the Sales Order Agreement, Pinal County traded in its DS200 scanner and tabulator and two of its DS850 scanners and tabulators as part of the agreement.
11. The DS850 and DS950 scanners and tabulators are self-contained pieces of equipment running off internal firmware and the election definition database files that are loaded onto them from the EMS. The only external devices that these scanners and tabulators connect to are a printer and uninterruptable power supply (UPS) for battery backup;⁸ they do not operate off of external laptops or computers.
12. On Thursday, September 12, 2024, as part of the Technical Assessment, Pro V&V performed, and I witnessed, a system integrity (aka Hash), validation of the software on the DS950 and DS850 scanners and tabulators. The Hash values matched the expected Hash values, as certified by the U.S. EAC, confirming that the ES&S software files had not been tampered with or altered from the certified versions.

⁸ https://www.essvote.com/storage/2024/07/DS950_One-Sheet.pdf

13. The County also uses the ExpressVote Ballot Marking Device (BMD), but these devices were not included in the Scope of the Review since they do not tabulate.

Physical Security

14. Pinal County has extremely strict and well documented physical security around the voting system and the tabulation room. These physical security measures follow and/or exceed best practices for ensuring the voting system is not tampered with, as well as detective measures to identify any protective measures that may have been bypassed. Based on the documentation I reviewed, and visual inspection of the equipment and physical security measures implemented, there was not any evidence that the machines had been physically tampered with.

15. Pinal County's Tabulation Room, where the voting system is operated, is under 24-hour surveillance and livestreamed to the public on the County website. The County informed me that the footage is maintained for 30 days. Additionally, the County creates a backup of the footage from the start of tabulation through the final canvas. According to the County, this backup is archived for the 22-month retention period. The Tabulation Room also has motion detection sensors that power the lights on upon movement.

16. In order to enter the Tabulation Room, two authorized people must be present; this is enforced by key card access. The two people must be of different political parties, as well. Any visitors, or individuals whose key card does not provide them access, must sign a visitor log. Any person entering the Tabulation Room must first store all internet connected devices, including computers and cell phones, as these items are prohibited from entering the Tabulation Room. Because she is on the ballot, Recorder Dana Lewis informed me that she had her staff remove her key card access from the Tabulation Room.

17. The EMS Server is stored in a locked cage. All connectivity between it and the rest of the voting system components use color-coded cables so the public can trace the connectivity between devices; and to show that they are not connected to any external ports.

18. Every voting system component, including the EMS Server, EMS Workstation (i.e., client computer), and tabulators, has all ports locked when not in use. The County used port blockers, which must be unlocked using a key before being removed to access the port. This prevents unauthorized access and/or unauthorized devices from being plugged into the USB-ports.

19. There are standard election processes that require the use of a USB-port and removable media, such as a USB thumb drive. Standard processes where a

USB-port could be accessed on the EMS computers may include [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

20. Further, the EMS Workstation (i.e., client computer), where the staff logs in to access the files on the EMS Server, requires multifactor authentication, a security best practice. Pinal County uses [REDACTED]

[REDACTED]

[REDACTED].

21. Similarly, there are valid, and required, uses of a USB-port on the scanners and tabulators, including [REDACTED]

[REDACTED]

22. The USBs, [REDACTED]

[REDACTED] are stored

[REDACTED].

23. The scanners and tabulators are sealed using wire tamper-evident, serialized seals to protect against and detect any unauthorized access to the equipment.

The seal numbers are documented on a seal log and reviewed by staff.

Expert Review and Analysis

24.Documentation provided by the County, and confirmed by additional documentation from ES&S, showed that the DS950 scanners and tabulators had their annual preventative maintenance performed in June 2024, prior to the conduct of the 2024 Primary Election and in advance of the required State and County level logic and accuracy (L&A) tests. The scanners and tabulators also had minor maintenance to fix certain physical issues that were previously observed by the County. This is a standard best practice to ensure the scanners and tabulators are functioning properly before the county begins scanning and tabulating ballots.

25.According to the seal logs, the county sealed the scanners and tabulators with tamper-evident, serialized seals, as a security measure, after the conclusion of the preventative maintenance. I reviewed the seal logs and did not detect any unauthorized access to the equipment. Each time a seal was broken, it was documented, and the documented reason described standard election operations.

26.In accordance with the EPM, Pinal County performed Logic and Accuracy (“L&A”) tests on all non-Statewide contents and measures (e.g., county, city, other local districts). The County informed me that it used the ES&S Toolbox laptop and software to develop the L&A Test deck. I reviewed the results of

the County L&A showing that there was not any discrepancy in tabulation. The County L&A results report dated June 21, 2024, which I reviewed, had the initials of two individuals. The County informed me that these were the initials of the chair of the county Republican and Democratic parties who were signing off that the L&A was conducted accurately and completely.

27. In accordance with the State Law¹⁰ and the Arizona Election Procedures Manual,¹¹ the Secretary of State also conducted L&A tests on the Statewide Contests and measures. The State L&A was performed on the four DS950 scanners and tabulators that Pinal County used in the 2024 Primary Election. Specifically, Pinal County informed me that there were two DS950s configured for the Early Voting reporting group, one DS950 configured for the Election Day reporting group, and one DS950 configured for the Provisional reporting group. On June 25, 2024, the Secretary of State issued Pinal County its Logic & Accuracy Equipment Certificate. I reviewed the results of the State L&A showing that there was not any discrepancy in tabulation, and that Pinal County met the requirements for L&A testing. Note that the County informed me that State L&A required manual adjudication due to a mismatch in expected totals versus machine totals. The hand count

¹⁰ <https://www.azleg.gov/ars/16/00449.htm>

¹¹ <https://azsos.gov/elections/about-elections/elections-procedures/epm>

determined that the voter (state employee) marked the ExpressVote card incorrectly (i.e., did not match the test script and therefore did not match the expected results). However, the machine tabulated the ballot correctly and as marked by the voter.

28. Following the L&A tests, and in advance of the scanning and tabulating of 2024 Primary Election ballots, the County zeroed out the machines, removing any prior results, including results from testing. The County provided copies of all of their zero reports, including two files dated July 5, 2024, and July 31, 2024, respectively. The first report was generated and printed prior to any ballots being scanned and tabulated, and the second was showing that there were zero Election Day votes on the system when the County began scanning and tabulating Election Day ballots. Each of the two reports were signed by two individuals who verified that there were no votes on the machine at the time. This confirms that there were no results in the voting system prior to the commencement of the scanning and tabulating of 2024 Primary Election ballots and that there were no Election Day votes on the system when the County began scanning Election Day ballots.

29. The County provided a copy of the audit logs from the ElectionWare software on the EMS Server. The ElectionWare software is used to aggregate results from the scanners and tabulators, as well as generate the results reports.

According to the audit logs, the County “Deactivated” the ability to display election results in the ElectionWare settings on July 5, 2024, at 2:19pm. This means that system can no longer generate results reports and therefore, cannot display the results, even to staff operating the system. This timeframe coincides with the time that the County generated the Zero Report, which shows that there are no votes on the system prior to beginning to scan ballots, as previously described. According to the copy of the Zero Report that the County provided, and was initialed by members of the public, it was generated and printed at 2:09pm on July 5, 2024. It is a best practice to turn off the Display of Election Results as soon as the Zero Report has been confirmed. Based on this information, it seems the County followed this best practice. Additionally, according to the audit logs, the election results were not “Activated” to display the results until July 30, 2024, at 7:01pm, specifically 7:01:10pm, which is one minute and ten seconds after the close of the polls. This means that between July 5, 2024, at 2:09pm and July 30, 2024, at 7:01pm, the system could not have generated a results report and therefore could not have displayed the results on the system during that time. Based on this information, the County would not have had the results from the system to provide to members of the public until after the close of the polls on Election Day, in accordance with Arizona State Law.

30. While not applicable to the scanners and tabulators or the voting system, in order to ensure I did my due diligence in reviewing data applicable to the scanning and tabulation process, I requested information on the elections operations. Specifically, I requested data and information on the chain of custody of mail ballot packets, chain of custody and security of Election Day ballots, reconciliation processes and forms, ballot duplication processes, personnel who operate the scanners and tabulators, etc. Pinal County's operations followed, or exceeded, standard election practices for each of the processes I inquired about. I reviewed documentation supporting the described processes, including the review of batch sheets and a binder that resides at each scanner and tabulator documenting the date, batch number, number of ballots, type of ballot (e.g., EV, E-Day, PROV), and running total of ballots scanned and tabulated for the respective machine. Additionally, the County informed me that in the 2024 Primary Election only Certified Election Officials operated the scanners and tabulators.

31. Pursuant to the EPM, during the Canvas, Pinal County conducted a Hand Count Audit on Saturday, August 3, 2024. I reviewed the Early Ballot and the Precinct/Polling Place Hand Count Audit results reports, as well as the *Hand Count/Early Ballot Audit Report* dated August 3, 2024. According to the

documents I reviewed, there were no discrepancies between the hand count and machine count for the ballots and contests that were included.

32. Pursuant to the EPM, Pinal County performed a Post-Election L&A test. The County informed me that the post-election L&A is conducted using the same ballots as the pre-election L&A test. Additionally, it is performed using the same process except that the scanners and tabulators report the results individually, instead of being aggregated in the EMS Server. This is done to ensure that the results from the L&A do not accidentally get incorporated into the results of the election, which is a good practice. Further, the County provided me with a copy of both the Zero Report, showing that the scanners and tabulators did not have any votes on them when the testing began, and a copy of the results reports from each of the four DS950s, designated by the respective machine's serial number, which were used during the election. Both reports are dated August 9, 2024, and both have two sets of initials which look to be the same as the initials on the pre-election L&A test result files. There were not any discrepancies found in the Post-Election L&A test.

Technical Assessment Review and Analysis

33. After reviewing the Technical Assessment Report and data provided by Pro V&V from its analysis of the Technical Assessment, it is my expert opinion that:

- 1) the only ES&S software on the one County laptop used in the 2024 Primary Election was the ES&S Toolbox software. This software does not operate the ES&S scanners and tabulators.
- 2) the 2024 Primary Election files were not loaded onto the DS850. Therefore, the DS850 could not have been used to scan and tabulate ballots for that election.

Conclusion

1. The results of the system integrity, or Hash, validation, from the scanners and tabulators matched the expected matched the expected Hash values, as certified by the U.S. EAC, confirming that the ES&S software files had not been tampered with or altered from the certified versions.
2. It is my expert opinion that all four DS950 voting tabulators operated properly, tabulating the votes accurately and securely, in the 2024 Primary Election, as demonstrated in the State Pre-Election L&A, County Pre-Election L&A, County Post-Election L&A, and Hand Count Audit.
3. It is my expert opinion that the Pinal County V.O.T.E.S. department could not have generated a copy of the tabulated results for any contests in the 2024 Primary Election, from the Election Management System Server, until after the close of the polls on Election Day. Therefore, the County could not have

provided preliminary results from the EMS Server to any member of the public prior to the close of polls on Election Day, specifically after 7:01:10pm.

4. It is my expert opinion that the Pinal County V.O.T.E.S. department conducted the 2024 Primary Election following election practices that meet or exceed standard election practices, including chain of custody and security, and are performed in accordance with the law. The security implemented by the County is likely to protect against any unauthorized access to the voting equipment and would detect any unauthorized access to the voting equipment if it occurred.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 5, 2024.

Ryan Macias Digitally signed by Ryan Macias
Date: 2024.10.05 17:16:43
+02'00'

Ryan Macias

Ryan Macias

RSM Election Solutions LLC

(E) Ryan@RSM Election Solutions.com (P) 805.345.9050

Professional Profile

Advising, strategizing, and developing policy for over 18 years with a proven record of significant, successful contributions in election administration, election infrastructure, technology security, and standards development both within the U.S. and abroad.

Experience

RSM Election Solutions LLC– Election Technology & Cybersecurity Consultant/Owner: (05/2019 – Present)

Develop methodologies and strategies for evaluating critical products, assets, and appliances used to secure critical infrastructure, with emphasis on election infrastructure technologies.

Assess the needs of United States (U.S.) and international government entities, particularly election authorities, in procuring and implementing cybersecurity infrastructure projects.

Provide expert research, analyses, and recommendations on U.S. funding of international government entities, such as U.S. Agency for International Development (USAID) funded projects for securing democratic institutions around the world.

Audit the resiliency and cybersecurity of major critical infrastructure projects to identify risk, estimate the impact, and assess the value added.

Advise election officials on process, procedures, rules, and regulations to address changes in election technology infrastructure and election administration.

Testify, provide oral testimony, written declarations, and consultation on election technology and security litigations and hearings in state and federal courts.

Lafayette Group Inc.– Subject Matter Expert (SME), Election Security: (05/2019 – Present)

Strategize, advise, and provide stakeholder engagement to the Election Security Resilience (ESR) subdivision at Cybersecurity and Infrastructure Security Agency (CISA).

Lead SME for election technology and security, including cybersecurity of election technologies, incident response of election infrastructure breaches, disclosure of vulnerabilities, and identification of best practices for mitigative measures to the election infrastructure.

Develop and train election infrastructure stakeholders on election security, including cyber hygiene best practices, phishing, ransomware, reducing operation risk by using secure practices, and mitigating risks of insider threat.

U.S. EAC– Acting Director, Testing & Certification (03/2019 – 05/2019)

Managed the development of publications and trainings for stakeholders on election technology and cybersecurity.

Served as the U.S. Election Assistance Commission (EAC) lead on critical infrastructure issues.

Lead to the [Technical Guidelines Development Committee](#) (TGDC) a federal advisory committee encompassing experts in the field of security, accessibility, standards development that advise on the development of HAVA compliant election technology principles, guidelines, and standards.

Collaborated with state and local election officials implementing new legislation, rules, regulations, and standards for election infrastructure.

Developed strategies and methodologies for balancing security with accessibility in election technology in compliance with the Help America Vote Act (HAVA) 2002.

U.S. EAC– Sr. Election Technology Program Specialist (05/2016 – 05/2019)

Engineered a new strategic approach for federal certification of voting systems, restructuring internal policies, processes, and procedures - focusing on the auditing and conformance to international standards for security, quality assurance, and configuration management.

Transformed the scope of voting system standards to implement a functional process-based model providing adaptability across multiple election technologies.

Project Manager for federal voting system certification - analyzing voting systems to determine conformance with federal standards, policies, and procedures.

Developed nationally recognized publications and trainings on the best practices for securing, procuring, and implementing election technology; many of which have been referenced in technical or policy related publications.

Implemented a risk-based approach to analyze and identify current threats and challenges in election technology, particularly regarding cybersecurity and information operations.

California Secretary of State– Sr. Election Technology Analyst (08/2006 – 05/2016)

Collaborated with legislators, election officials, and special interest groups to develop legislation, regulations, and policies for election systems including the [California Voters Choice Act](#), [California Voting System Standards](#), and [remote accessible vote by mail systems](#) legislation and standards.

Advise the Secretary of State and Executive Staff on the certification and implementation of election technologies, such as voting systems and remote accessible vote by mail technologies to ensure that all voters have an opportunity to vote privately and independently.

Professional Organizations & Committees

Board Member – [California Voter Foundation](#)

Member – [National Task Force on Election Crises](#)

Member - [GCA Cybersecurity Toolkit](#) for Elections Advisory Group

Program Committee Member – [E-Vote-ID](#): International Conference for Electronic Voting

Steering Committee Member for the Center for Internet Security (CIS) [Rapid Architecture-Based Election Technology Verification \(RABET-V\)](#)

Former State of California appointee to the [U.S. EAC's Standards Board](#)

Education & Professional Certifications

Bachelor of Science, Business Administration (Finance) – California State University, Sacramento

Certified Election/Registration Administrator (CERA)

Lead Auditor - ISO 9001 & ISO 17025

Certified as a Protected Critical Infrastructure Information (PCII) Authorized User

Projects & Publications

- CO-AUTHOR of Trust and electoral technologies throughout the election cycle: Comparing the USA, Netherlands, Poland, and Kenya: Published in the [eJournal of eDemocracy and Open Government \(JeDEM\) Volume 16 Number 3 \(2024\): Special Issue e-Vote Conference](#)
- EXPERT WITNESS on behalf of the Secretary of the Commonwealth of Pennsylvania: Fulton County, Pennsylvania, et al., v. Secretary of the Commonwealth in the Commonwealth Court of Pennsylvania, Case #277 MD 2021 No. 3 MAP 2022 as identified in the [MEMORANDUM OPINION BY PRESIDENT JUDGE COHN JUBELIRER](#)
- EXPERT WITNESS on behalf of the Secretary of the Commonwealth of Pennsylvania: No. 3 MAP 2022 Appeal from the Order of the Commonwealth Court at No. 277 MD 2021 dated January 14, 2022, in the Supreme Court of Pennsylvania Middle District, Case # J-46-2022 as identified in the [OPINION by Justice Wecht](#)
- [EXPERT WITNESS on behalf of Arizona Secretary of State Katie Hobbs](#): Jeanne Kentch, et al., v. Kris Mayes, et al., in the Superior Court of Arizona, Mohave County, Case #CV-2022-01468
- [EXPERT WITNESS TESTIMONY on behalf of Arizona Secretary of State Katie Hobbs](#): Kari Lake v. Katie Hobbs, et al., in the Superior Court of Arizona, Maricopa County, Case #CV 2022-095403
- [DECLARATION on behalf El Paso County](#): Timothy J. Kirkwood and Paul T. Prentice v. Board of County Commissioners, El Paso County, et. al. in the District Court of Colorado, Case #2022CV
- EXPERT WITNESS TESTIMONY on behalf of the Secretary of the Commonwealth of Pennsylvania: Fulton County, Pennsylvania, et al., v. Secretary of the Commonwealth in the Commonwealth Court of Pennsylvania, Case #277 MD 2021 as identified in [REPORT CONTAINING PROPOSED FINDINGS OF FACT AND RECOMMENDATIONS CONCERNING THE SECRETARY OF THE COMMONWEALTH'S APPLICATION FOR AN ORDER HOLDING THE COUNTY OF FULTON, ET AL, IN CONTEMPT AND IMPOSING SANCTIONS](#)
- AFFIDAVIT (second) on behalf of the Secretary of the Commonwealth of Pennsylvania: Fulton County, Pennsylvania, et al., v. Secretary of the Commonwealth in the Commonwealth Court of Pennsylvania, Case #277 MD 2021.
- [EXPERT WITNESS TESTIMONY on behalf of Arizona Secretary of State Katie Hobbs](#): Kari Lake, et al. v. Katie Hobbs, et al., in the United States District Court for the District of Arizona, Case #2:22-cv-00677
- [AFFIDAVIT on behalf of the Secretary of the Commonwealth of Pennsylvania](#): Fulton County, Pennsylvania, et al., v. Secretary of the Commonwealth in the Commonwealth Court of Pennsylvania, Case #277 MD 2021.
- [DECLARATION on behalf of Secretary of State's Motion to Intervene](#): Arizona Democratic Party and Steve Gallardo v. Karen Fann et al., Superior Court of the State of Arizona for the County of Maricopa County, Case #CV-2021-006646.
- [Rebuttal Report](#) to the Allied Security Operation Group (ASOG) Antrim Michigan Forensics Report.
- [Election Security Risk in Focus: Ransomware](#) – Trained hundreds of election administrators on the cybersecurity risks and mitigative measures related to ransomware in the election infrastructure.

- [MEMORANDUM in Opposition re13 MOTION for Preliminary Injunction](#): Harley et al v. Kosinski et al, United States District Court in the Eastern District of New York, Case #1:20-cv-04664.
- [MEMORANDUM in Opposition re26 MOTION for Preliminary Injunction](#): Taliaferro et al v. North Carolina State Board of Elections et al, United States District Court for the Eastern District of North Carolina Western Division, Case #5:20-cv-00411.
- [Election Security Risk Profile Tool](#) – Collaborator on the methodology for a simple, non-technical tool that provides mitigations for the non-cybersecurity professionals to understand.
- Co-Author of the Harvard Belfer Center Defending Digital Democracy Project (D3P) [State and Local Election Cybersecurity Playbook](#) and [The Elections Battle Staff Playbook](#).
- Trainer and scenario builder for the D3P [State and Local Election Official Tabletop Exercise](#) and [Battle Staff Bootcamp](#).
- Contributor to CIS [A Handbook Election Infrastructure Security](#) and [Election Technology Procurement Guide](#).
- Lead on [EAC Voluntary Voting System Guidelines v. 2.0](#) focusing on providing technologies that are both secure and accessible.
- Created the 17-Functions process model that defined the [Scope of the VVSG 2.0](#) so that non-traditional election technologies could be tested to the same standards as traditional voting systems.