Subject: RE: Public Records Request (AZ-SEN-22-0250)
Date: Monday, April 11, 2022 at 12:23:58 PM Eastern Daylight Time
From: Pete Galvan
To: AO Records
Attachments: AO 0250 Records.pdf

EXTERNAL SENDER

Hello,

After a careful and thorough search of records, attached are 313 pages of responsive records in fulfillment of your public records request.

Best,

Pete

Pete Galvan
Arizona State Senate | Associate Rules Attorney
(602) 926-3777 | pgalvan@azleg.gov

From: Christine Bauserman
To: Karen Fann
Cc: Warren Petersen; Warren Peterson LD 12; Ken Bennett
Subject: Re: Meeting on "Report" with Ken Bennett
Date: Monday, November 1, 2021 9:04:42 AM

Confirming today at 2:30 for Ken and Christine

On Fri, Oct 29, 2021, 12:49 PM Christine Bauserman <cb12221@gmail.com> wrote:

> Yes. We can meet.
> Apologies for delay.
>
> May I suggest Zoom for Senator Petersen.
>
> On Thu, Oct 28, 2021 at 10:44 AM Karen Fann <KFann@azleg.gov> wrote:
>
> > I am available Monday between 2>30 and 3:30 . Does this work for everyone?
> >
> > *Karen Fann*
> >
> > *President of the Senate*
> >
> > *Tel: 602.926.5874*
> >
> > ---
> >
> > **From:** Christine Bauserman <cb12221@gmail.com>
> > **Sent:** Wednesday, October 27, 2021 1:33 PM
> > **To:** Karen Fann <KFann@azleg.gov>; Warren Petersen <wpetersen@azleg.gov>
> > **Cc:** Ken Bennett <kbazsos@gmail.com>
> > **Subject:** Re: Meeting on 'Report' with Ken Bennett
> >
> > Apologies - Ken has a personal conflict (he must send his dog over the rainbow bridge).
> >
> > Does Monday or Tuesday work?
> >
> > And this includes Warren's correct email.
> >
> > On Wed, Oct 27, 2021 at 6:56 AM Karen Fann <KFann@azleg.gov> wrote:

On my calendar

Sent from my iPad

On Oct 26, 2021, at 8:29 PM, Christine Bauserman <cb12221@gmail.com> wrote:

100% agree.

Ken and I will be in your office at 12:30 on Thursday. We hope that works for Warren also.

Thank you for your expedient response.

Christine

On Tue, Oct 26, 2021 at 4:03 PM Karen Fann <KFann@azleg.gov> wrote:

> Thank you for reaching out ahead of time. Yes, we absolutely need to meet and go over this "report" before it is released to the public. I am being overly cautious about making sure we are working together and not against each other. My schedule is open from 12.30 to 2:00 pm on Thursday at the Capitol office. I need to drive back to Prescott Thursday night but will have time available to meet on Friday in Prescott. Let me know what works best for everyone. Karen
>
> <image002.jpg>
>
> *Karen Fann*
>
> *President of the Senate*
>
> *Tel: 602.926.5874*
>
> ---
>
> **From:** Christine Bauserman <cb12221@gmail.com>

Sent: Tuesday, October 26, 2021 12:05 PM
To: Karen Fann <KFann@azleg.gov>; wpeterson@azleg.com; Ken Bennett <kbazsos@gmail.com>
Subject: Meeting on 'Report' with Ken Bennett

Hello President and Chairman,

It was wonderful talking with you President Fann at the Lincoln Day Dinner.

Ken and I have produced an 'Additional Report' similar, while simultaneously different, from a Minority Report. It lacks criticism while focusing on solutions to the concerns and anomalies identified in the AZ Audit with detailed recommendations for systems for future audits.

Our goal is to bring Arizona together under election integrity and we strongly believe the audit should have united us, not divide us, and that it is still an achievable goal. The team that contributed to the report are election integrity subject experts and our camaraderie is inspiring.

Ken and I were hoping you would entertain a meeting this Thursday or Friday to review our report.

--

*Christine Bauserman, **520-235-2234***

--

*Christine Bauserman, **520-235-2234***

--

Christine Bauserman, **520-235-2234**

--
Christine Bauserman, **520-235-2234**

From:	JovanHutton Pulitzer
To:	Jennifer.Wright@azag.gov; james.cope@azag.gov; Roger; Joshua.Kredit@azag.gov
Cc:	Karen Fann; Sonny Borrelli; Mark Finchem; Kelly Townsend
Subject:	FOLD Forensics
Date:	Wednesday, March 2, 2022 4:36:00 PM

Jennifer, this is the explainer for the FOLD FINGERPRINT report.
However, I am concerned after missing our debrief together, we have not been able to close the loop and now 14 plus messages have gone unanswered. My thinking is the people of AZ care deeply about all evidence being reviewed. Any way we can catch back up.?

VIDEO LINK
ARIZONA AG REPORT - Why Folds in Ballots are FORENSIC FINGERPRINTS - Understand WHAT THE FOLDS SHOW in Maricopa County, Arizona Ballots and what the audit looked for and discovered. https://rumble.com/vwa90r-arizona-ag-report-why-folds-in-ballots-are-forensic-fingerprints.html

jhp

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From:	JovanHutton Pulitzer
To:	Karen Fann; Sonny Borrelli; Mark Finchem; Vince Leach; Rick Gray; Randy Pullen; Wendy Rogers
Cc:	sgreen@rklawtexas.com; GHowison@munckwilson.com
Subject:	Intellectual Property NOTICE
Date:	Monday, January 17, 2022 1:47:46 PM

Dear Legislator,

We are sending this email as both a polite notification and a legal notification nonetheless.

We have been informed Randy Pullen has asked for the actual ballot scans were taken during the audit to be made ready and sent to Dr. Shiva. **Therefore, we become forced to provide this intellectual property notice, so there is not an incident of willful infringement on behalf of the Senate or its spokes personnel.**

Key to the collection of the forensic ballot images (which is our unique proprietary process in action) Mr. Pullen may be unaware the images contain significant intellectual property and trade secrets that are part of our intellectual property suite. A few examples are:

1. Image orientation and how this works within our Kinematic Artifact Detection Program, and;
2. How the placement of the ballots must fall within pre-determined guides and rulers specific to our trade secret specifications, and;
3. How placement tokens are used and placed within each forensic photo specimen to provide guide markers for computer vision and machine learning exact measurement systems, and;
4. How certain non-reflective situations involved which reduce environment overflow lights and light-based pollution from distorting the image so that computer vision might properly read the image, and;
5. How formulas and procedures are present and inseparable from the forensic photo for increasing the reading and proper OCR of critical ballot information, and;
6. How proper side lighting and orientation are present and inseparable from the forensic images, which help enhance and identify the folds, present or not present, in the ballot, and;
7. How lighting and side lighting specifically identify paper properties, textures, and colors for authentic computer vision acquisition of the forensic image, and are present and inseparable from the forensic images, and ;
8. How unique backlighting allows for our unique process of reading and measuring the ballots and key markers, and are present and inseparable from the forensic images, and;
9. How the tracking process allows for the front and the back images to be tracked in parallel, and;
10. How our unique naming culture allows us to identify – in code – the pallet, ballot batch, ballot number, and many unique cross-human identified markers during the forensic acquisition process, which allows cross communications with our Kinematic Artifact Detection Platform and audit and reconciliation systems.

We could continue, but our contract called for these images to be captured, stored, and transferred with a very stringent copyrighted and intellectual property protocol. To just hand them over to another party who would by mere getting of the photos and their integrated and inseparable intellectual property would be a ***"willful infringement"*** of our protected rights and intellectual property.

As you can imagine, after 35 years of developing and patenting novel valuable patents, at a cost of tens of millions of dollars, we are very protective of our intellectual property. After hundreds upon hundreds of patents granted, not on in the United States but 188 other countries around the world, I can assure you we will take all legal means necessary to protect our innovations and intellectual property suite.

In February and March 2020, we had to put each of you on this list (Arizona Senate) on an Intellectual Property legal notice with your representatives' assertions there were existing systems

that could do what only our Kinematic Artifact Detection Programs can do. Now, in January 2022, here we are at another Intellectual Property crossroads. Our trade secrets, copyrights, and intellectual property cannot be handed over to outside parties. Maybe an alternative could be agreed upon if each of the 2,089,000 x 2 (front and back) million files would need to be renamed generically and every image (2 per ballot – thus 4,178,000) could be image cropped to cut out trade secrets, IP, and Copyrights. We would then expect to inspect each image so we can affirm that key elements of our intellectual property were verified removed. The complication still exists that even with image editing, it would not allow for certain trade secrets and use measures could not all be removed.

We could attempt this but would take several months (and would be costly) and would need to be signed off on by us to assure no willful infringement has occurred.

The United States Courts allow, in cases of **willful infringement**, an amount of ***"damages up to three times the amount found or assessed,"*** after finding a defendant to have willfully infringed. Regarding the subject of ***"the subjective willfulness of a patent infringer, intentional or knowing, may warrant enhanced damages, without regard to whether his infringement was objectively reckless. "***

It is our firm belief the transfer of these images to outside or other parties will compromise our Intellectual Property and would surely make up ***"willful infringement"*** and the damages ***would easily be over $3,000,000*** (since we severely discounted our services being used in the Arizona audit), plus future PKAD earned revenues denied by the infringement.

We further think with all the conspiracy theories, stories, rumors, and doubts cast on the handling of the 2020 Arizona Senate audit of the General Election by the Senate, that an event like this would further fuel Arizona's citizens' distrust of their Arizona Legislators. It is apparent Arizona citizens are on pins and needles waiting for action and this is a tinderbox ready to explode on lawmakers if confidence by the public continues to erode.

In closing, there is zero need to provide the images of outside parties, but if they are to be shared the Arizona Senate and its representatives must act which protect our trade secrets, copyrights, and Intellectual Property to prevent damages to our company.

We send this notice in the spirit of partnership and what may be a very ill-informed understanding of what these images contain and what many just thinks are just photographs. Our contract has always defined our intellectual property, trade secrets, formulas and specifically sets out ***"Client acknowledges it does not gain, retain, or pass through any ownership into Contractors unique and proprietary technologies, forensic analyzation tools (software and mathematical), filters, formulas, processes, procedures, and techniques."***

We are in the final stages of completing our in-depth forensic investigation and know the people of Arizona will be very pleased with the results and have praise of their legislatures in finally showing what happened in the Arizona 2020 General Election. It is our sincere belief there is beyond a doubt that Attorney General Brnovich will have more than enough instances of evidence to take legal actions against those who enabled this egregious maladministration of the 2020 General Election.

Sincerely,

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Jovan Hutton Pulitzer #JovanHuttonPulitzer
www.JovanHuttonPulitzer.org
https://www.linkedin.com/in/jovanhuttonpulitzer/
Cell: 646.656.1876 Office: 213.632.6425
"It isn't the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deeds could have done them much better. The credit belongs to the man who's actually within the arena, whose face is marred by dust and sweat and blood; who strives valiantly; who errs, who comes short again and once more, because there isn't any work without error and shortcoming; but who does strive to complete the deeds; who knows fantastic enthusiasms, the great devotions; who spends himself inside a worthy cause; who in the best knows within the finish the triumph of higher achievement, and who in the worst, if he fails, at least fails whilst daring greatly, so that his location shall by no means be with those cold and timid souls who neither know victory nor defeat." **Theodore Roosevelt.**

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From:	JovanHutton Pulitzer
To:	Jennifer.Wright@azag.gov; mark.brnovich@azag.gov; Roger; james.cope@azag.gov
Cc:	markfinchem@me.com; Mark Finchem; Karen Fann; Sonny Borrelli; Wendy Rogers; Warren Petersen
Subject:	URGENT - why are you not following up?
Date:	Tuesday, March 1, 2022 10:10:06 AM

Is there any particular reason NO ONE is following up with the request to debrief and deliver additional evidence files?

Jennifer, we were supposed to have a follow-up, but it just keeps being NO response from your office? Is there something I am missing in how all of us in the audit get findings to you and/or get your attention?

Here is your newest explainer video on the machines and how they ran predetermined rhythms. What do we need to do to get your attention?
https://rumble.com/vw36og-maricopa-arizona-2020-was-a-predetermined-managed-outcome.html

jhp

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From:	JovanHutton Pulitzer
To:	Karen Fann; Rick Gray; Sonny Borrelli; Vince Leach; Mark Finchem; Wendy Rogers
Cc:	Randy Pullen
Subject:	Urgent Audit Information Request
Date:	Friday, January 14, 2022 12:07:59 PM

Good afternoon each of you.
For months we have been asking for some number confirmations regarding "envelopes found with no signatures" by Dr. Shiva.

Here is what is going on - *"when we ask for the information we are told Randy Pullen hates your guts and is not going to give you anything".*

What we seek is really simple, since it will help cross confirm key findings which are part of our reports being buttoned up:

1. How many total envelopes was Dr. Shiva provided?
2. How many total envelopes were actually mailed?
3. Please cross confirm how many "non-signatures" were actually found?

Pretty simple, but we need some assistance. We have found something very interesting and key and this helps cross confirm our findings.

We do not think it would be appropriate to publish our report that we were denied access due to "Randy Pullen hating Jovan" - we think that would enrage the public when all anyone wants is hard numbers.

Could someone assist with this very simple information request?

Thank you for your attention to this matter.

jhp

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error and shortcoming; but who does strive to complete the deeds; who knows fantastic enthusiasms, the great devotions; who spends himself inside a worthy cause; who in the best knows within the finish the triumph of higher achievement, and who in the worst, if he fails, at least fails whilst daring greatly, so that his location shall by no means be with those cold and timid souls who neither know victory nor defeat." **Theodore Roosevelt.**

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From:	JovanHutton Pulitzer
To:	Douglas Logan; Karen Fann
Cc:	wpeterson@azleg.gov; Wendy Rogers; Sonny Borrelli; Randy Pullen
Subject:	URGENT AZ Report 7.0
Date:	Saturday, September 18, 2021 1:19:19 PM
Attachments:	Maricpoa Report 7.0.pdf

To Madame President Karen Fann and Doug Logan,

I know the meetings are fast and furious and yesterday after numerous attempts I was not able to reach Doug with this revised version so I am making sure I am not delaying your review and process by being out of contact with Doug. Attached is my **revised PKAD Report 7.0.** - From day one this has been a moving target and revisions are made almost daily and there are several thousand pages of results that are impossible to email but are at the printing press as we speak.

The scope of our work has well in excess of 10 million proof images which are in the process of uploading as well. Please remember, we are not only an analysis and follow-up report, but the generation of millions of cross confirming images of proof files of how votes in Maricopa County were compromised.

First, I want to take time to thank Randy Pullen, who as many may not know starting working with me in late November 2020 (and very diligently thereafter for months) following my technology development and how it would aid an audit (to become a full forensic audit) in Maricopa County. I have not updated Randy in months, but during our original dialog time, Randy has been a steadfast supporter, from the start took tremendous time to conduct calls, meetings, exchange emails, and even initially introduced my work to Chairman Ward, Representative Finchem, various lawyers, and other GOP notables.

Personally, I knew this forensic audit work would be both historic and explosive in nature when an Arizona politician called me (as *the nature and reality of this historic endeavor became a reality*) and had a discussion with me regarding *"if I would being willing to walk away and not do my work in exchange for a significant sum of money"*. Personally, I could not sell out my country for any amount of money. However, as a direct result of this nefarious offer I knew then forces would work even harder behind the scenes to do whatever they could to not have my work included. Anyone knows if steps would be taken to try to silent this type of work, then we all must be right over the target and on the precipice of revealing to all voters how this kind of thing can happen within our election systems.

I want to take each of you who have supported my work and stood up for not only all of America but every voter of Maricopa County. Each of you has had either direct calls or exchanges with me or is part of my reporting process and status reports.

For your heroic efforts in standing for election integrity and total transparency, each of you will go down in the history books as being the ones who cared more about their voters than political parties or political allegiances. Many of you have expended tremendous political capital to make sure this historic forensic audit effort was undertaken. Further to that goal, Kinematic Artifact Detection played a significant role in the public funding the true needs of the election (they have always understood the clear nature of kinematic artifact detection) and we all know the public is eager to see the findings for Maricopa County which have been revealed for the first time in history. All of America thanks each of you for taking these bold

and historic steps.

Over 33 million voting Americans have now participated in sessions, training, list joining, and the education on Kinematic Artifact Detection and its value to election audits. This list of "activated voters" will become very important and valuable to our Republic in the future. As I communicate with this vast base of supporters, it is my feeling that PKAD may be the gateway that gives American Voters back their confidence in all US elections. In short, PKAD is a visual means for voters to understand what happened in the 2020 general election.

Therefore, our revised 7.0 Maricpoia PKAD report - simply put out by Tesla Labratories, LLC and not myself.

Tesla Laboratories' Kinematic Artifact Detection systems have discovered numerous questionable election management and performance activities that went on during the 2020 election. Most, if not all, reveal equal protection under the law, in various areas, was not considered in Maricopa County Arizona's 2020 general election process. For the sake of absolute confirmation of each finding Tesla has expanded our work to additionally deploy two further cross confirming PKAD systems. These systems are designed to reconfirm each of the individual findings herein. Tesla's cross-confirmation systems were developed out of necessity as findings were discovered.

The findings reveal serious election management, performance, and reliability issues. We agreed with the Arizona Senate our findings would be 100% transparent and all findings regarding our Kinematic Artifact Detection work for Maricopa County, Arizona would be made available to the public. Therefore, to honor each of the Maricopa County Voters who may have been compromised and their vote not treated equally under the law, we have taken these additional steps to cross-confirm each finding and as a result therefore this report is "pass one" of what is now a "three pass" (cross confirmation) system.

--

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KINEMATIC ARTIFACT DETECTION REPORT

Prepared for: ARIZONA SENATE

Report Scope: Preliminary – Maricopa County Update

Date of Report: As of September 14, 2021

Prepared by: Tesla Laboratories, LLC

Tesla Laboratories' Kinematic Artifact Detection systems have discovered numerous questionable election management and performance activities that went on during the 2020 election. Most, if not all, reveal equal protection under the law, in various areas, was not considered in Maricopa County Arizona's 2020 general election process.

For the sake of absolute confirmation of each finding Tesla has expanded our work to additionally deploy two further cross confirming PKAD systems. These systems are designed to reconfirm each of the individual findings herein. Tesla's cross-confirmation systems were developed out of necessity as findings were discovered. The findings reveal serious election management, performance, and reliability issues. We agreed with the Arizona Senate our findings would be 100% transparent and all findings regarding our Kinematic Artifact Detection work for Maricopa County, Arizona would be made available to the public.

Therefore, to honor each of the Maricopa County Voters who may have been compromised and their vote not treated equally under the law, we have taken these additional steps to cross-confirm each finding and as a result therefore this report is "pass one" of what is now a "three pass" (cross-confirmation) system.

This Kinematic Artifact Detection Report is presented here in step-by-step progression starting with the top of the ballot. Since we are a forensic image investigation[1], we will present the correct image findings and marker first, then a marked-up proof file of issues, problems, and illegal acts; followed up by a very brief synopsis of findings in the category presented.

We conduct our investigation base on two type of images (1) A Quad Image, and a (2) Full Ballot Image Front and Back

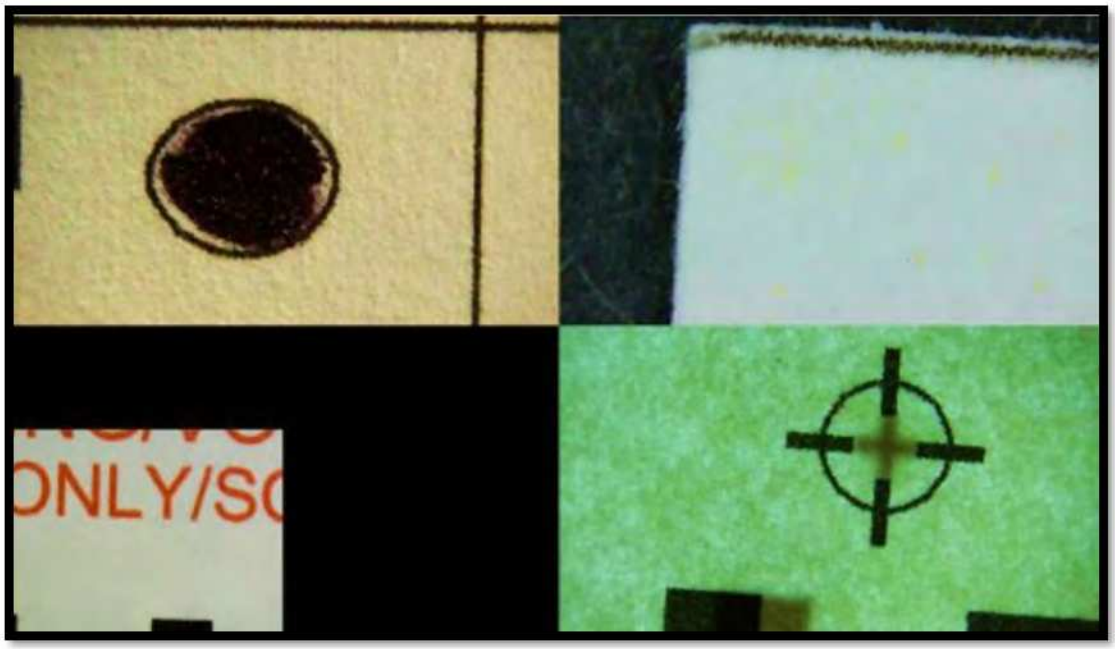


Figure 1 This is a PKAD Forensic Microscopy QUAD image which in a zoomed format investigates ballot paper, hand or machine marked images, print cover levels, color levels, MIC coding and ballot print calibration

[1] SEE Pulitzer Kinematic Artifact Detection Program – Scientific Reader

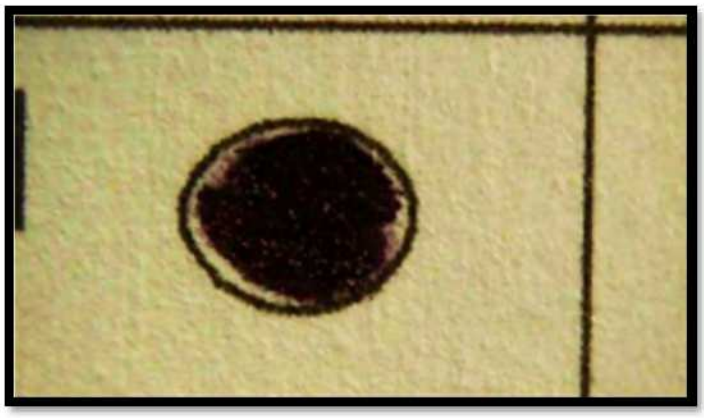


Figure 2 This is a correct, legal, compliant, and official Runbeck ballot which features a Human marked Presidential Voted oval

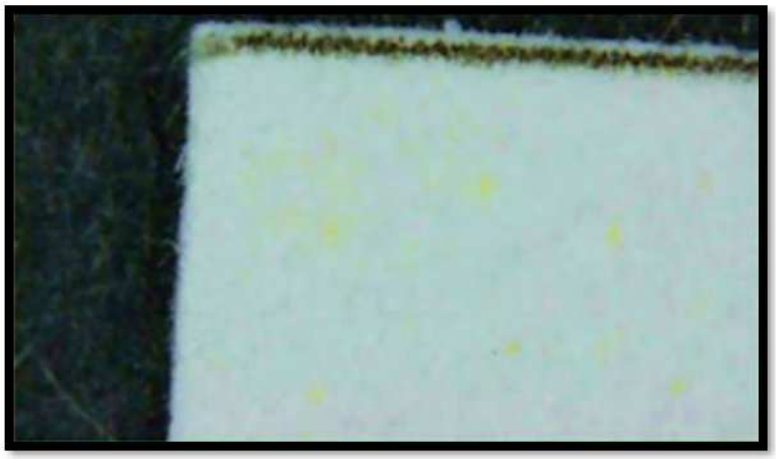


Figure 3 This is a correct, legal, compliant, and official Runbeck ballot paper stock which appears with the correct embedded MIC codes (yellow dots)

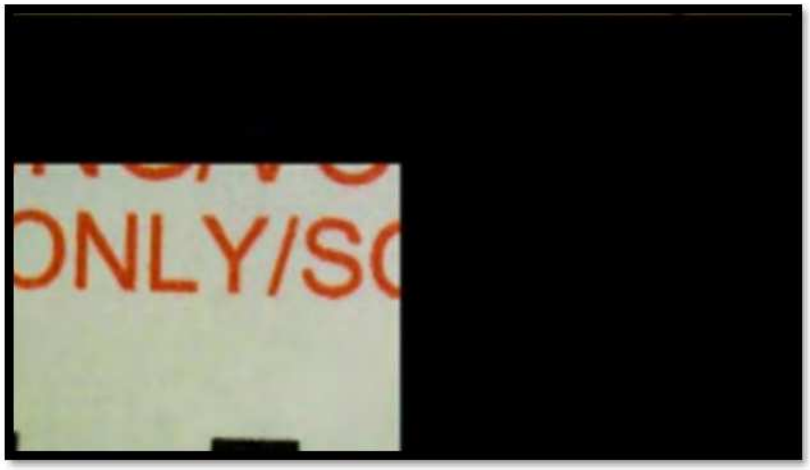


Figure 4 This is a correct, legal, compliant, and official Runbeck ballot print saturation for both black ink and color ink (notice solid lines, true saturation, and intensity)

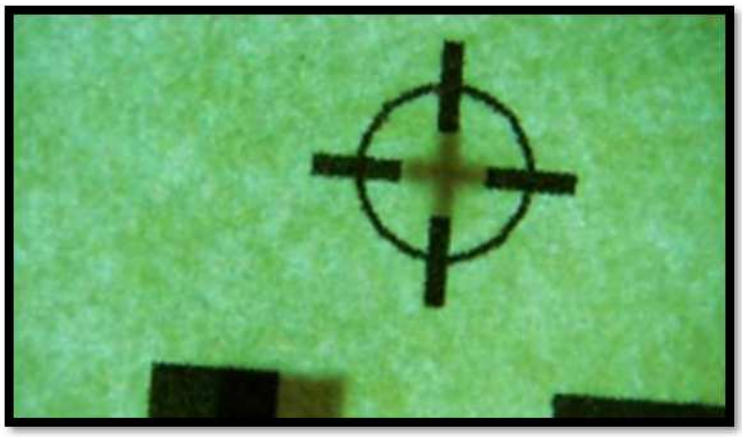


Figure 5 This is a correct, legal, compliant, and official Runbeck ballot print calibration mark (looking through the front of the ballot to the back of the ballot. Notice the target - + - aligns perfectly with the cross hairs of the sighting oculus)

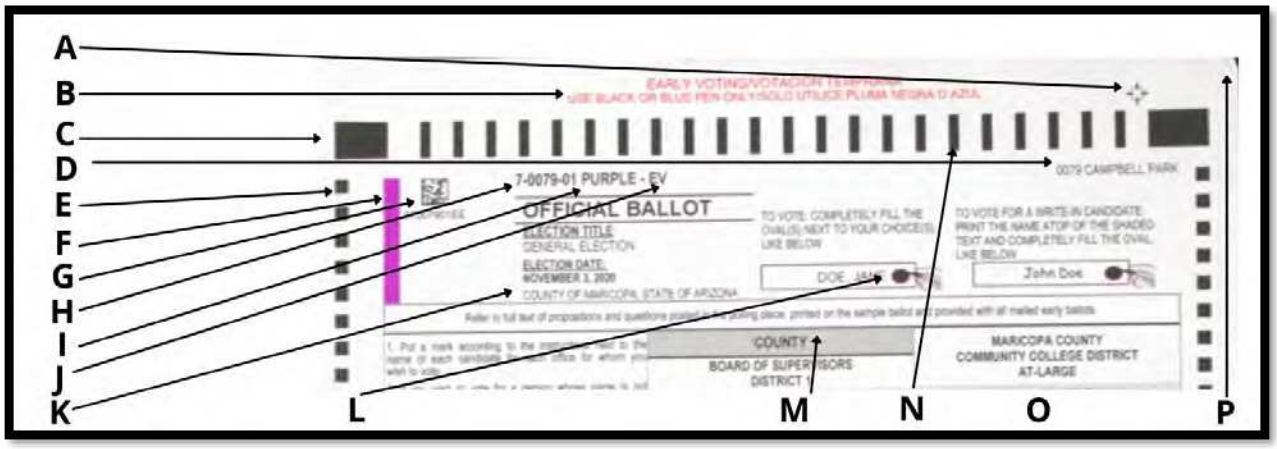


Figure 6 PKAD Computer Vision Inspection Data Points (Enlarged version on following page)

From an official, legal, and compliant standpoint the follow are the items we inspect, monitor, verify and assure are present in what is to be deemed an official mail-in Runbeck legal 2020 Maricopa County, Arizona Ballot

A: This is where we verify the calibration (registration) of the printer which printed the ballot. We also use this as a unique marker measured on the micron scale to identify the "fingerprint" of the printing machine at the time of printing the ballot

B: Each official, legal, and compliant Runbeck mail-in ballot has red printing of a certain font and style at the header and footer of the ballot and such color is displayed on both sides of the ballot front and back

C: Each official, legal, and compliant Runbeck mail-in ballot has certain timing marks, calibration zones, specific measurements, top and bottom calibration zones, ID marks and other patterns to be recognized and measured

D: Each ballot lists the precinct-by-precinct number and precinct name

E: Each official, legal, and compliant Runbeck mail-in ballot has certain timing marks, calibration zones, specific measurements, top and bottom calibration zones, ID marks and other patterns to be recognized and measured

F: Certain ballots have UNIQUE color coding represented by a vertical color bar

G: Each ballot has cross confirmed unique codes

H: Each ballot has additional ID marks which are used to confirm authenticity of each ballot

I: Each ballot has a corresponding WORD CODE which matches the UNIQUE COLOR CODE BAR

J: Each ballot has a "type" designate which labels the type of ballot. This example is EV for Early Vote (mail-in)

K: Each ballots has specific title and date designations

L: This (red outline slightly off-set around the black oval) we use to measure the exactness of properly printed registration

M: Each official, legal, and compliant Runbeck mail-in ballot utilizes the full spectrum of the Kodak Gray Scale

N: Each official, legal, and compliant Runbeck mail-in ballot has certain timing marks, calibration zones, specific measurements, top and bottom calibration zones, ID marks and other patterns to be recognized and measured

O: Each official, legal, and compliant Runbeck mail-in ballot have certain design features, layout, and patterns overall and are adjusted per precinct

P: Each official, legal, and compliant Runbeck mail-in ballot utilizes approved, certified, and detectable official ballot paper

Although other very important layout items and cross checks occur to assure the integrity, validity, and usability of an Official Runbeck, the above items are the core of our kinematic artifact detection forensic inspection system[2].

[2] SEE Pulitzer Kinematic Artifact Detection Program – Scientific Reader

WHAT OUR SYSTEMS IDENTIFY AS A COUNTERFIT BALLOTS DETECTED

Ballots exist, in system, which do not meet specific criteria. When certain criteria are not met there are only the following possibilities:

- Unauthorized color printing and casting of ballots of what appear to be official ballots was conducted – this could indicate the Runbeck subcontracted some portion of its ballot printing contract to outside sources, but failed to report such
- Color Official Ballots were, in an unofficial and non-compliant manner, duplicated using a color duplication process versus the official Runbeck printers
- Ballots presented as legitimate were not printed within the United States of America and were shipped in from a country not compliant with US legal requirements for MIC encoding (otherwise known as CPS Codes – Counterfeit Protection System Codes and/or PCS – Printer Stenography Codes). MIC codes are standard in all commercial printing machines and most consumer machines but are not found on obsolete printers and foreign not for import printing presses and machines.[3]

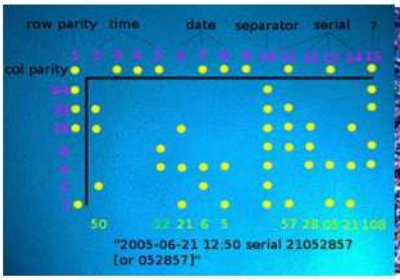


Figure 7 Official MIC Code Explainer

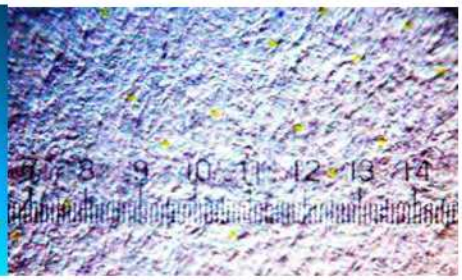


Figure 5 MIC Codes at the micron detection scale

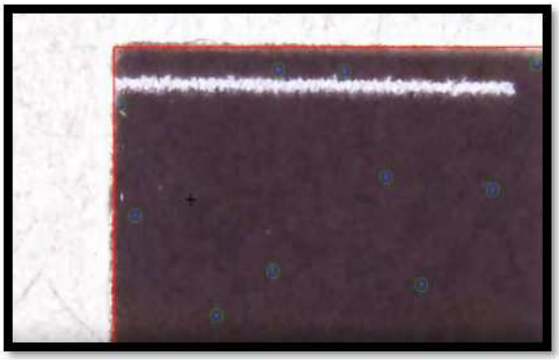


Figure 8 100% Confirmed MIC Within PKAD Systems

[3] SEE Pulitzer Kinematic Artifact Detection Program – Scientific Reader

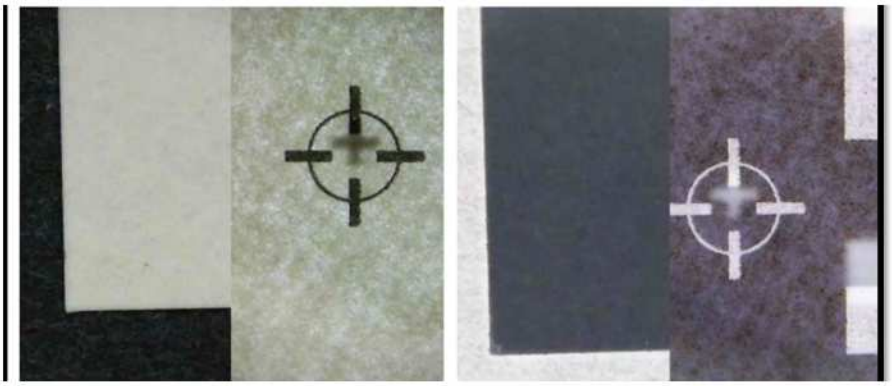


Figure 9 Our PKAD SYSTEMS have detected Counterfeit Color Ballots – No MIC Encoding Detected, Incorrect Paper Standard and Off Repeatable Printer Pattern Detected

Figure 10 This is a close up of Figure 9 natively and no MICS are present

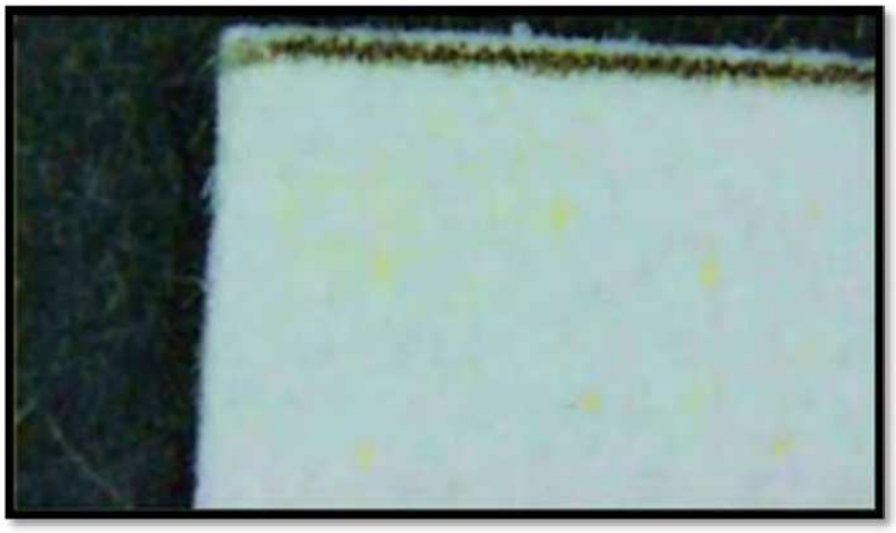


Figure 11 PKAD should detect MIC like these shown in this example

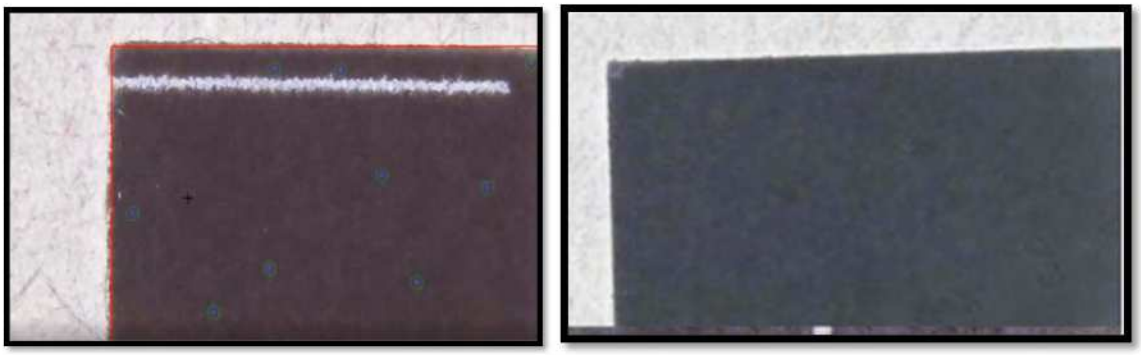


Figure 12 IF the ballot shown in Figure 9 were to have MICS present our PKAD systems would map them and identify. The close up in PKAD System shows no MICS present (right side image)

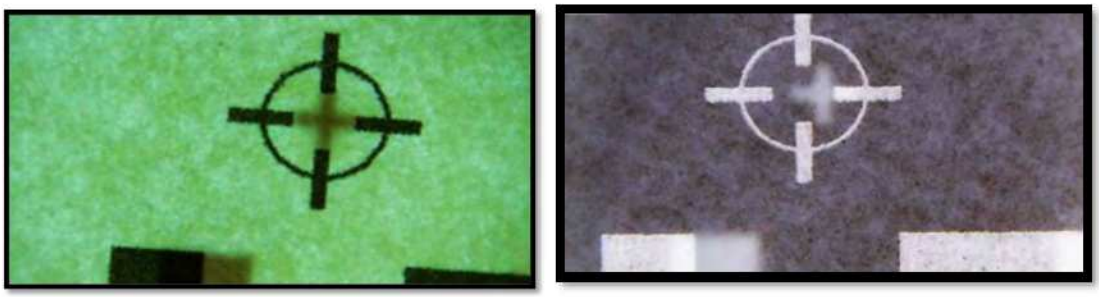


Figure 13 PKAD Systems show this counterfeit ballot to be out of calibration and the calibration mark used as a fingerprint repeat in numerous ballots

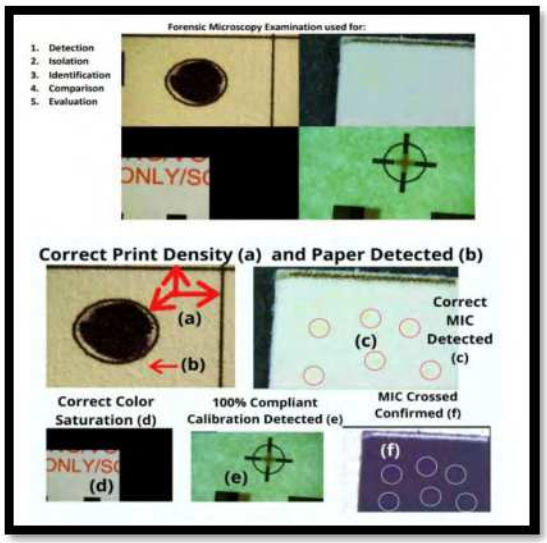


Figure 14 Various Items To Cross Confirm 100% Legal Ballots

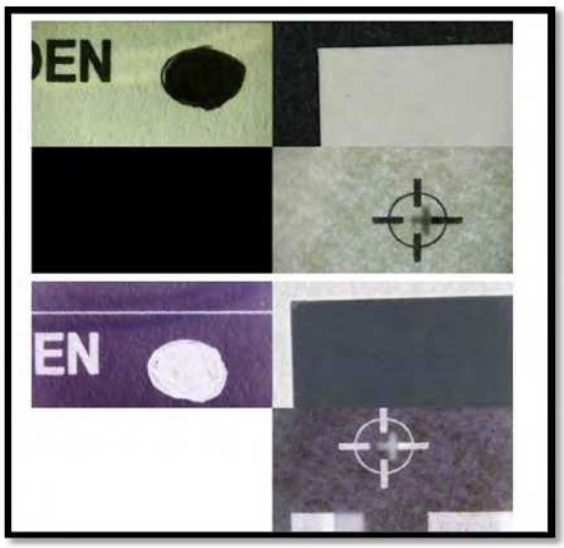


Figure 15 Ballot Failing MIC Code Confirmation and Calibration – Counterfeit Ballot Detected

Our PKAD Systems have detected potentially counterfeit color ballots in system, which are the current rate they are being identified and cross confirmed may end of being in excess of 12,000 individual ballots.

UNAUTHORIZED BALLOT PAPERS DETECTED

These are the Maricopa County Official Papers used for all ballots (Printed by Runbeck or used in Ballot on Demand systems). These are the forensic images of the actual ballot papers which have been confirmed by Maricopa County as the only papers authorized to be used and to work properly with its voting systems[4],[5],[6],[7] (Rolland Opaque and Vote Secure Specimens - Specimen 1 – RO-TWS80, Specimen 2 – RO-TWS100, Specimen 3 – VIJ-100, Specimen 4 – VIJ -GR-80)

Figure 1 Authorized Maricopa Specimen 1

Figure 2 Authorized Maricopa Paper Specimen 2

Figure 3 Authorized Maricopa Specimen 3

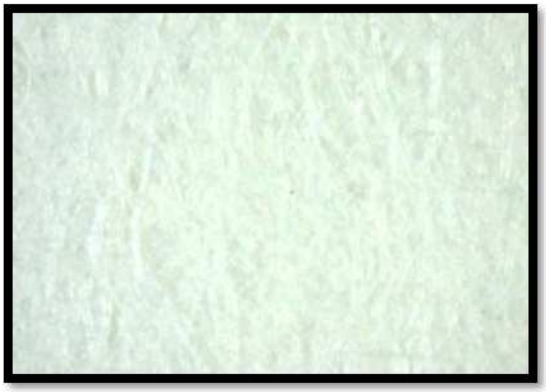


Figure 4 Authorized Maricopa Paper Specimen 4

PKAD Systems have detected a significant use of **"unauthorized ballot papers"** which do not meet the official statements of Maricopa County Election officials as the types of voting papers utilized. We

[4] Maricopa County uses several different types of printers to ensure voters have the ability to cast a ballot in the way that works for them. No matter the mode in which a voter casts a ballot, all counted ballots are printed on VoteSecure paper. https://www azdemsld1.com/post/just-the-facts-from-the-maricopa-county-elections-dept

[5] https://content.govdelivery.com/accounts/AZMARIC/bulletins/2e47605

[6] https://www.westernjournal.com/az-audit-revelation-wrong-paper-used-ballots-confirm-sharpiegate-according-az-sen-president/

[7] SEE Pulitzer Kinematic Artifact Detection Program – Scientific Reader

consider the authorized papers to be VoteSecure paper specifically defined for use with the Democracy Suite ImageCast Printing and Finishing Specifications.[8] VoteSecure papers as defined by Dominion Voting Systems are:

> ***2.4 Approved Ballot Paper Stocks - Version: 5.11-CO:1 3 5/31/2019 Democracy Suite® ImageCast® Printing and Finishing Specifications***
>
> *The optimal paper base for all ballot types and all scanners except the DRS Photoscribe platform, is Rolland Opaque 100# Text. Rolland Opaque is specialty paper with high levels of recycled content, high consistency, low defects, and greater quality control than other commercial papers. This elevated quality reduces potential problems with printing and improves scanning performance. Also of note, it is produced at the leading specialty paper plant in North America for stainability and recycling, and the only North American plant whose energy source is landfill methane. There are 3 types of Rolland Opaque 100# Text customized for ImageCast® and specific print technologies:*
>
> *• Rolland Opaque 100# Text: the base paper for use in offset presses.*
>
> *• Vote Secure SL: the base paper with a treatment improving the adhesion of xerographic toner.*
>
> *• Vote Secure IJ: the base paper with a treatment improving ink density and fastness for commercial ink jet presses, as well as improving the sliding resistance of the ballots to meet specification. Vote Secure IJ 100# Text is the only paper qualified for use in ink jet presses.*
>
> *The optimal paper stock for the DRS Photoscribe platform is Rolland Opaque 80# Text. Outside North America, only Rolland Opaque 100# Text is qualified for use. The full list of North American papers approved for manufacturing ImageCast® ballots is provided in Table 2.1.*

Manufacturer	Type	Weight	Color/Finish	Comments
Rolland Enterprises Inc	Rolland Opaque and Vote Secure SL, IJ, GR	100# Text	Low Brightener, Smooth Finish	Optimal choice. 30% Post consumer fiber, BioGas, EcoLogo, FCS Mixed Sources
	Rolland Opaque	80# Text	Bright White, Smooth Finish	DRS only, 30% Post consumer fiber, BioGas, EcoLogo, FCS Mixed Sources
International Paper	Accent Opaque	100# Text	Smooth	Not recommended for ink jet printing, FCS Forest Management

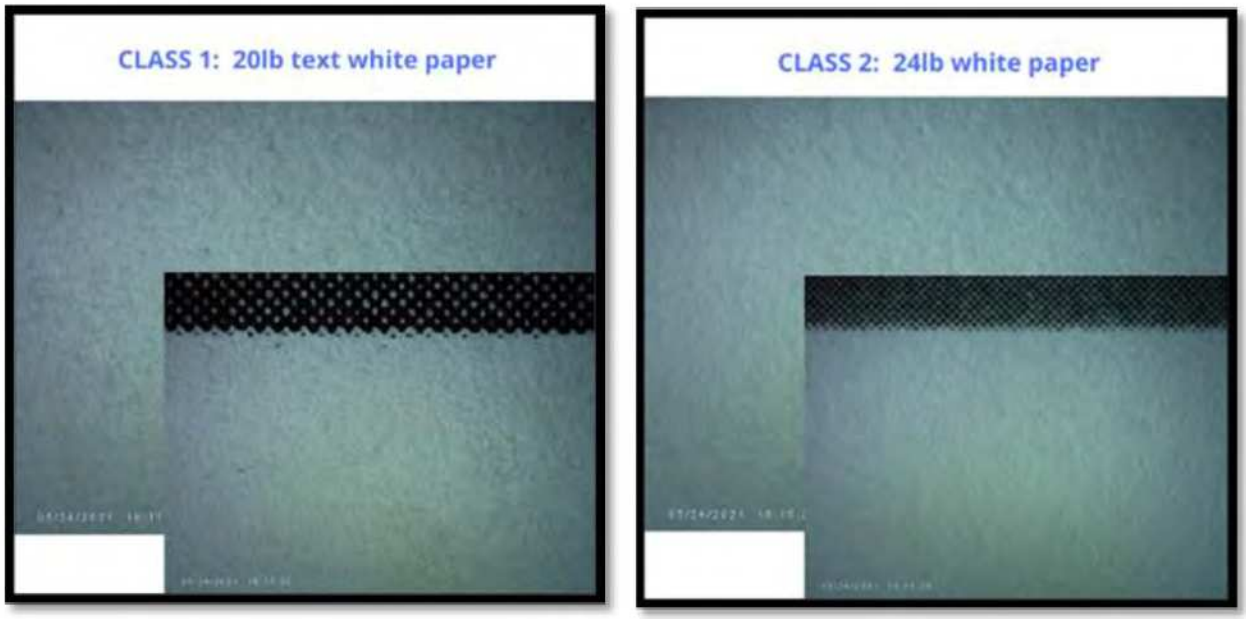
Table 2-1: Text and Paper Stocks Approved for ImageCast® Ballots

[8] https://www sos state.co.us/pubs/elections/VotingSystems/DVS-DemocracySuite511/documentation/SD-IC-PrintingSpecification-5-11-CO.pdf

No other papers are qualification for use with ImageCast®. In cases where alternatives are requested, Dominion may perform an additional qualification testing.

Our PKAD Systems currently project unauthorized, non-compliant, possibly voted reading and counting ballot paper to exceed 15% of all ballots cast in the 2020 Maricopa General Election

Per voting systems and official ballot printing specifications, utilizing the wrong ballot paper can affect the actual count and function of the voting systems. Ballot papers are designed to read, reflect, and not allow bleed through votes[9],[10],[11],[12] to exacting specifications.[13],[14],[15],[16] More than 1 out of every 10 ballots cast in Maricopa County were compromised this way. The following are partial example of identified and unauthorized papers in use in Maricopa County:



[9] No other papers are qualification for use with ImageCast®

[10] Print quality: Clean and well-printed images, with sharply defined edges, accurately reproducing the ballot artwork. Ink density must be uniform across the ballot and should be free from smudges, mist, spray, spots, hickeys, voids or other stray marks. No visible set-off, ghosting or bleedthrough.

[11] VoteSecure paper is utilized, it's actually a thick paper, it has a special coding (coating) on it that helps make sure there isn't bleed-through. Based on our discussions to paper experts they specifically state that that paper is thick enough that it wouldn't bleed-through

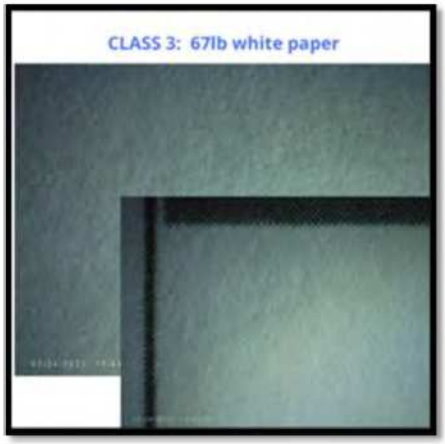
[12] …include specifications for ballot materials to ensure that vote selections are read from only a single ballot at a time, without detection of marks from multiple ballots concurrently (e.g., reading of bleed-through from other ballots).
https://www.eac.gov/sites/default/files/eac_assets/1/28/Voting_System_Standards_Volume_I.pdf

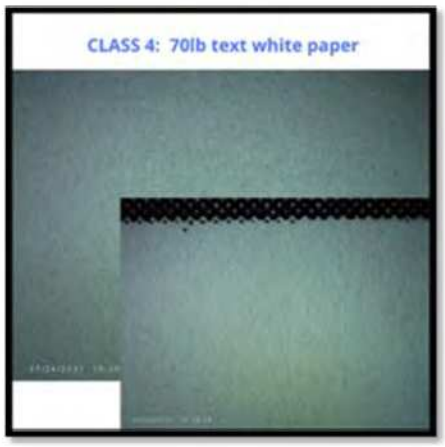
[13] https://www.rollandinc.com/sustainable-papers/security-profile/

[14] Rolland VoteSecure SL GR White. At this time, the paper can only be purchased from Dominion, the company that makes the new voting equipment.
https://www.habershamga.com/files/Meeting2612_Report%20to%20Commissioners%20on%20Implementation%20of%20New%20Voting%20Machines.pdf

[15] Volume I — Performance Standards -The ballot conforms to vendor specifications for type of paper stock, weight, size, shape, size and location of punch or mark field used to record votes, folding, bleed through, and ink for printing if paper ballots are part of the system

[16] SEE Pulitzer Kinematic Artifact Detection Program – Scientific Reader





- Initial detection suggests as many as (if not more – still under investigation) **10 different forms of unauthorized ballot papers** were used, all of which do not meet election guidelines
    i. These unauthorized ballot papers are known to cause misreading of ballots, bleed through of voted ovals and can force excessive adjudication.
    ii. Historic Maricopa County, Arizona (and national averages) shows adjudication rates show 2016 to be 1.1%[17] of total ballots cast 2018 to be 2.2%[18] of total ballots cast, and 2020 reflects a minimum (which actually may be higher) of 11.2%. This **represents a 1000+% increase in adjudication compared to 2016 and a 509% increase over 2018 adjudication rates**[19]

[17] https://www.pewresearch.org/fact-tank/2020/11/10/most-mail-and-provisional-ballots-got-counted-in-past-u-s-elections-but-many-did-not/
[18] https://www.pewresearch.org/fact-tank/2020/11/10/most-mail-and-provisional-ballots-got-counted-in-past-u-s-elections-but-many-did-not/
[19] https://ballotpedia.org/Election_results,_2020:_Analysis_of_rejected_ballots

iii. Reports show mail-in ballot rejection rates being around 1% historically, 3% for first-time absentee ballot voters and as high as 6.5% in some states[20]

iv. It is common among election results to consider 3% an abnormally high adjudication rate and cause for a complete adjudication process audit and investigation

v. We believe the abnormally high vote adjudication process in Maricopa was significantly caused by non-compliant, unauthorized, and not official papers being used as ballots

vi. This is a serious example of election malfeasance

[20] https://www.newsmax.com/politics/ballot-rejection-rates-mail/2020/11/15/id/997128/

Out of Calibration Failure and Compromised Ballots

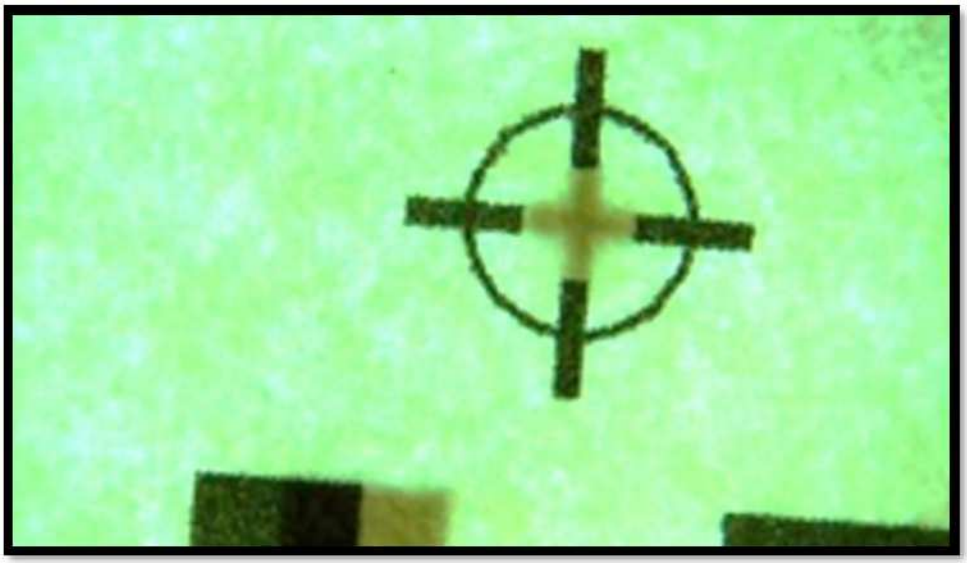


Figure 16 This is an example of a both a perfect calibration mark and a calibration of a Runbeck official mail-in ballot

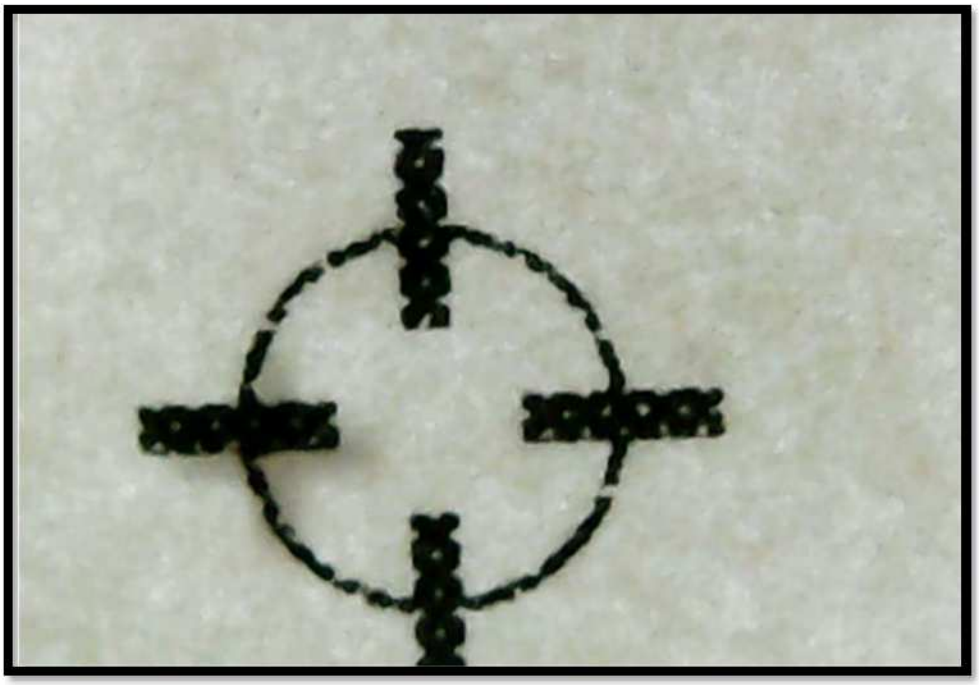


Figure 17 This is a PKAD detected calibration so far out of calibration the target is almost completely hidden under the West sighting hash mark of the oculus

Our PKAD Systems currently estimate that 17% (or more) of the entire universe of the Maricopa County Ballots are compromised at the print calibration level. **355,226 ballots in this compromised position.**

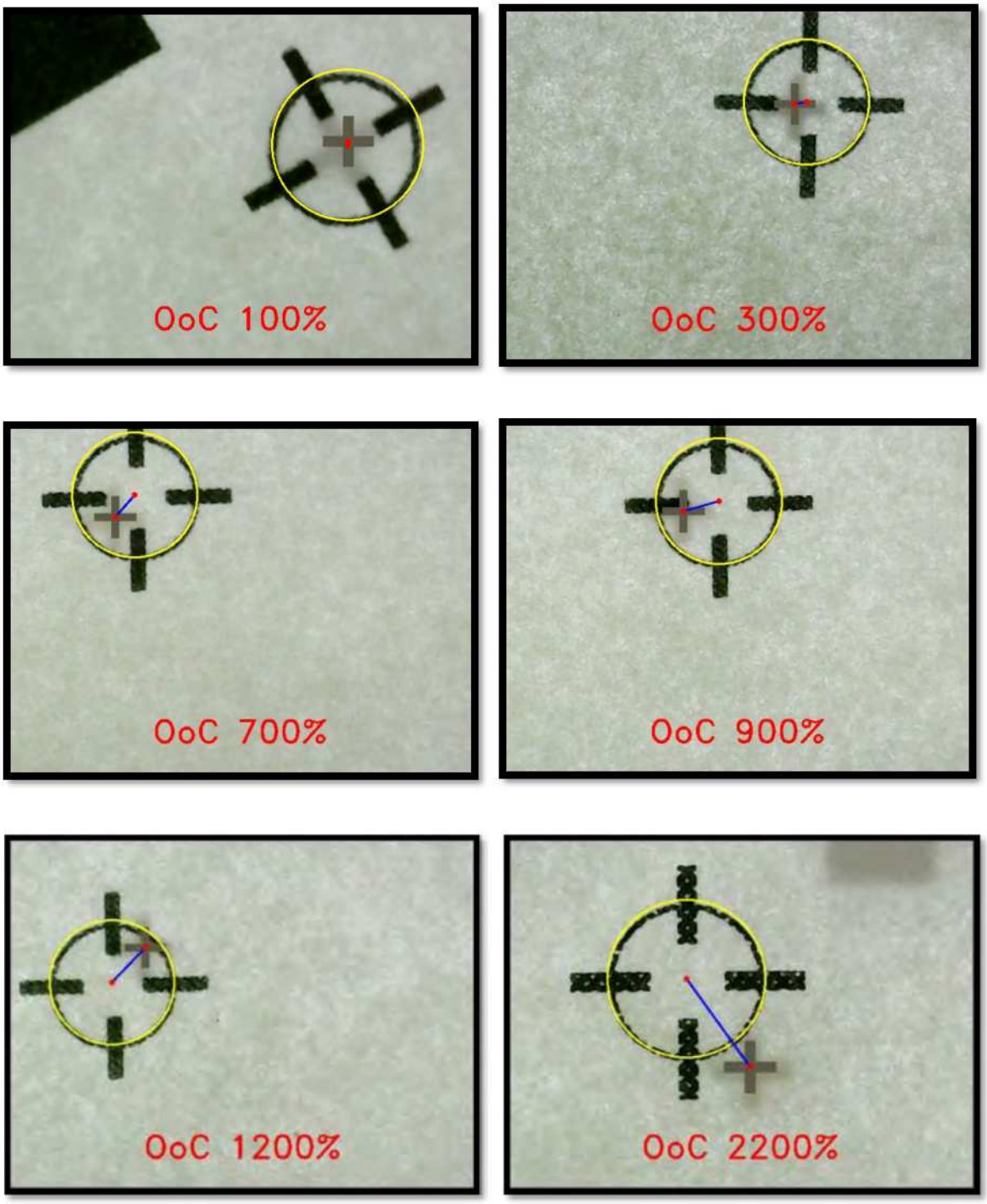
NOTE: Runbeck ballots are printed in an exacting calibrated printing system, however BOD (Ballot on Demand) is more than likely to be out of calibration. The out of calibration is a clear example of not maintaining the voting equipment properly and not having proper standards in conducting elections.

PKAD Systems have identified, what can only be considered an egregious lack of standards, compliance, management oversight and protecting of a citizens vote within the calibration setting of the overall ballot printing.[21] **Our systems have detected an estimated 30% + of all the printed ballots out of normal, acceptable, and allowable machine calibration. Out of calibration printed ballots can cause votes to not be read correctly or to be artificially adjudicated.**

Due to the sensitivity of ballot scanning devices, when ballots are misprinted, out of alignment or fed into vote scanning systems off center or askew, errors can occur thus forcing the adjudication of ballots. These errors can also be used to force adjudication of ballots when standards and procedures are ignored and used to create "forced adjudication" scenarios.

NOTE: Out of Calibration Ballot Printing when combined with out of compliance ballot paper and marker based marking devices can create the "illusion of over votes and marked out votes" by allowing "ghost ovals" to appear in the scan field. This may not necessarily cancel out any one vote, but it can cause an abnormally high adjudication rate to occur. History shows any adjudication rate in excess of 3% to be deemed highly suspect.

[21] SEE Pulitzer Kinematic Artifact Detection Program – Scientific Reader



The following PKAD OoC Reports Charts are supplied at random for your review:

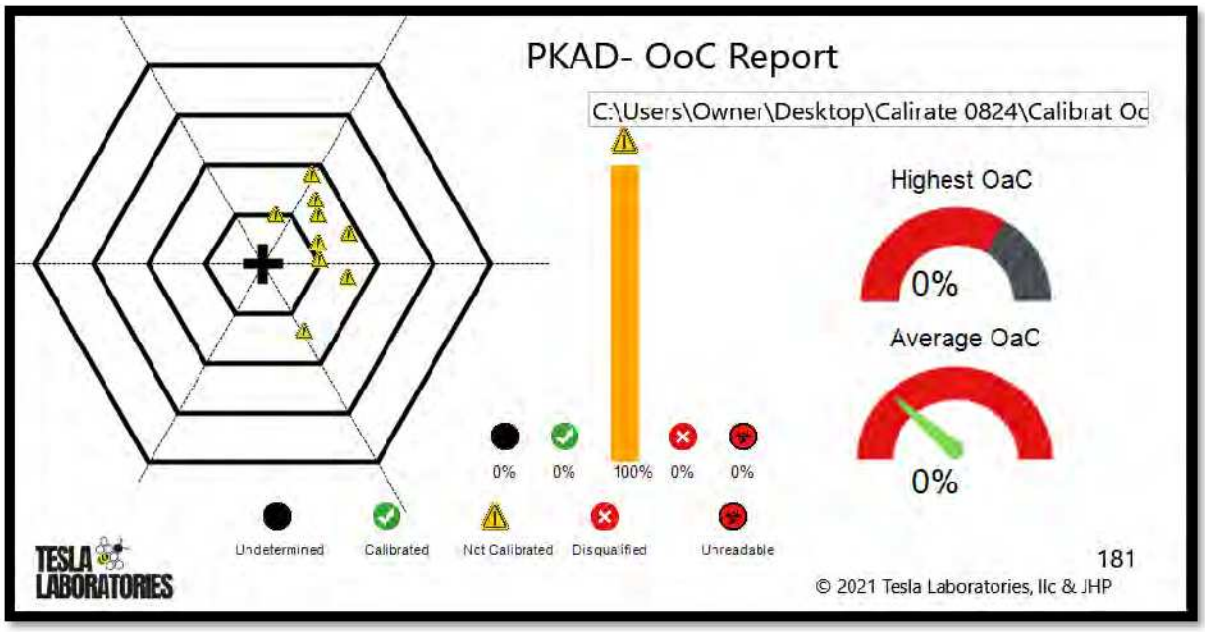


Figure 18 This PKAD OoC Report Chart represents one of the best instances of Ballot on Demand Printing Results. Note: There are no instances in the Correct Calibration Designation and at best yield "This machine needs calibration immediately" results

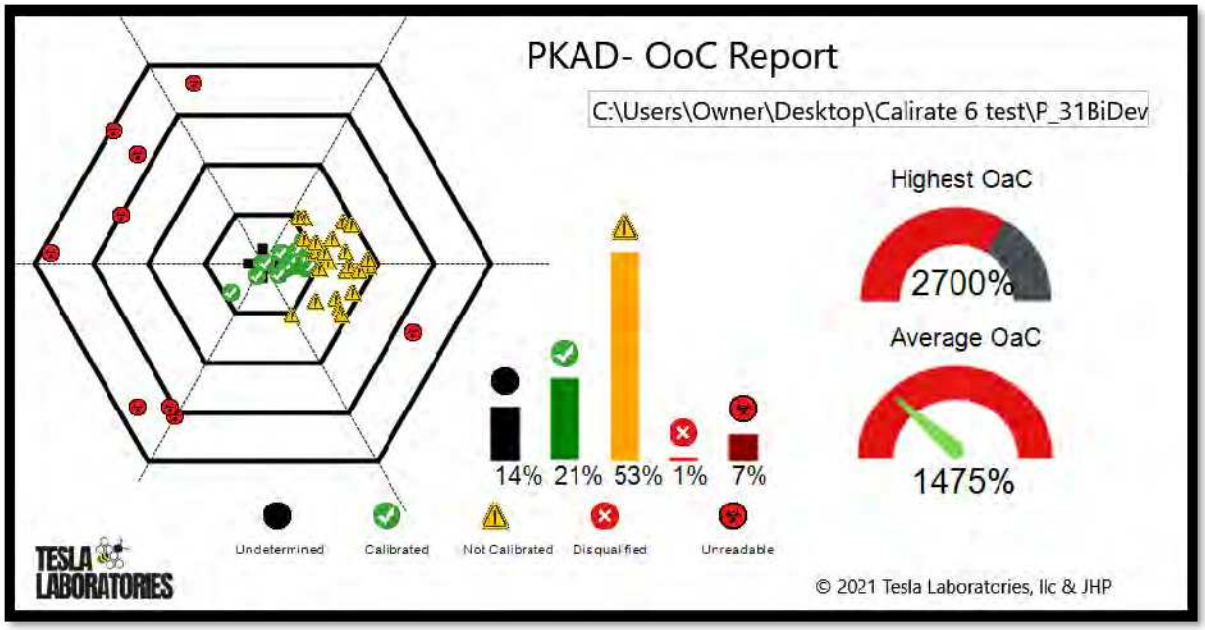


Figure 19 Black indicates that a calibration mark could not be read in the PKAD process. This occurs if the paper is not bearing calibrations marks or when any given photo may not be within focus range

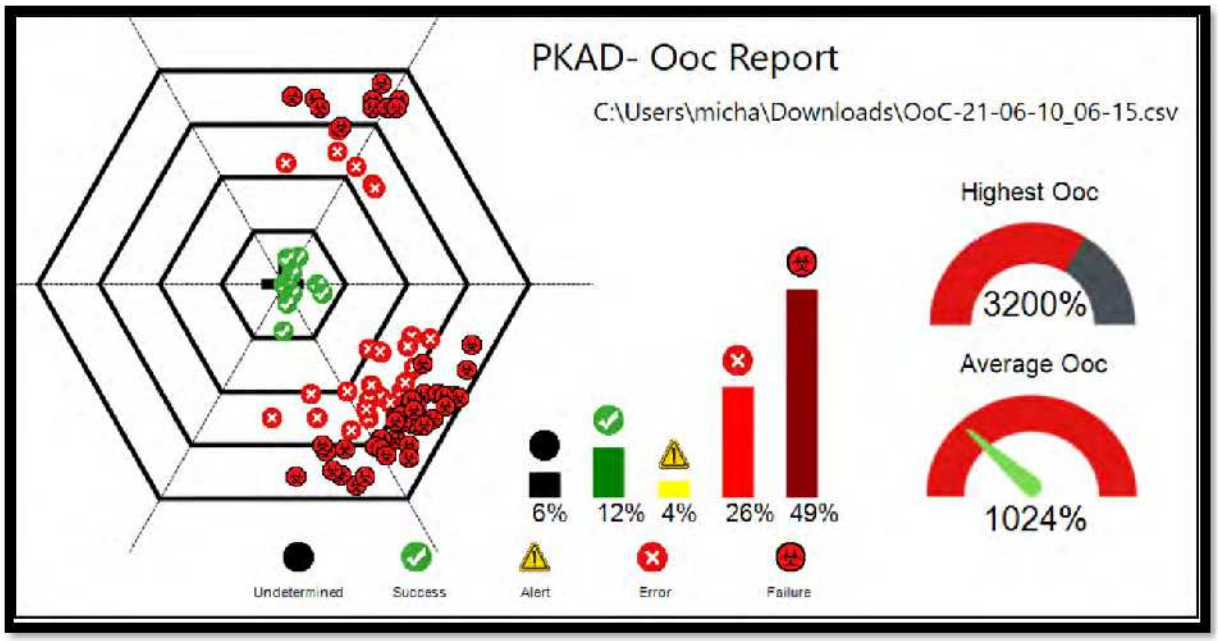


Figure 20 This PKAD OoC Report Chart shows 75% of the ballots printed by this machine egregiously exceed printing calibration allowances for the ballot to be read properly

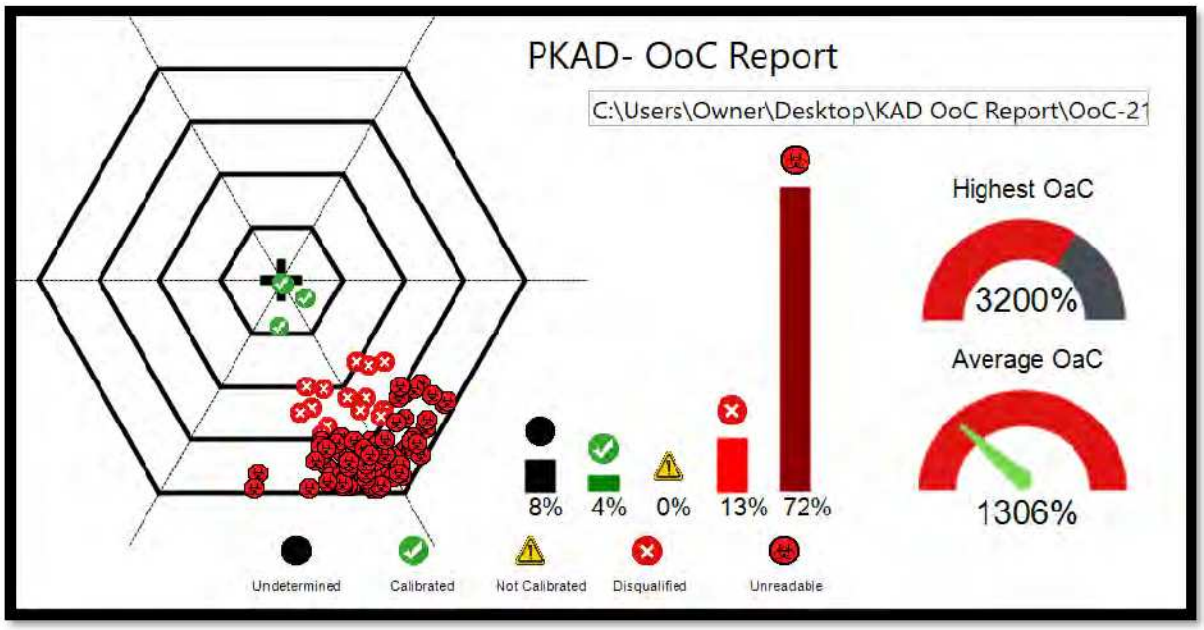


Figure 21 PKAD OoC Reports are designed to not only show out of calibration issues, but to show the migration issues. For example, in this chart 85% of the out of calibration shift on the back side of the ballot, when combined with incorrect and non-compliant ballot paper plus the use of a highly viscous marking instrument such as a Sharpie or marker – would result in a vote for a judge on the reverse of the ballot (top 1/5th) actually reading as an "over vote" or "marked out vote" in the Presidential voting oval on the front side of the same ballot. This correlates to 96% of a given vote for a particular judge on the back side of the ballot could cancel a specific President vote on the front side of the ballot.

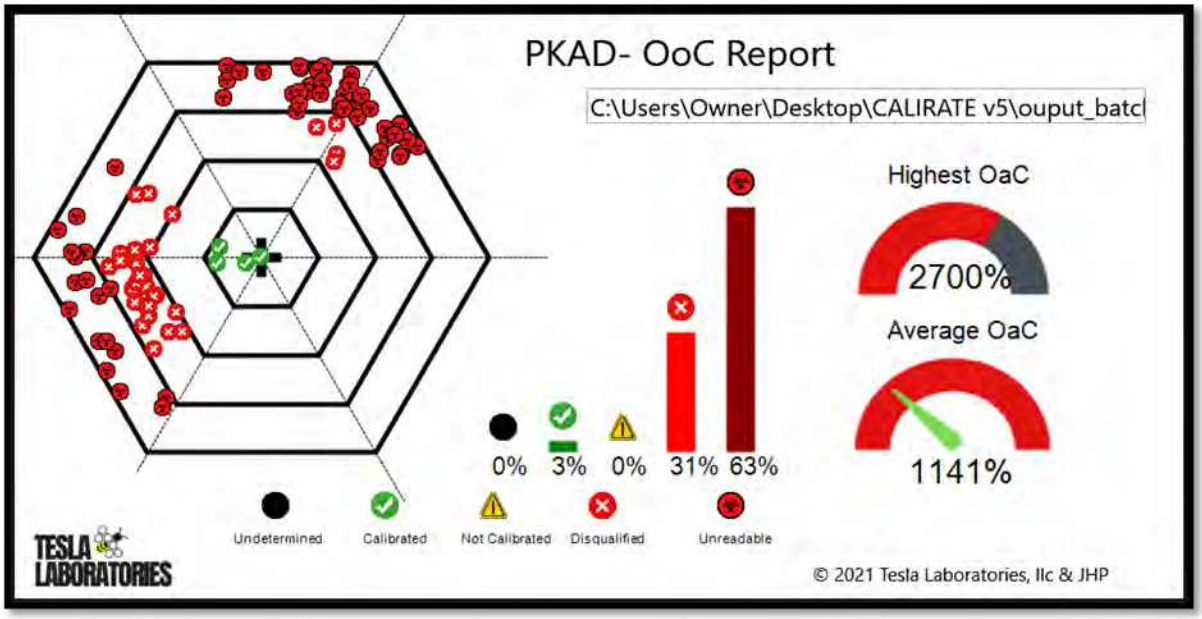
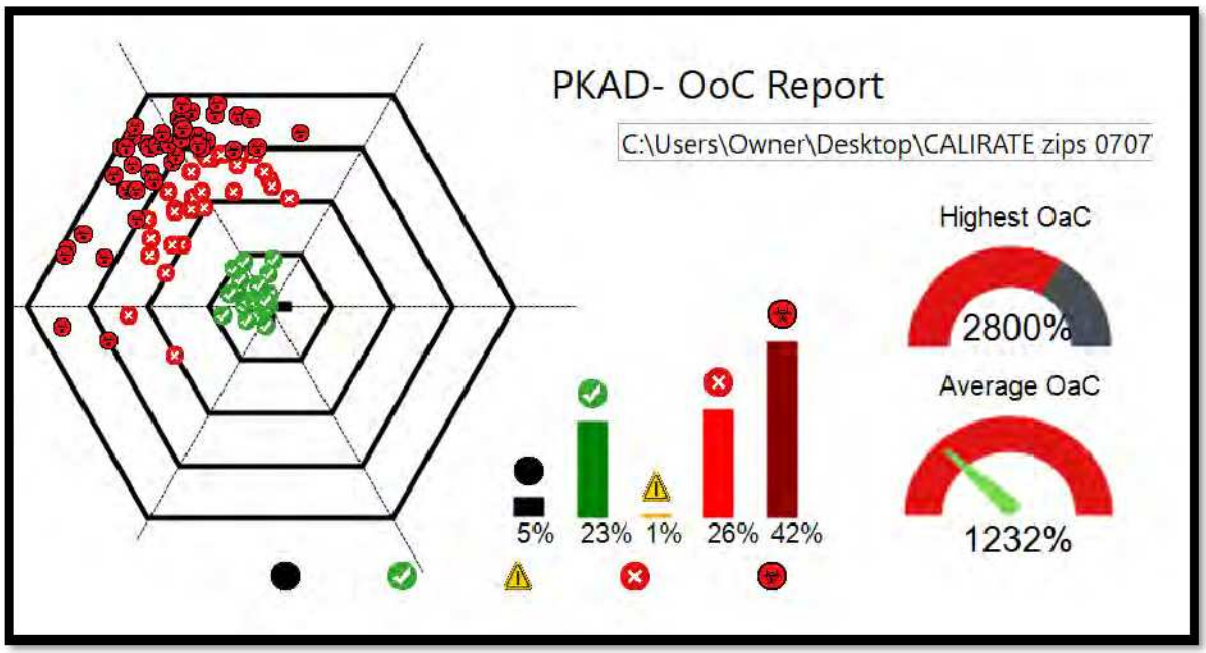
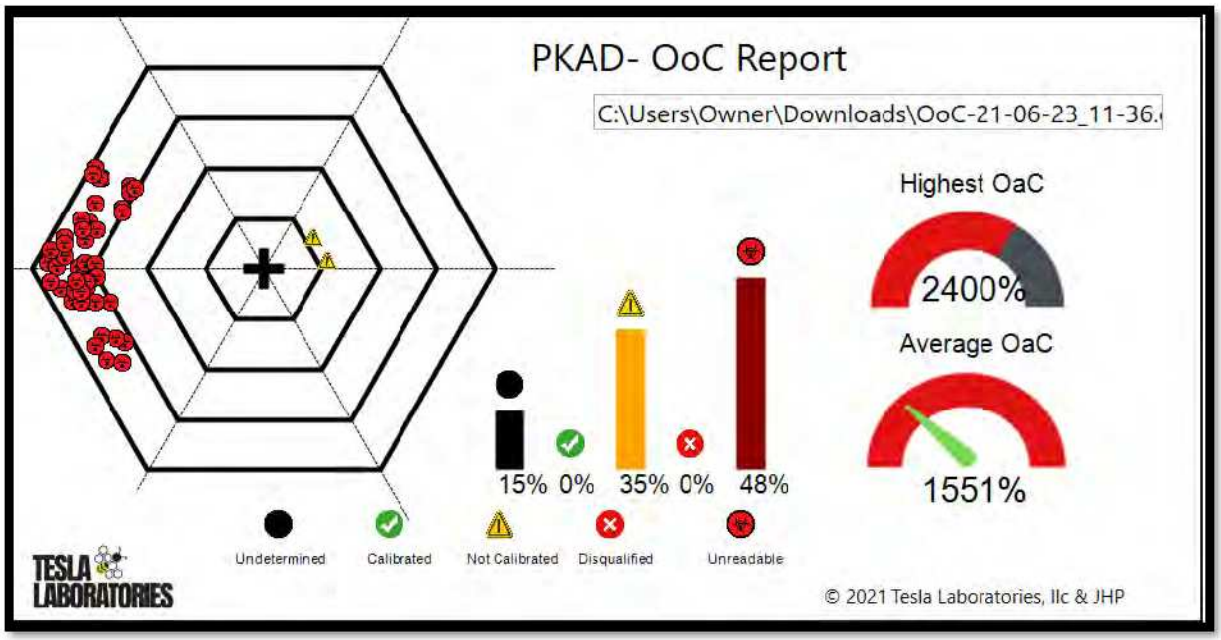
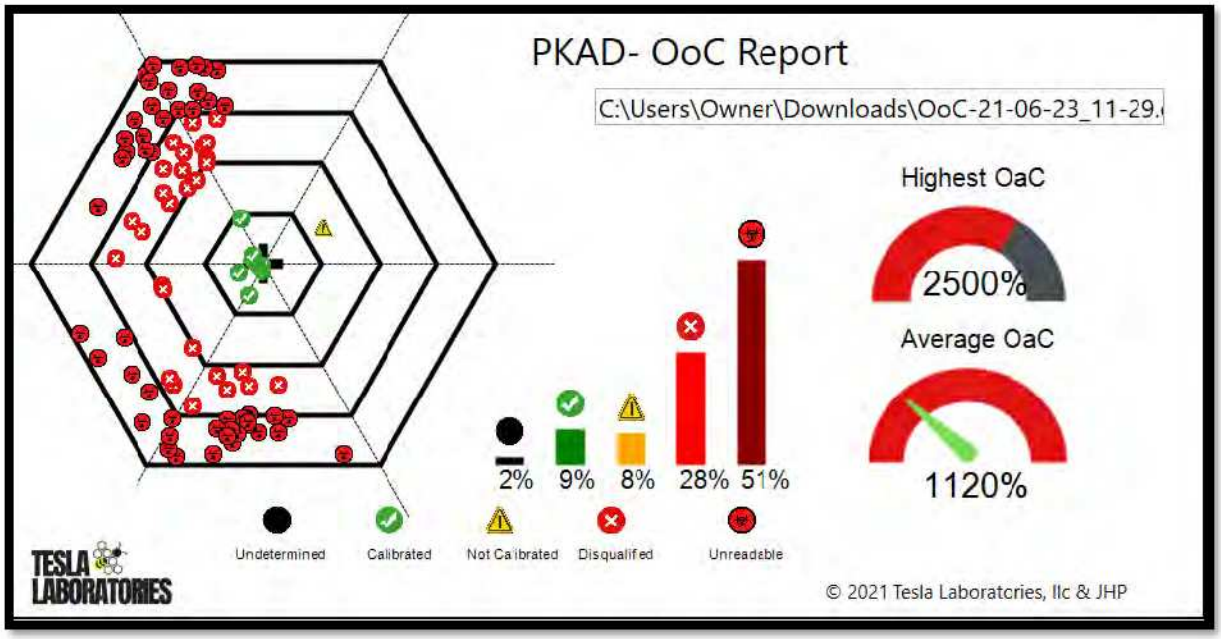
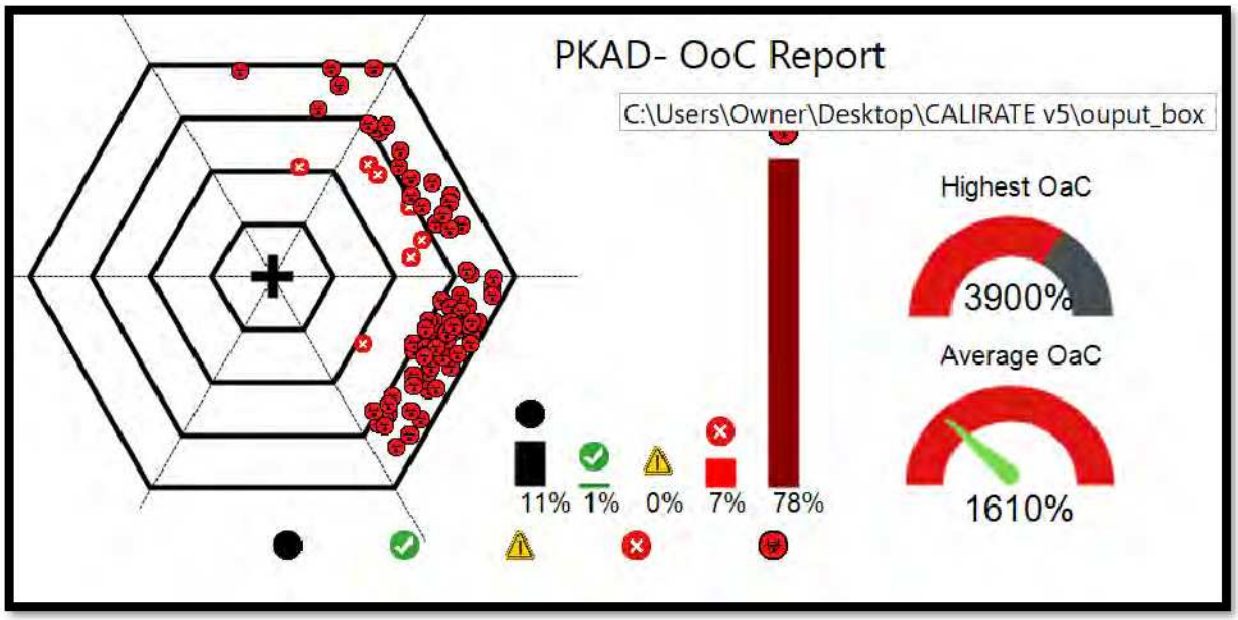


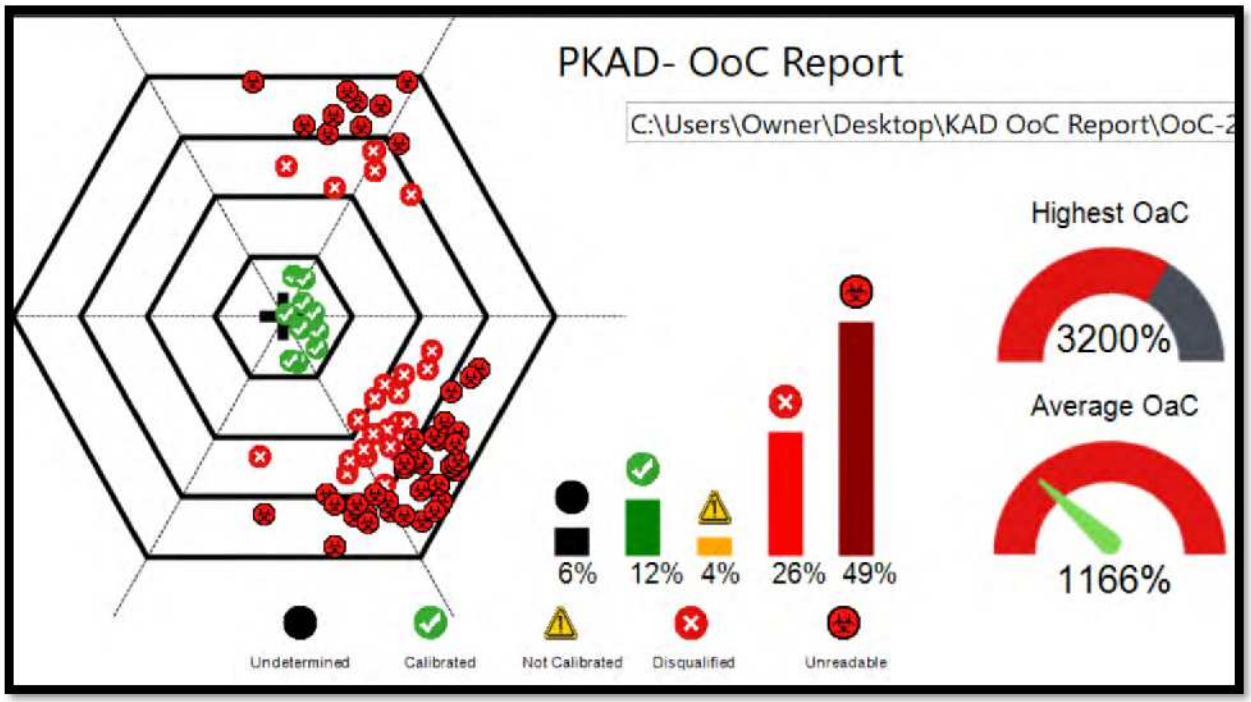
Figure 22 This PKAD OcO Report shows that a vote on the back side of an out of compliance ballot and writing device would allow certain votes on the back side to possibly over vote or cancel a vote on the front side which is just above and adjacent the oval on the front of the ballot







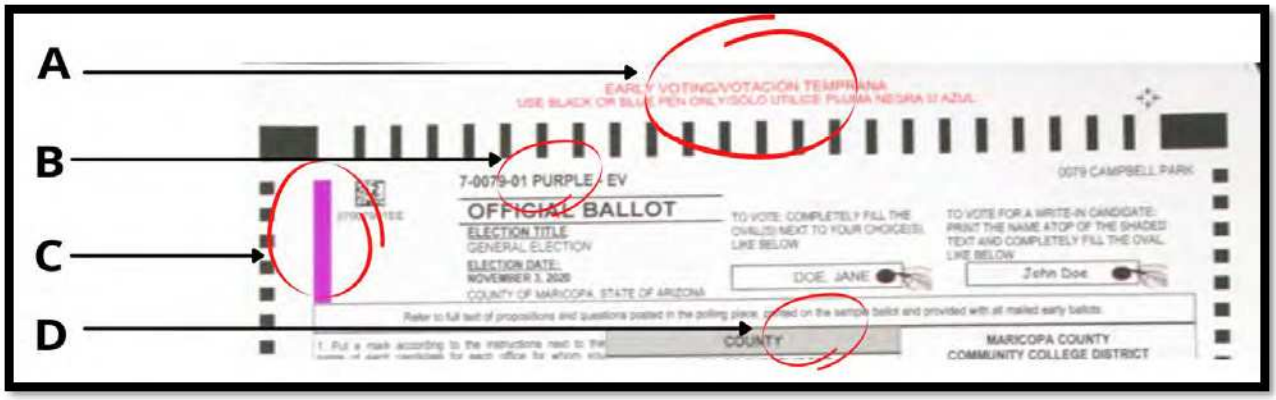

PKAD- OoC Report
C:\Users\Owner\Desktop\CALIRATE v5\ouput_box
Highest OaC
3900%
Average OaC
1610%
11%
1%
0%
7%
78%


PKAD- OoC Report
C:\Users\Owner\Desktop\KAD OoC Report\OoC-2
Highest OaC
3200%
Average OaC
1166%
6%
12%
4%
26%
49%
Undetermined
Calibrated
Not Calibrated
Disqualified
Unreadable

CHROMA ROTATIONS

Each official, legal, and compliant Runbeck mail-in ballot utilizes specific color-coding mechanisms. These visual devices are displayed as true colors and word designates. The following is two specific examples of what our PKAD Systems look for in our digital forensic investigations:

OFFICAL, LEGAL, COMPLIANT RUNBECK MAIL-IN BALLOT:



A: We are confirming the ballot has proper size, font, and print density of red printing on the tops and bottom of the ballot

B: We are confirming the Word-based COLOR CODE on the ballot

C: We are confirming the VISUAL TRUE COLOR BAR of the ballot

D: We are confirming the gray scale variables of the ballot

DUPLICATED/REPLACEMENT/COPIED BALLOT

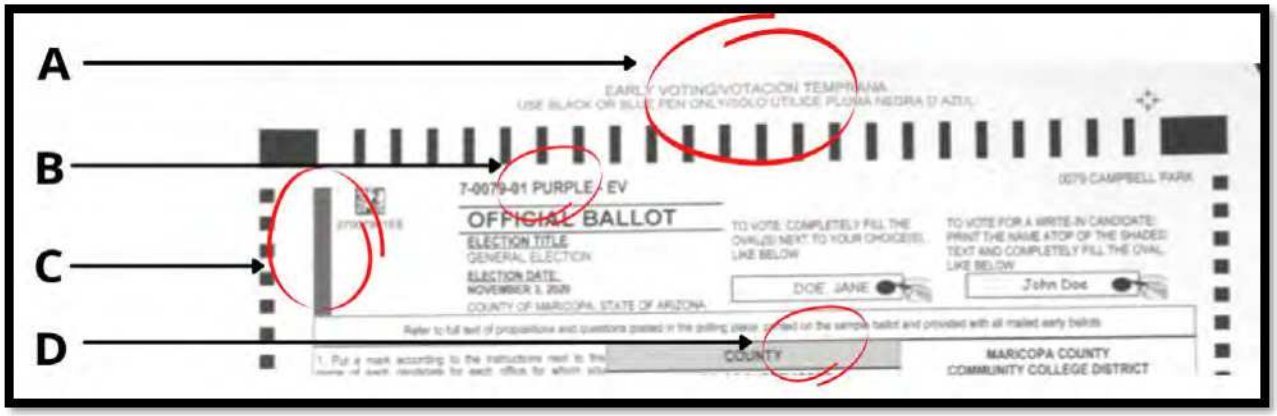


Figure 23 PKAD Color Ballot appearing in grayscale NOTICE (A) the red is now gray and (B) the word color designate is still PURPLE but (C) the color bar is now in grayscale and (D) the saturation level of the grayscale bar is frequency modified

There are varying reasons why a color-coded ballot may appear with color on the ballot. Those reason are as follows:

1. The ballot was duplicated for an Early In-Person Voter
2. The ballot was replaced/duplicated since the original ballot was spoiled
3. The ballot is a Precinct based Ballot on Demand reprint
4. Or the ballot has been illegally copied and inserted into the ballot stream

Official, Compliant and Legal Maricopa County have a "data rhythm." Rhythm generally means a "movement marked by the regulated succession of strong and weak elements, or of opposite or different conditions". This general meaning of regular recurrence or pattern in time can be viewed and measured within our PKAD Systems. The chart below shows the official "color-coded-nature" of official Maricopa ballot. These instances are all tracked and measured by our PKAD Systems

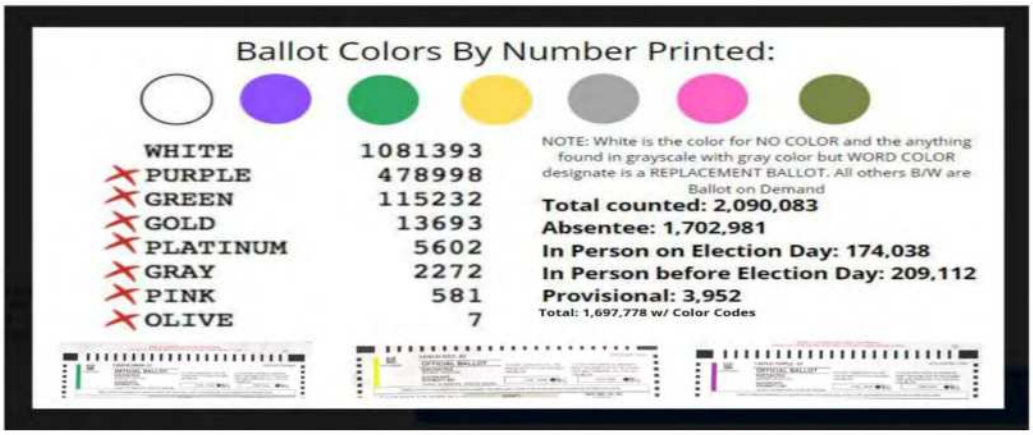


Figure 24 Color Coding by the Official Numbers

Currently our PKAD Systems are not detecting the color rotations and rhythms which match the official county published records (see Official numbers supplied by Maricopa County Arizona in Figure 24 above). There appear to be more copy or duplicated ballots in system then are allowed. When these duplicates cannot be matched to the "duplicate records" said ballots are considered to be "nefariously inserted counterfeit ballots" found in the system.

Our PKAD CHROMO Report is another way we cross confirm duplicate, batch loaded and fraudulent ballots in system. By examining the ballots for indications of color we are able to create "match counts" for all color ballots, special coded ballots and ballots which indicate color via word codes, but do not exhibit color printing visually.

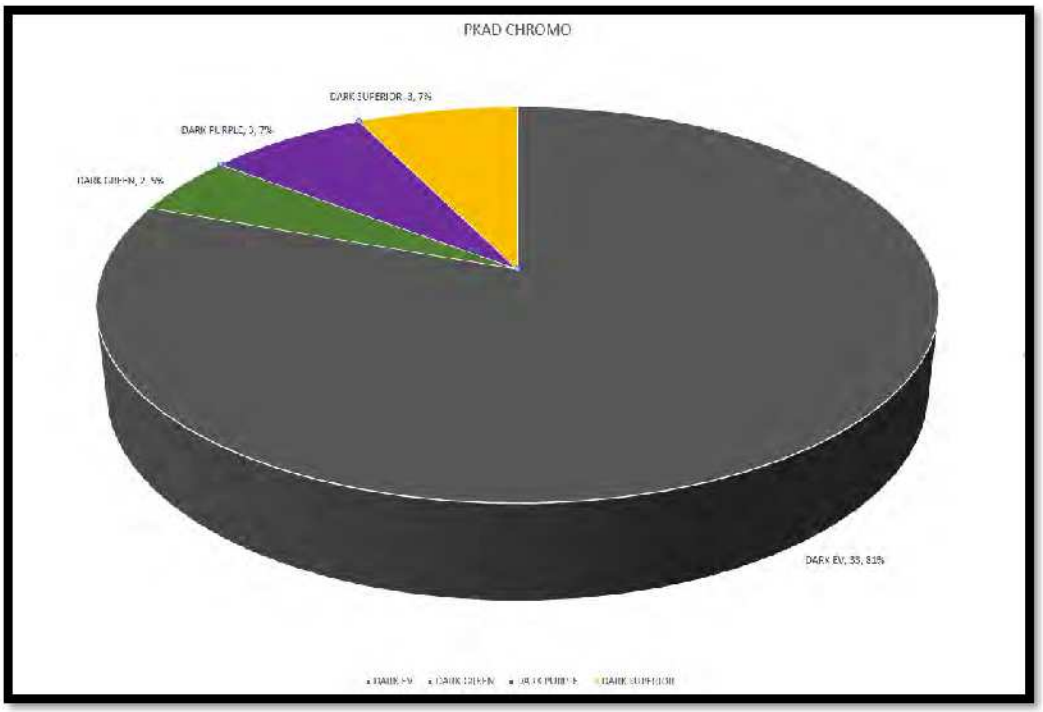


Figure 25 Instances where Color Name does not match Color designation (shown as gray or muted colors) represent reproduced ballots

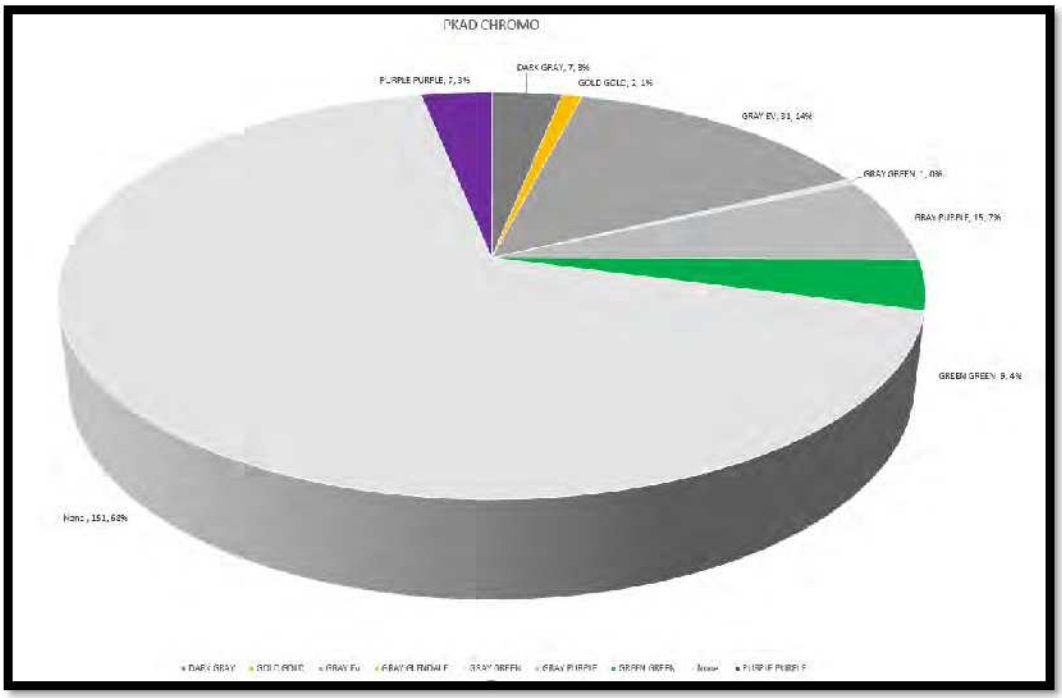


Figure 26 PKAD CHROMO Analysis showing correct WHITE (uncolored rhythm) but excessive replacement or duplicate rhythms

GHOST VOTES OR BLEED THROUGH VOTES

When a combination of things occurs, it both creates errors in our voting systems, but at the same time, if used for nefarious activities, can help mask a perfected hack. This spectrum of compliance issues can be due to both human error and human nefarious intent and should be considered from both possibilities. This compliance issue can also be created by an official ballot paper provider simply not making sure the required and authorized ballot papers are not supplied. When the order is overlooked, intentional or otherwise, this leaves unsuspecting election officials and workers to have to obtain non-compliant ballot papers from general retail sources.

When the county does not use the authorized paper (or in this case does not supply or order it) and that paper is used to print ballots in an out of calibration machine combined with the county actively promoting and suggesting the use of Sharpies or any other markers, it creates a synthetic "over-vote" and "canceled vote" situation. These instances send the ballot to adjudication is excessive high rates.

When artificial means have been utilized to force adjudication of votes, the indicators of such nefarious activities will severely spike when compared to historical records.

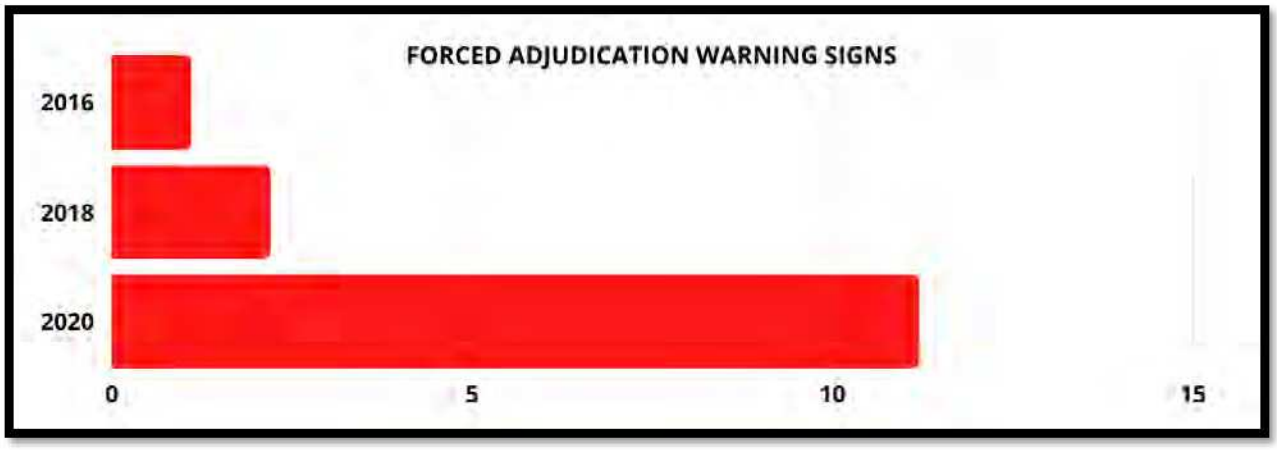


Figure 27 Our PKAD Systems reflect Maricopa County experienced nefarious adjudication activity

PKAD systems, detecting instances of situations which cause "ghost votes" to appear on the fonts of the ballots. We have found the instance of bleed through to be excessive when they easily could have been controlled.

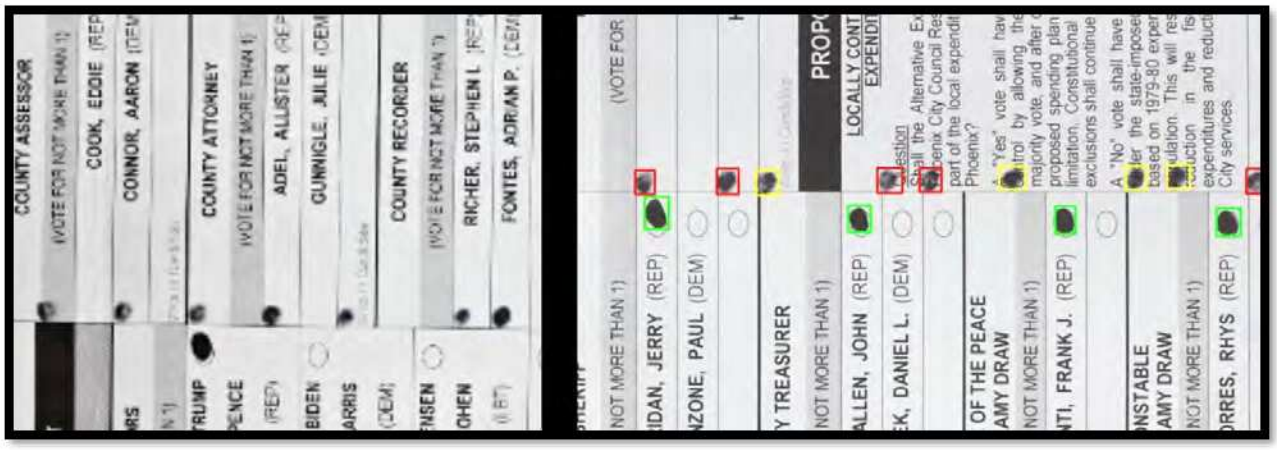


Figure 28 The left side of this photo shows a ballot with bleed throughs as the ballot appears when scanned. The image on the right is how our PKAD Hemo Systems identify, track, and trace each ghost vote instance

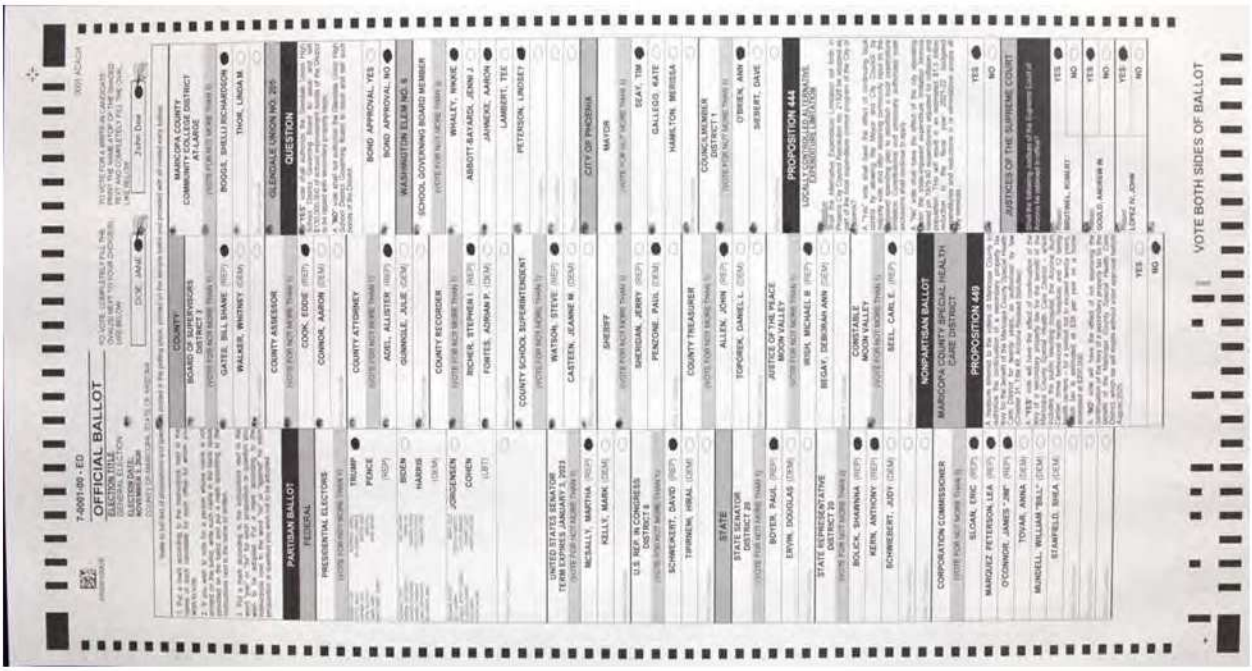


Figure 29 Maricopa Ballot With Bleed Through Votes FRONT FACE

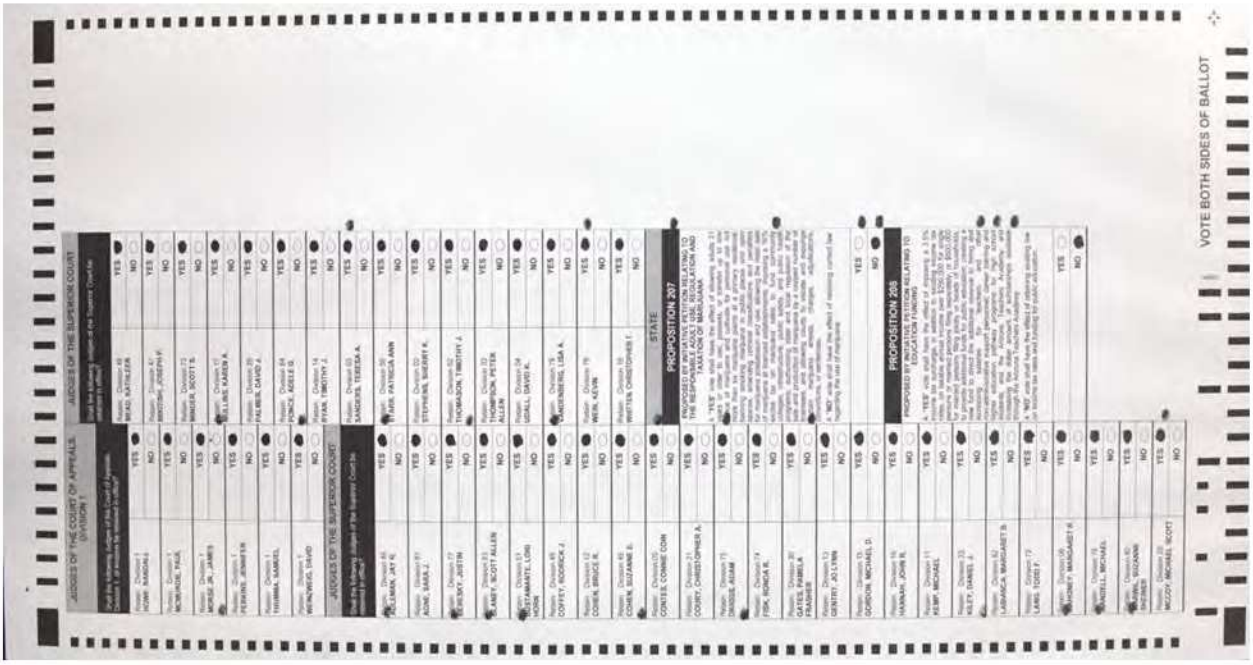


Figure 30 Maricopa Ballots With Bleed Through Votes BACK FACE

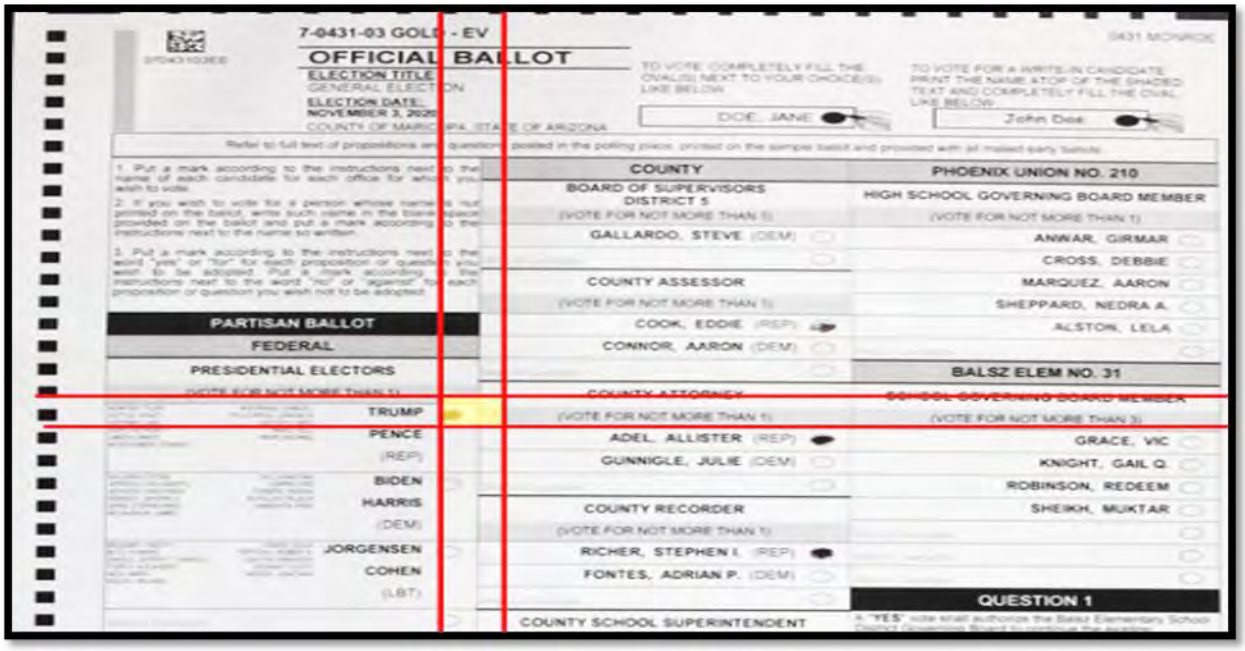


Figure 31 Highlighted Area In Yellow Outlines The "Read/Scan" Area By Voting Equipment - Multiple Votes Which Appear In This Zone Can Be Read As Over Votes or Marked Out Votes

Due to these non-compliance issues when bleed through ovals have been detected, we have found the potential for automatically canceled votes to run from worst cases averages per ballot instances of 20% or greater (number of voted ovals on the ballot to fall within the cancelable range as an over-vote) to average instances between .8% to as high as 3.3%. Ghost Ovals can cause the scan systems to see a voted oval as potentially a marked out oval and thus trigger adjudication.

Within 2020 Maricopa County BOS messaging to the public, they promoted the use of Sharpies to vote on ballots. The following are cause for alarm:

b. In the overall history of Maricopa County, the use of Sharpies and markers to cast votes has been highly discouraged due to the fact it can lead to canceled votes. In 2020 specifically, and for the first time in AZ history, voting officials released the following information:

   i. *Sharpies do not invalidate ballots. Leading up to the 2020 March Presidential Preference Election, the Elections Department did extensive testing on multiple different types of ink with our new ballot tabulation equipment. Sharpies were used at in-person voting locations in all five elections during 2020. Sharpies are* ***recommended by the manufacturer*** *because they provide the fastest-drying ink.*

a. *The offset columns on ballots ensure that any bleed-through will not impact your vote. For this reason, sharpies were provided to in-person voters on Election Day.*

b. *SEE DOMINION REFERENCE LATER IN THIS PRELIMINARY REPORT*

ii. ***MOST CRITICAL: Due to these non-compliance issues when bleed through ovals have been detected, we have found the potential for automatically canceled votes to run from worst cases averages per ballot instances of 20% or greater to average instances between .8% to as high as 3.3% (NOTE: The highest single incident of potential cancelled votes on a single ballot is one where 20% of the voted ovals could be considered an over-vote and automatically canceled)***

a. **NOTE: The 2020 year instituted never before seen advanced Artificial Intelligence pre-adjudication systems being used prior to human adjudicators. Please see our later report on adjudications, but indications are there were vastly more adjudications than the 11.2% reported.**

NOTE: All voting columns on ballots are offset and have been for decades for this very reason and the paper, which was supposed to assure no bleed through, thus no canceled votes, was NOT provided to Maricopa County, Runbeck or Dominion since the "manufacturer" mentioned above is in fact Dominion Scan Machines

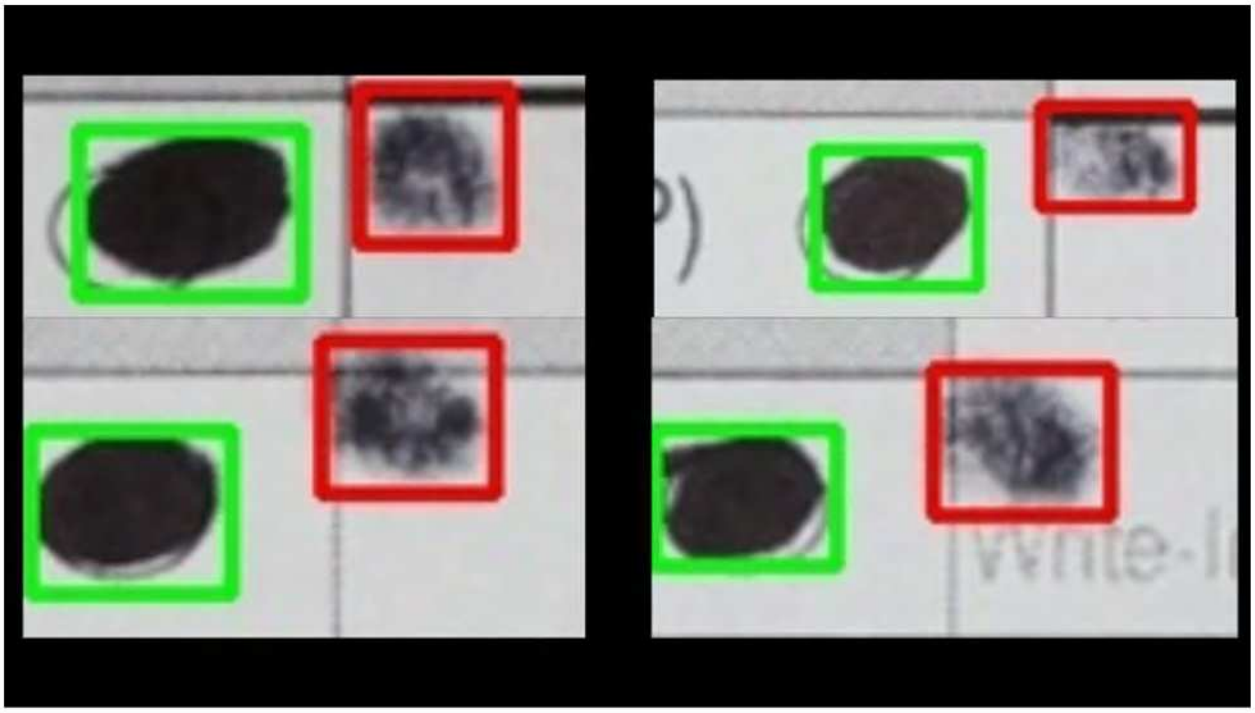


Figure 32 PKAD HEMO Report Detection - Green Actual Vote (Front Face) Red Ghost Oval (on Back Face)

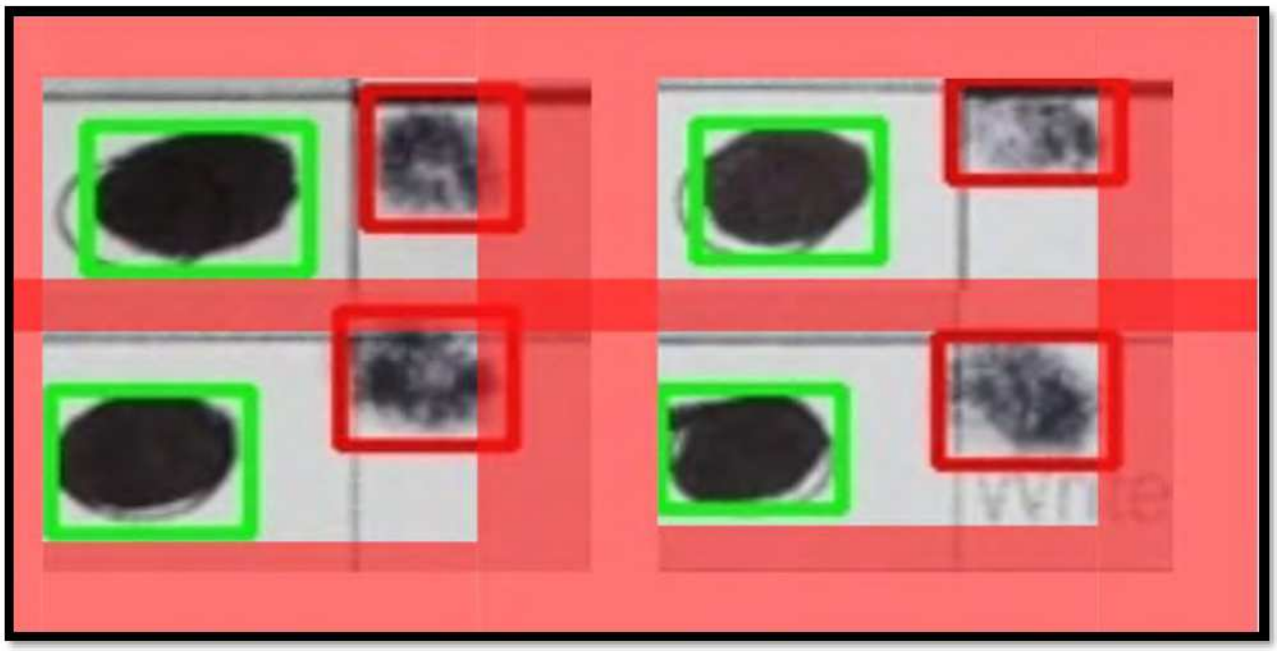


Figure 33 PKAD Hemo Report CONFLICT - COLISION ZONE within the non-shaded areas

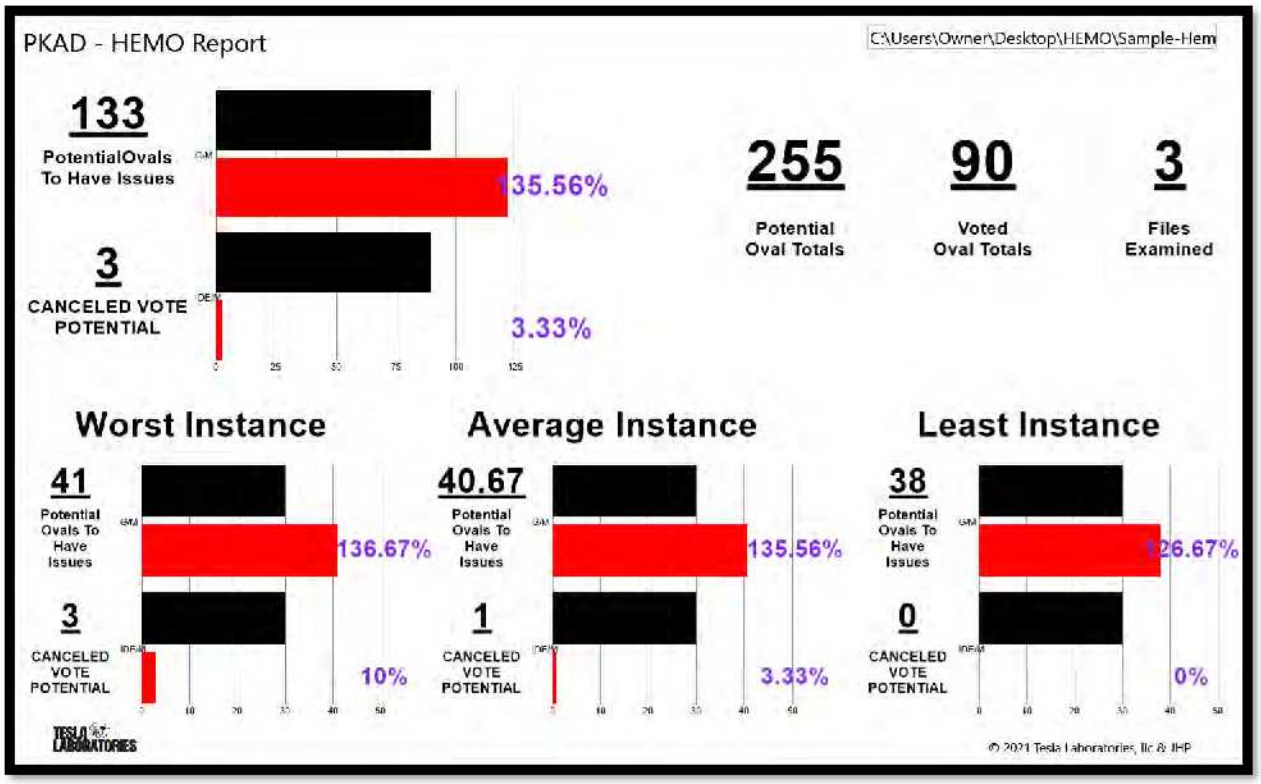


*Figure 34 PKAD Hemo Report SAMPLE Showing Collision Rate of Plus 35.56% with Worst Case instance in this batch of one ballot having 10% Canceled Vote Potential and Average Ballot in this batch having a 3.3% collision of potential canceled vote PROVIDED FOR CHART EXAMPLE ONLY – **Black indicates number of valid ovals and Red indicates number of potential ovals with issues. This chart reflects that all ovals plus 35.56% could have potential issues forcing adjudication of the ballot.***

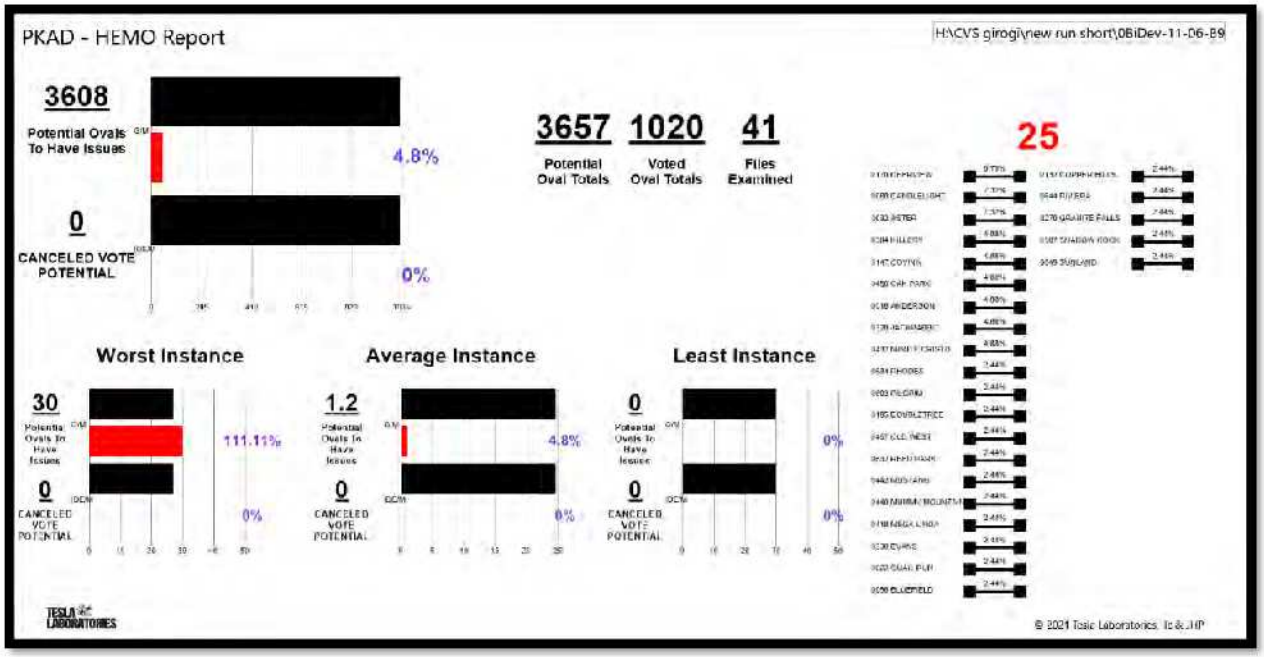


Figure 35 Actual PKAD Hemo Report Batch Which Is Not Conflicted with bleed through votes

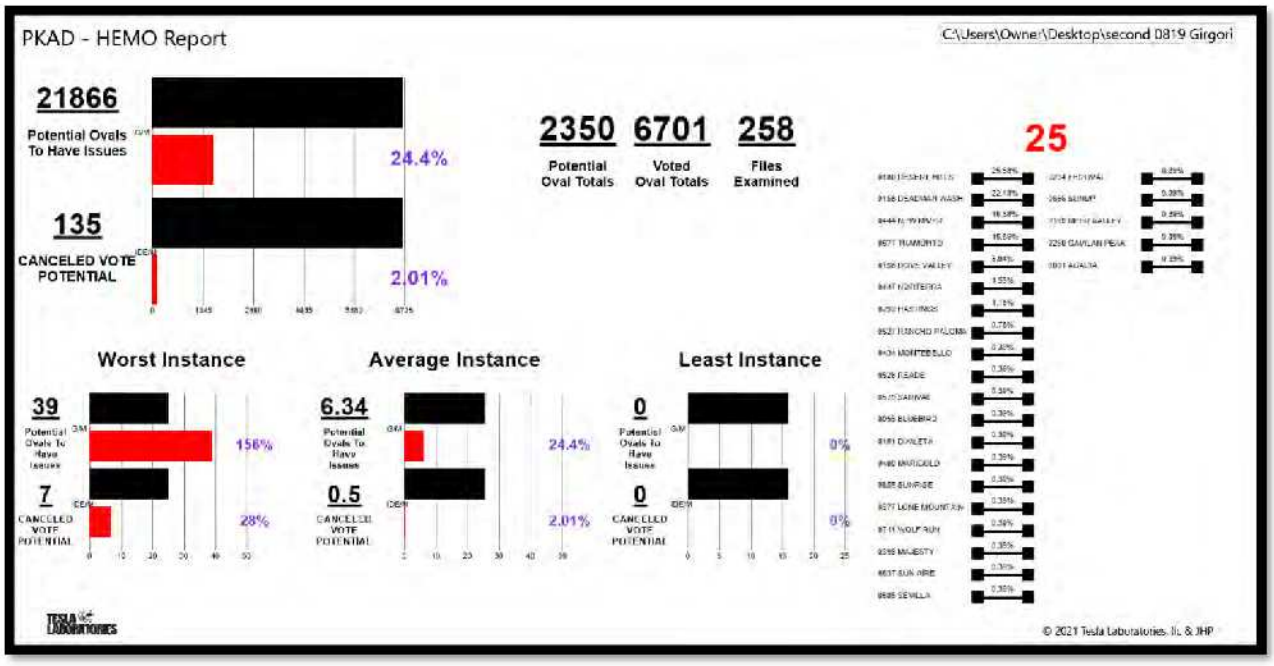


Figure 36 Actual PKAD Hemo Batch Report Which Reflects Bleed Through Conflicts with an overall 2.01% cancelled vote possibility with the worst single ballot instance of 28% of votes on said ballot being canceled

Figure 37 This PKAD Hemo reports shows that 3.48% of all ovals voted are connected to a bleed through ghost vote problem

Figure 38 14.89% of real voted ovals have a potential bleed through ghost vote issue. This is alarming.

NOTE: The trend in the chart above indicates there could be a greater adjudication rate than the existing 11.2% reported. It is important to note that <u>each voting machine has a variable setting for scan sensitivity</u>. Currently, we do not know the exact sensitivity settings used for each scan machine, however the "settings" could be modified on a precinct-by-precinct basis, thus adding to an already existing "Equal Protection Under The Law" issue.

BULK SCAN – BATCH LOADING

Maricopa County, Arizona has 743 2020 Voting Precincts. Due to COVID restrictions polling locations were pushed down to a representation of polling locations at the rate of 4.37 to 1 (4.37 individual precincts merged into 1 polling location), the average ballot box/bag should represent from 4.37-to-21 average precincts in any given batch – this cadence of precincts is not currently holding across all boxes and batches of ballots. The graphic below is just a snapshot of the "precinct reporting" on individual reports and as you can see, the number of precincts in any one batch vary greatly.

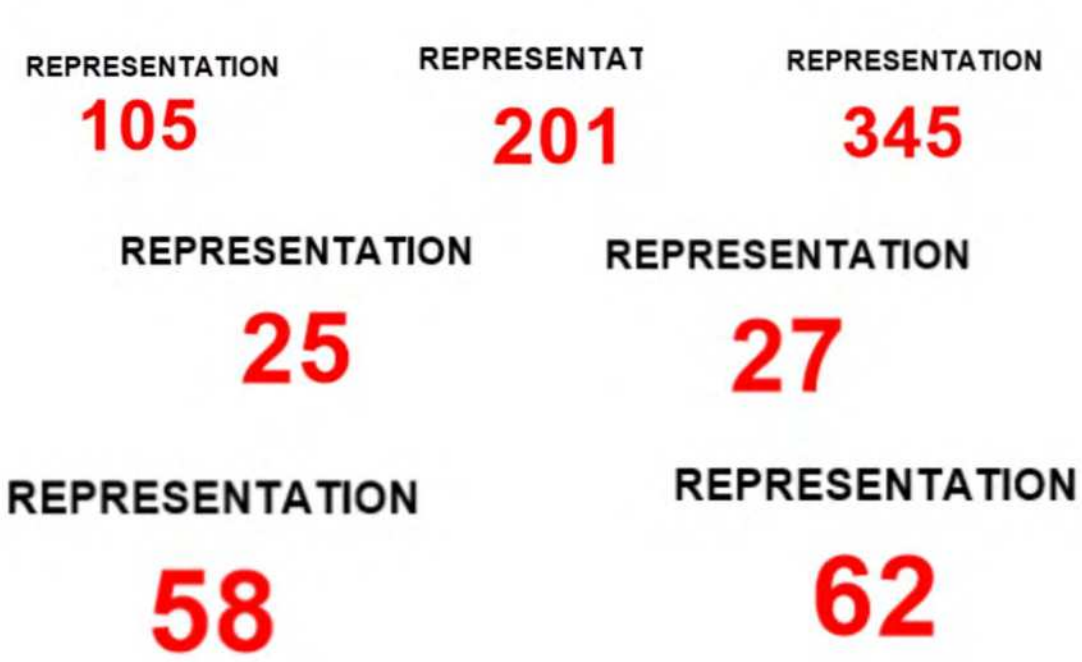


Figure 39 Sampling of PKAD Precinct Activity Tracking Report – Numbers of Precincts Represented in any given Batch

There are varying reasons multiple precincts would be co-located within any individual ballot box or ballot batch. However, when the coding of a particular precinct, which reflect both EIP, and ED ballot coding, show excessive insertion of ballots from an uncharacteristic number of precincts we can only conclude that a "dump of ballots" occurred whereby unknown individuals "inserted" nefarious cast ballots, in bulk into any given precinct. We are still processing these PKAD reports with new programs we have developed to plot the instances of these highly suspicious ballot insertions.

We see Precinct counts in the 20's (in any particular batch) as somewhat normal for suburban voting areas and up to double that for areas which represent those who may travel to their workplace and deposit their ballots.

However, when combined with the very unique and restrictive COVID19 restrictions in place at the time of the 2020 General Election, we consider three-digit Precinct counts worth significantly more investigation while at the same time we deem 345 Precincts located in any one ballot batch to be highly dubious and a possible sign of ballot stuffing and nefarious ballots being inserted into the system.

When precinct occurrences are high in any particular batch, it cross confirms duplicated ballots, duplicated patterns and ovals, nefarious ballots, batch run ballots and inserted ballots to modify counts nefariously. All of these patterns of "insertions" are cross verifying each other.

FOLD DETECTION – Non-Folded Ballots Analysis

EXAMLE OF PERFECT MACHINE FOLD OF MAIL-IN BALLOT WHEN LEGAL AND COMPLIANT

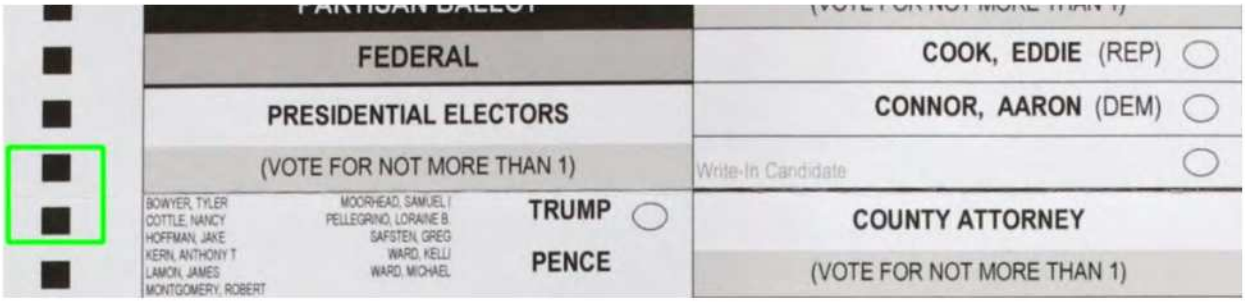


Figure 40 (Green ID focal point showing fold) This PKAD MECH Proof Image shows a perfect legal machine fold of exact calibration. Notice how the fold aligns perfectly along the 2-micron print line dividing the voting sections. This is a compliant and legal fold mark example. This image represents the left side of the ballot enlarged for viewing.

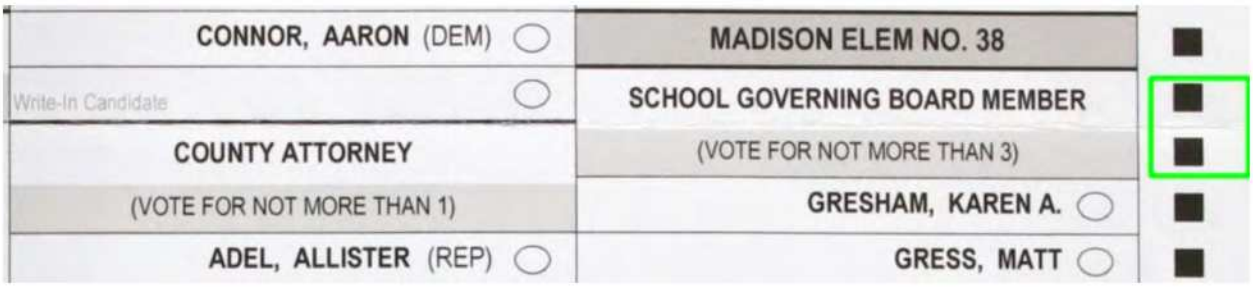


Figure 41 (Green ID focal point showing fold) This PKAD MECH Proof Image is the left side view of the same legal machine calibrated fold as shown above in Figure 40

PKAD systems detected **machine-folded** irregularities and issues with the number verification of what was reported by Maricopa County election officials as the **official mail-in ballot counts**. According to official reports there were to be:

2. 1,702,981 mail-in ballots out of 2,089,563 ballots cast in total
    a. These numbers would indicate that 81.15% of all official and legal ballots counted would display the kinematic artifacts of machine folding
3. At present status our PKAD reports are in conflict with the officially reported number and when all system reports are completed, we do not expect the count of "mechanically folded legal official ballots" to meet the 81.55% threshold

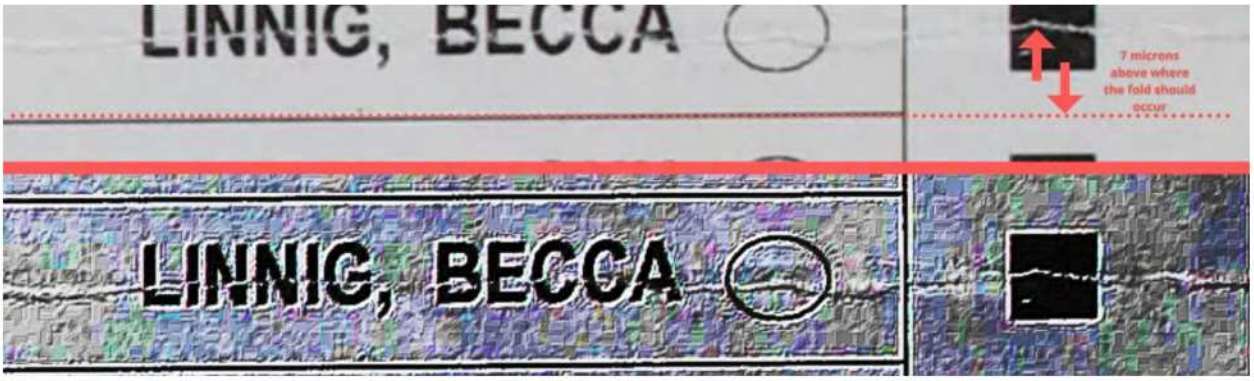


Figure 40 This PKAD MECH Proof Image shows a positive and negative scan image of an out of compliance hand fold on a ballot. We are showing such a fold in its native and then image negative form for identification. Hand folds are not along the designated 2-micron line, nor are straight in nature. The identification of a hand fold is recognized by the "bunching of fibers due to the squeeze and push of a human hand"

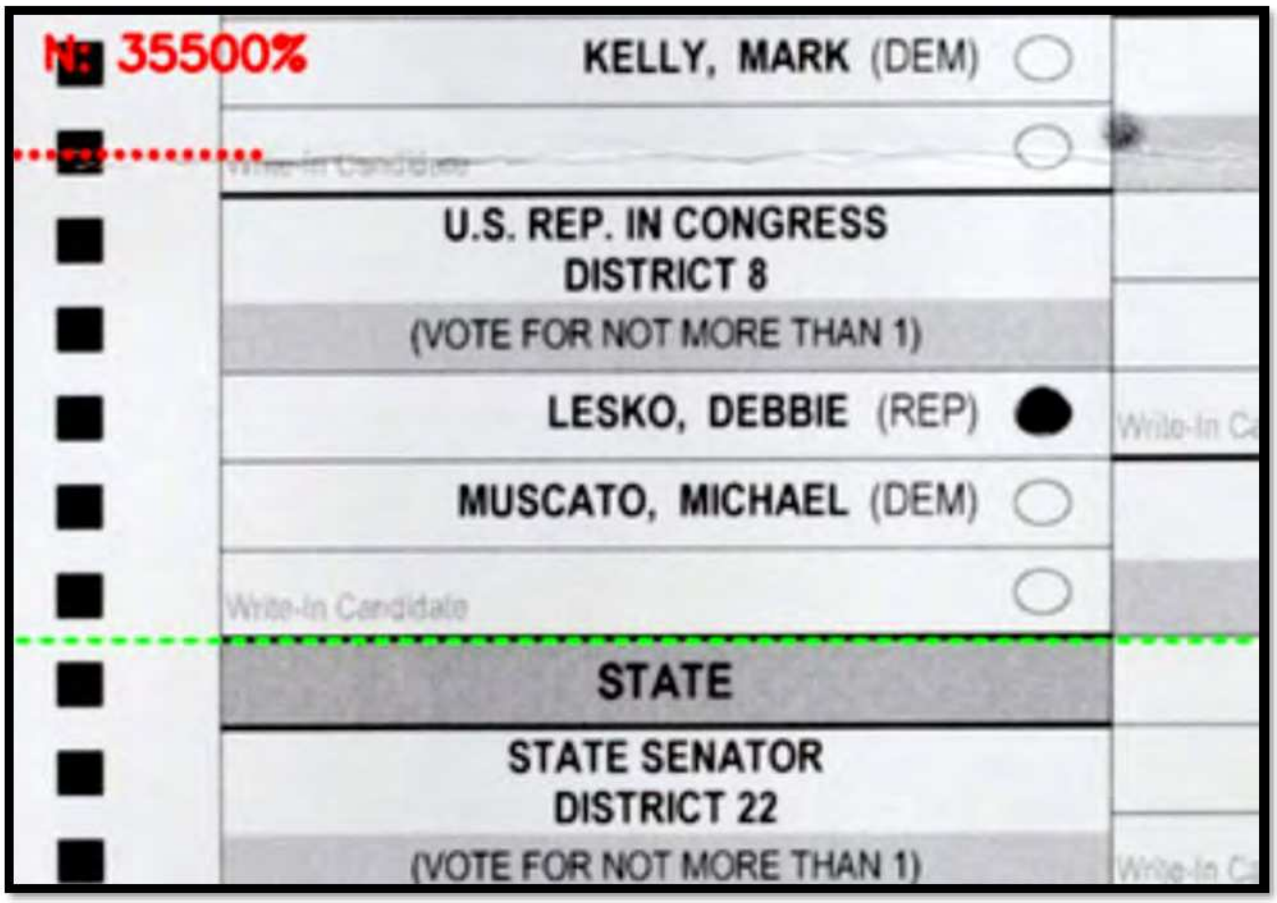
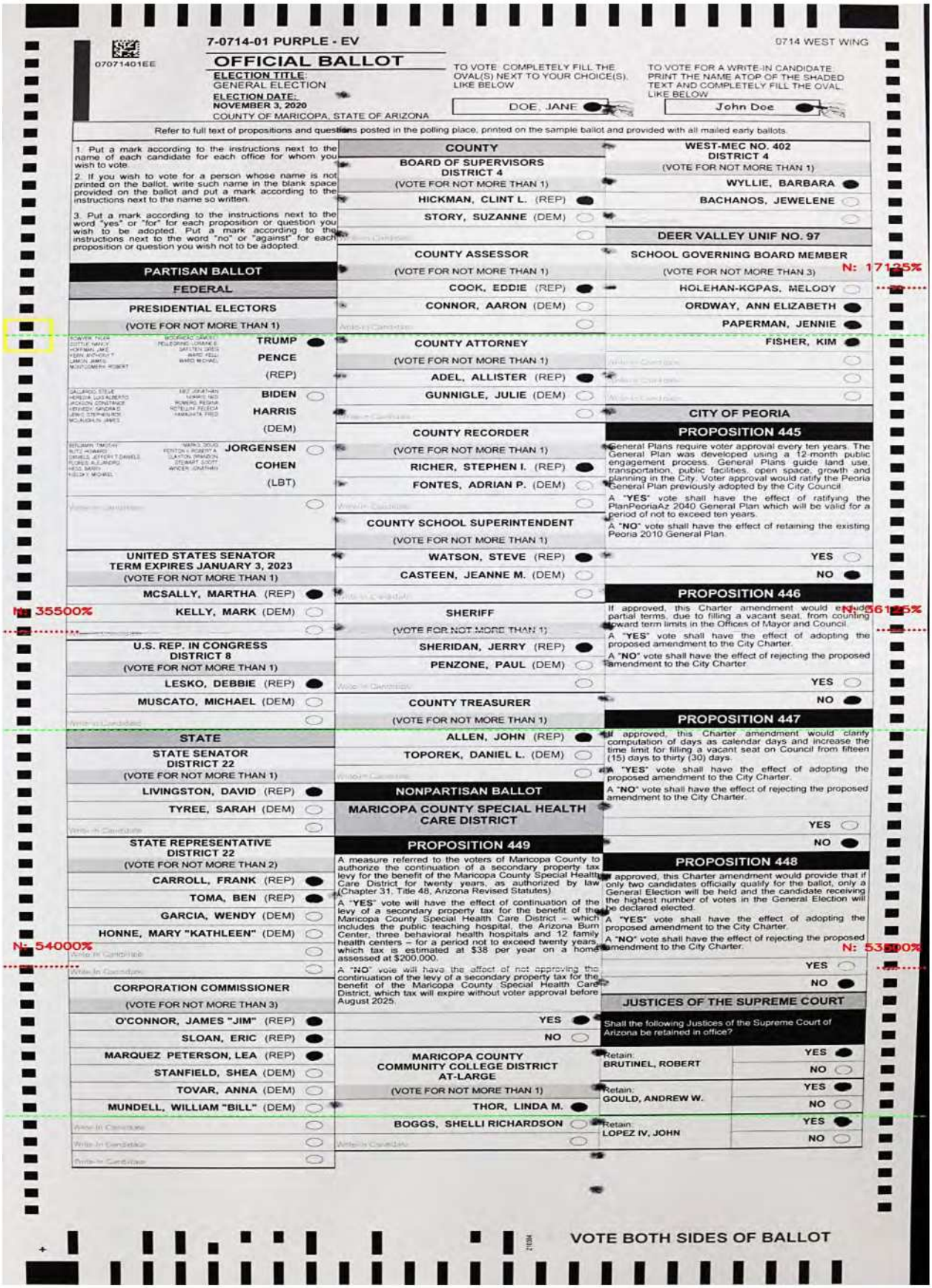


Figure 41 This PKAD MECH Proof Image represents a proof file notation of where a legal fold should be located (GREEN) and where a Hand Fold is detected (red) and how far out of calibration the fold appears from the designated mark.

PKAD Systems detect both hand-folded ballot and ballots which display no kinematic artifacts of folding of any kind. Our base numbers, as reported by Maricopa County, should be equal to the following:

4. **10% or 209,112 ballots** which display kinematic artifacts of being hand-folded due to the nature of the instance when an individual voted in person in early voting locations
5. **8.5% or 177,990 ballots** which display no-folds of any kind due to being cast on election day or provisionally
6. **At present, and not as conclusive total as of this time, our systems are displaying per run somewhat greater instance of no fold detected and hand-folds found in oddly higher concentrations in certain ballot boxes**

The following figure represent a "PKAD FOLD PROOF FILE" Green notates where the official machine fold occurs on an official machine folded ballot. Any red notations were both Out of Calibration folds have been found (and expressed on the micron scale) and is in fact a hand folded ballot (fold not made by machines)



7-0714-01 PURPLE - EV

0714 WEST WING

07071401EE

OFFICIAL BALLOT

ELECTION TITLE:
GENERAL ELECTION

ELECTION DATE:
NOVEMBER 3, 2020

COUNTY OF MARICOPA, STATE OF ARIZONA

TO VOTE: COMPLETELY FILL THE OVAL(S) NEXT TO YOUR CHOICE(S). LIKE BELOW

DOE, JANE

TO VOTE FOR A WRITE-IN CANDIDATE: PRINT THE NAME ATOP OF THE SHADED TEXT AND COMPLETELY FILL THE OVAL LIKE BELOW

John Doe

Refer to full text of propositions and questions posted in the polling place, printed on the sample ballot and provided with all mailed early ballots.

1. Put a mark according to the instructions next to the name of each candidate for each office for whom you wish to vote.
2. If you wish to vote for a person whose name is not printed on the ballot, write such name in the blank space provided on the ballot and put a mark according to the instructions next to the name so written.
3. Put a mark according to the instructions next to the word "yes" or "for" for each proposition or question you wish to be adopted. Put a mark according to the instructions next to the word "no" or "against" for each proposition or question you wish not to be adopted.

PARTISAN BALLOT

FEDERAL

PRESIDENTIAL ELECTORS
(VOTE FOR NOT MORE THAN 1)

TRUMP / PENCE (REP)

BIDEN / HARRIS (DEM)

JORGENSEN / COHEN (LBT)

Write-In Candidate

UNITED STATES SENATOR
TERM EXPIRES JANUARY 3, 2023
(VOTE FOR NOT MORE THAN 1)

MCSALLY, MARTHA (REP)

KELLY, MARK (DEM)

N: 35500%

Write-In Candidate

U.S. REP. IN CONGRESS
DISTRICT 8
(VOTE FOR NOT MORE THAN 1)

LESKO, DEBBIE (REP)

MUSCATO, MICHAEL (DEM)

Write-In Candidate

STATE

STATE SENATOR
DISTRICT 22
(VOTE FOR NOT MORE THAN 1)

LIVINGSTON, DAVID (REP)

TYREE, SARAH (DEM)

Write-In Candidate

STATE REPRESENTATIVE
DISTRICT 22
(VOTE FOR NOT MORE THAN 2)

CARROLL, FRANK (REP)

TOMA, BEN (REP)

GARCIA, WENDY (DEM)

HONNE, MARY "KATHLEEN" (DEM)

N: 54000%

Write-In Candidate

Write-In Candidate

CORPORATION COMMISSIONER
(VOTE FOR NOT MORE THAN 3)

O'CONNOR, JAMES "JIM" (REP)

SLOAN, ERIC (REP)

MARQUEZ PETERSON, LEA (REP)

STANFIELD, SHEA (DEM)

TOVAR, ANNA (DEM)

MUNDELL, WILLIAM "BILL" (DEM)

Write-In Candidate

Write-In Candidate

Write-In Candidate

COUNTY

BOARD OF SUPERVISORS
DISTRICT 4
(VOTE FOR NOT MORE THAN 1)

HICKMAN, CLINT L. (REP)

STORY, SUZANNE (DEM)

Write-In Candidate

COUNTY ASSESSOR
(VOTE FOR NOT MORE THAN 1)

COOK, EDDIE (REP)

CONNOR, AARON (DEM)

Write-In Candidate

COUNTY ATTORNEY
(VOTE FOR NOT MORE THAN 1)

ADEL, ALLISTER (REP)

GUNNIGLE, JULIE (DEM)

Write-In Candidate

COUNTY RECORDER
(VOTE FOR NOT MORE THAN 1)

RICHER, STEPHEN I. (REP)

FONTES, ADRIAN P. (DEM)

Write-In Candidate

COUNTY SCHOOL SUPERINTENDENT
(VOTE FOR NOT MORE THAN 1)

WATSON, STEVE (REP)

CASTEEN, JEANNE M. (DEM)

Write-In Candidate

SHERIFF
(VOTE FOR NOT MORE THAN 1)

SHERIDAN, JERRY (REP)

PENZONE, PAUL (DEM)

Write-In Candidate

COUNTY TREASURER
(VOTE FOR NOT MORE THAN 1)

ALLEN, JOHN (REP)

TOPOREK, DANIEL L. (DEM)

Write-In Candidate

NONPARTISAN BALLOT

MARICOPA COUNTY SPECIAL HEALTH CARE DISTRICT

PROPOSITION 449

A measure referred to the voters of Maricopa County to authorize the continuation of a secondary property tax levy for the benefit of the Maricopa County Special Health Care District for twenty years, as authorized by law (Chapter 31, Title 48, Arizona Revised Statutes).

A "YES" vote will have the effect of continuation of the levy of a secondary property tax for the benefit of the Maricopa County Special Health Care District – which includes the public teaching hospital, the Arizona Burn Center, three behavioral health hospitals and 12 family health centers – for a period not to exceed twenty years, which tax is estimated at $38 per year on a home assessed at $200,000.

A "NO" vote will have the effect of not approving the continuation of the levy of a secondary property tax for the benefit of the Maricopa County Special Health Care District, which tax will expire without voter approval before August 2025.

YES

NO

MARICOPA COUNTY COMMUNITY COLLEGE DISTRICT AT-LARGE
(VOTE FOR NOT MORE THAN 1)

THOR, LINDA M.

BOGGS, SHELLI RICHARDSON

Write-In Candidate

WEST-MEC NO. 402
DISTRICT 4
(VOTE FOR NOT MORE THAN 1)

WYLLIE, BARBARA

BACHANOS, JEWELENE

Write-In Candidate

DEER VALLEY UNIF NO. 97

SCHOOL GOVERNING BOARD MEMBER
(VOTE FOR NOT MORE THAN 3)

N: 17125%

HOLEHAN-KOPAS, MELODY

ORDWAY, ANN ELIZABETH

PAPERMAN, JENNIE

FISHER, KIM

Write-In Candidate

Write-In Candidate

Write-In Candidate

CITY OF PEORIA

PROPOSITION 445

General Plans require voter approval every ten years. The General Plan was developed using a 12-month public engagement process. General Plans guide land use, transportation, public facilities, open space, growth and planning in the City. Voter approval would ratify the Peoria General Plan previously adopted by the City Council.

A "YES" vote shall have the effect of ratifying the PlanPeoriaAz 2040 General Plan which will be valid for a period of not to exceed ten years.

A "NO" vote shall have the effect of retaining the existing Peoria 2010 General Plan.

YES

NO

PROPOSITION 446

N: 56125%

If approved, this Charter amendment would eliminate partial terms, due to filling a vacant seat, from counting toward term limits in the Offices of Mayor and Council.

A "YES" vote shall have the effect of adopting the proposed amendment to the City Charter.

A "NO" vote shall have the effect of rejecting the proposed amendment to the City Charter.

YES

NO

PROPOSITION 447

If approved, this Charter amendment would clarify computation of days as calendar days and increase the time limit for filling a vacant seat on Council from fifteen (15) days to thirty (30) days.

A "YES" vote shall have the effect of adopting the proposed amendment to the City Charter.

A "NO" vote shall have the effect of rejecting the proposed amendment to the City Charter.

YES

NO

PROPOSITION 448

If approved, this Charter amendment would provide that if only two candidates officially qualify for the ballot, only a General Election will be held and the candidate receiving the highest number of votes in the General Election will be declared elected.

A "YES" vote shall have the effect of adopting the proposed amendment to the City Charter.

A "NO" vote shall have the effect of rejecting the proposed amendment to the City Charter.

N: 53500%

YES

NO

JUSTICES OF THE SUPREME COURT

Shall the following Justices of the Supreme Court of Arizona be retained in office?

Retain: BRUTINEL, ROBERT	YES	
	NO	
Retain: GOULD, ANDREW W.	YES	
	NO	
Retain: LOPEZ IV, JOHN	YES	
	NO	

VOTE BOTH SIDES OF BALLOT

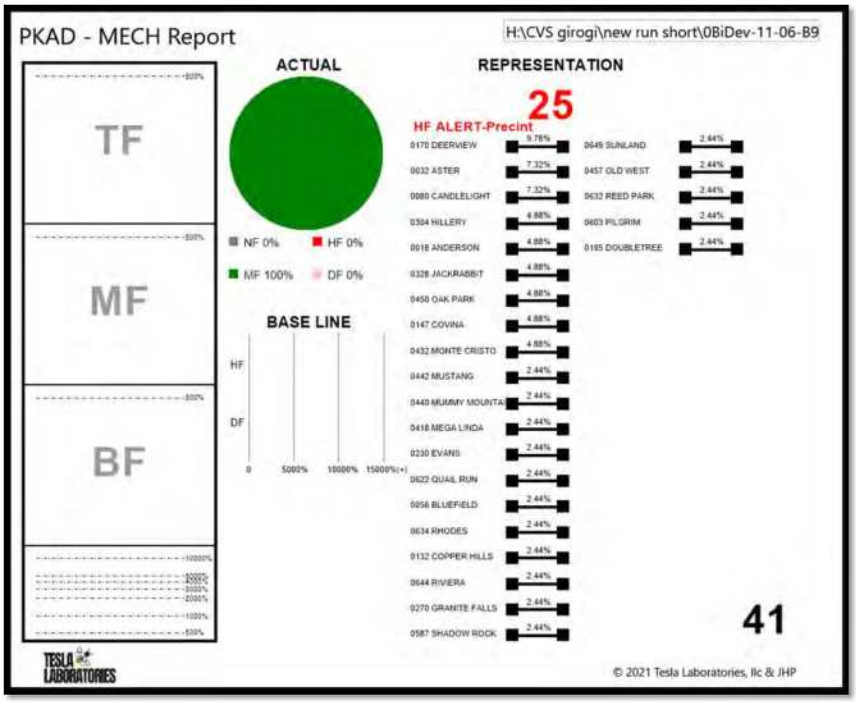


Figure 42 This PKAD MERCH Reports shows a batch which was 100% Machine Folded Ballots with the Proper Average Precinct Appearance

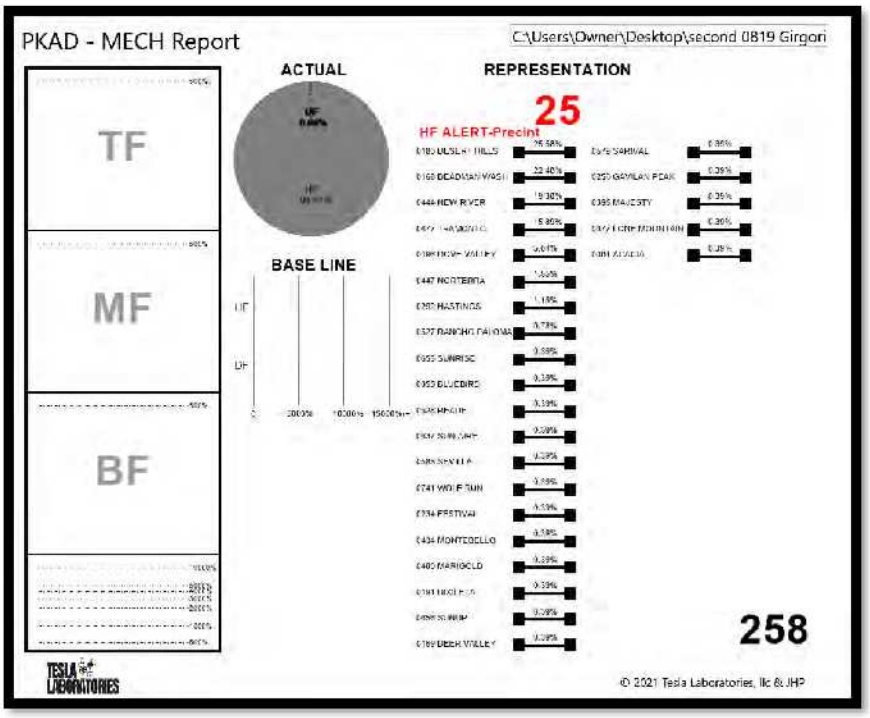


Figure 43 This PKAD MERCH report depicts a random batch which displays ballots which are almost exclusively not folded in any fashion

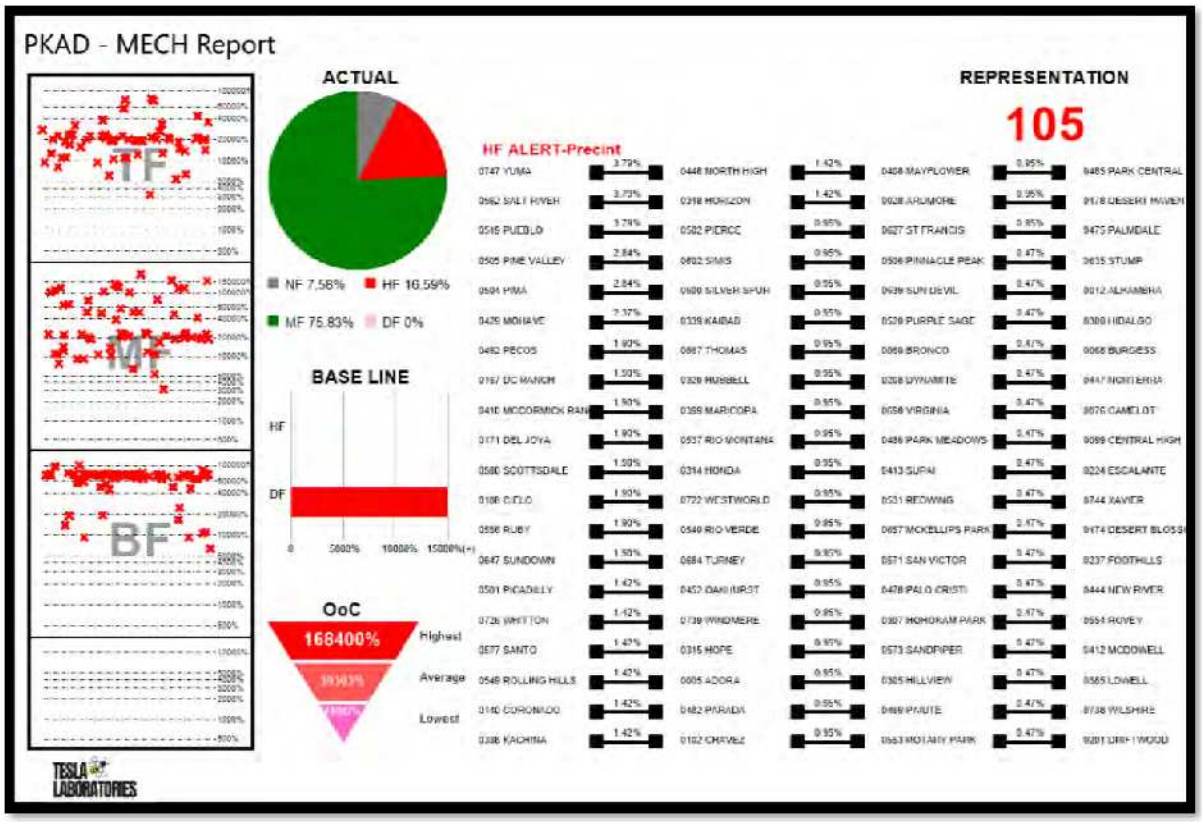


Figure 44 This PKAD MECH Report shows a combination of machine folded, hand folded, no folds in a single batch sample. Each out of calibration fold is noted on the ballot layout on the right hand of the data visualization chart

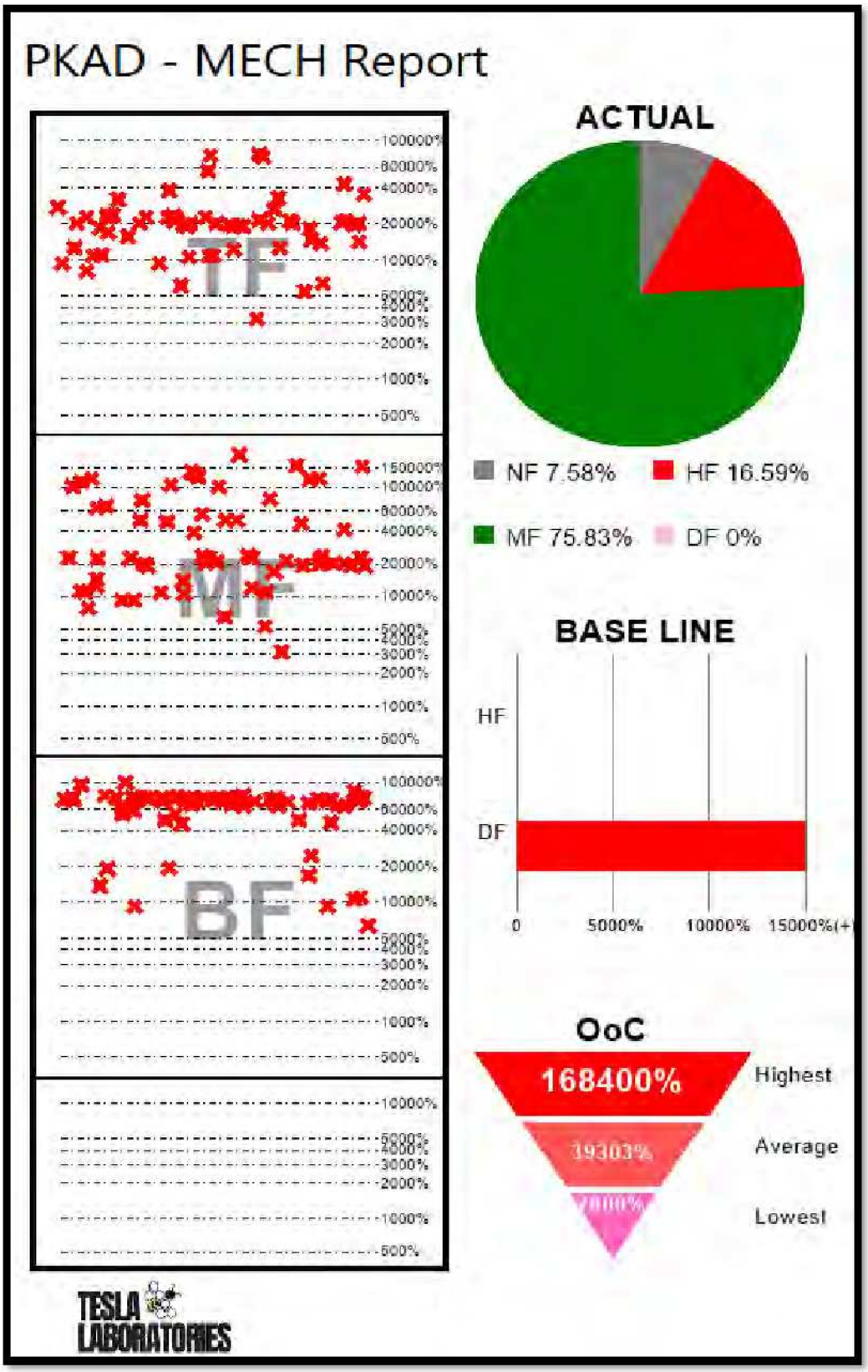
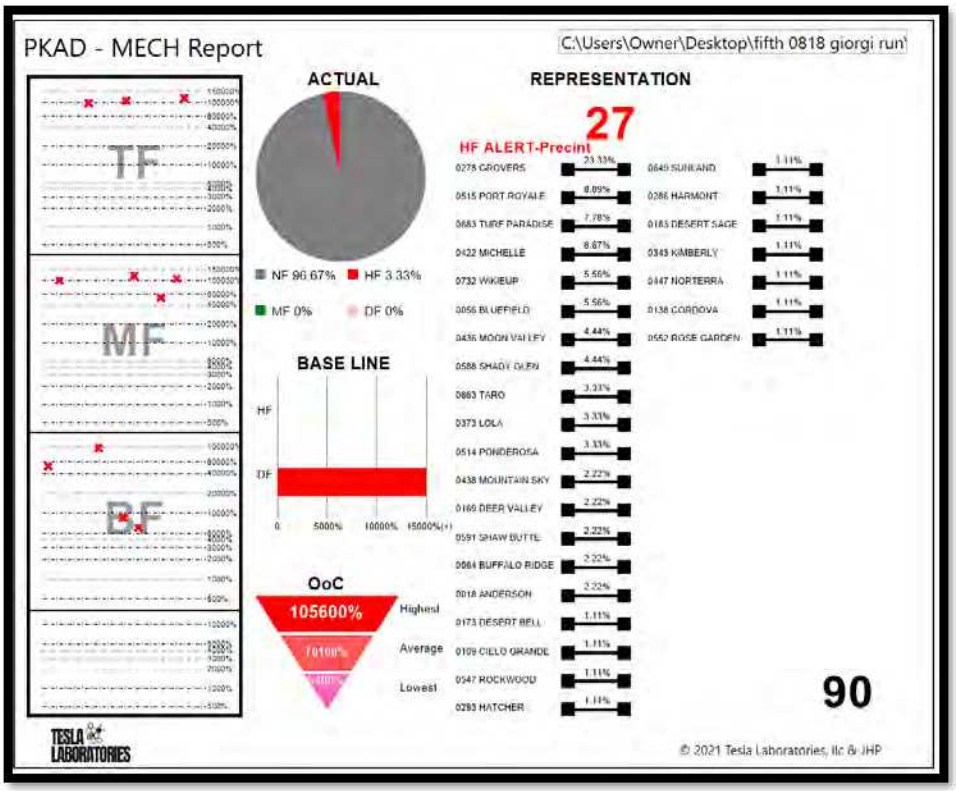


Figure 45 Close Up View of PKAD MECH Report Plotting



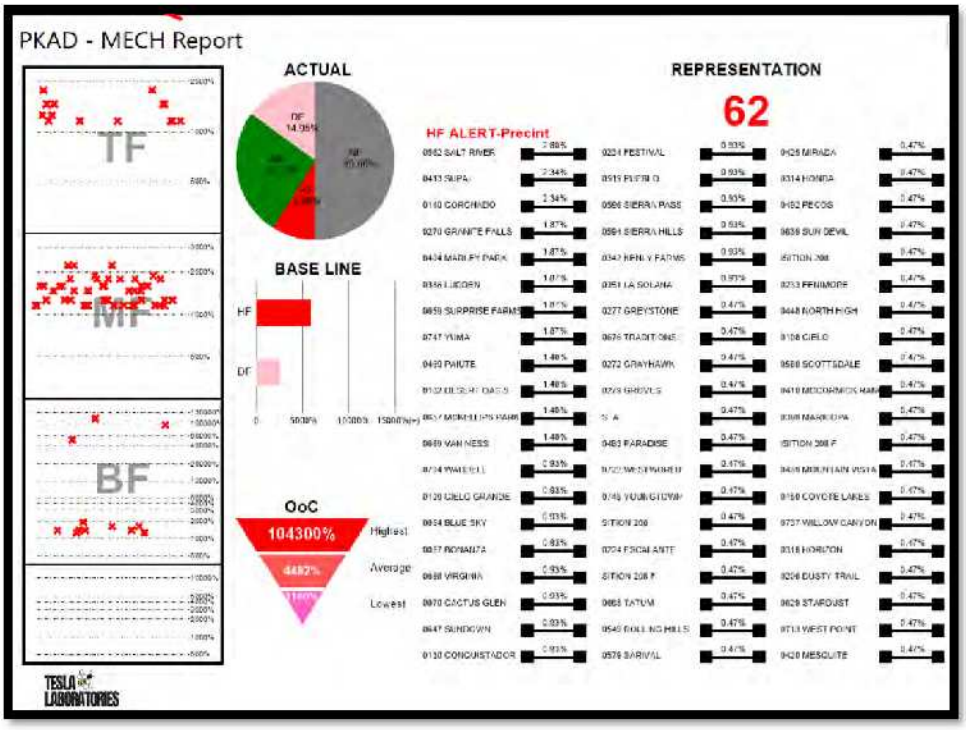
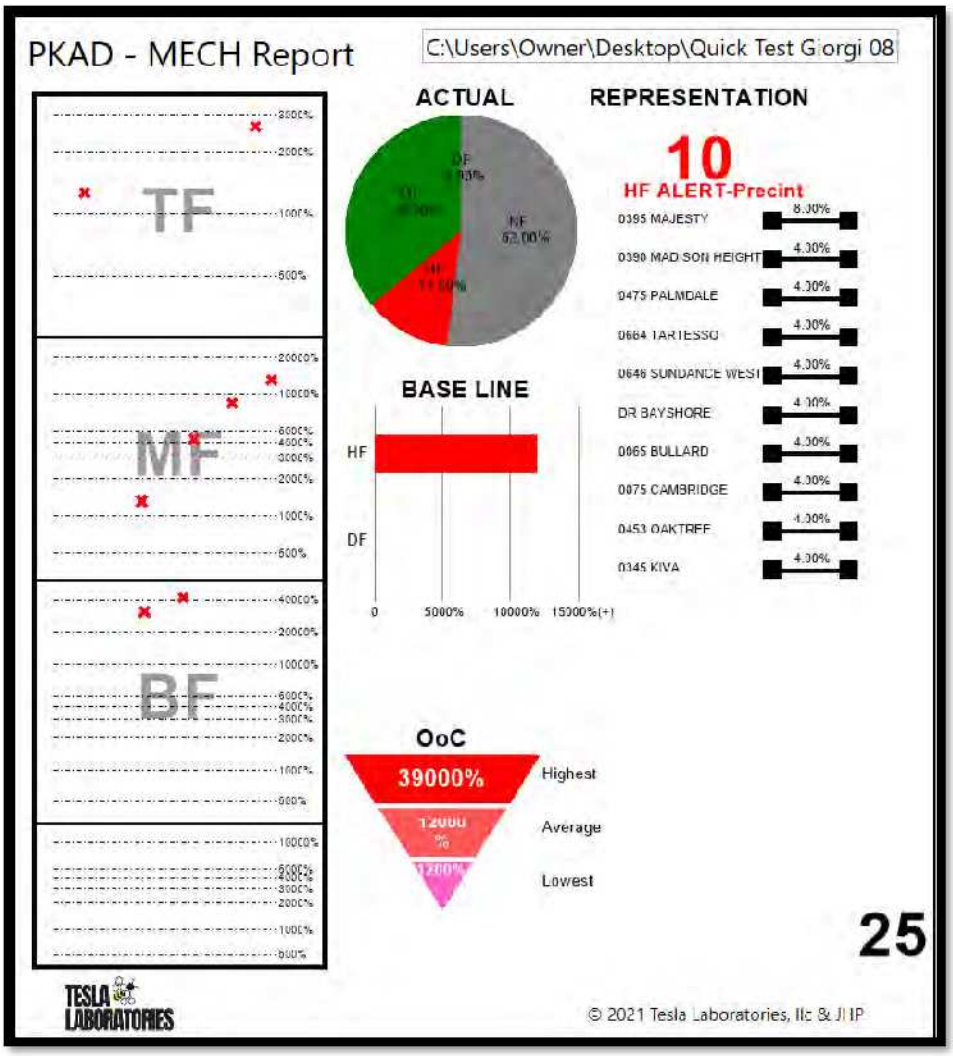
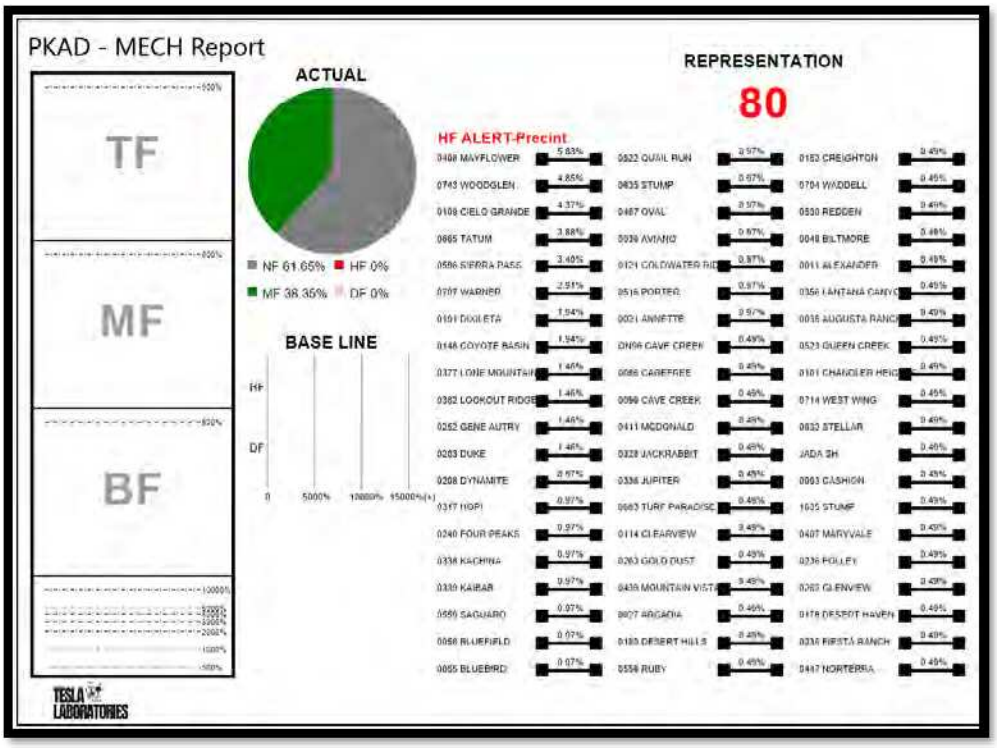
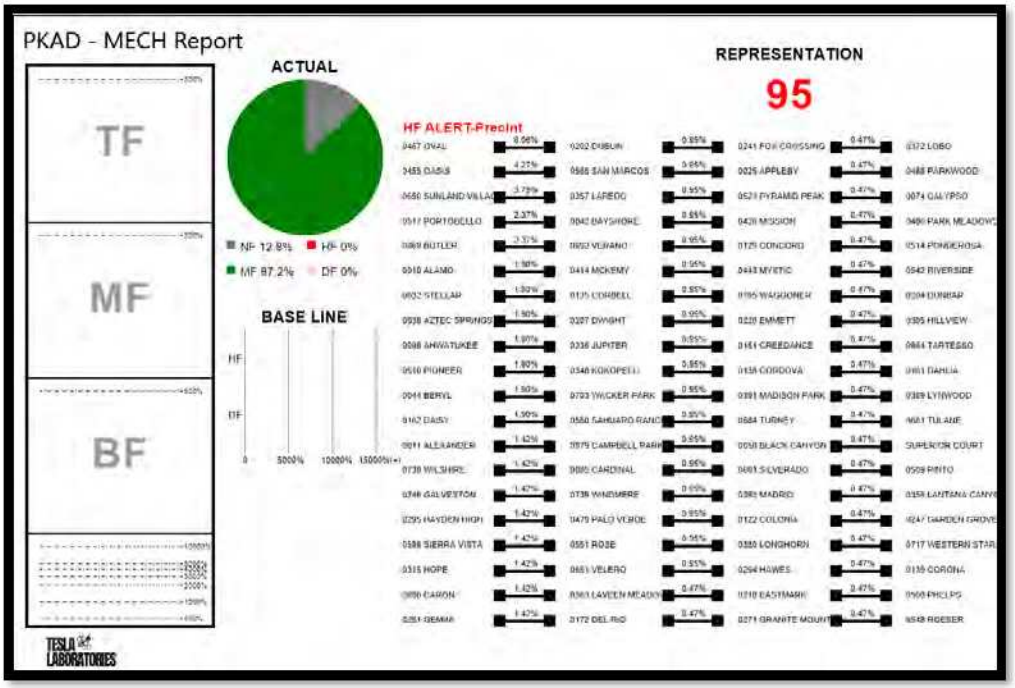
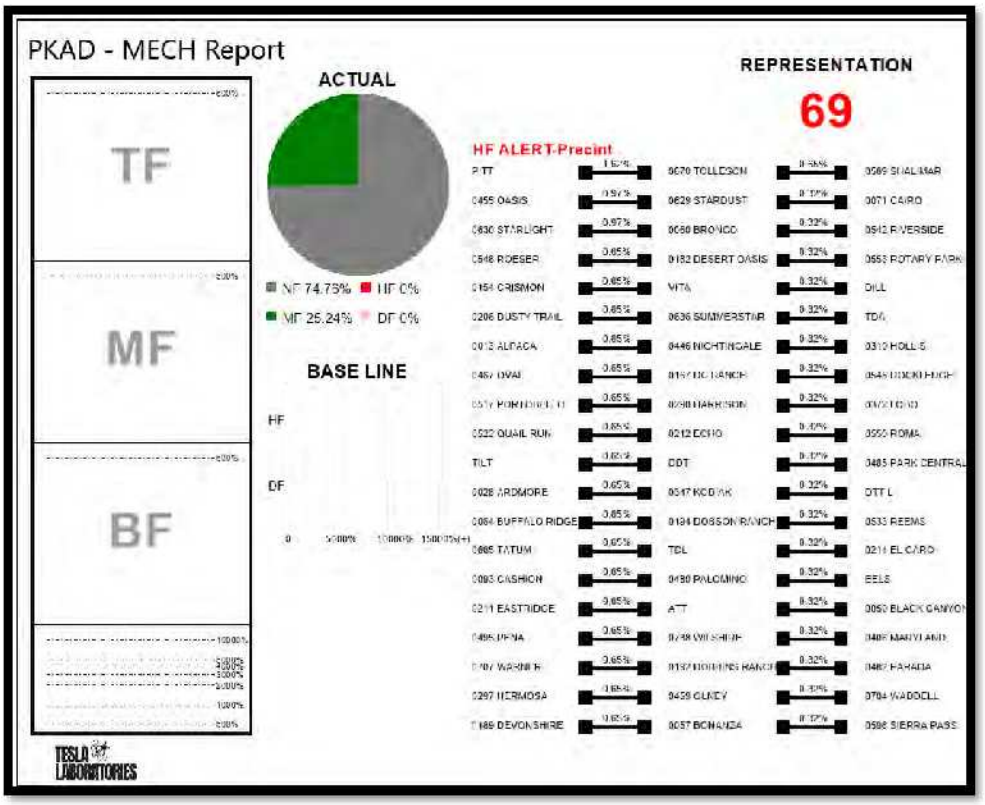


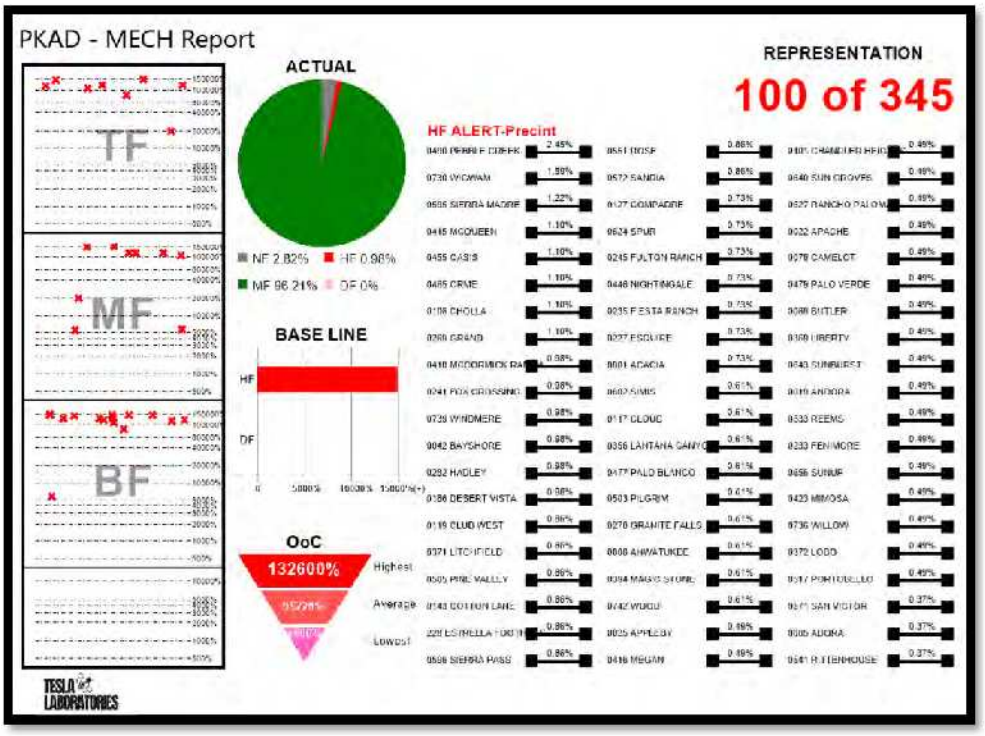
Figure 46 PKAD MECH Systems Have Detected Ballots Which Had Been Machine Folded at one time and then were refolded by Hand


PKAD - MECH Report
C:\Users\Owner\Desktop\Quick Test Giorgi 08
TF
MF
BF
ACTUAL
REPRESENTATION
HF 62.00%
10
HF ALERT-Precint
0395 MAJESTY 8.00%
0390 MADISON HEIGHT 4.00%
0475 PALMDALE 4.00%
0664 TARTESSO 4.00%
0646 SUNDANCE WEST 4.00%
DR BAYSHORE 4.00%
0065 BULLARD 4.00%
0075 CAMBRIDGE 4.00%
0453 OAKTREE 4.00%
0345 KIVA 4.00%
BASE LINE
HF
DF
0
5000%
10000%
15000%(+)
OoC
39000%
Highest
Average
Lowest
25
TESLA LABORATORIES
© 2021 Tesla Laboratories, llc & JI IP


PKAD - MECH Report
ACTUAL
REPRESENTATION
80
TF
MF
BF
NF 61.65%
HF 0%
MF 38.35%
DF 0%
BASE LINE
HF
DF
0
5000%
10000%
15000%(+)
HF ALERT-Precint
0408 MAYFLOWER 5.83%
0743 WOODGLEN 4.85%
0108 CIELO GRANDE 4.37%
0665 TATUM 3.88%
0686 SIERRA PASS 3.40%
0707 WARNER 2.91%
0101 DIXILETA 1.94%
0148 COYOTE BASIN 1.94%
0377 LONE MOUNTAIN 1.46%
0362 LOOKOUT RIDGE 1.46%
0252 GENE AUTRY 1.46%
0203 DUKE 1.46%
0208 DYNAMITE 0.97%
0347 HOPI 0.97%
0240 FOUR PEAKS 0.97%
0338 KACHINA 0.97%
0339 KAIBAB 0.97%
0686 SAGUARO 0.97%
0058 BLUEFIELD 0.97%
0055 BLUEBIRD 0.97%
0822 QUAIL RUN 0.97%
0835 STUMP 0.97%
0487 OVAL 0.97%
0039 AVIANO 0.97%
0121 COLDWATER RID 0.97%
0516 PORTER 0.97%
0021 ANNETTE 0.97%
DN06 CAVE CREEK 0.49%
0086 CAREFREE 0.49%
0096 CAVE CREEK 0.49%
0411 MCDONALD 0.49%
0328 JACKRABBIT 0.49%
0336 JUPITER 0.49%
0083 TURF PARADISE 0.49%
0114 CLEARVIEW 0.49%
0263 GOLD DUST 0.49%
0439 MOUNTAIN VISTA 0.49%
0827 ARCADIA 0.49%
0185 DESERT HILLS 0.49%
0558 RUBY 0.49%
0183 CREIGHTON 0.49%
0704 WADDELL 0.49%
0530 REDDEN 0.49%
0048 BILTMORE 0.49%
0011 ALEXANDER 0.49%
0356 LANTANA CANYO 0.49%
0016 AUGUSTA RANCH 0.49%
0523 QUEEN CREEK 0.49%
0101 CHANDLER HEIG 0.49%
0714 WEST WING 0.49%
0833 STELLAR 0.49%
JADA 2H 0.49%
0063 CASHION 0.49%
1025 STUMP 0.49%
0407 MARYVALE 0.49%
0236 FOLLEY 0.49%
0263 GLENVIEW 0.49%
0178 DESERT HAVEN 0.49%
0238 RIPSTA RANCH 0.49%
0447 NORTERRA 0.49%
TESLA LABORATORIES


PKAD - MECH Report
ACTUAL
REPRESENTATION
95
TF
MF
BF
NF 12.8%
HF 0%
MF 87.2%
DF 0%
BASE LINE
HF
DF
0
5000%
10000%
15000%(+)
HF ALERT-Precint
0467 OVAL 8.06%
0455 OASIS 4.27%
0680 SUNLAND VILLA 3.73%
0517 PORTOBELLO 2.37%
0069 BUTLER 2.37%
0010 ALAMO 1.90%
0832 STELLAR 1.90%
0038 AZTEC SPRINGS 1.90%
0098 AHWATUKEE 1.90%
0510 PIONEER 1.90%
0044 BERYL 1.90%
0162 DAISY 1.90%
0011 ALEXANDER 1.42%
0738 WILSHIRE 1.42%
0746 GALVESTON 1.42%
0295 HAYDEN HIGH 1.42%
0588 SIERRA VISTA 1.42%
0315 HOPE 1.42%
0656 CANON 1.42%
0351 GEMINI 1.42%
0202 DUBLIN 0.95%
0566 SAN MARCOS 0.95%
0357 LAREDO 0.95%
0842 BAYSHORE 0.95%
0652 VERANO 0.95%
0414 MCKEMY 0.95%
0125 CORBELL 0.95%
0207 DWIGHT 0.95%
0236 JUPITER 0.95%
0346 KOKOPELLI 0.95%
0703 WICKER PARK 0.95%
0556 SAHUARO RANCH 0.95%
0579 CAMPBELL PARK 0.95%
0085 CARDINAL 0.95%
0736 WINDMERE 0.95%
0479 PALO VERDE 0.95%
0551 ROSE 0.95%
0651 VELERO 0.95%
0363 LAVEEN MEADOW 0.47%
0172 DEL RIO 0.47%
0241 FOX CROSSING 0.47%
0026 APPLEBY 0.47%
0521 PYRAMID PEAK 0.47%
0428 MISSION 0.47%
0125 CONCORD 0.47%
0443 MYSTIC 0.47%
0195 WAGONER 0.47%
0228 EMMETT 0.47%
0151 CREEDANCE 0.47%
0158 CORDOVA 0.47%
0091 MADISON PARK 0.47%
0684 TURNEY 0.47%
0058 BLACK CANYON 0.47%
0061 SILVERADO 0.47%
0383 MADRID 0.47%
0122 COLONIA 0.47%
0350 LONGHORN 0.47%
0294 HAWES 0.47%
0310 EASTMARK 0.47%
0271 GRANITE MOUNT 0.47%
0372 LOBO
0488 PARKWOOD
0074 CALYPSO
0490 PARK MEADOWS
0514 PONDEROSA
0543 RIVERSIDE
0204 DUNBAR
0305 HILLVIEW
0664 TARTESSO
0661 DAHLIA
0389 LYNWOOD
0681 TULANE
SUPERIOR COURT
0509 PINTO
0359 LANTANA CANYO
0247 GARDEN GROVE
0717 WESTERN STAR
0139 CORONA
0560 PHELPS
0548 RIDGER
TESLA LABORATORIES


PKAD - MECH Report
ACTUAL
REPRESENTATION
69
TF
MF
BF
NF 74.73%
HF 0%
MF 25.24%
DF 0%
BASE LINE
HF
DF
HF ALERT-Precint
PTT
0455 OASIS
0630 STARLIGHT
0548 ROESER
0154 CRISMON
0206 DUSTY TRAIL
0028 ARDMORE
0084 BUFFALO RIDGE
0865 TATUM
0093 CASHION
0211 EASTRIDGE
0297 HERMOSA
0670 TOLLESON
0629 STARDUST
0680 BRONCO
0182 DESERT OASIS
VITA
0636 SUMMERSTAR
0446 NIGHTINGALE
0522 QUAIL RUN
TILT
0547 KODIAK
0194 DOBSON RANCH
TDL
0490 PALOMINO
ATT
0589 SEALMAR
0071 CAIRO
0542 RIVERSIDE
0552 ROTARY PARK
DILL
TDA
0310 HOLLIS
0550 ROMA
0485 PARK CENTRAL
DTT L
0533 REEMS
0211 EL CAIRO
EELS
0050 BLACK CANYON
0486 MARYLAND
0487 PARADA
0704 WADDELL
0598 SIERRA PASS
TESLA LABORATORIES


PKAD - MECH Report
ACTUAL
REPRESENTATION
100 of 345
TF
MF
BF
NF 2.82%
HF 0.98%
MF 96.21%
DF 0%
BASE LINE
HF
DF
OoC
132600%
Highest
Average
Lowest
HF ALERT-Precint
0730 WICKIAM
0686 SIERRA MADRE
0485 MCQUEEN
0455 OASIS
0485 CRME
0108 CHOLLA
0268 GRAND
0241 PDA CROSSING
0729 WINDMERE
0042 BAYSHORE
0292 HADLEY
0186 DESERT VISTA
0119 CLUB WEST
0551 DOSE
0572 SANDIA
0624 SPUR
0245 FULTON RANCH
0448 NIGHTINGALE
0235 FIESTA RANCH
0227 ESQUIRE
0001 ACACIA
0503 PILGRIM
0276 GRANITE FALLS
0008 AHWATUKEE
0640 SUN GROVES
0627 RANCHO PALOMA
0622 APACHE
0078 CAMELOT
0479 PALO VERDE
0088 BUTLER
0369 LIBERTY
0640 SUNBURST
0010 ANDORA
0533 REEMS
0233 PENMORE
0696 SUNUP
0423 MIMOSA
0736 WILLOW
0372 LODO
0598 SIERRA PASS
0416 MEGAN
TESLA LABORATORIES

DUPLICATES AND MACHINE CAST VOTES DETECTED

In all ballots there are only to be HUMAN MARKED voted ovals. The presence of machine marked ovals shows either duplicated ballot or pre-printed ballot masses, which are not supposed to be present in the system in excess of the known number of authorized "duplicated ballot" replacements. The current explanation for excessive duplicated ballots may be caused by pre-printed ballots (already containing votes) being inserted into the system.

AUTHENTIC HUMAN VOTED OVAL

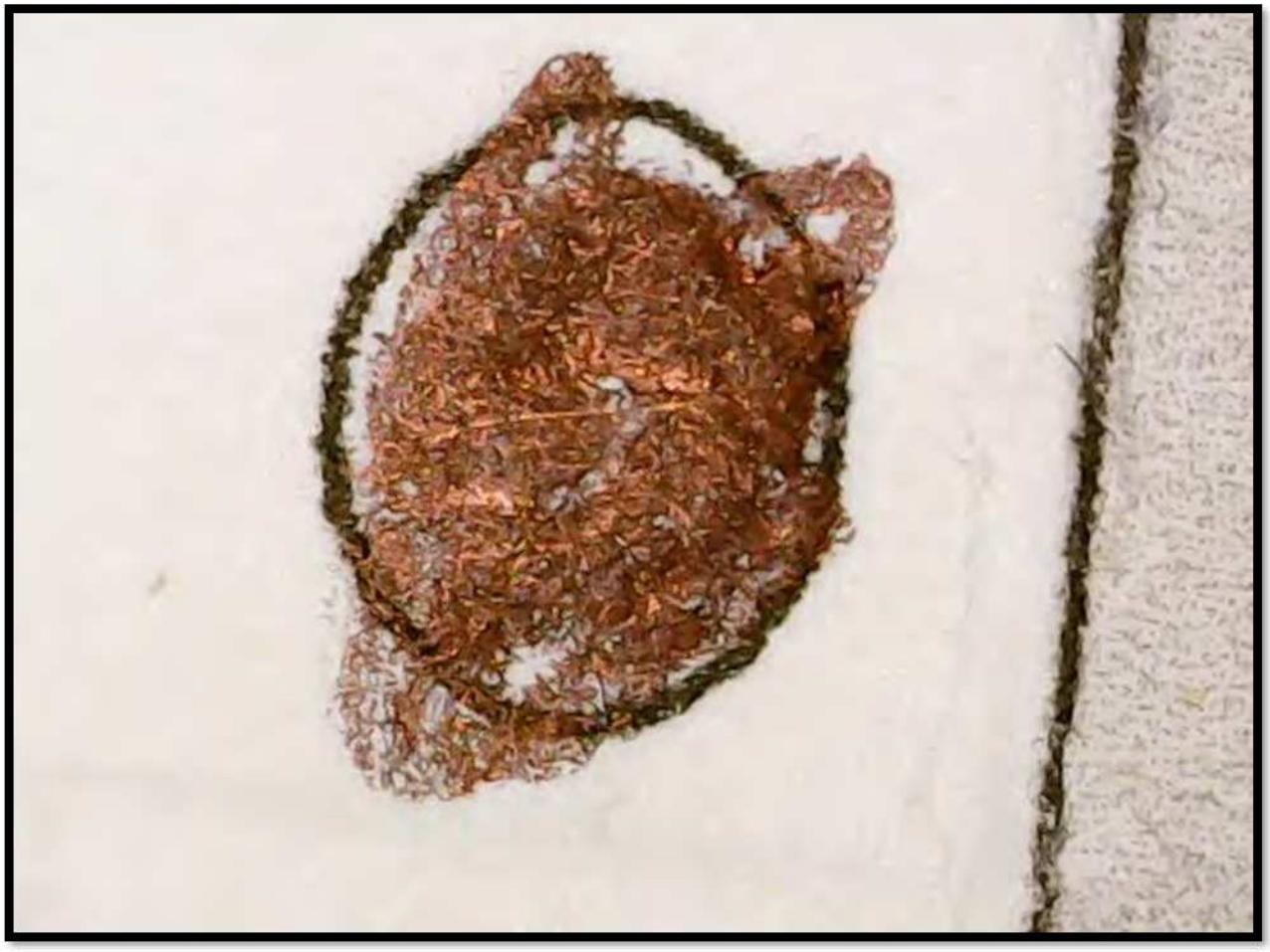


Figure 47 This is a PKAD detected Human Marked Voting Oval. Human hand movements and conventional writing instruments have unique identifiable properties

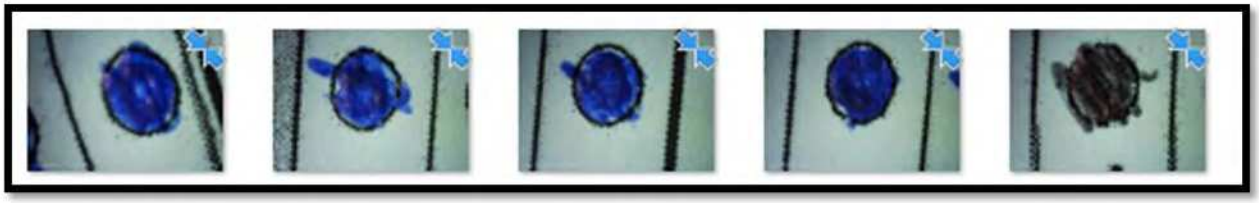
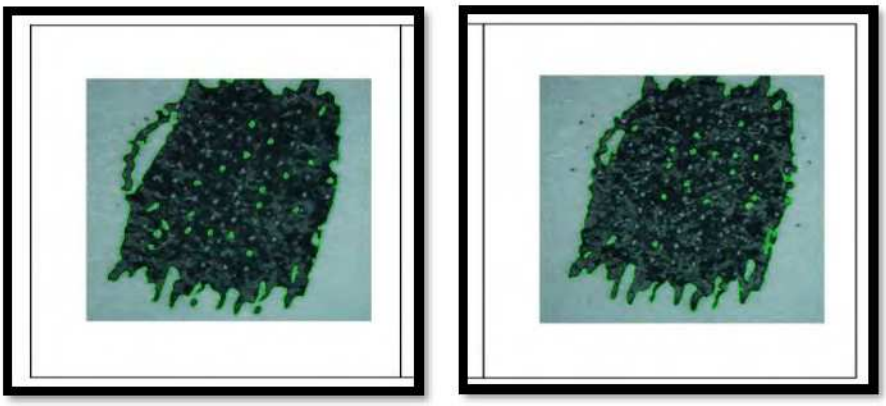


Figure 48 PKAD Detected Machine Made Ovals display different characteristics than an authentic human voted oval

- Based on our initial **"machine versus human"** marking research we find our systems have detected marks (voted ovals) which preliminary reports suggest are made by machines (pre-printed ovals or duplicates of images of legal cast ballots)
- Maricopa County does not utilize BDM's (*Ballot Marking Devices - a ballot marking device (BMD) or system allows for the electronic presentation of a ballot, electronic selection of valid contest options, and the production of a human-readable paper ballot, but does not make any other lasting record of the voter's selections*) we find the discovery of *"machine-voted-ballots"* suspicious, however this does cross confirm with our findings of suspicious ballots and tend to lean towards the possibly of illegitimate ballots within the system. These suspicious ballots will also appear as ballots in which we have not detected folds
- Machine Voted Ballots, which are not specifically authorized duplicates, should not exist within the system

Figure 47 (LEFT) This is an example of one of the image mapping techniques we use to identify duplicated votes

Figure 48 (RIGHT) This is an example of a PKAD detecting the same oval slightly enlarged but re used



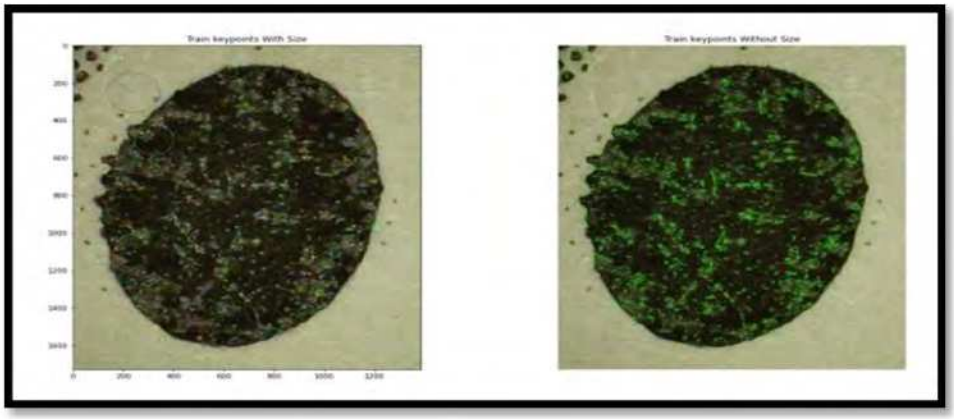


Figure 49 Secondary PKAD shape detection layer at work confirming duplication

Figure 50 PKAD Images of Authentic Human Marked Ovals

Figure 51 Human Made Detected Ovals

Figure 52 Machine Made detected /Duplicated Ovals

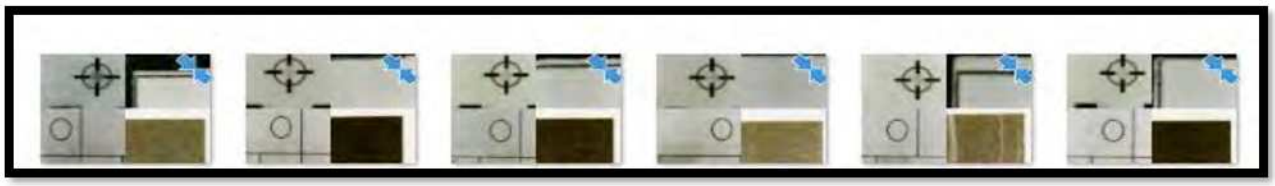


Figure 53 PKAD TWINKIE Report also reports blank ovals in the Presidential Section (meaning no vote for any Presidential Candidate) as a repeating pattern to track

There is no legitimate reason duplicated ovals should exist. The detection of duplicated ovals cross confirms duplicated ballots, nefarious ballots, batch run ballots and inserted ballots to modify counts nefariously. All of these patterns of "insertions" are cross verifying each other.

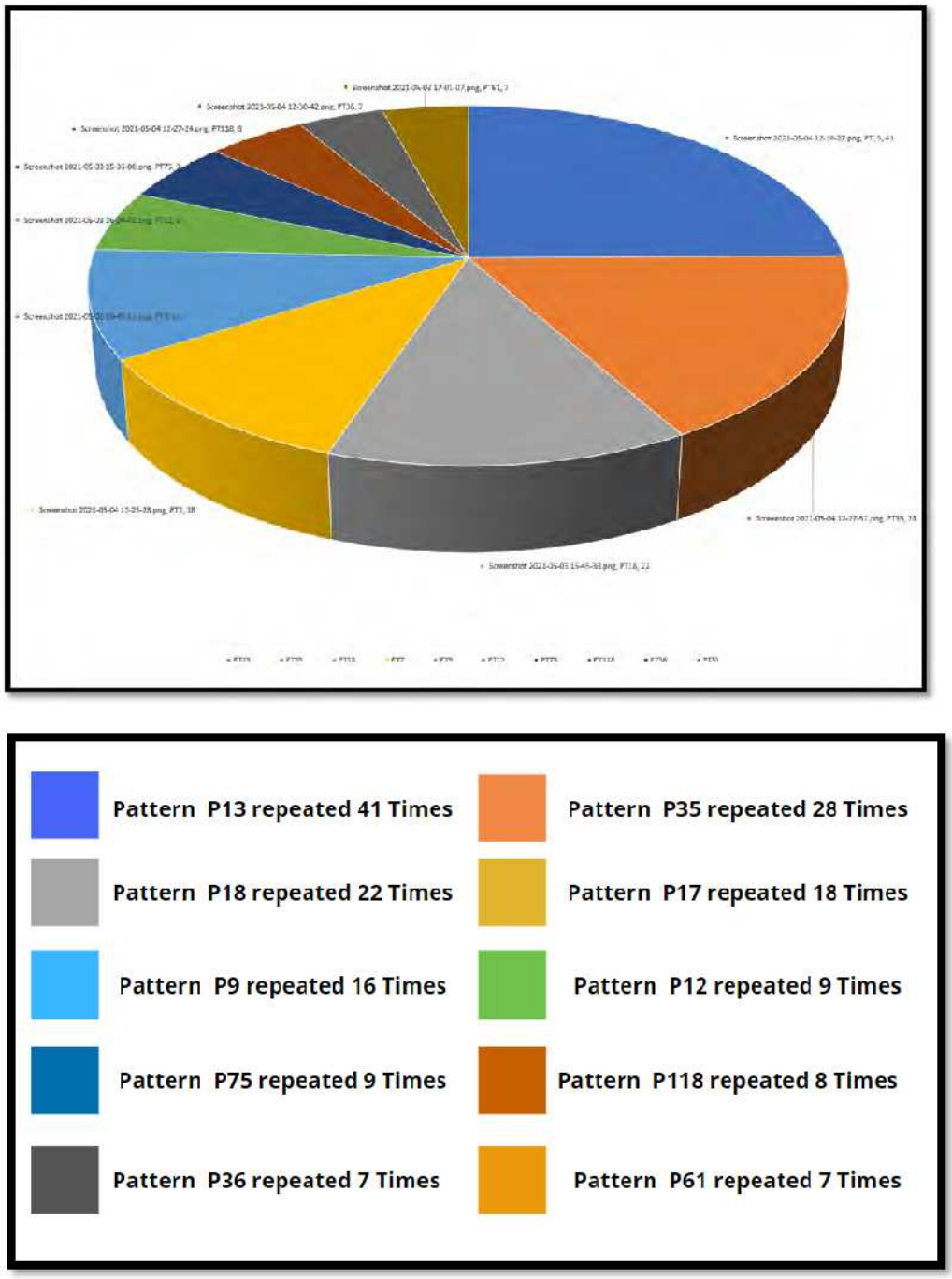


Figure 54 This is a PKAD TWINKIE Report Chart This chart shows how many times a particular voted oval match appears within any given batch. Duplicate or "Twinkie" Images indicate both fraudulent votes cast and/or duplicated ballots

EQUAL PROTECTION UNDER THE LAW IRREGULARITIES DETECTED

PKAD Systems have detected what seems to be a pattern of ignoring **"equal protection under the law"** practices from precinct to precinct.

NOTE: In 2016, 2,460,421 provisional ballots were cast nationally, and 71.1 percent of these ballots were counted in full or in part. Four states—Arizona, California, New York, and Ohio—each reported that more than 100,000 provisional ballots were cast in the 2016 election.[22] HOWEVER, in 2020 the Maricopa County approval versus rejection rates reversed with the once approval average becoming the new rejection average.

In 2016, nearly 2.5 million people voted provisionally, according to the EAVS data. However, only about 1.5 million of those provisional ballots were fully counted – 214,000 more were counted in part, which some but not all states allow. (For example, if a person was registered to vote but cast a provisional ballot in the wrong district, his vote for president could be recorded but not his vote for state legislator.) All told, 28.5% of all provisional ballots cast – nearly 700,000 – ultimately weren't counted.

In the 2018 off-year elections, just over 1.8 million people cast provisional ballots. A little over half of them eventually were counted in full, another 101,000 or so were partially counted, and nearly 790,000, or 42.6%, weren't counted at all.[23] Once again, in historic comparisons, 2020 Provisional Ballots were rejected at a rate of almost 2x over historical voting and provisional ballot adjudication indices.

Our systems measure and report on Provisional Ballot Acceptance and Denials on a precinct-by-precinct bases. In order to statistically evaluate the fair and unbiased nature of **PROVISIONAL ballots** and their acceptance we created a Precinct Rating System which would rate each precinct on a history of 16 running years of data. Our findings, up to this point are as follows:

i. Our systems have detected what seems to be "unequal" decisions making when viewed by the approval or denial codes, finding similar reasons for approval with similar reasons for denial
ii. Additionally, we find a number of precincts having strikingly similar denial codes which express the same mathematically, but are very different precincts in those registered to those who actually voted

[22] https://www.eac.gov/sites/default/files/eac_assets/1/6/2016_EAVS_Comprehensive_Report.pdf
[23] https://www.pewresearch.org/fact-tank/2020/11/10/most-mail-and-provisional-ballots-got-counted-in-past-u-s-elections-but-many-did-not/

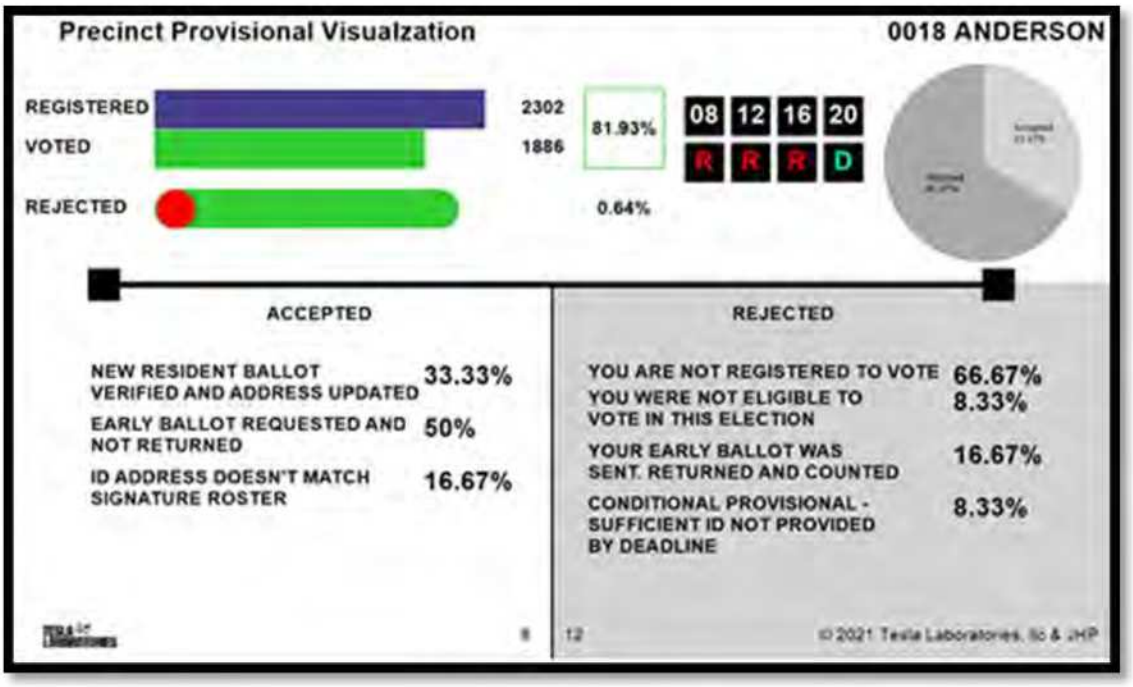


Figure 55 This is a PKAD Precinct Report Detailing Provisional Vote Acceptance and Rejection Status. Each chart includes the Precinct name, the number of registered voters, the number of voters who voted in the 2020 General Election and the accepted or rejected instances, numbers and designated "reason codes"

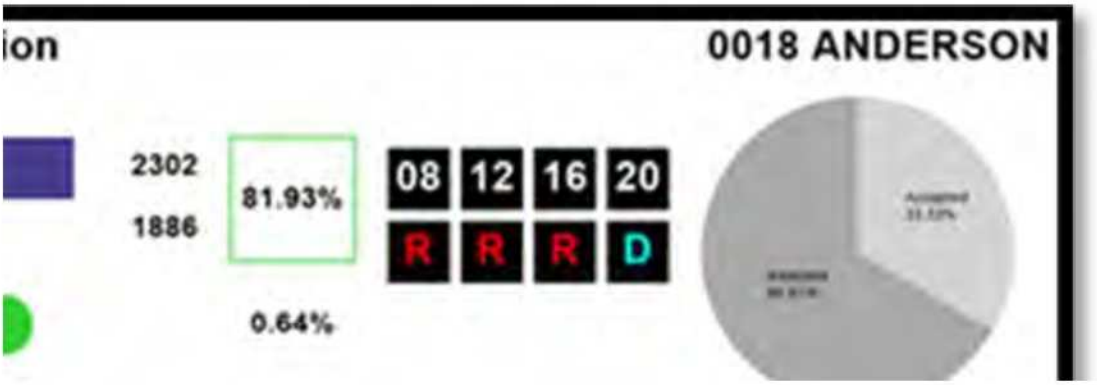


Figure 56 Each PKAD Precinct Report Contains the 2020 turn out percentage and the overall rejection percentage based on how many votes versus how many votes rejected. Of particular interest is we have created a PKAD Precinct Rating System based on the past 16 years of voting history in Maricopa County, Arizona. Viewing the data through this PKAD PRS filter it gives you an insight as to the "moves or transitions which have occurred or may be occurring within a specific precinct"

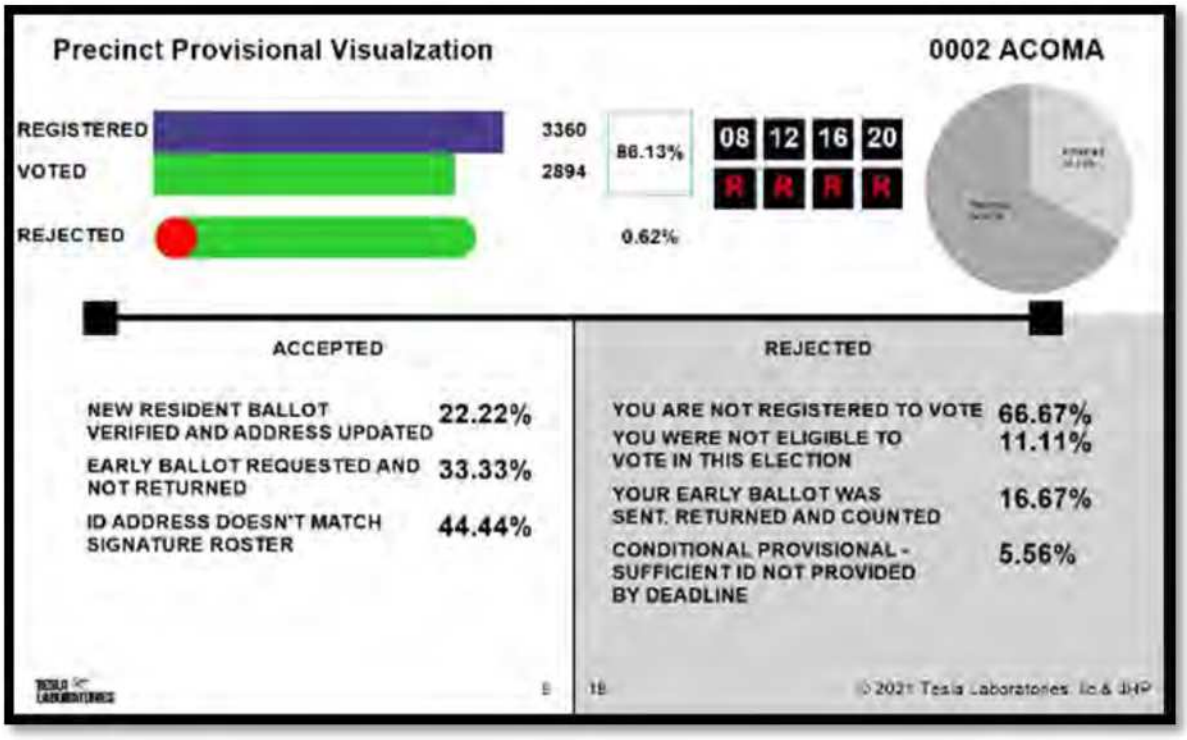


Figure 57 This represents a Precinct which for some reason seems to be ratio in-sync in certain rejection rates as another precinct. We have detected numerous instances of these similarities which should be questioned and further investigated.

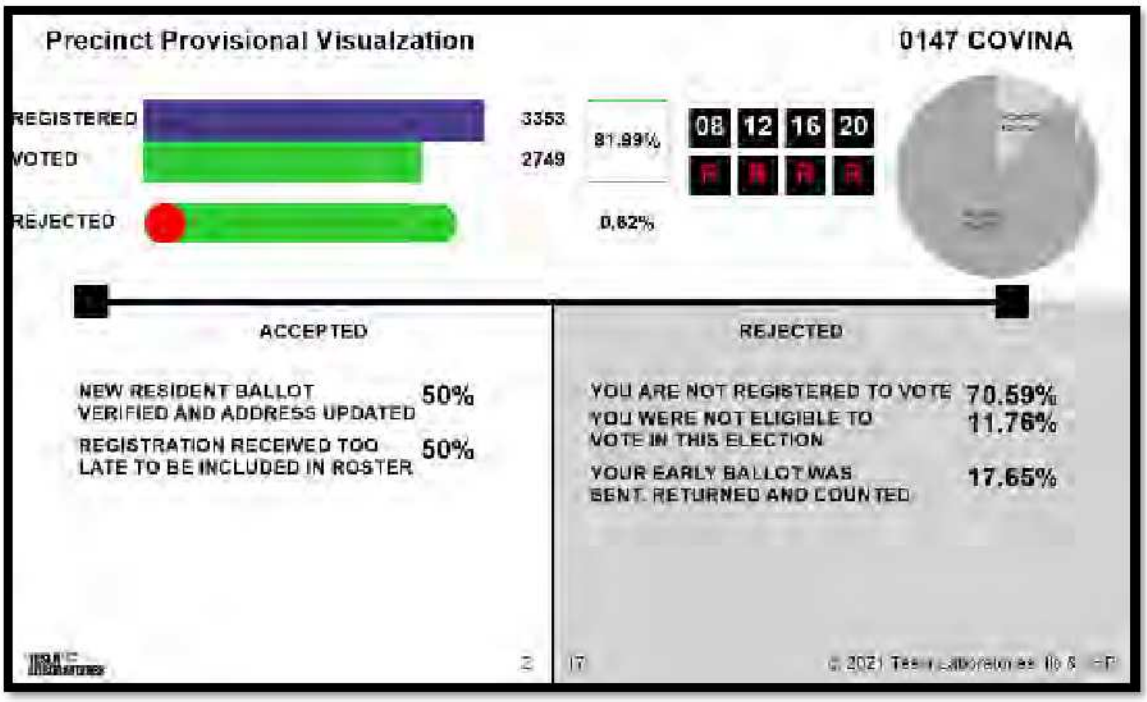
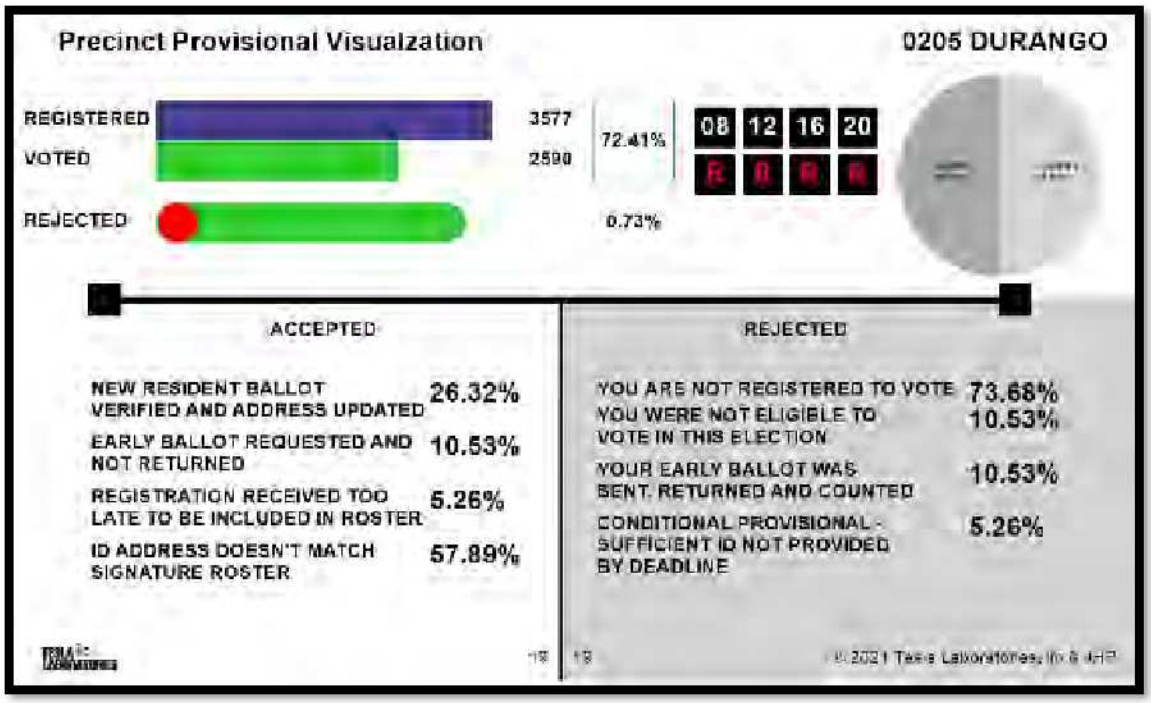
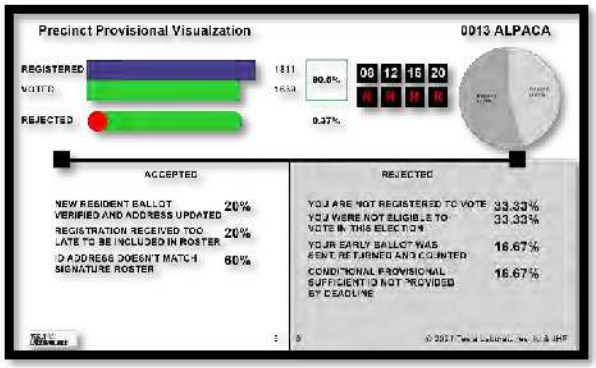
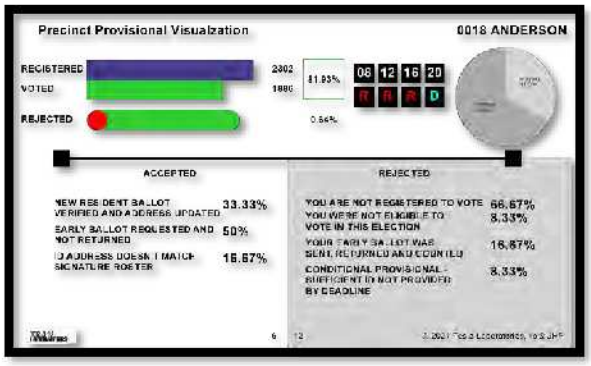
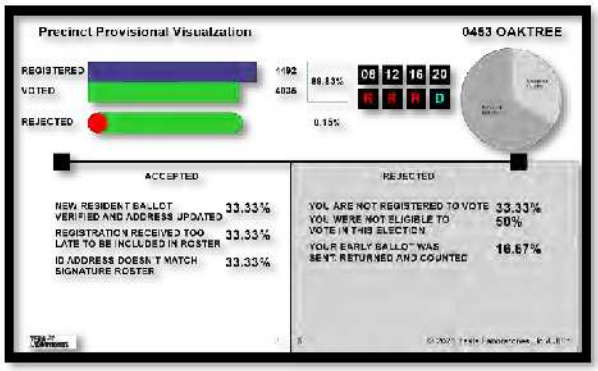


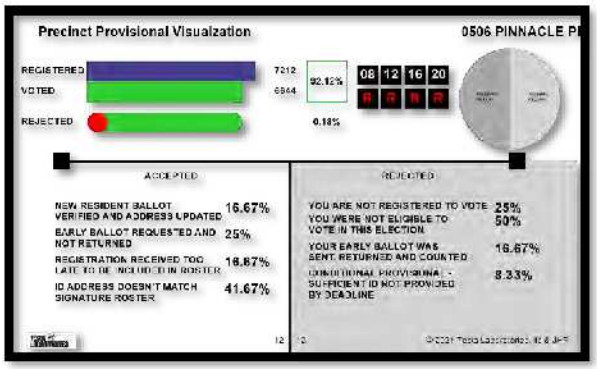
Figure 58 This particular report highlights a disturbing trend of the rejection being for " Your Early Ballot Was Sent, Returned And Counted" Once again these trends are alarming

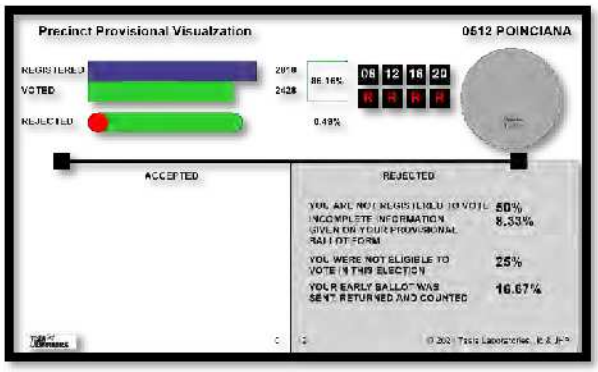

Precinct Provisional Visualization
0205 DURANGO
REGISTERED
VOTED
REJECTED
3577
2590
72.41%
0.73%
08 12 16 20
R R R R
ACCEPTED
NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED 26.32%
EARLY BALLOT REQUESTED AND NOT RETURNED 10.53%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER 5.26%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER 57.89%
REJECTED
YOU ARE NOT REGISTERED TO VOTE 73.68%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION 10.53%
YOUR EARLY BALLOT WAS SENT, RETURNED AND COUNTED 10.53%
CONDITIONAL PROVISIONAL - SUFFICIENT ID NOT PROVIDED BY DEADLINE 5.26%

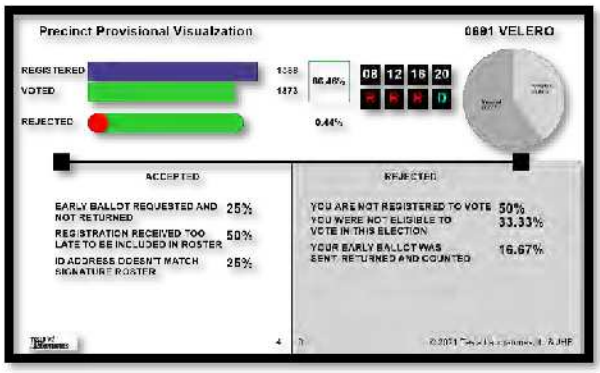

Precinct Provisional Visualization
0013 ALPACA
REGISTERED
VOTED
REJECTED
1811
1638
90.6%
0.17%
08 12 16 20
R R R R
ACCEPTED
NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED 20%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER 20%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER 60%
REJECTED
YOU ARE NOT REGISTERED TO VOTE 33.33%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION 33.33%
YOUR EARLY BALLOT WAS SENT, RETURNED AND COUNTED 16.67%
CONDITIONAL PROVISIONAL - SUFFICIENT ID NOT PROVIDED BY DEADLINE 16.67%

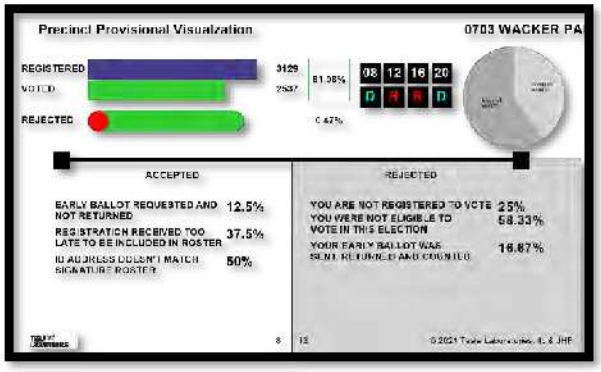

Precinct Provisional Visualization
0018 ANDERSON
REGISTERED
VOTED
REJECTED
2302
1886
81.93%
0.56%
08 12 16 20
R R R D
ACCEPTED
NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED 33.33%
EARLY BALLOT REQUESTED AND NOT RETURNED 50%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER 16.67%
REJECTED
YOU ARE NOT REGISTERED TO VOTE 66.67%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION 8.33%
YOUR EARLY BALLOT WAS SENT, RETURNED AND COUNTED 16.67%
CONDITIONAL PROVISIONAL - SUFFICIENT ID NOT PROVIDED BY DEADLINE 8.33%

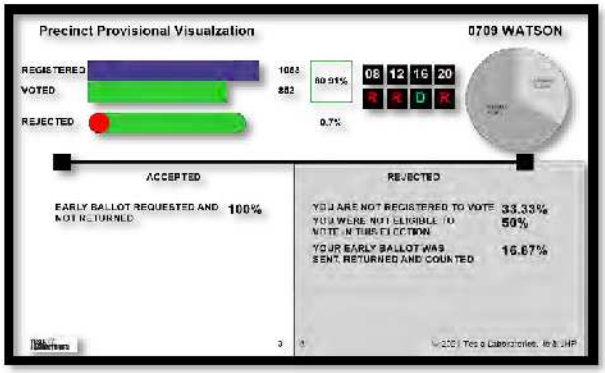

Precinct Provisional Visualization
0463 OAKTREE
REGISTERED
VOTED
REJECTED
1493
1236
88.83%
0.15%
08 12 16 20
R R R D
ACCEPTED
NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED 33.33%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER 33.33%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER 33.33%
REJECTED
YOU ARE NOT REGISTERED TO VOTE 33.33%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION 50%
YOUR EARLY BALLOT WAS SENT, RETURNED AND COUNTED 16.67%


Precinct Provisional Visualization
0506 PINNACLE PI
REGISTERED
VOTED
REJECTED
7212
6644
92.12%
0.18%
08 12 16 20
R R R R
ACCEPTED
NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED 16.67%
EARLY BALLOT REQUESTED AND NOT RETURNED 25%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER 16.67%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER 41.67%
REJECTED
YOU ARE NOT REGISTERED TO VOTE 25%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION 50%
YOUR EARLY BALLOT WAS SENT, RETURNED AND COUNTED 16.67%
CONDITIONAL PROVISIONAL - SUFFICIENT ID NOT PROVIDED BY DEADLINE 8.33%

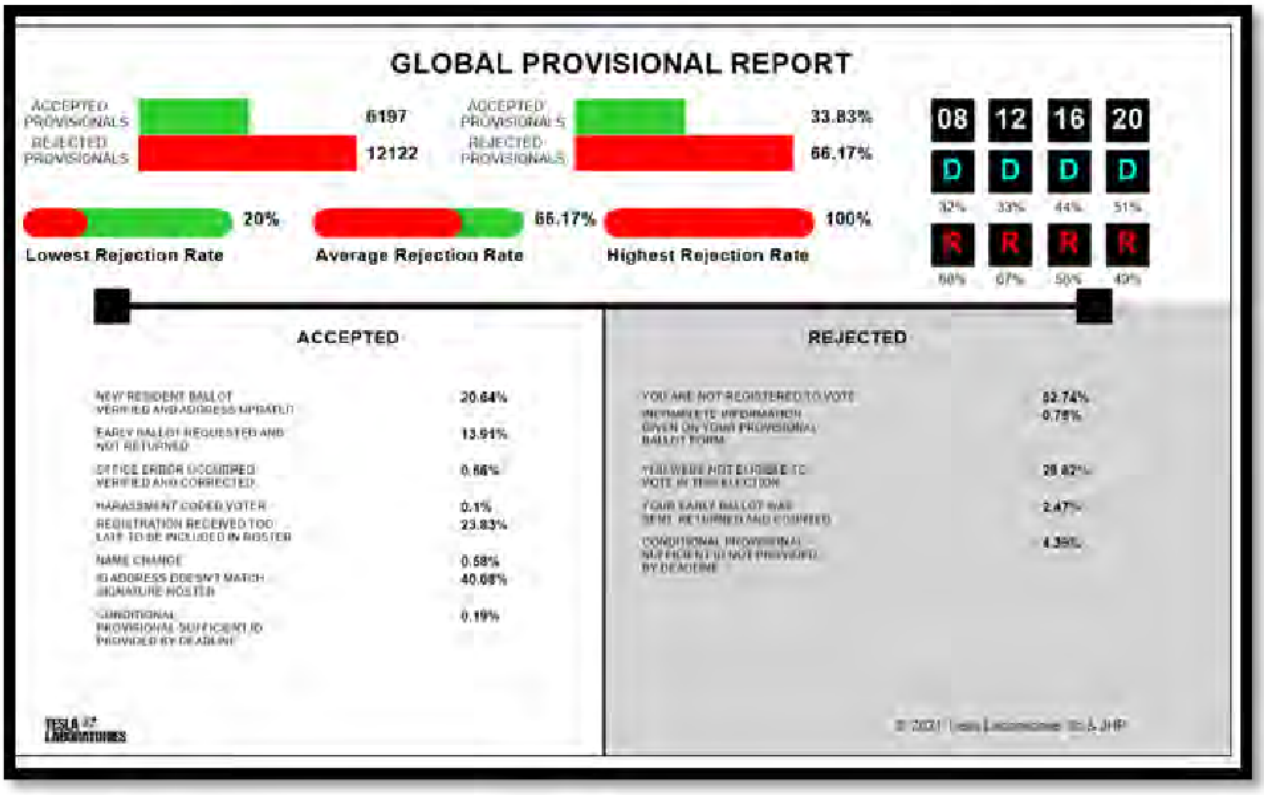








b. The chart below is a global overview of what happened with provisional approval and denial. As you will see there were 6197 approved provisional ballots and 12122 denied provisional ballots. Looking on balance by precinct by code one can see the decision-making discrepancies.



c. A provisional ballot is by default a voter being faced with the prospect that their ballot will not be counted, while at the same time the voter demanded to still vote at that minute. Many people when faced with this option, knowing their vote possibly may not be counted actually depart the voting line in frustration. Most glaring contradiction in this process is when voters were face with the pronouncement "***we show that your mail-in ballot has already been voted and counted***".

d. Unable to debate the fact, or prove otherwise and feeling powerless, most voters leave the polling place without casting their vote. For that reason, we're estimating that the actual number of votes who didn't cast a vote due to being told they'd have to be provisional would be somewhere between 1.40875 and 2.8175 times the 18,319 total Provisionals. This would result in between 25,806 and 51,612+ ballots not being cast. We determined this phenomenon by interviewing Maricopa County Voters, reading submitted affidavits and being supplied with information where Voters left polling stations when it was told to them, they had already voted, were not registered but said they were, told they were not able to vote in the general election but not given a clear explanation as to why, or told their voter information did not match correctly. We attribute this to a possible "frustration factor"

(during both early voting or day of voting) of such a heated and contentious election for those who chose to vote in person. Many have reported leaving (specifically EV instances) and not returning due to frustrations or an increased lack of confidence in the voting process). Our formula is derived from both interviews, reports, social media monitoring and affidavits.

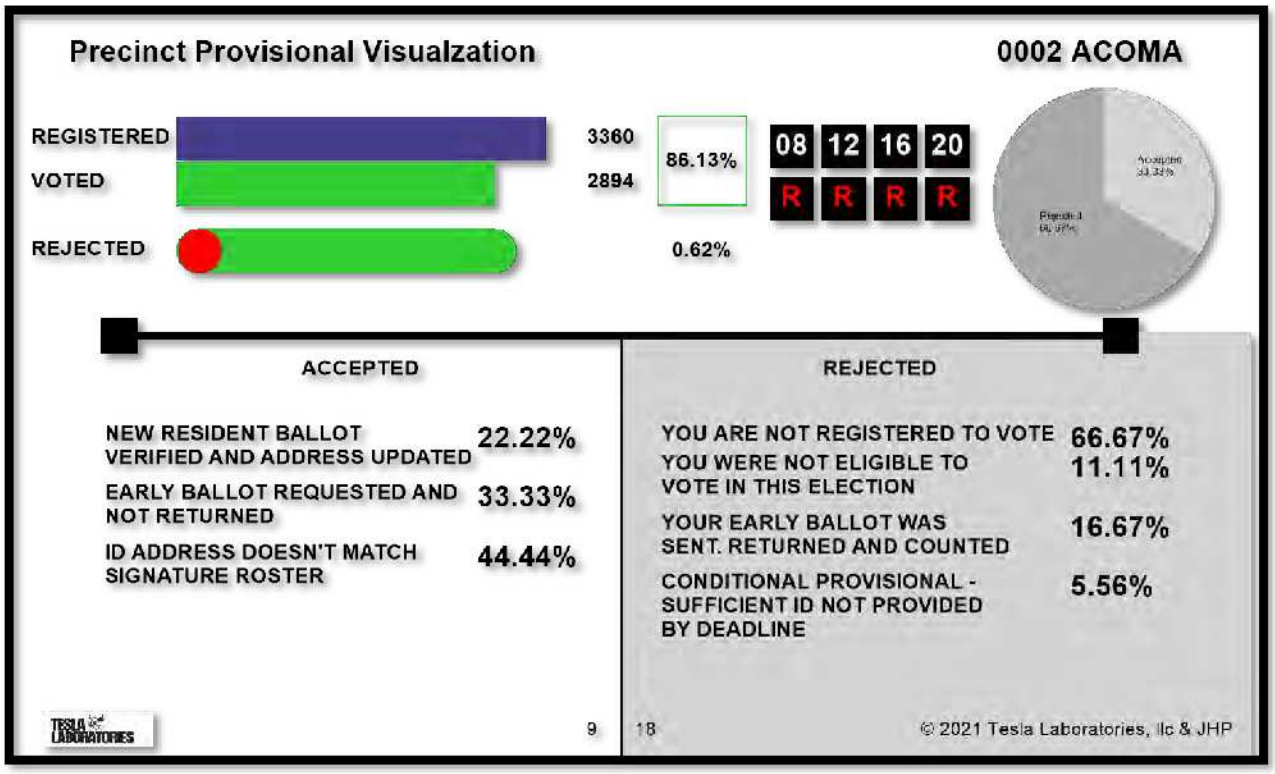
MOST NOTABLE DATA ANOMALY

When reviewing the Provisional Ballot Acceptance and Rejection Codes for the 2020 General Election we detect an interesting anomaly.

Provisional Ballots by nature are usually reserved for individuals who show up at a voting precinct and during the process of obtaining a ballot to vote are informed their ballot will need to be cast provisionally.

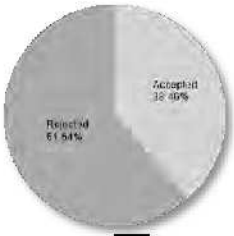
We noticed in numerous Maricopa Precincts voters were meet with the Provisional Code which states ***"Your Early Ballot Was Sent, Returned and Counted".*** In short, you already voted by mail. The nature of a provisional ballot being voted even after someone has been told their vote had already been cast, is usually when the person insists, they have not voted by mail in ballot, and they want to make sure their vote is cast in person. We think of such as a "protest by the voter to election officials" that something is wrong and there should not be an existing vote for them already in the record.

This trend happened with great frequency in the 2020 Maricopa County General Election. We will display a few of these occurrences here in the following Precinct Provisional Visualization Charts: (more commentary following charts begins at page 66)



Precinct Provisional Visualzation

0011 ALEXANDER



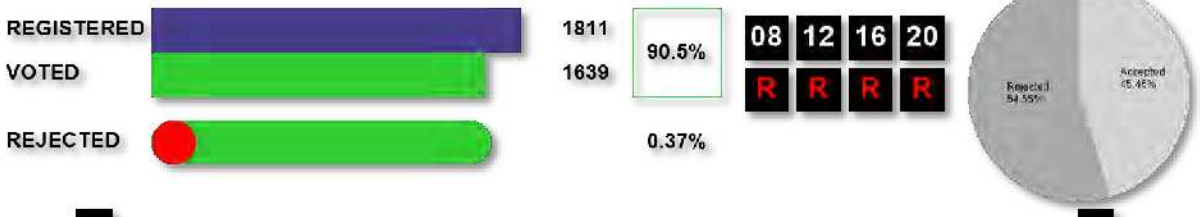
ACCEPTED		REJECTED	
NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED	20%	YOU ARE NOT REGISTERED TO VOTE	37.5%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER	40%	YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	50%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER	40%	YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	12.5%

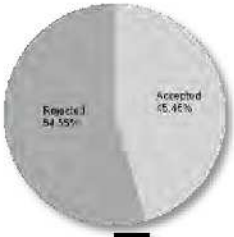
TESLA LABORATORIES

5 8

Precinct Provisional Visualzation

0013 ALPACA





ACCEPTED		REJECTED	
NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED	20%	YOU ARE NOT REGISTERED TO VOTE	33.33%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER	20%	YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	33.33%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER	60%	YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	16.67%
		CONDITIONAL PROVISIONAL - SUFFICIENT ID NOT PROVIDED BY DEADLINE	16.67%

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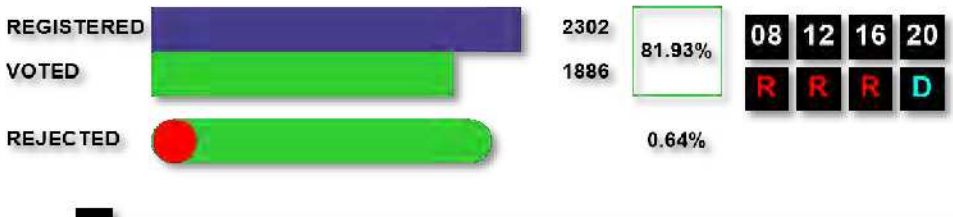
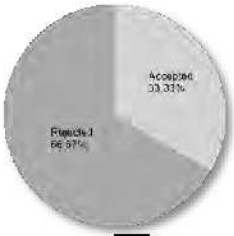
5 6

Precinct Provisional Visualzation

0018 ANDERSON





ACCEPTED

NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED	33.33%
EARLY BALLOT REQUESTED AND NOT RETURNED	50%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER	16.67%

REJECTED

YOU ARE NOT REGISTERED TO VOTE	66.67%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	8.33%
YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	16.67%
CONDITIONAL PROVISIONAL - SUFFICIENT ID NOT PROVIDED BY DEADLINE	8.33%

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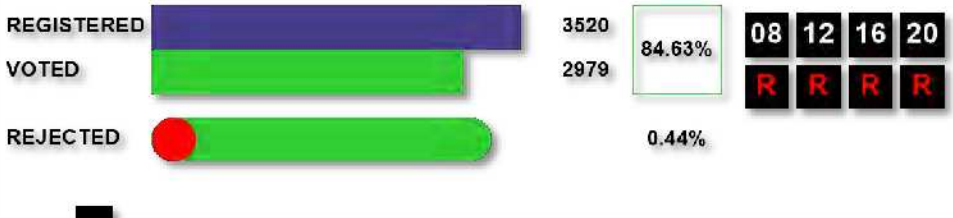
6 12

Precinct Provisional Visualzation

0021 ANNETTE



ACCEPTED

NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED	16.67%
EARLY BALLOT REQUESTED AND NOT RETURNED	33.33%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER	16.67%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER	33.33%

REJECTED

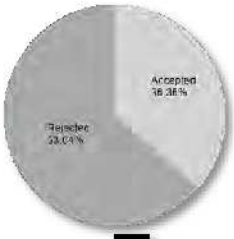
YOU ARE NOT REGISTERED TO VOTE	38.46%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	30.77%
YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	15.38%
CONDITIONAL PROVISIONAL - SUFFICIENT ID NOT PROVIDED BY DEADLINE	15.38%

TESLA LABORATORIES

6 13

Precinct Provisional Visualzation

0032 ASTER



ACCEPTED	
NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED	25%
OFFICE ERROR OCCURRED VERIFIED AND CORRECTED	25%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER	25%
NAME CHANGE	25%

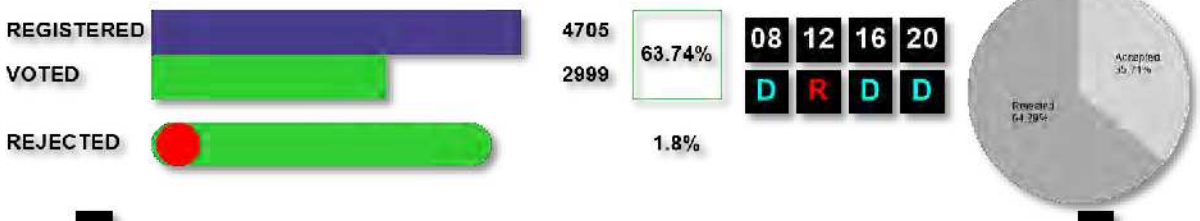
REJECTED	
YOU ARE NOT REGISTERED TO VOTE	57.14%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	28.57%
YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	14.29%

TESLA LABORATORIES

4 7

Precinct Provisional Visualzation

0040 BALSZ



ACCEPTED	
NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED	23.33%
EARLY BALLOT REQUESTED AND NOT RETURNED	20%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER	20%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER	36.67%

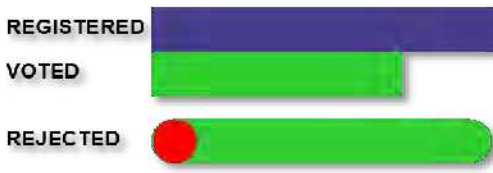
REJECTED	
YOU ARE NOT REGISTERED TO VOTE	57.41%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	33.33%
YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	3.7%
CONDITIONAL PROVISIONAL - SUFFICIENT ID NOT PROVIDED BY DEADLINE	5.56%

TESLA LABORATORIES

30 54

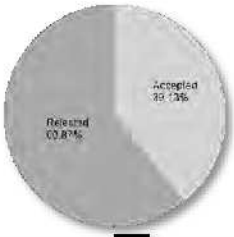
Precinct Provisional Visualzation

0063 BUCKLEY



3073
2090
68.01%
0.67%

08	12	16	20
D	R	R	D



ACCEPTED

NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED	11.11%
EARLY BALLOT REQUESTED AND NOT RETURNED	22.22%
OFFICE ERROR OCCURRED VERIFIED AND CORRECTED	11.11%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER	11.11%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER	44.44%

REJECTED

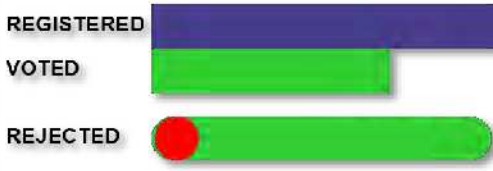
YOU ARE NOT REGISTERED TO VOTE	50%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	21.43%
YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	14.29%
CONDITIONAL PROVISIONAL - SUFFICIENT ID NOT PROVIDED BY DEADLINE	14.29%

TESLA LABORATORIES

9 14

Precinct Provisional Visualzation

0087 CARL



3774
2446
64.81%
1.27%

08	12	16	20
R	R	R	D

ACCEPTED

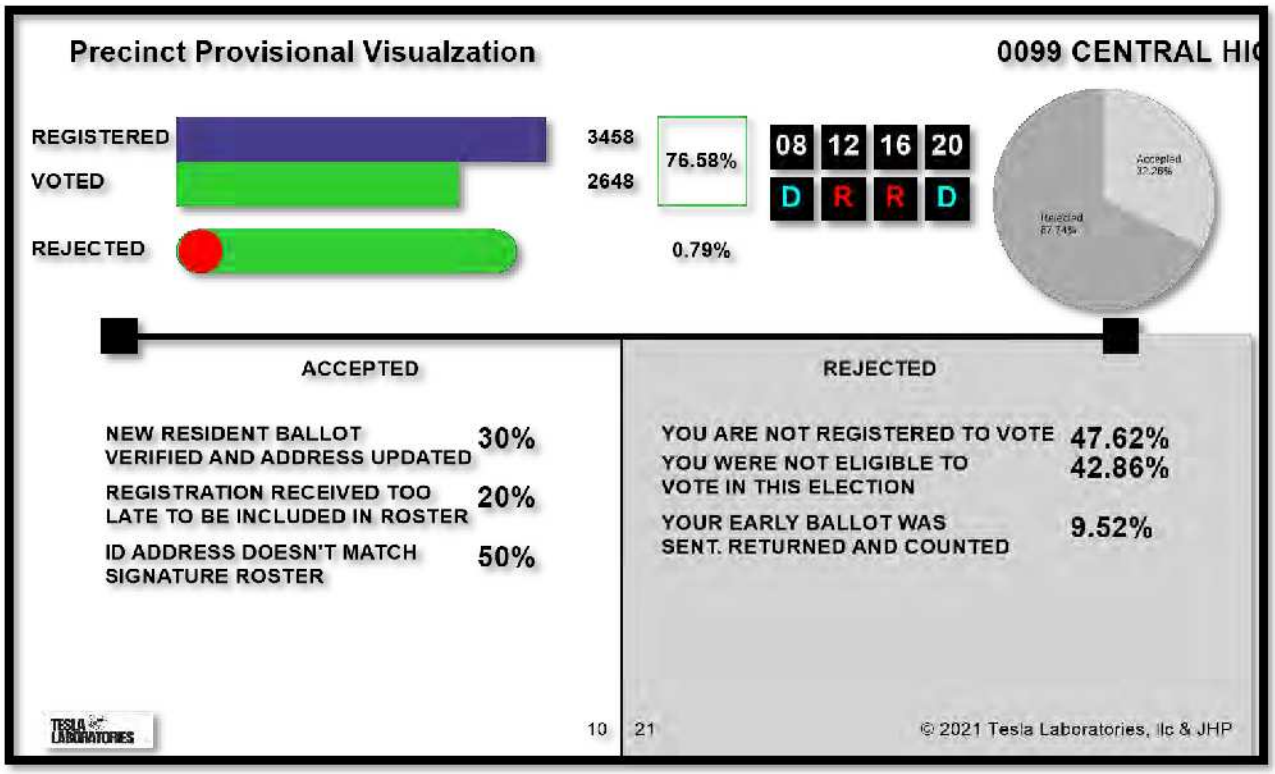
NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED	25%
EARLY BALLOT REQUESTED AND NOT RETURNED	18.75%
OFFICE ERROR OCCURRED VERIFIED AND CORRECTED	6.25%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER	18.75%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER	31.25%

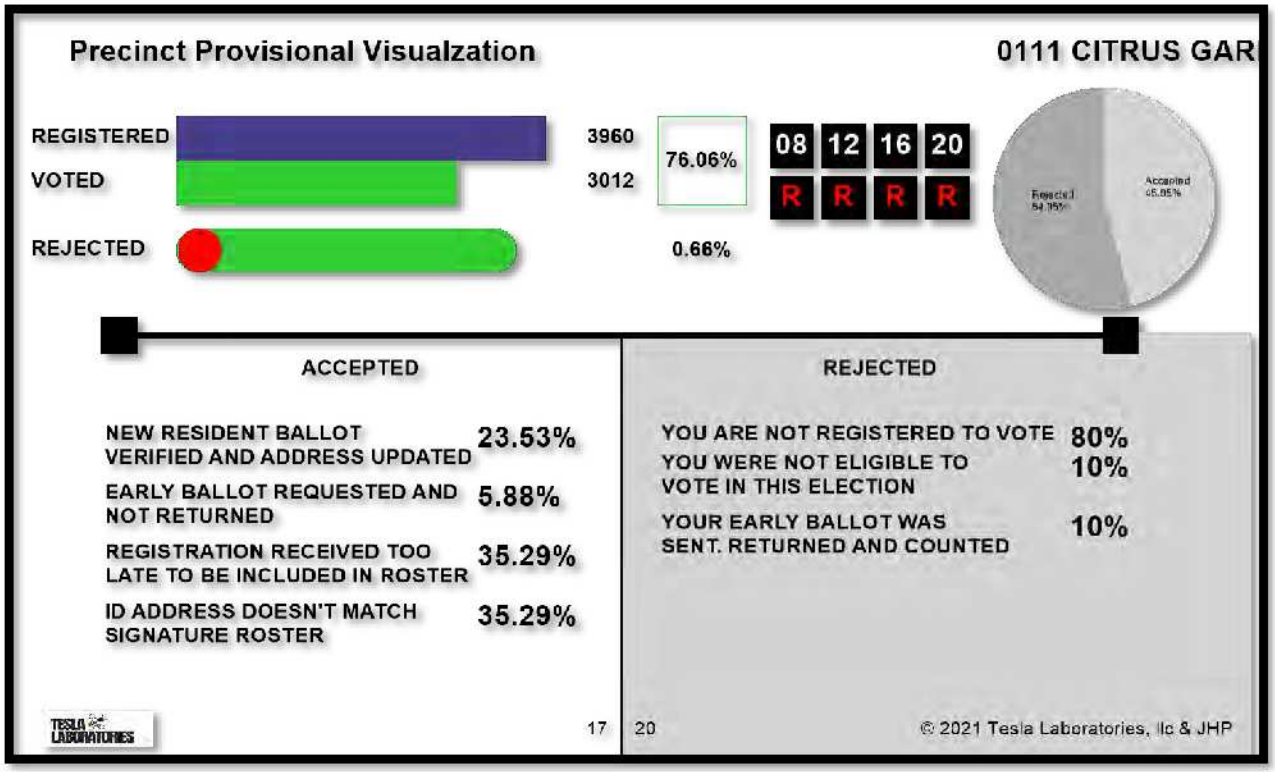
REJECTED

YOU ARE NOT REGISTERED TO VOTE	67.74%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	29.03%
YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	3.23%

TESLA LABORATORIES

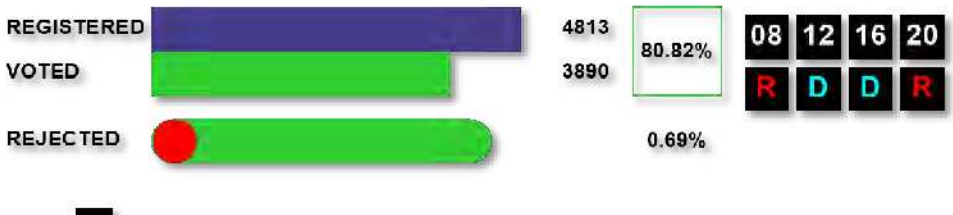
16 31





Precinct Provisional Visualzation

0112 CITRUS GRO



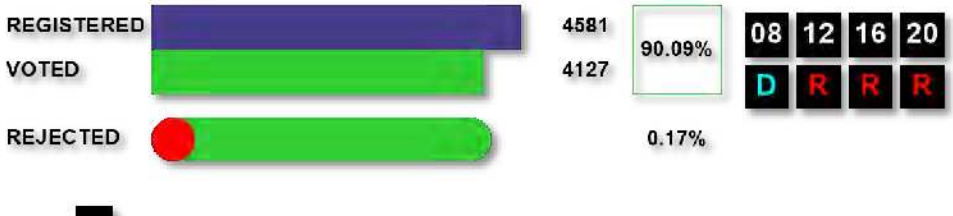
ACCEPTED		REJECTED	
NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED	21.05%	YOU ARE NOT REGISTERED TO VOTE	62.96%
EARLY BALLOT REQUESTED AND NOT RETURNED	15.79%	INCOMPLETE INFORMATION GIVEN ON YOUR PROVISIONAL BALLOT FORM	3.7%
OFFICE ERROR OCCURRED VERIFIED AND CORRECTED	5.26%	YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	18.52%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER	15.79%	YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	7.41%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER	42.11%	CONDITIONAL PROVISIONAL - SUFFICIENT ID NOT PROVIDED BY DEADLINE	7.41%

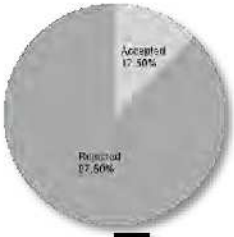
TESLA LABORATORIES

19 27

Precinct Provisional Visualzation

0144 COTTONWOO





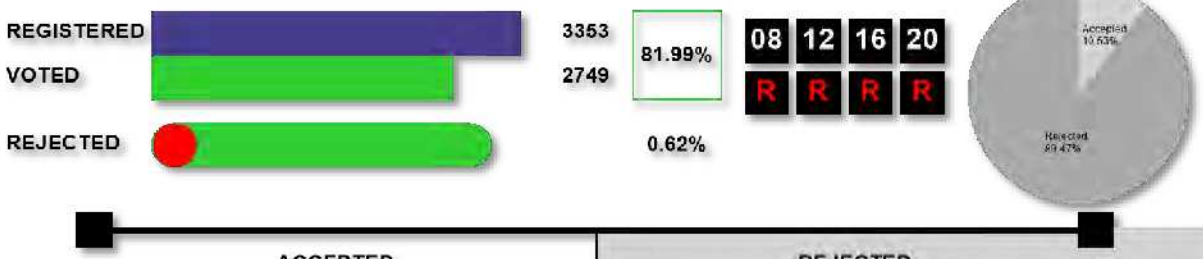
ACCEPTED		REJECTED	
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER	100%	YOU ARE NOT REGISTERED TO VOTE	57.14%
		YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	28.57%
		YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	14.29%

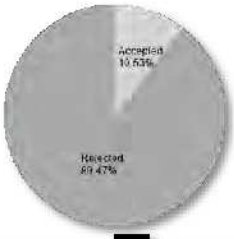
TESLA LABORATORIES

1 7

Precinct Provisional Visualzation

0147 COVINA





ACCEPTED

NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED	50%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER	50%

REJECTED

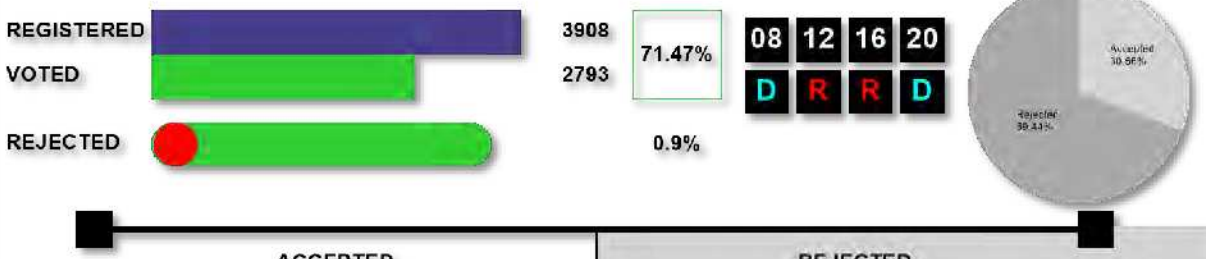
YOU ARE NOT REGISTERED TO VOTE	70.59%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	11.76%
YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	17.65%

TESLA LABORATORIES

2 17

Precinct Provisional Visualzation

0165 DANYELL



ACCEPTED

NEW RESIDENT BALLOT VERIFIED AND ADDRESS UPDATED	27.27%
EARLY BALLOT REQUESTED AND NOT RETURNED	9.09%
REGISTRATION RECEIVED TOO LATE TO BE INCLUDED IN ROSTER	45.45%
ID ADDRESS DOESN'T MATCH SIGNATURE ROSTER	18.18%

REJECTED

YOU ARE NOT REGISTERED TO VOTE	64%
YOU WERE NOT ELIGIBLE TO VOTE IN THIS ELECTION	24%
YOUR EARLY BALLOT WAS SENT. RETURNED AND COUNTED	8%
CONDITIONAL PROVISIONAL - SUFFICIENT ID NOT PROVIDED BY DEADLINE	4%

TESLA LABORATORIES

11 25

What we are unable to reconcile is the very high instance of this "Provisional Rejection Code" (Code B13) due to the following seemingly "disappearance" of CodeB3 post-election day. The following logic is used:

When a person is handed a Provisional Ballot (which occurs when voting in-person) someone from the county's office has discovered the voters "ballot was mail, returned and counted"

1. This literally means the county voting precinct is able to see and verify the existence of a mail-in vote as having been recorded at that specific moment in time
2. At the end of Election day, it was reported Maricopa County had only counted ***between 30% and 35% of the actual mail-in ballots*** due to the tremendous volume of mail-in ballot used in the election
3. The net global percent of Provisional Ballots is 2.47% of total rejections under Code B13
4. Utilizing 1,702,981 as the total number of mail-in ballots, and 35% as the "official opened and counted as of EOD November 3, 2020", then 596,043 mail-in ballots would have been the number "in-system" at the time of the Provisional Code B13 being determined
5. Therefore, 1,106,938 ballots where were ostensibly counted in the 10 days following Election Day (as reported by Maricopa County as being needed to count the excess mail-in ballots)
6. These already counted 596,043 ballots yielded 300 Code B13 Provisional Vote Rejections
7. Applying the same simple math and logic, when the remainder of the mail-in ballots were counted and totaled 10 days later, there should of have been located at least 557 ballots of the inverse. Inverse being "***an attempt to vote twice***" (which Code B13 implies) but of the nature of voted by mail and then voted in person As well, would not be discovered until the totality of the mail-in ballots were counted. **Of specific note is a rejected mail-in vote code does not appear in any of the final records.**

This bring us to what we are unable to reconcile.

Q1- If the mail-in votes were so lagging in counting, how did so many precincts report Code B13 "Your Early Ballots Was Sent, Returned and Counted"? and,

Q2- If the phenomena of people attempting to vote twice was to have been statistically proven as an "authentic data point" then why does the existence of the Code B13 completely disappear in the remaining 1,106,938 ballots which were yet to be counted? **Again, Of specific note is a rejected mail-in vote code does not appear in any of the final records.**

Following the logic that in order to even be able to access and apply a Provisional Code B13 that mail-in ballots must have been accounted for and known by the EOD of Election Day, therefore what were the other 10 days of counting needed for?

Is it possible that all mail-in ballots were in fact known and accounted for EOD on Election Day (this proven by the mere existence of the application of Provisional Code B13 across numerous Maricopa Precincts) and the time needed was not actually for counting mail-in ballots which were uncounted, but in the time needed to swap out or replace legitimate ballots with ballots which had been scalped, gathered and collected from the numerous over mailing of ballots to voters with only one voter present at the resident?

Or could these ballots be accounted for as part of the missing 605,494 mail-in ballots shown as mailed but to date have been unaccounted for?

Since the mailing of a ballot to a voter is an admission by the State of the system believing a qualified registered voter lives at that address. Said mail-in ballot allows for any number of these "605,494 unaccounted for but mailed ballots" to be used by nefarious actors to "count/collect/ or present" what looks like legally voted ballot. This would in fact be an official and legal ballot, but a ballot that was voted illegally.

Could these nefariously collected and voted ballots then simply swapped for the legal ballots of voters who may have voted a different way?

If in fact ballots were swapped in a nefarious manner, what happened to the legally voted ballots which were cast and opened but held in abeyance?

Could those legal ballots have been collected and subsequently destroyed after being replaced?

DEAD VOTERS VOTED

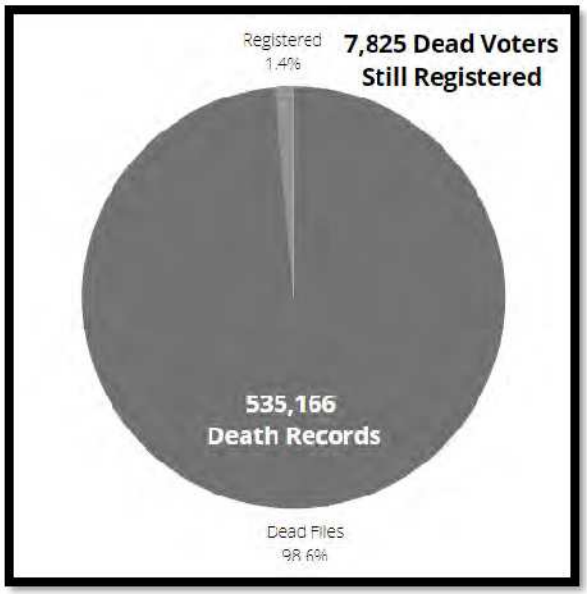
Maricopa County reports approximately 2,607,371 registered voters.

As part of our PKAD Investigation, in order to understand where potential problem areas could exist within the Maricopa County Election System, we gathered all death records for any individuals known to of have died in Maricopa County Arizona since the year 1900.

After eliminating any file irregularities, duplicated death records and incomplete death records we ended up with a list of 535,166 individual death records. These records were comprised of first and last name of individuals (middle name if provided), date of birth as listed on death certificate, date of death, county, and address of individual at the time of death.

Our team processed 535,166 known dead individuals against information showing Registered Maricopa County Arizona Records. If the names, date of birth and location of the individual matched the Maricopa County Voter Rolls a voter registration number was then added to our database.

These are the result of our findings:



7,825 Dead Voters Still Registered

5470 (69.904%)Of These Voters Voted in Maricopa County in the 2020 General Election

ISSUES, *CONCERNS, FINDINGS AND POSSIBLE REFFERALS FOR INVESTIGATION*

1. "…our current level of analysis leads us to estimate that in excess of 118,478 ballots (or greater) could be of questionable origins or standards.
2. "…our estimates suggest that in excess of 75,000 potential votes were canceled, scrubbed, or compromised due to non-compliance to normal election standards and laws, combined with nefarious actions and malfeasance"
3. "…based on a unique phenomenon of a voter finding their "vote had already been cast, received and counted", we estimate a "turned-away voter" rejection rate could represent number exceeding 51,612 voters – who were turned away from the polls" (see comment page 58 – paragraph 3)
4. "…rejected, compromised, illegal and nefarious votes could represent 245,090 ballots/votes" (estimated total ballots not compliant, or questionable)
5. "…unauthorized and/or non-compliant ballot papers are estimated to compromise 314,182 ballots cast" (see Pages 26 – 34)
6. "…we have detected what we label as "ballot stuffing" to increase the votes for individual candidates, in what we define as possible nefarious cast ballots being inserted into the system, in bulk and from a centralized collection location" (see Page 35 – Figure 39)
7. "…due to COVID restrictions polling locations were pushed down to a representation of polling locations at the rate of 4.37 to 1 (4.37 individual precincts merged into 1 polling location), the average ballot box/bag should represent from 4.37-to-21 average precincts in any given batch – this cadence of precincts is not currently holding across all boxes and batches of ballots"
8. "… we have detected boxes/batches with excess of 100 precincts inserted into one voting batch, with some over 300 individual precincts in one batch. These occurrences, in our estimation (with consideration given to EV, EIP, ED coding) point to batch loading of illegal or nefarious ballots"
9. "We believe unauthorized color printing and casting of ballots of what appear to be official ballots was conducted"
10. "…what we define as counterfeit ballots have been detected in multiples"
11. "…ballot batches display significant odd combinations of flat, hand folded and machine folded ballots in which are not in sync with how ballots are collected and tallied"

12. "… at least, 10 different forms of unauthorized ballot papers have been detected by our systems, of which are none of the specific types of ballot papers which should occur as reported by Maricopa County are detected in certain types of ballots counted."
13. "… the uncontrolled use of unauthorized ballot papers seems to have contributed to the possibility of cancelled votes, votes read as marked out and an excessive ballot adjudication process" (see page
14. "…what can only be considered an egregious lack of standards, compliance, management oversight and protecting of a citizens vote has been detected within the calibration settings of the overall ballot printing"
15. "…the lack of standards, compliance, management oversight and protecting of a citizens vote indicate that a significant number of legitimately cast votes were not counted and this seems to have occurred in certain precincts over other precincts"
16. "…on a precinct-by-precinct measurement of the data and analysis we can only conclude that different standards and operations were run on a precinct-by-precinct basis and equal protection under the law was not affording the voters of Maricopa County Arizona"
17. "… third party programs were inserted into the tally process which may have automatically canceled votes, unknown to adjudicators"[24], [25], [26], [27]
18. "…found the potential for automatically adjudicated, canceled or questioned votes within the system. These instances range from a worst cases averages per ballot instances of 20% (or greater) to average instances between .8% to as high as 3.3%" (bleed, calibration and combined incorrect ballot paper stock – See appropriate sections herein)
19. "…currently we do not expect the count of "mechanically folded legal official ballots" to meet the 81.55% threshold"
20. "…our systems are displaying, per run greater instances of no fold detected and hand-folds found in odd higher concentrations in certain ballot boxes"
21. "…the detection of no-folds-present we consider to be a cross confirmation of potentially counterfeit ballots being presented/counted as legal mail-in ballots"
22. "have detected what seems to be "unequal" decisions making when viewed by the approval or denial codes, finding similar reasons for approval with similar reasons for denial"

[24] https://www.azmirror.com/blog/ducey-signs-electronic-adjudication-bill-to-speed-ballot-counting/
[25] https://azsos.gov/sites/default/files/Electronic_Adjudication_Addendum_to_the_2019_Elections_Procedures_Manual.pdf
[26] https://roselawgroupreporter.com/2020/02/electronic-adjudication-bill-to-speed-ballot-counting-signed/
[27] https://mediaassets.abc15.com/html/data/audit/county_adjudication.pdf

23. "our initial "machine versus human" individual marking of a vote oval research has detected marks (voted ovals) which preliminary reports suggest are made by machines (pre-printed ovals or duplicates of images of legal cast ballots) which possibly exceed the number of known and approved duplicated ballots"

24. "...certain ballots have color coding in both visual cues and lettered confirmation. These coded ballots have been reported by the County in specific numbers per color code. Currently the numbers given by Maricopa County do not match what our systems are detecting. This can be cause by illegal ballots, copied ballots and duplicated ballots being inserted into the voting system"

25. "...color coded ballots such as Purple should appear in approximately 28% of the counted ballots, just as Green should appear 6.8% within the ballots cast. Currently our systems are not detecting color coded ballots in sync with precincts where said color ballots should appear"

The following are the forensic data, image research programs and standards we are processing at the time of this report. Each program reports back finding at a different process rate; however, this report will give overview of current reports and sampling as we complete our work. The programs are listed by our internal nick names:

Programs Running

Nick-Titled and Functions

CALIBRATE	STRIPTAL	STRIPMINE	TWINKIE	FIBERFIB	TERMINATOR	CVR-DUPE
Run calibration work on calibration marks and targets to identify those within and outside of industry calibration allowances	Fast image strip of Presidential field and ovid counts tracked by individual Precinct code names double checks POTUS tally and checks for overruns of precinct printing of ballots	Front and Back high res image of ballot checking compliance, tracking all precinct and codes, tallying key races including judges and monitoring rotation sequences ALL OVALS COUNTED	Runs all ovals and does voted oval pattern matching and sequencing to identify repeating patterns which could indicate machine cast ovals mimicking human marks	Automated Paper Match and Sequencing to identify # of sources used for ballot printing and possible quick copy counterfit ballots	Identifying if ovid marks are machine made or made by human hand	Image scan matching of scanned files, time, date of scan and seeking over batch runs and dupes. These are the ballot image scan CVR's

ADAMTZ	FOLD-IT	HANDY	HEMO	CHROMO	ALIEN
Precinct only tracking to compare ballot cast number identified as printed and cast, compared to offical voting records and population data	Verification of machine made official mail-in ballot folds, identifying folds are at official mail-in locations on ballots and made within complaince	Verification of ballots, presumably folded by hand after tallied, thus possibly not legal mail-in cast or showing hack into ballot boxes for after the fact attempt at masking fraud	Sharpie or other marking instrument used with out-of-calibration printing and wrong paperstock to create vote collision on the front of the ballot when scanned - forced adjudication	Identifying total number of color printed ballots with full color tabs and name designation against known records of print	Number and Precinct Report of Non-US-Citizen Ballots and Counts

Programs Running

Nick-Titled and Functions

REPRO REPORT	MEASLES REPORT	IN-SYNC	LEMON LIME	PURGE-MERGE	GRAVEYARD	OVA
Color Ballots reproduced on BOD devices by precinct to check against Chromo Reports and Official Duplicated Ballots Reports	Tracking Each DOT of Princinct as they come back to the 172 approved areas to determine high concentration of Irreigular precinct ballot drops from out laying precincts	Mapping of timing of scan of all votes to find multiple scan machines scanning at same exact same for possible digital insertion	Color Ballots with Perfect Calibrataion Compared Against Color Ballots with OoC To Determine How Many Possible Illegal Color Ballots	Princinct matching of deleted voters to added voters and mapping of voted but not active in registration list 6 months pre and 6 months post	Voter Registration Mapping of Deceased AZ clitizens for the last 40 years	Precinct Mapping of Over Vote and Acceptance or Rejected Vote Coding

PRO-V	WOBBLE	CLONE	BOD-ID	ADAM 12 CHROMO	SORE THUMB
Precinct tracking mapping of provisional votes and detecting anomolies and canceled	Precinct by Precinct accounting based on Presidential Votes seeking out of balance vote ratios compared to normal precinct splits	Treating Ballot Images as a photograph and seeking 100% exact voting pattern clones without being same image file to detect possible batch ballot dupe loading	Tracking Tally Devices and Mapping Known Tally Devices Used to see if additional unaccounted for tally devices were in use based on scanned data tracking	Precinct only tracking to compare color count to BOD count to Precinct Records	Visually mapping all reports in a precinct to precinct overlay to allow bad precincts to stick out like sore thumb

FRADULENT – COUNTERFIET BALLOTS DETECTED

Copied from Sworn Affidavit of 08/04/2021

It is my belief, determined utilizing the standard of evidence upon which evidentiary rules are formed utilizing the balance of probabilities, that we have discovered the presence of counterfeit election ballots manufactured and used during the 2020 General Election conducted in Maricopa County, Arizona. Our direct research, consultation with industry professionals, forensic document examiners, official ballot printers and experts within the industry has determined that the evidence conclusively reveals 'all of the known physical and kinematic artifact markers which tightly define a legal and official 2020 General Election Ballot for Maricopa County are noticeably absent in a sub-set of physical ballots' and these counterfeit ballots were counted in the final election results as legal and fully compliant ballots.

Industry standards, guidelines and compliance documents outline specific procedures for the manufacturing and printing of official election ballots. Within these standards, laws, guidelines, and compliance recommendations it is generally accepted that legal and official mail-in ballots are produced utilizing the following standards:

1. Legal and Approved Official Ballot Paper, and;

2. Printed utilizing full color printing methods, and;

3. Be managed, manufactured, and printed under the strict supervision and standards of an officially registered, officially contracted 'authorized' ballot printer utilizing printers which confirm with all industry security standards and have incorporated into their print systems certain steganographic codes, specifically hexagonal dots known as Machine Identification Codes (MIC), and;

4. Election Ballots must be manufactured and printed with strict adherence to print calibration standards for printing to insure said ballots are properly machine readable and assure each voter equal protection under the law when casting and securing their vote.

Considering the above 4 elements are the 'minimal requirements' which must be present for any color ballot to be considered an official Maricopa County, Arizona 2020 General Election Mail-In Ballot, when our systems identify any specific color ballot which is missing any 2 of these 4 key identification elements it necessitates further deep forensic research to ascertain if the said ballot is an actual official ballot or something possibly mimicking that of an official ballot.

In this case, the sub-set of ballots described herein have been conclusively determined to be 'illegal or forged official ballots.' Our deep forensic research revealed additional out of compliance, highly suspicious and uniquely identifiable traits specific to this sub-set of ballots and which further confirmed these ballots as counterfeit. These additional indicators include but are not limited to:

A. A number of very specific differences, noted only under microscopic examination, common to every ballot in the sub-set of counterfeit ballots and completely different from the official ballots.

B. The same ballots in question having the appearance of irregular off-set printing and font distribution, and;

C. The same ballots in question had been further visually identified as being of a different print density and color density or chromatic response/chromatic adaptation when visually inspected by document examiners during the audit process, and;

D. The ballots in question had been recorded by physical document examiners during the audit process as having a "different texture or feel" in regard to the known official Maricopa County, Arizona 2020 General Election Ballots identified by purposive touch and sampling techniques, i.e., active tactile perception, further supported by subsequent microscopic analysis of the ballots and;

E. In conjunction with these highly conclusive natural haptic experiences, or natural kinesthetic communications, additional unique kinematic artifacts were detected which reveals the ballots in question to likely not be printed from large commercial ballot paper rolls on traditional large scale full color ballot printers, but to originate more likely from small individual run color print systems which do not result in the "kinematic detectable curl of the paper grain" being "with the grain". Visual inspection reveals these ballots exhibiting indicators of being produced and folded against the natural grain of the paper, leaving tell-tale signs of incorrect paper curl.

These additional 5 elements, which are not detected when examining any color ballot which is to be considered an official Maricopa County, Arizona 2020 General Election Ballot, further supports our decision to label these ballots as "illegal or forged official ballots."

PREVIOUSLY SUBMITTED PRE-PRELIMINARY REPORT (partial - attachments not included)

1. **Problem:** If the vast majority of votes cast were mail-in ballots (90%), do the ballots audited reflect (a) verifiable signs of being processed for and/or mailed, and; (b) does the percentage of ballots showing such kinematic artifacts reflect the reported percentage of mail-in voter participation (less spoiled ballots)? (c) Within the counts of ballots are their ballots counted as mail-in ballots which are not authentic mail-in ballots? (d) Do the officially reported numbers of ballots received match against the type of ballot which was audited? (e) Is there the possibility for not legal or compliant ballots to be mixed in with official and legal ballots?

REPORT QUICK SYNOPSIS

- 605,494 mail-in ballots, shown as mailed, are unaccounted for
- Pre-Preliminary random batch selections detail different statistical ratios which conflict with official state reports and accounting
- Hand-Folded Ballots exist in a ratio which reflects they may not be early voting ballots, therefore raises question of "Why were they hand folded?"
- Are hand folded detected ballots legitimate or were there attempts to make flat ballots appear as if they have been mailed
- Is there a discrepancy between official ballots printed and what may have been printed on BOD Printers but not Early-In-Person Voting instances?
- Were "returned as undeliverable" ballots mishandled and pirated for the secure return envelope in order to be presented as a legal mail-in ballot?
- Third-Party information requests can answer many unknowns
- Should the USPO "Mail Isolation Control and Tracking Program" be utilized?

2. Research: For this study, our lab spot checked ballot batches at random from approximately (still to be confirmed in writing from the Maricopa Audit Prime) sixteen-hundred fifty-two (1652) official ballot boxes containing the physical and original ballots of votes cast in Maricopa County, Arizona. The following sequence of photos depicts how the digital data for study is received – EXHIBIT A

2a. The specific types of digital images examined with the PKAD-Mech Systems are provided in the following manner – EXHIBIT B

2.b The source image files are then processed utilizing computer vision, machine learning, artificial intelligence and further processed matched utilizing a convolutional neural network as follows – EXHIBIT C

2c. For determining the standard for ballot printing compliance, we utilized known legal samples of authentic Maricopa County Mail-In Ballots, which were acquired from individuals who were mailed multiple mail-in ballots to their single address. Many were addressed to past occupants who moved long ago.

3. Hypothesis:

Can legally compliant folds on official ballots be detected utilizing computer vision, machine learning, artificial intelligence, and convolutional neural networks (PKAD)? Once processed through this PKAD system, If the final number of audited ballots (less spoils) show no kinematic artifacts relating to being legally mailed (such as mechanical folds) greater than 8.5% of the total PKAD

Pre-Preliminary Findings Brief Only Sample Representation of Possible Analytic Judgements ballot cast, does this mean there is a compliance and/or legal issue with the status of a portion of ballots counted as legal mail-in ballots?

The recorded totals for Maricopa ballots cast are stated to be:

(a) 2,089,563 (two million eight nine thousand five hundred sixty-three) ballots said to be part of the audit, and

(b) 1,702,981 (one million seven hundred thousand two nine hundred eighty-one) were actual mail-in early voters (EV), and

(c) 209,112 (two hundred nine thousand one hundred twelve) were recorded as early in-person with print on demand ballots (EIP)

(d) leaving 177,470 to represent in-person-day-of-election voters

If the reported numbers are correct data analysis should reflect:

(e) kinematic artifacts should confirm 81.5% of the ballots display mechanical folds detected (approximately)

(f) 10% should be detected with hand folds or a possible combination thereof, and

(g) 8.5% should be detected with no fold's present, thus cast as an in-person-day-of-vote

1) Does PKAD-Mech reporting match the numbers and percentages as reported?

2) If the numbers do not match, can the discrepancy be identified?

3) If there are in excess of 8.5% of ballots which are flat in nature (never folded but with an allowance for replacement by spoiled ballots), does this indicate fraudulent mail-in ballot reporting?

4) Does a discrepancy indicate print-on-demand being counted as mail-in-votes when they are most assuredly not mail-in votes?

5) Can the USPS system give an accurate accounting of all ballots returned to them as "undeliverable"?

6) Can these returned as "undeliverable" ballots be accounted for?

7) Does the possible missing returned as "undeliverable" mail-in ballots represent potential fraudulent ballots which were opened, voted, and then placed through the system?

8) Do the USPS postage remittances assigned to the State to mail-out ballots confirm a ballot mailing program of at least 1,702,981 individual cases in need postage paid?

9) Do the USPS postage remittances assigned to the State to mail-out ballots confirm a ballot mailing program of 3,448,181 individual cases in need postage paid?

10) Does the return postage reimbursement tally from the USPS equal the number of mail-in ballots returned (less those collected and scanned in from drop boxes)?

11) Do the State's financial records for USPO "postage due" payments confirm the numbers in question?

12) When USPS scanned in the ballots for mailing, i.e., "return postage applied" does this number equal 1,701,981 mail-in ballots recorded?

13) Does the USPS "return postage applied" individual ballot number, when added to hand drop offs and drop boxed scanned in, confirm 1,701,981 mail-in ballots recorded

WARNING NOTICES The State of Arizona is one of the only states to not "officially" report how many mail-in ballots they mailed in Arizona. Subsequently, State Certified numbers for Maricopa County, Arizona have not been able to be located. As of this pre-preliminary report the State of Arizona has still not reported these number to the Federal Election Commission (FEC) and the U.S. Election Assistance Commission (EAC).

We discovered numerous out of compliance instances of ballots not printed on official Vote Secure Paper as reported by the Maricopa County Elections Department on June 17th, 2021: "Maricopa County uses several different types of printers to ensure voters have the ability to cast a ballot in the way that works for them. No matter the mode in which a voter casts a ballot, all counted ballots are printed on VoteSecure paper. Runbeck printer printing ballots- Elections"

We discovered extraordinarily little, if any, professional compliance oversight was applied in the handling of the mail-in ballots specifically when it comes to printing and accounting for said ballots. It is our assertion, that without the official mail-in ballots mailed numbers, combined with the official "returned as not deliverable" ballots for use as comparison for the State Certified numbers, that certain "unaccounted for and absconded returned as undeliverable ballots" could have been used to make nefarious and illegal votes appear legal and compliant when tallied by the precincts.

We advise, due to the historic and monumental nature of the number of ballots mailed from Maricopa County (record setting), that actual postal and financial records of postal transactions for said mailings be researched and collected. These should then be combined with use of the Mail Isolation Control and Tracking Program. This may take a subpoena, but it may be the only way to fully understand the true and authentic nature of the election ballots mailed from Maricopa County, Arizona. Mail Isolation Control and Tracking is an imaging system employed by the United States Postal Service that takes photographs of the exterior of every piece of mail that is processed in the United States.

From:	JovanHutton Pulitzer
To:	Jennifer.Wright@azag.gov; james.cope@azag.gov; Roger
Cc:	Sonny Borrelli; Karen Fann; Wendy Rogers
Subject:	Official Ballot Confirm
Date:	Friday, March 4, 2022 12:39:56 PM
Attachments:	8230_8230_t44_FP_HM_2021-06-21T12.40.57_4101_C_Y_MIC_confirmed_OoC_C_100.png 8230_8230_t44_FP_HM_2021-06-21T12.42.08_4105_C_Y_MIC_confirmed_OoC_C_100.png

For how we confirm an official ballot from Runbeck. Will just be sending a few over, and these are on the way to you in bulk. I will send a separate folder of compromised ballots. We found very odd instances in numerous Biden ballots with machine inserted votes but that will be covered in a separate report.

Jennifer, we still need to do a debrief. jhp

--

NOTICE: *All video and voice meetings are subject to recording for recording keeping and documentation purposes.*

Jovan Hutton Pulitzer #JovanHuttonPulitzer
www.JovanHuttonPulitzer.org
https://www.linkedin.com/in/jovanhuttonpulitzer/
Cell: 646.656.1876 Office: 213.632.6425
"It isn't the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deeds could have done them much better. The credit belongs to the man who's actually within the arena, whose face is marred by dust and sweat and blood; who strives valiantly; who errs, who comes short again and once more, because there isn't any work without error and shortcoming; but who does strive to complete the deeds; who knows fantastic enthusiasms, the great devotions; who spends himself inside a worthy cause; who in the best knows within the finish the triumph of higher achievement, and who in the worst, if he fails, at least fails whilst daring greatly, so that his location shall by no means be with those cold and timid souls who neither know victory nor defeat." **Theodore Roosevelt.**

From: Karen Fann
To: Shelby Busch
Subject: FW: questions about pdfs
Date: Wednesday, September 29, 2021 6:36:17 AM
Attachments: image011.png

Fyi

Karen Fann
President of the Senate
Tel: 602.926.5874

From: Dajana Zlaticanin <DZlaticanin@azleg.gov>
Sent: Wednesday, September 29, 2021 5:35 AM
To: Karen Fann <KFann@azleg.gov>; Grant Hanna <GHanna@azleg.gov>; Melissa Taylor <MTaylor@azleg.gov>
Subject: FW: questions about pdfs

President,

Below you will find the response from our IT team regarding the documents I posted on our website.

Dajana Zlaticanin | Deputy Director of Communications
(Da-ya-na Zla-ti-cha-nin)
Arizona Senate Republicans – Majority Staff
dzlaticanin@azleg.gov | 602-926-3905
Cell: 602-999-5562

From: Ryan McIver <RMcIver@azleg.gov>
Sent: Monday, September 27, 2021 11:42 AM
To: Denis Bideri <DBideri@azleg.gov>; Dajana Zlaticanin <DZlaticanin@azleg.gov>
Cc: Paul Robbert <PRobbert@azleg.gov>
Subject: RE: questions about pdfs

Hi Dajana,

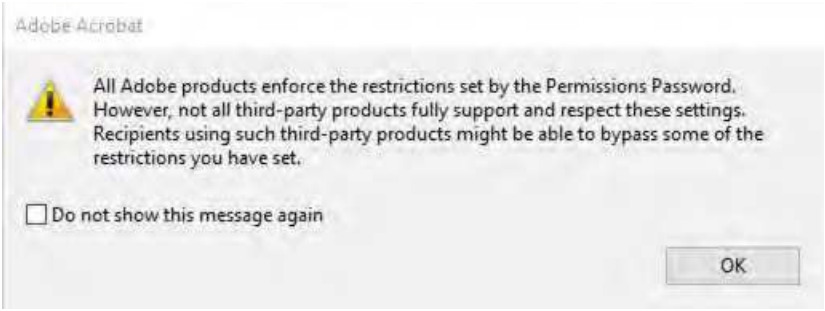
Please see the response below from @Denis. I want to reiterate his point that, while you can use these settings to make it more difficult to edit these files, a determined person with the right software may still be able to access and edit their downloaded copies of these documents.

Thanks
Ryan

Hi Dajana,

Your understanding is correct, anyone can download anything and edit provided they have the right tools. Although there are steps you can take to discourage that. The level of restrictions you can apply to documents varies with each file type.

- For PDFs, you can apply a *permissions password* to restrict printing, editing, copying, commenting, form filling add or redacting pages. However, even with a password, Adobe will still inform you that 3rd party tools may be able to edit the document (see the screen shot below…). That being said, Adobe still offers more flexibility on how much you can restrict a document.



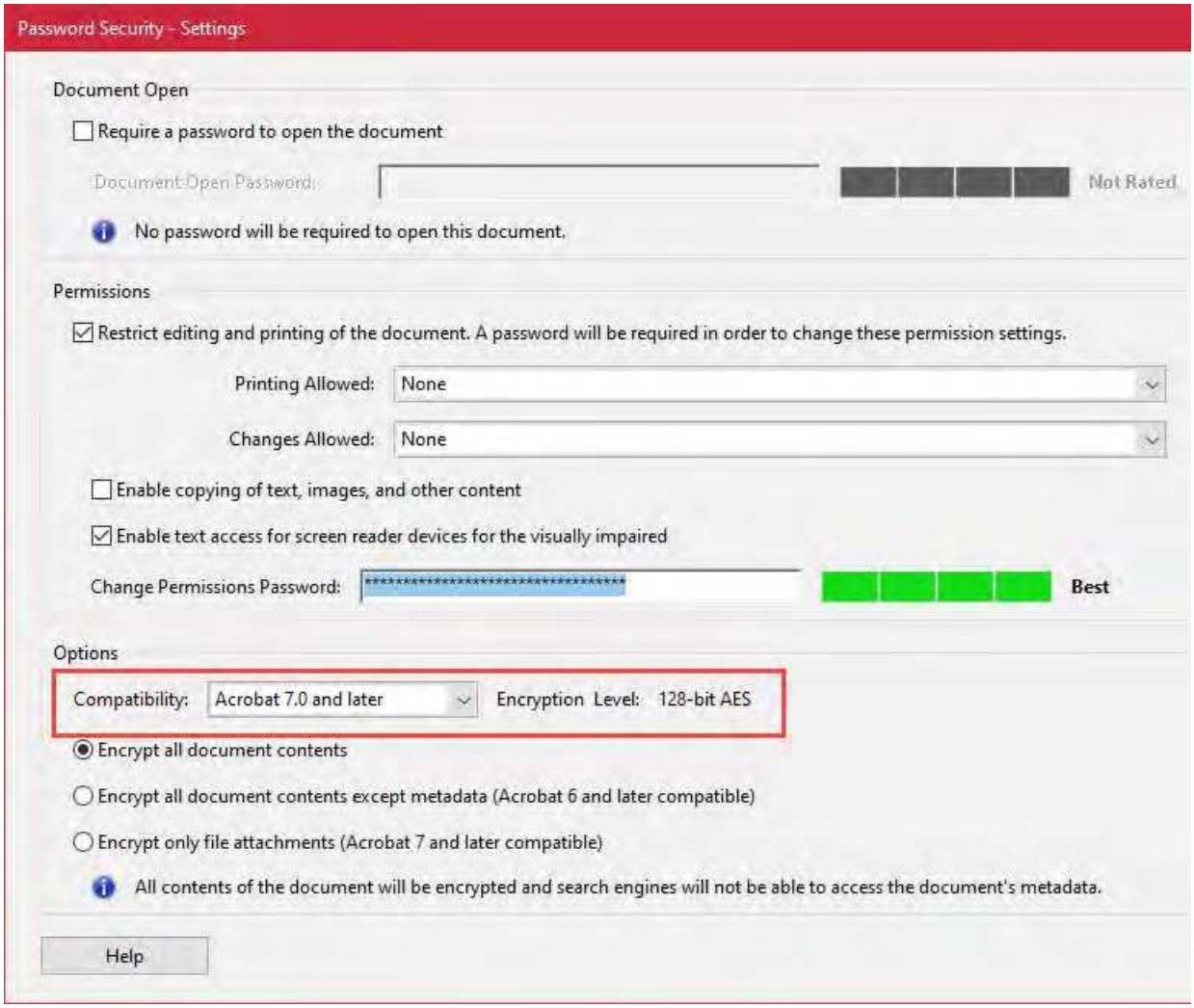
- For PowerPoint documents, you can apply a password to restrict editing. The effect being it locks the document and which can then only be opened with a password. Once the document has been decrypted with the password, changes can be made to the file. This approach would not be ideal for documents that are posted online. My suggestion would be to export the PowerPoint to PDF, then apply the restrictions to PDF before posting.

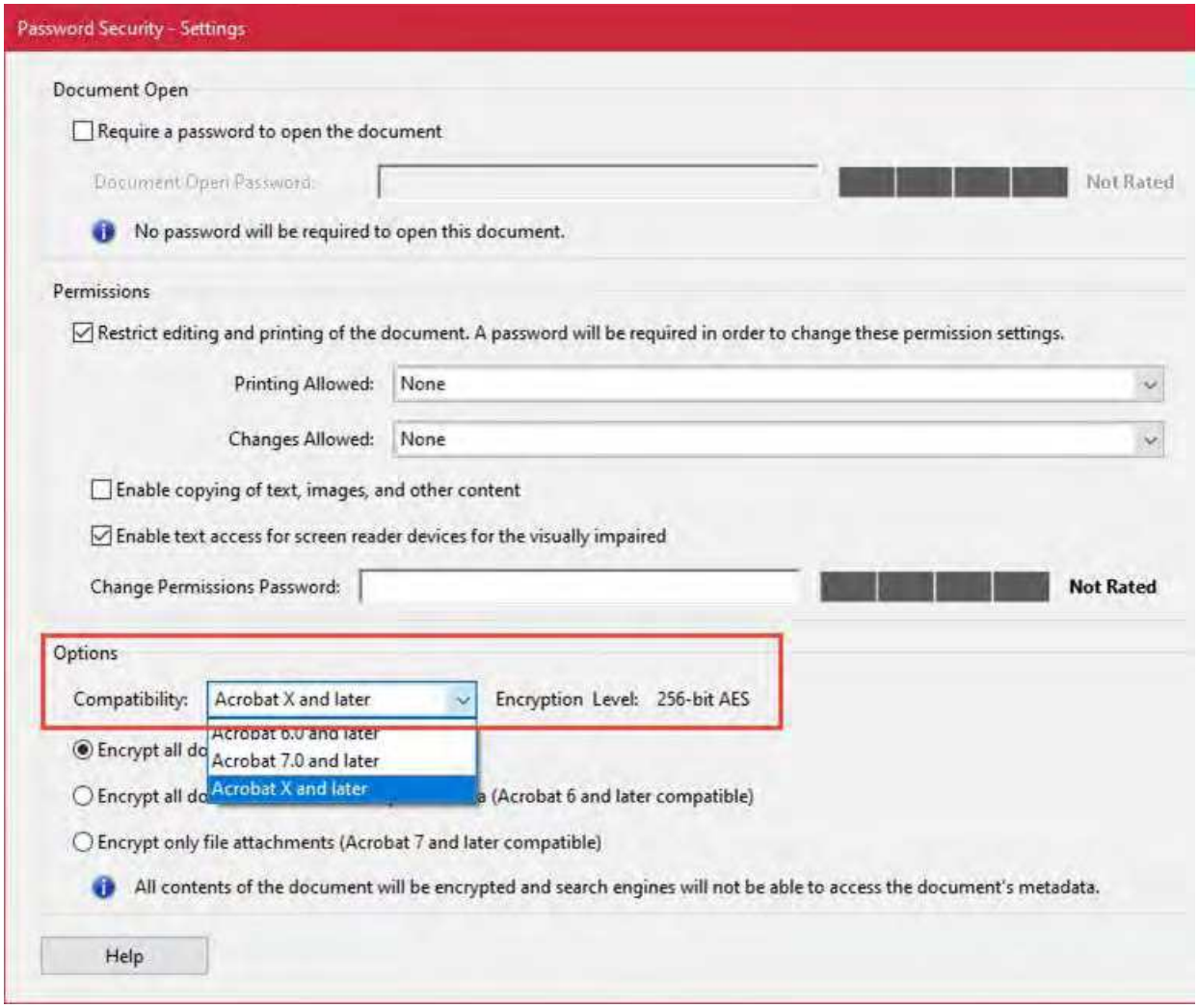
As mentioned, there is no bulletproof method to protect PDFs from edits, but this makes it more difficult to tamper with it.

Instructions on how to protect PDF documents

1. With the document open, go to File > Properties
2. In the document properties, click on Security tab
3. Select "Password Security" for the security method

The window below will come up. You can then create a password and fine-tune your settings, including the encryption levels as shown in the images below.





If you have any questions please feel free to reach out to us.
Thanks,
Denis

From: Dajana Zlaticanin <DZlaticanin@azleg.gov>
Sent: Saturday, September 25, 2021 10:57 PM
To: Boris Mulady <bmulady@azleg.gov>; Denis Bideri <DBideri@azleg.gov>
Subject: questions about pdfs
Importance: High

Good evening,
Hope you are both well.
I have posted different pdfs and PowerPoint presentations from the audit presenters on our website. There is a lady who reached out to the president and said she is worried people can download and edit the document. Even though I explained to that lady that anyone can download anything and edit it, she feels it's very unprofessional to post just a pdf and a PowerPoint. Also, I explained that anyone can download the pdf the presentation and temper with it if they want and that we have no control of it. We just have to make sure the information on our documents is correct. It doesn't take much skill to do those things.
However, I wanted to get your opinion on this. What is your advice on how to proceed? And is there a way to protect these documents to ensure their legitimacy?
Here are all the docs: https://www.azsenaterepublicans.com/audit
THANK YOU!

Dajana Zlaticanin | Deputy Director of Communications
(Da-ya-na Zla-ti-cha-nin)
Arizona Senate Republicans – Majority Staff
dzlaticanin@azleg.gov | 602-926-3905

Cell: 602-999-5562

From:	Shiva Ayyadurai
To:	Randy Pullen; fannm@cableone.net
Subject:	Final Version
Date:	Friday, February 4, 2022 3:44:44 PM
Attachments:	Analysis-of-Counterfeit-Ballot-Report.pdf

Dear All,
Here is the final version. Attached also is an invoice of $2,500 for the effort. I believe the analysis will help in ensuring we support our efforts for election integrity.

Warm regards,
Shiva

--
Office of V.A. Shiva Ayyadurai, Ph.D.
VA SHIVA | Know the Truth - Find Your Way - Be the Light™
1.617.631.6874 | vashiva.com | twitter: @va_shiva

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Initial Analysis of the "Counterfeit Ballot Report" Submitted to the Arizona State Senate on "September 14, 2021"

Shiva Ayyadurai, Ph.D.
February 4, 2022

INTRODUCTION

On January 28, 2022, representatives of the Arizona State Senate sent this author a copy of a Report that alleged counterfeit ballots were used in the Maricopa 2020 General Election. The author was asked to review the Report. This analysis is by no means extensive rather it aims to provide the reader commentary on aspects of the Report, when considering the credibility of this Report as evidence of counterfeit ballots. The organization of the analysis herein provides the reader references to pages in the Report along with commentary for consideration. In addition to the author's review of the Report, special thanks to Heather Honey for providing her inputs based on her experience at the Maricopa Audit.

COMMENTARY

I. Page 7 of the Report

a. The Report asserts that the presence of yellow dots on the ballots is evidence of MIC codes being present on the paper. This is false.

b. The yellow dots on ballots, printed by Runbeck's color printers, are not MIC codes. The yellow dots are random. This was confirmed by HP, the manufacturer of the equipment.

c. It is a total misrepresentation to state the ballots were printed in foreign countries. The Report provides no evidence to support such an assertion.

d. The Report asserts that there is a legal requirement to put MIC codes on the ballots. This is false. Neither the author nor those he has consulted associated with the Maricopa audit are aware of any such legal requirement. The Report should provide, if it exists, reference to such a legal requirement.

II. Page 9 of the Report

a. The assertion is that misalignment of ballots is the basis for them being counterfeit. This is false.

b. On ballot-on-demand printers, mis-alignment may occur and is not abnormal, and likely not infrequent.

c. Misaligned ballots are corrected by software during ballot image processing. The author's own work in processing Maricopa County's ballot images provides evidence of this process. Comparison of the ballot images, moreover, with the CVR reveals that printer alignment did not cause adjudication.

d. Basic digital image processing techniques such as homography allows for re-alignment of ballot images that are mis-aligned. The Dominion software provides the ability to realign misaligned ballot images.

III. Page 10-12 of the Report

a. This portion of the Report asserts evidence of the use of unauthorized ballot papers. The evidence is not apparent.

b. Various figures in section of the Report are provided to assert multiple types of ballot papers were used. This has no basis in science. The sample paper that the Report's writer purchased and used for comparison is not available in the size used for the ballots and therefore could **not** be the ballot paper used. Maricopa County has produced records showing the purchase of ballot paper used in the 2020 election.

c. There is no evidence to assert that the "unauthorized ballot paper" was the basis of excessive adjudication.

d. There is no evidence to assert that the "bleed through" was caused by such "unauthorized ballot paper" leading to adjudication. The author's ballot image analysis reveals there is no evidence of "bleed through" as the basis for adjudication as asserted in the Report. The CVR and the ballot images show that bleed through did not cause excessive adjudication.

IV. Bottom of Page 16 of the Report

a. The claim 335,000 ballots were affected by alignment issues has no basis.

b. As aforementioned, alignment problems are easily taken care of in software.

V. Page 17-22 of the Report

a. Alignment issues are easy to handle in software through homography.

b. Misaligned printing of ballots are not the cause of adjudication.

c. The "web" graphs are incomprehensible and irrelevant, and provide no basis for evidence that mis-alignment led to increased adjudication.

VI. Page 23-25 of the Report

a. When ballot-on-demand printers didn't have color ink, it is normal to convert color to gray scale.

b. This is a misrepresentation of facts.

VII. Page 26-34 of the Report

a. There is no evidence to assert that the "bleed through" was caused by such "unauthorized ballot paper" leading to adjudication.

b. There is no evidence that the misalignment led to adjudication.

c. Review of Election Day ballots shows no evidence. In fact, the near 100% of adjudicated Election Day ballots were Write-In's.

VIII. Page 37 to 47

a. The Report asserts that all Early Voting Ballots (EVBs) should be machine folded, not folded by humans. This is false.

b. Among the EVBs, Early In-Person ballots are folded by humans, as is expected. Among the EVBs, only the Runbeck printed ballots, are machine-folded.

c. Furthermore, all of the duplicated ballots, approximately 25,000, were not folded at all.

d. The Fold issues asserted in the Report is not an issue.

IX. Page 52 - 58

a. Lack of understanding of what is a provisional ballot and how they are processed.

b. The number of Provisional ballots actually reduced from 2016 to 2020.

c. These graphs are nothing but a restatement of the Maricopa Canvass Report.

CONCLUSION

There are many real and significant problems affecting election systems integrity. The issues addressed in the Report are non-issues, and the manner in which those non-issues are addressed serve at best to delegitimize the efforts of dedicated scientists and analysts who are performing credible work based on evidence, not assertions and claims without basis in fact.

From: Sawyer Bessler
To: Shiva Ayyadurai
Subject: RE: Audit Review Meeting
Date: Thursday, September 23, 2021 3:25:00 PM

Dr. Shiva,

Thank you. I've texted Melissa and President Fann to let them know. As soon as Mr. Logan is finished with his presentation you will be able to go next. I apologize for the wait.

Respectfully,
Sawyer Bessler
Assistant to President Karen Fann
Arizona State Senate
1700 W. Washington St.
Phoenix, Arizona 85007
Tel: (602) 926-3843

From: Shiva Ayyadurai <vashiva@vashiva.com>
Sent: Thursday, September 23, 2021 3:15 PM
To: Sawyer Bessler <SBessler@azleg.gov>
Subject: Re: Audit Review Meeting

Sawyer
- Im on the Zoom call

On Thu, Sep 23, 2021 at 4:47 PM Sawyer Bessler <SBessler@azleg.gov> wrote:

> My apologies for the delayed response. Unfortunately, the Senate team will not be on the call until 5:00 pm EDT. We are willing to accommodate your time and have you present first if you are able to join the call.
>
> Respectfully,
> **Sawyer Bessler**
> ***Assistant to President Karen Fann***
> ***Arizona State Senate***
> 1700 W. Washington St.
> Phoenix, Arizona 85007
> Tel: (602) 926-3843
>
> ---
>
> **From:** Shiva Ayyadurai <vashiva@vashiva.com>
> **Sent:** Thursday, September 23, 2021 12:15 PM
> **To:** Sawyer Bessler <SBessler@azleg.gov>
> **Subject:** Re: Audit Review Meeting
>
> Hi Sawyer,
> I 'm on my way back from a dentist APPT. I will be home shortly, and perhaps can join a 4:30PM to show my current version.

_Shiva

On Thu, Sep 23, 2021 at 2:32 PM Sawyer Bessler <SBessler@azleg.gov> wrote:

> Good Afternoon Dr. Shiva,
>
> We are are setting up a Zoom call this afternoon at 2:00 pm MST or 5:00 pm EDT. The purpose of the meeting is to review the power points for tomorrow's hearing in the Senate, and it will include everyone from your previous Zoom call. We know you are very busy, so I will add you to the optional tab of the invite if you can't attend. If you are able to attend, we are also happy to go through your presentation first so that you do not need to stay on for the entire meeting. Please reach out if you have any questions.
>
> Respectfully,
> **Sawyer Bessler**
> ***Assistant to President Karen Fann***
> ***Arizona State Senate***
> 1700 W. Washington St.
> Phoenix, Arizona 85007
> Tel: (602) 926-3843

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From:	Shiva Ayyadurai
To:	Karen Fann
Cc:	Randy Pullen; Kory Langhofer
Subject:	Extended Study on Signature Verification
Date:	Wednesday, March 2, 2022 3:39:59 PM
Attachments:	ESII-Signature-Verification-Final-Report-Extended-Study.pdf

Dear Honorable Senate President Fann:

Attached is a PDF containing the Extended Study on Signature Verification. There are no signature images in this document, except a exemplar one of "Thomas Jefferson." The document has been delivered to the Attorney General of Arizona along with a database of pairwise signature images providing evidence of the conclusion of this scientific study that at minimum over 200,000 early voting mail ballots were counted without being reviewed.

The initial Pilot Study as you may recall had a sample size of 499 for a 95% confidence level. This new study has a sample size five times larger - 2,770 - for a 99% confidence level with a +/- 2.5% Margin of Error. We will be publishing this on Thursday.

Kindly provide any feedback and comments. I've reviewed the Study with Randy Pullen and all of his feedback and comments have been incorporated.

Thank you again.

Sincerely,
Dr. Shiva Ayyadurai.

--
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ESII ELECTION SYSTEMS INTEGRITY INSTITUTE

AN EXTENDED STUDY

Extended Study Confirms At Minimum Over 200,000 Mail Ballots With Mismatched Signatures Counted Without Review ("Curing") in Maricopa County, Arizona 2020 General Election

Dr. Shiva Ayyadurai, MIT Ph.D.

S.B. Electrical Engineering & Computer Science, M.I.T.
S.M. Visual Studies, M.I.T. Media Laboratory
S.M. Mechanical Engineering, M.I.T.
Ph.D. Biological Engineering, M.I.T.

Study Completed: February 23, 2022
Reviewed with AZ Senate Liaison: March 1, 2022
Delivered to AZ Senate: March 2, 2022
Delivered to AZ Attorney General: March 2, 2022

Delivered to:

Honorable Senator Karen Fann
President of the Senate
Arizona State Senate
1700 West Washington Street
Phoenix, AZ 85007

Honorable Mark Brnovich
Attorney General of Arizona
Office of Attorney General
2005 N. Central Avenue
Phoenix, AZ 85004-2926

AUTHOR'S BIO

Dr. Shiva Ayyadurai, MIT PhD, S.M.M.E., S.M.V.S., S.B.E.E., the inventor of email and polymath, holds four degrees from MIT, is a world-renowned engineer, systems scientist, inventor and entrepreneur. He is a Fulbright Scholar, Lemelson-MIT Awards Finalist, India's First Outstanding Scientist and Technologist of Indian Origin, Westinghouse Science Talent Honors Award recipient, and a nominee for the U.S. National Medal of Technology and Innovation. He holds multiple patents, is the author of twenty books, and has published original research, in leading peer-reviewed high-impact scientific journals including *IEEE, IJPRAI, Nature Neuroscience, CELL Biophysical Journal,* that have received thousands of citations. He has started seven successful high-tech companies, received numerous industry awards, consults for Global 2000 organizations and government, and has been invited to present Keynote and Distinguished lectures at leading institutions such as NSF, NIH, FDA, Harvard, and at MIT, where he delivered the Presidential Fellows Lecture.[1]

In 1978, as a 14-year-old, he was recruited as a Research Fellow by the University of Medicine and Dentistry of New Jersey (UMDNJ), in Newark, NJ after graduating with Honors from a special program in Computer Science at the Courant Institute of Mathematical Science at NYU. At UMDNJ, he invented email – ***the system*** as we know it today – when he was the first to convert the old-fashioned *interoffice paper-based mail system* consisting of the Inbox, Outbox, Memo (To:, From:, Date:, Subject:, Cc:, Bcc:), Attachments, Folders, etc. into its electronic equivalent by writing 50,000 lines of code to create a software system, which he named "Email," – a term never used before in the English language – and went on to be awarded the first U.S. Copyright *TXu 111-775* for "EMAIL, COMPUTER PROGRAM FOR ELECTRONIC MAIL SYSTEM" recognizing him as the inventor of email at a time when Copyright was the only legal mechanism to protect software inventions. Only in 1994 did the Federal Circuit recognize software as a "digital machine" allowing for software patents. Email is not the simple exchange of text messages. Dr. Shiva has never claimed to be the inventor of electronic messaging, which predates email - the system that he created in 1978.[2,3]

Recognizing his talents in software programming, UMDNJ gave him the opportunity to conduct medical research focused on developing pattern recognition classification methods for categorization of sleep signature patterns from babies with Sudden Infant Death Syndrome (SIDS). His research was published in IEEE and presented at the IEEE-EMBS conference in Espoo, Finland. Since that time and for more than forty years, his research and development efforts in academia and industry have been focused in the field of pattern recognition classification systems, systems science, and development of large-scale computational systems for analysis of diverse signals and signatures across a range of industries: biology and medicine, engineering (e.g. aeronautical, civil, mechanical, electrical), banking, finance, and, government, as well as across a diversity of applications including handwriting recognition of courtesy amounts on bank checks, automatic analysis and classification of electronic documents e.g. email, ultrasonic and radar wave signature classification for non-destructive evaluation (NDE), signals analysis of Tadoma

[1]Dr. Shiva Ayyadurai, Biography and Curriculum Vitae, https://vashiva.com/about-va-shiva-ayyadurai/
[2]Facts on the invention of email, https://www.inventorofemail.com/thefacts/
[3]The Man Who Invented Email, TIME, https://techland.time.com/2011/11/15/the-man-who-invented-email/

AUTHOR'S BIO (CONT.)

feature identification, biomarker analysis for determining signatures of efficacy for multi-combination therapies, image analysis for cardiology, and signal detection of fluid flow anomalies in fluidized bed reactors.

He earned a Bachelors in Electrical Engineering and Computer Science, a Masters in Mechanical Engineering, and another Masters in Visual Studies from the MIT Media Laboratory. In the midst of his PhD research in 1993, where he aimed to create a generalized platform – Information Cybernetics – for pattern recognition, he won an industry-wide competition sponsored by the White House, Executive Office of the President, to automatically analyze and classify President Clinton's email, resulting in his developing EchoMail® - a platform for automatic classification of electronic documents –, and subsequently launching EchoMail, Inc., a company that grew to nearly $200 million in market valuation. EchoMail today applies its technologies across a diversity of applications.

In 2003, he returned to MIT complete his doctoral work in systems biology in the department of Biological Engineering where he developed CytoSolve®, a scalable computational systems biology platform for mathematically modeling the whole cell. Following his PhD, Dr. Shiva was selected for a Fulbright Fellowship returning him to India where he discovered the systems theoretic basis of eastern systems of medicine resulting in Systems Health®, a new educational program that provides a scientific foundation for integrative medicine. In 2012, Dr. Shiva launched CytoSolve, Inc. with the aim of modeling complex diseases and biomolecular processes to discover multi-combination medicines. His efforts led to CytoSolve earning an FDA allowance for a multi-combination therapy for pancreatic cancer in a record eleven months, developing innovative nutraceutical products, and garnering numerous industry and academic partnerships.

As an educator dedicated to the field of systems science and systems thinking, Dr. Shiva pioneered Systems Visualization, a course he taught at MIT to graduate and undergraduate students, which integrated systems theory, narrative story telling, metaphors, and data science to provide a pedagogy for visualization of complex systems. He founded the International Center for Integrative Systems, a research and educational institution and home to Innovation Corps and R.A.W./C.L.E.A.N. Food Certified, for broader applications of systems science.

Dr. Shiva has appeared in The MIT Technology Review, TIME, The Wall Street Journal, New York Times, NBC News, USA Today and other major media. Dr. Shiva was named Top 40 Under 40 in the Improper Bostonian. He continues his passion for entrepreneurialism as Managing Director of General Interactive to incubate, mentor and fund new startups in various areas including healthcare, media, biotechnology, information technology, to name a few.

Dr. Shiva is a member of Sigma-Xi, Eta Kappa Nu, and Tau Beta Pi.

ESII ELECTION SYSTEMS INTEGRITY INSTITUTE

A Publication of the Election Systems Integrity Institute

The Election Systems Integrity Institute ("ESII") is dedicated to providing independent research and infrastructure to support Election Systems Integrity. This publication documents the work completed by EchoMail, Inc., which was commissioned by the Arizona State Senate to perform the work in this study.

Table of Content

ABSTRACT

- Maricopa County Election Dept. states it has a "rigorous signature verification process."[1]
- Maricopa states, "When an early [voting mail] ballot is returned, the envelope is scanned in and sent to signature verification. **100% of mail-in ballot signatures are verified by trained staff.**"[1]
- During Maricopa Audit, EchoMail received early voting mail ballot (EVB) envelope images from 1,911,918 unique voters. Therefore, "100%" means at least 1,911,918 EVBs were "verified by trained staff."
- Of the 1,911,918 EVB signatures verified, the County reported only 25,000 were flagged as signature mismatches requiring review – "curing;" and after curing, the County concluded only 587 of the 25,000 (2.3%) to be "Bad Signatures."[1]
- On February 22, 2022, the Elections Systems Integrity Institute (ESII) published results of EchoMail's signature matching Pilot Study that found at a minimum over 200,000+ EVBs in Maricopa were signature mismatches that should have been cured, far larger than the 25,000 reported by the County [2]

[1] Maricopa County Elections Department, "Correcting the Record: Maricopa County's In-Depth Analysis of the Senate Review," January 2022.
[2] Ayyadurai, Shiva, "Irreconcilable Differences – Over 200,000 Mail Ballots With Mismatched Signatures Counted Without Being Reviewed ("Cured") in Maricopa: First Study to Calculate Signature Matching Rates to Provide a Quantitative Framework for Assessing Signature Verification of Mail Ballots," Election Systems Integrity Institute (ESII), Cambridge, MA, February 22, 2022.

ABSTRACT

- The Pilot Study was conducted using 499 EVB signature images that were randomly selected from a database of 1,911,918 EVB envelope images from Maricopa in order to have a 95% Confidence Level such that the real value would be within ±4.4% Margin of Error of the measured value.[3]
- In the Pilot Study, six reviewers – 3 experts (Forensic Document Examiners – FDEs) and 3 trained novices (non-FDEs) – who were presented pairwise images of signatures from the EVB envelope and a genuine signature, ALL concurred 60 of the 499 (12%) EVBs to be signature mismatches.[3]
- The Pilot Study concluded that 229,430 EVBs should have been cured versus the "upwards of 25,000" that Maricopa County reported cured.[3]
- Though the results from Pilot Study were compelling, it was decided an Extended Study should be conducted using a much larger sample size.
- The Extended Study used a sample size of 2,770 – five times larger than Pilot Study - in order to have a 99% Confidence Level so the real value would be within ±2.5% Margin of Error of the measured value.

[3] Ayyadurai, Shiva, "Irreconcilable Differences – Over 200,000 Mail Ballots With Mismatched Signatures Counted Without Being Reviewed ("Cured") in Maricopa: First Study to Calculate Signature Matching Rates to Provide a Quantitative Framework for Assessing Signature Verification of Mail Ballots," Election Systems Integrity Institute (ESII), Cambridge, MA, February 22, 2022,

ABSTRACT

- The Extended Study found:
  - If Experts - Forensic Document Examiners (FDEs) – alone were used to review the EVB signatures, then at a minimum over 400,000 mismatched signatures should have been cured given ALL three FDEs concurred that 21.0% of the same EVBs (582 of 2,770) were signature mismatches.
  - If Trained Novices – non-FDEs – alone were used to review the EVB signatures, then at a minimum over 250,000 mismatched signatures should have been cured given ALL three non-FDEs concurred that 13.1% of the same EVBs (363 of 2,770) were signature mismatches.
  - If non-FDEs and FDEs BOTH were used to review the EVB signatures in a two-step process (non-FDEs reviewing first, then FDEs), then at a minimum over 200,000 mismatched signatures should have been cured given a two-step signature mismatch rate of 10.5%, wherein 290 of 2,770 would be classified as signature mismatches.
- This Extended Study confirms the findings of the earlier Pilot Study and concludes that the process used for signature verification in Maricopa is a **flawed signature verification process.**

Background

What Is Signature Verification?

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- Signature verification is a multi-step process aimed to verify a signature based on review of two signatures side-by-side: one being genuine, the other being questionable.

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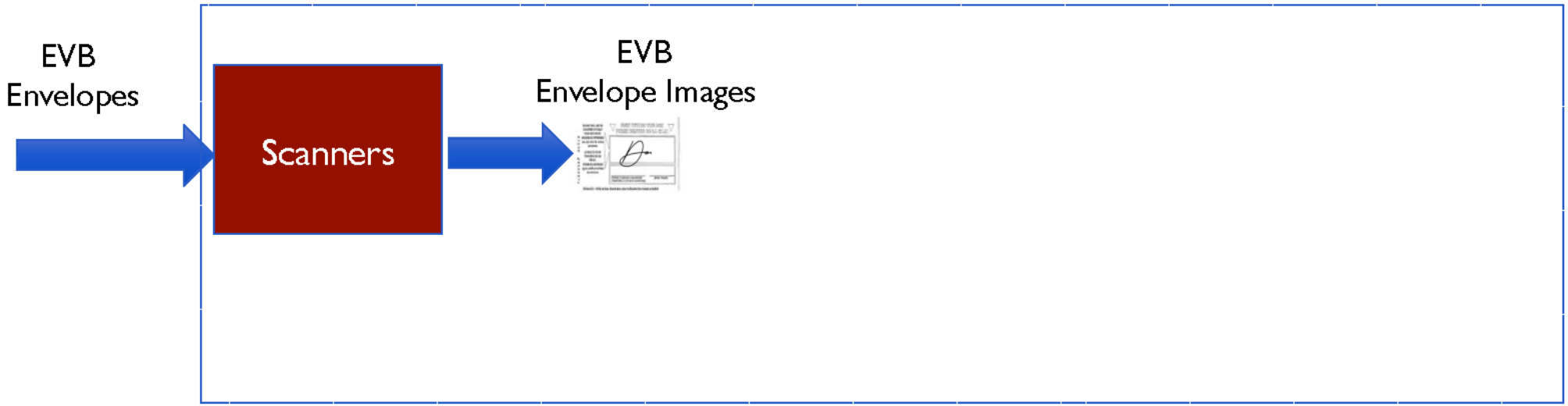

- EVB envelopes are scanned to produce EVB envelope images

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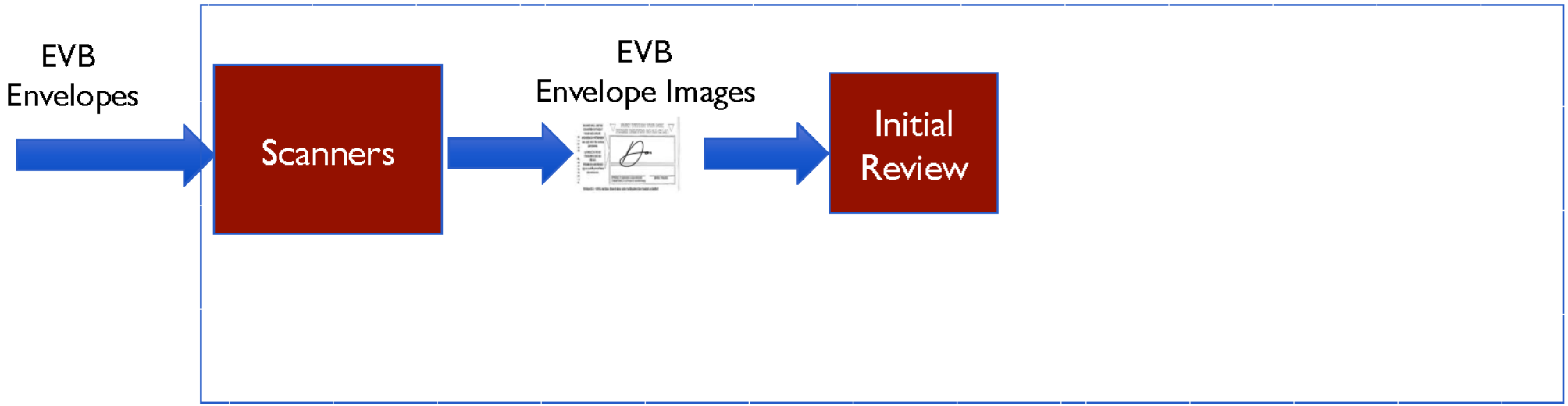

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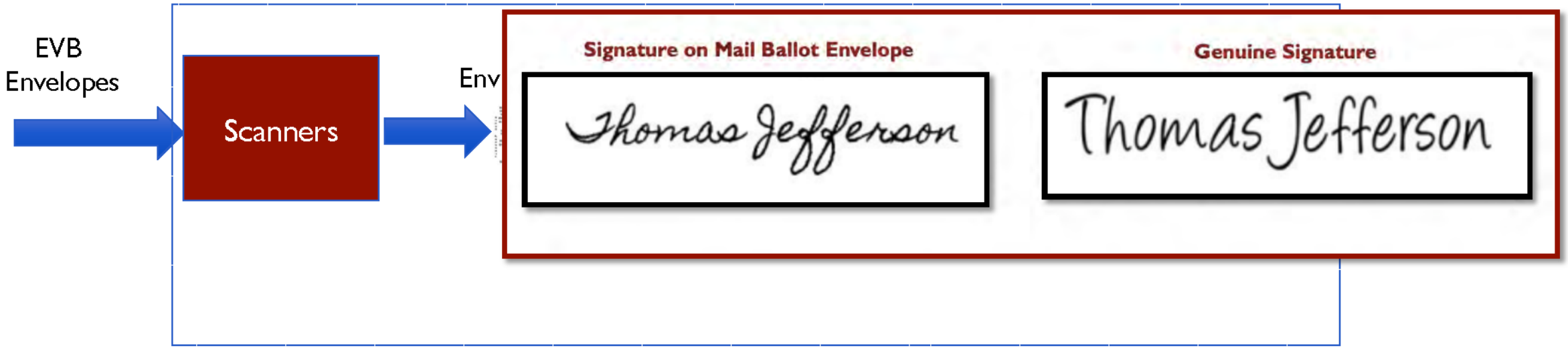

- EVB envelopes are scanned to produce EVB envelope images
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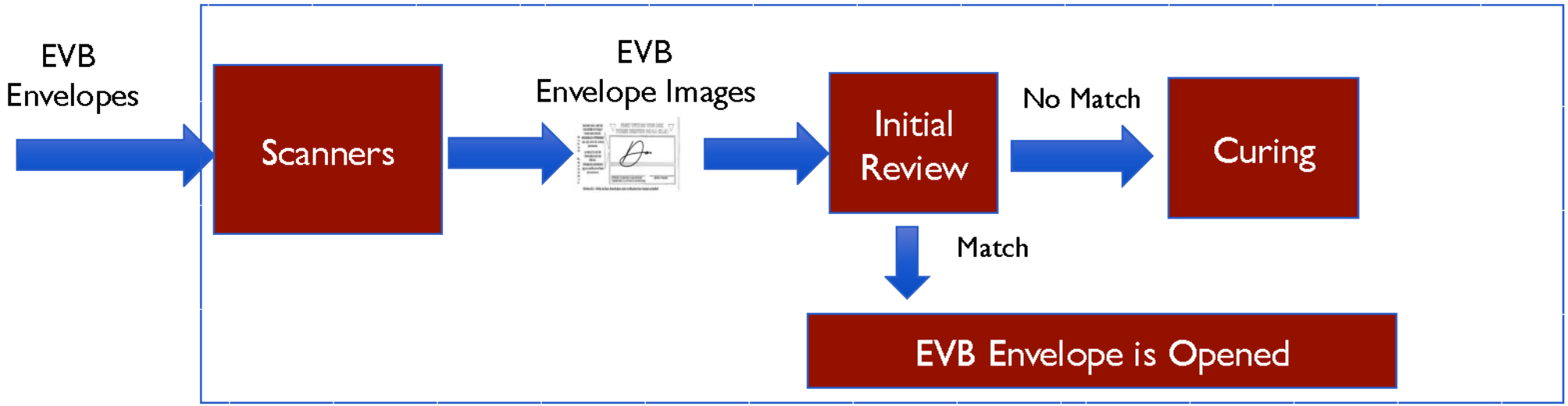

- EVB envelopes are scanned to produce EVB envelope images
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  - Trained Staff review 100% of all EVB envelope images following County's procedures to determine if EVB signature is a *Match* or *No Match* with genuine signature on file (takes 4 to 30 seconds)
  - Any *No Match* is sent to Manager (with more expertise) to determine if it should be cured or not

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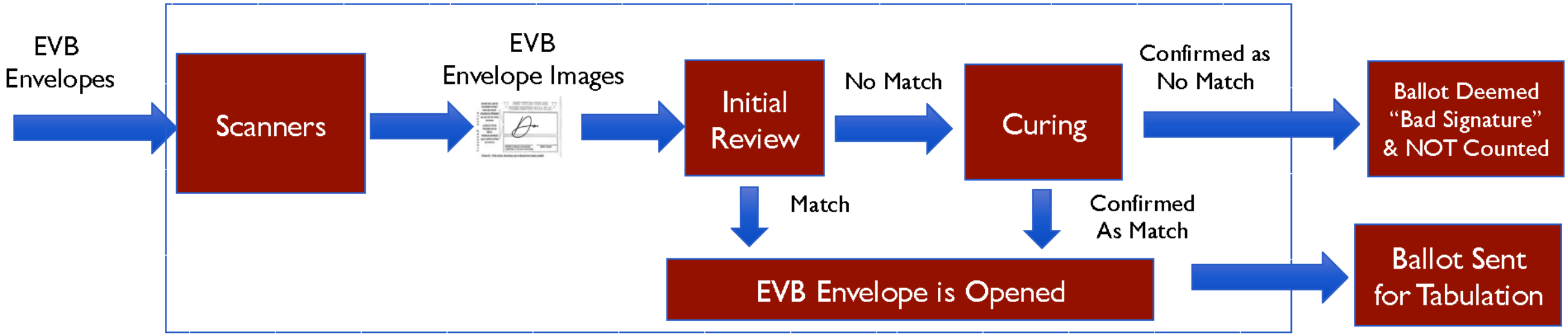

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  - Any *No Match* is sent to Manager (with more expertise) to determine if should it be cured or not
- Curing includes review by bipartisan teams & contacting voter to determine if *No Match* Initial Review is a "Bad Signature" or a *Match*

Results of Signature Verification In Maricopa County

2020 General Election

Total Number of Voters Submitting EVBs	**1,911,918**
Maximum Number of EVBS that Were Cured by Maricopa	**25,000***
Percentage Cured as a Total of All EVBs	1.31%
EVBs Determined to be "Bad Signatures" AFTER Curing	**587**
Percentage "Bad Signatures" as a Total of All EVBs	0.031%
Percentage "Bad Signatures" as a Total of EVBs Cured	2.3%

*County reported "upwards of 25,000" were cured. EchoMail in its earlier report [4] presented to the Arizona State Senate that it uncovered 17,322 duplicate EVB envelope images from 17,126 unique voters. The County stated these duplicate images were an artifact of the curing process, which means that 17,126 EVBs were cured. The County has yet to report the exact number of EVBs cured.

[4] Ayyadurai, Shiva, "Pattern Recognition Classification of Early Voting Ballot (EVB) Return Envelope Images for Signature Presence Detection: An Engineering Systems Approach to Identify Anomalies to Advance the Integrity of U.S. Election Processes," Presented to AZ State Senate, September 24, 2021.

Methodology

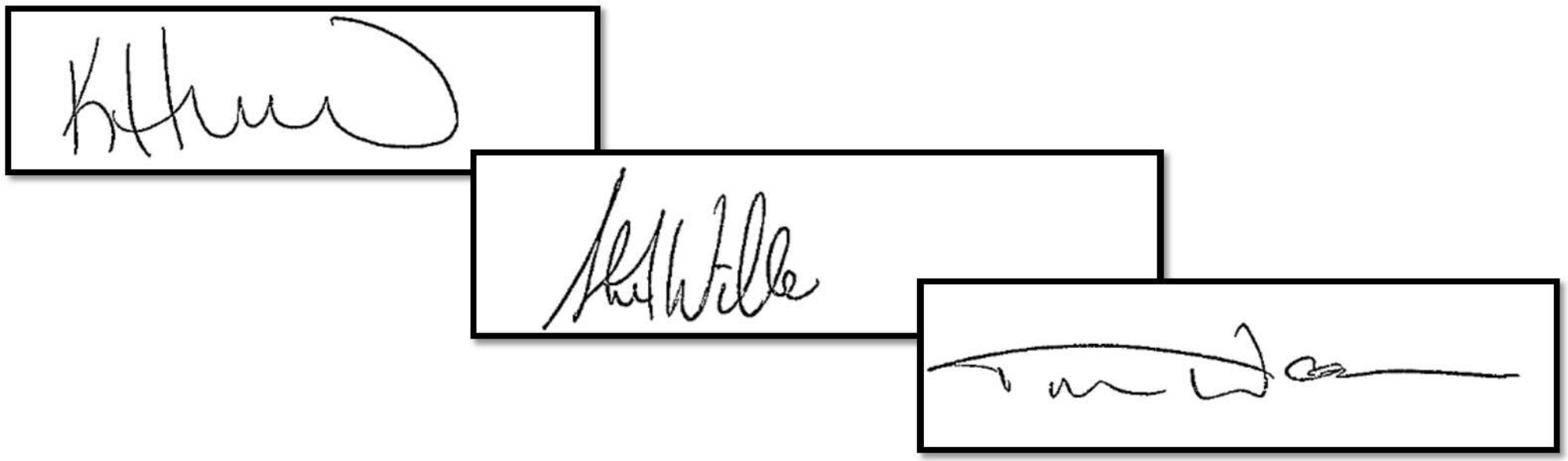
Methodology

- **Step 1**: Select a representative statistical sample from population of 1,911,918 early voting mail ballots (EVBs) to have a **Confidence Level of 99%** and a **Margin of Error of ±2.5%;**

- To achieve this, a **Sample Size of 2,770** is selected

Methodology

- **Step 2**: Organize a data set of 2,770 envelope signatures by random sampling of Maricopa's 1.9M+ EVB envelope images:



Methodology

- **Step 3**: Create data set of the 2,770 genuine signatures that match names and addresses of the 2,770 envelope signatures:
  - Genuine signatures are sourced from Maricopa's publicly accessible Deeds' repository
  - 2,770 Deeds' genuine signatures are extracted
  - It should be noted that the source of genuine signatures used in this study may be different from source of genuine signatures used by County; however, experts in forensic document examination share that signatures from a Deeds repository may likely be more valid given such signatures are Notarized

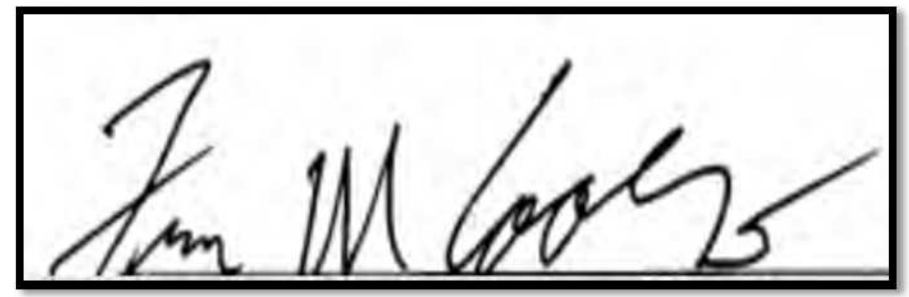
If the County provides the genuine signatures in their files for the 2,770 samples used herein, this Extended Study can be updated.

Methodology

- **Step 4**: Create pairwise dataset of 2,770 envelope signatures and 2,770 genuine signatures

Signature on Mail Ballot Envelope

Genuine Signature



- Reviewer is given TWO choices: ***Match*** or ***No Match***

Experiment I

Determination of Signature Mismatching Rates of EVBs Using Experts - Forensic Document Examiners (FDEs)

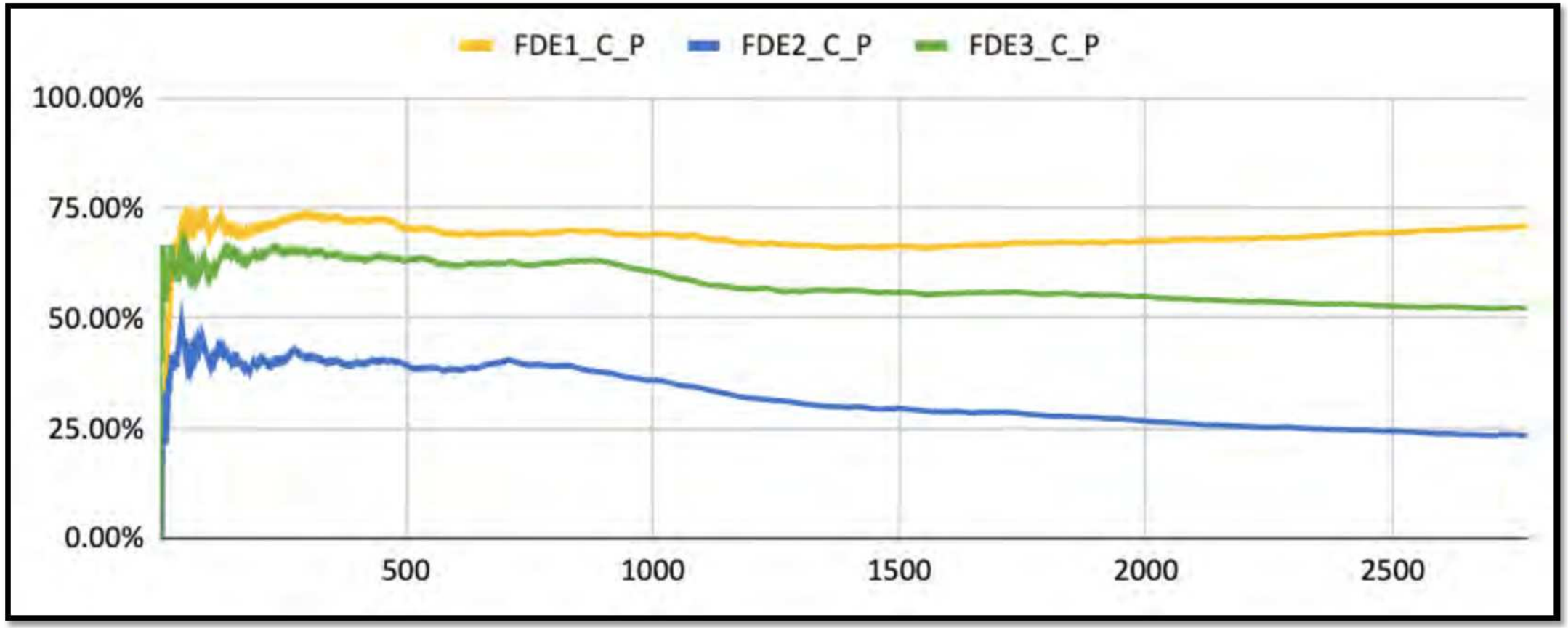
Experiment I

Experts: Forensic Document Examiners (FDEs)

- Three FDEs were recruited and asked to apply their training
- Presented 2,770 pairwise images to review for no more than 30 sec
- Recorded each FDEs **Match** and **No Match** selections
- Calculate each FDEs **Mismatch** rate
  - Calculate **FDEs Average Signature Mismatch Rates**
- Calculate **FDEs Pooled Consensus Signature Mismatch** rate
  - The "FDEs Pooled Consensus Signature Mismatch" rate is calculated by dividing the number of the same EVBs that ALL FDEs concur are signature mismatches by the number by 2,770

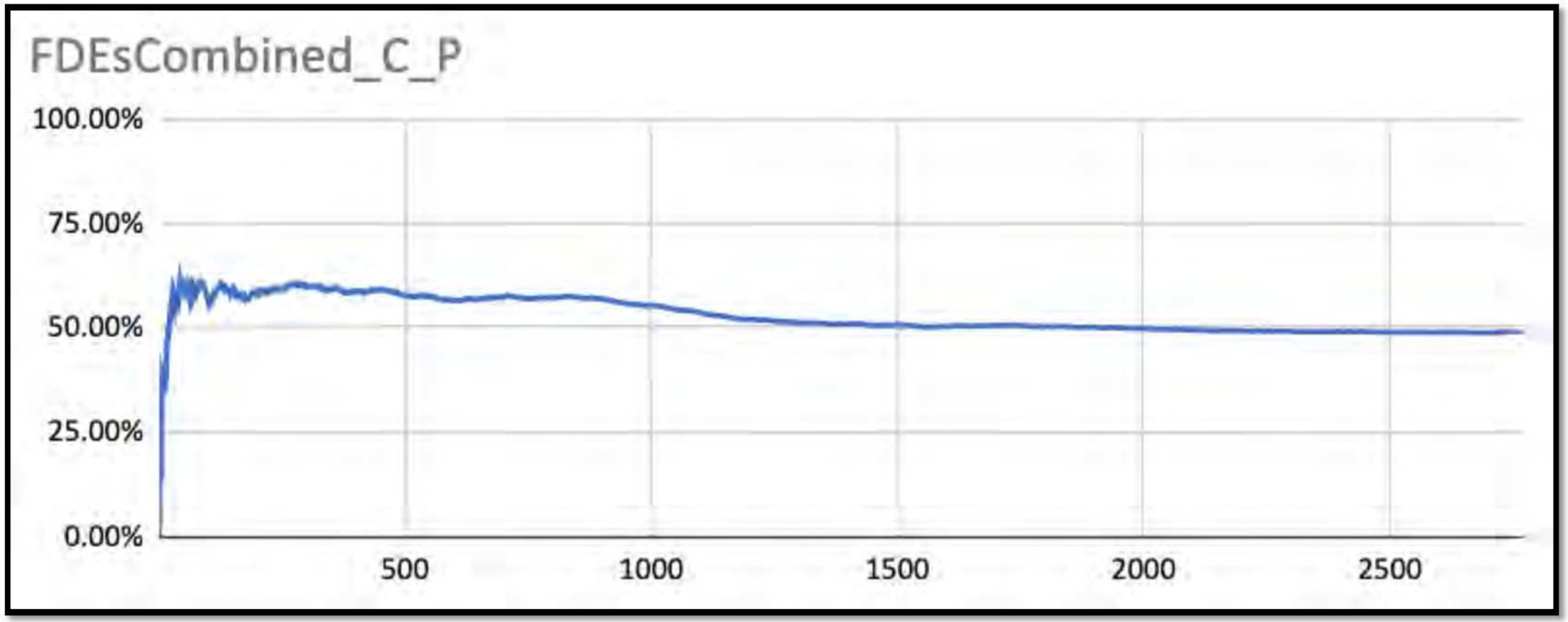
Results of Experiment I

Temporal Mismatch Rate of Each FDE



Results of Experiment I

Temporal Average Mismatch Rate of All Three FDEs: 49.0%



49.0%

Results of Experiment I

Average Mismatch Rate of All Three FDEs: 49.0%

NON-FDE	Match	No Match	Mis-Match Rate (%)
FDE-1	801	1,969	71.1%
FDE-2	2,122	648	23.4%
FDE-3	1,317	1,453	52.5%
		Average (FDE)	**49.0%**

49.0% FDEs Average Signature Mismatch Rate

Results of Experiment I

Average Mismatch Rate of All Three FDEs: 49.0%

NON-FDE	Match	No Match	Mis-Match Rate (%)
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		Average (FDE)	**49.0%**

49.0% FDEs Average Signature Mismatch Rate

1.3% Maricopa Signature Mismatch Rate

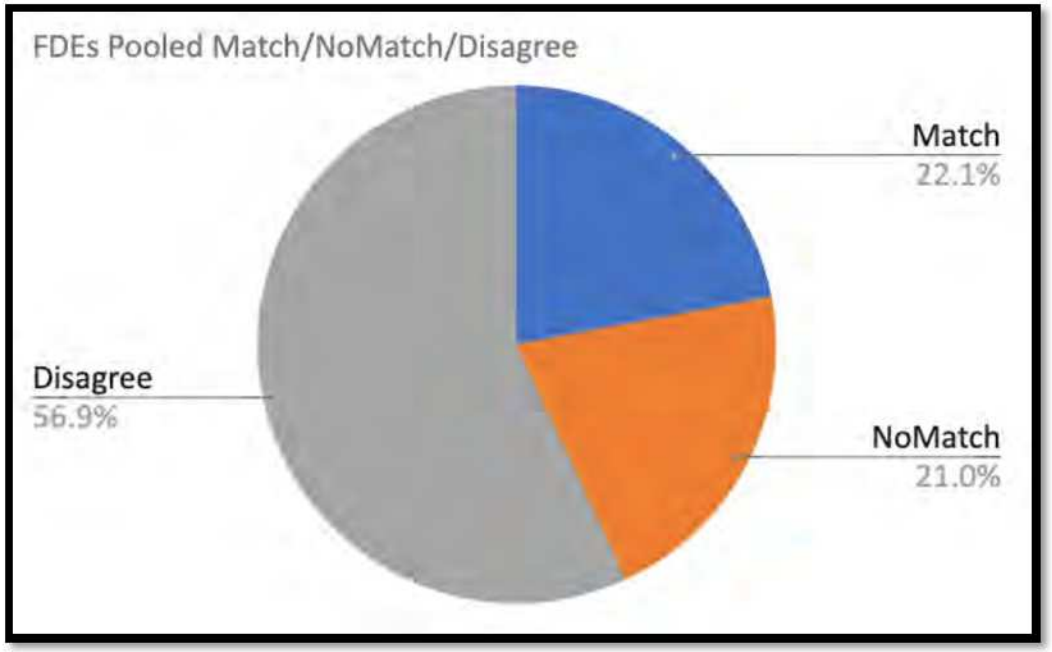
Results of Experiment I

Pooled Consensus of Three FDES

"Pooled Consensus" means how many times did ALL three FDEs, for the same pair of signatures associated with an EVB, conclude it to be a Match, a No Match, or be NOT in agreement.

Results of Experiment I

Pooled Consensus of Three FDES

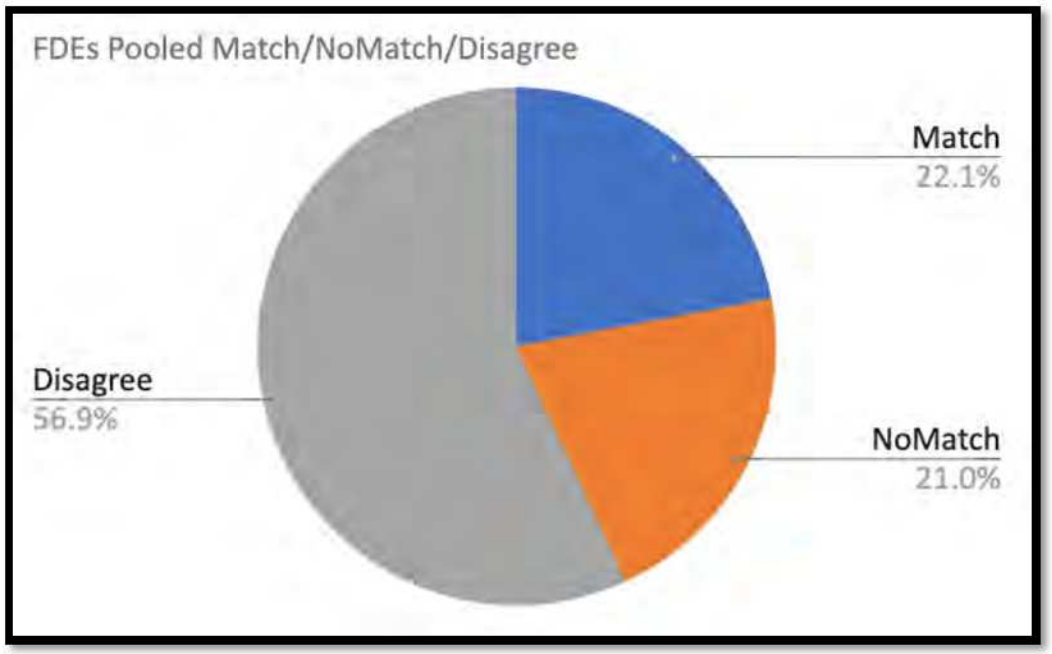


Assessments	Counts	Rate (%)
Match	611	22.1%
No Match	**582**	**21.0%**
Disagree	1,577	56.9%

21.0% FDEs Pooled Consensus Signature Mismatch Rate

Results of Experiment I

Pooled Consensus of Three FDES



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No Match	**582**	**21.0%**
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21.0% FDEs Pooled Consensus Signature Mismatch Rate

1.3% Maricopa Signature Mismatch Rate

Experiment I: Summary of FDEs

Total Number of Voters Submitting EVBs	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
FDEs Average Signature Mismatch Rate	**49.0%**
Number of EVBs That Should Have Been Cured	936,840
FDEs Pooled Consensus Signature Mismatch Rate	**21.0%**
Number of EVBs That Should Have Been Cured	401,503

Experiment I: Summary of FDEs

Minimum of 401,503 EVBs Should Have Been Cured

Total Number of Voters Submitting EVBs	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
FDEs Average Signature Mismatch Rate	**49.0%**
Number of EVBs That Should Have Been Cured	936,840
FDEs Pooled Consensus Signature Mismatch Rate	**21.0%**
Number of EVBs That Should Have Been Cured	401,503

Experiment I: Key Finding

If Experts – FDEs - reviewed the EVB signatures and the FDEs Pooled Signature Mismatch Rate of 21.0% is used, then at a minimum **401,503 EVBs** with mismatched signatures would have been detected cured;

Alternatively, if FDEs Average Signature Mismatch Rate of 49.0% is used, then at a maximum **936,840 EVBs** with mismatched signatures would have been detected and cured.

Therefore, conservatively, FDEs would have determined over 400,000 EVBs with mismatched signatures should have been cured in Maricopa.

Experiment II

Determination of Signature Mismatch Rates of EVBs Using Trained Novices - non-Forensic Document Examiners (non-FDEs)

Experiment II

Trained Novices: non-FDEs (non-Forensic Document Examiners)

- Three non-FDEs were given the County's Signature Verification Guide[5]:

[5] Maricopa County Elections Department, "Signature Verification Training," Powerpoint Presentation.

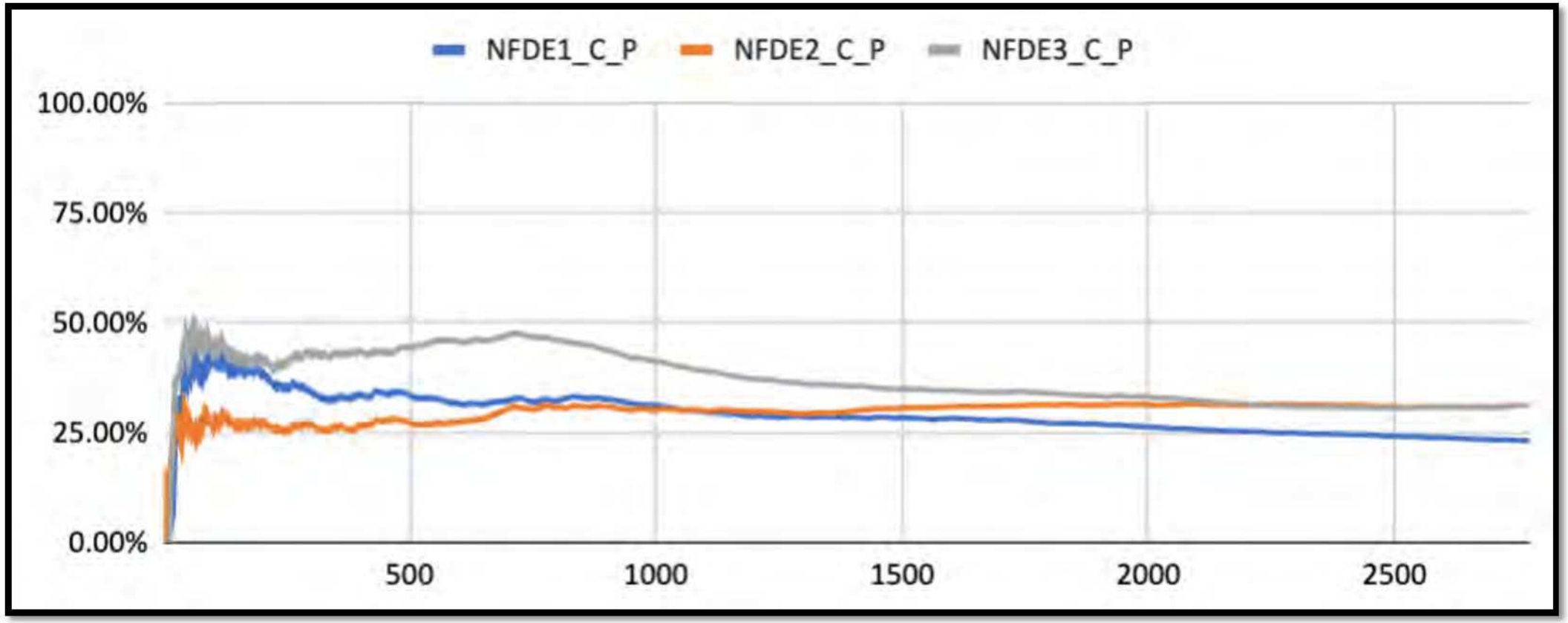
Experiment II

Trained Novices: non-FDEs

- Three non-FDEs selected and instructed to follow County's guide
- Presented 2,770 pairwise images to review – no more than 30 sec
- Recorded each non-FDEs **Match** and **No Match** selections
- Calculate each non-FDEs **Mismatch** rate
  - Calculate **non-FDEs Average Signature Mismatch Rates**
- Calculate **non-FDEs Pooled Consensus Signature Mismatch** rate
  - The "non-FDEs Pooled Consensus Signature Mismatch" rate is calculated by dividing the number of the same EVBs that ALL non-FDEs concur are signature mismatches by 2,770

Results of Experiment II

Temporal Mismatch Rate of Each Non-FDEs

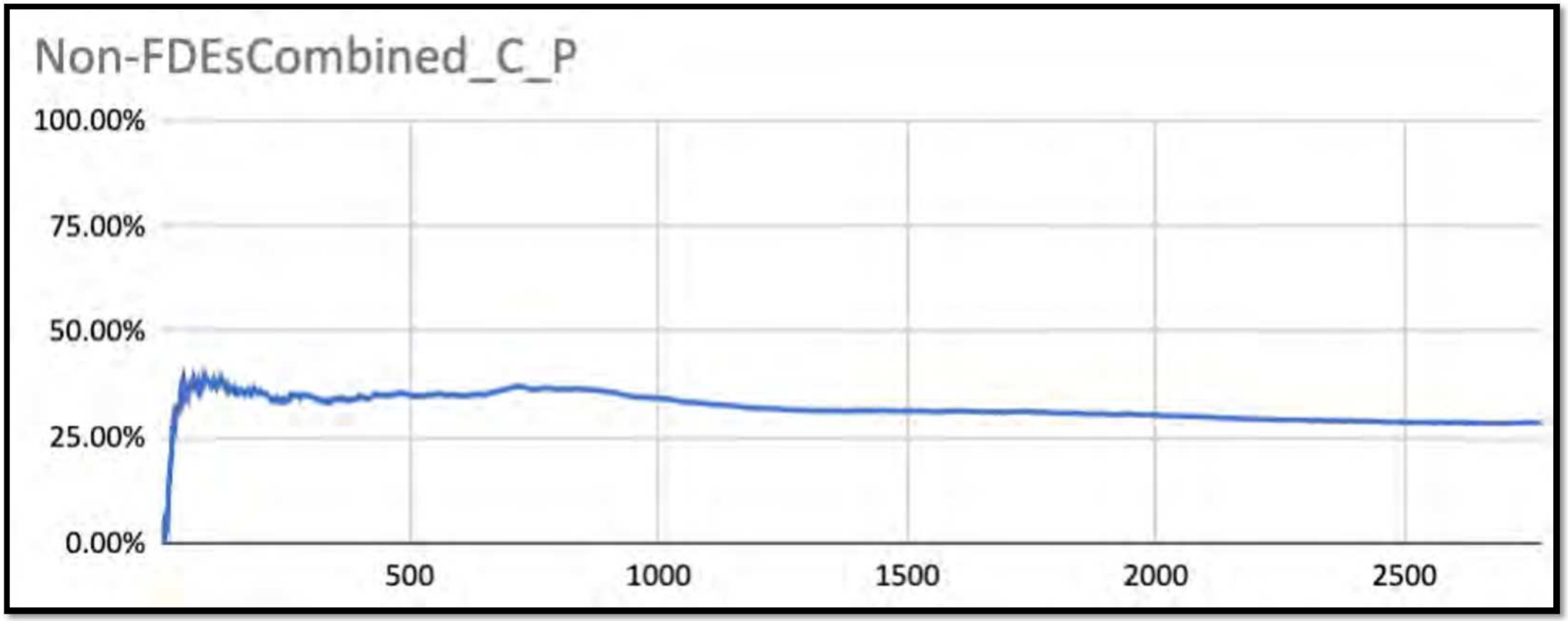


31.2%

23.1%

Results of Experiment II

Temporal Average Mismatch Rate of All Three Non-FDEs: 28.5%



28.5%

Results of Experiment II

Average Mismatch Rate of All Three Non-FDEs: 28.5%

NON-FDE	Match	No Match	Mismatch Rate (%)
Non-FDE-1	2,129	641	23.1%
Non-FDE-2	1,906	864	31.2%
Non-FDE-3	1,907	863	31.2%
		Average	**28.5%**

28.5% non-FDE Average Signature Mismatch Rate

Results of Experiment II

Average Mismatch Rate of All Three Non-FDEs: 28.5%

NON-FDE	Match	No Match	Mismatch Rate (%)
Non-FDE-1	2,129	641	23.1%
Non-FDE-2	1,906	864	31.2%
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		Average	**28.5%**

28.5% non-FDE Average Signature Mismatch Rate

1.3% Maricopa Signature Mismatch Rate

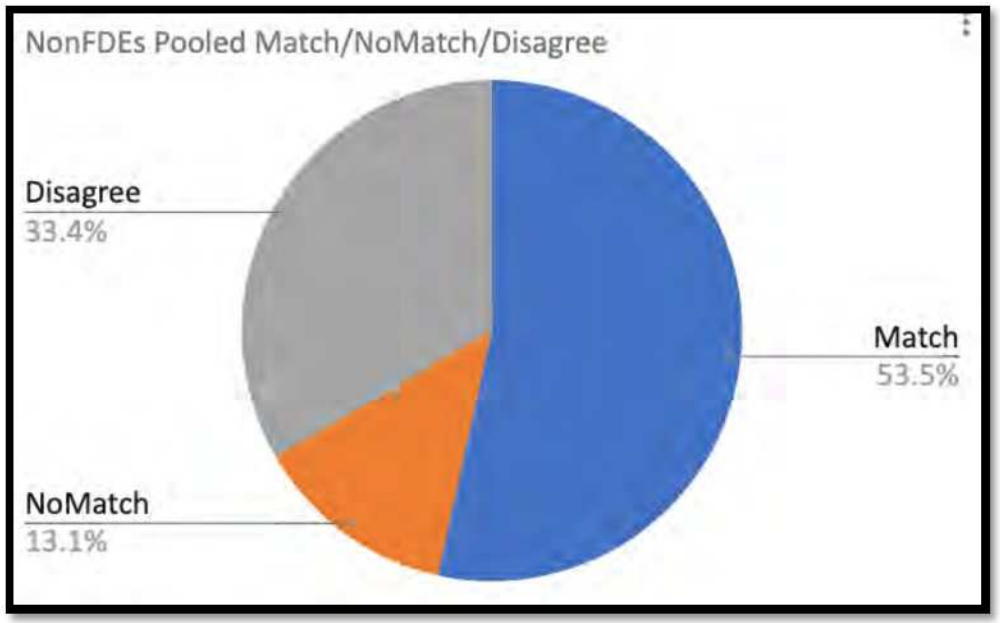
Results of Experiment II

Pooled Consensus of Three Non-FDES

"Pooled Consensus" means how many times did ALL three non-FDEs, for the same pair of signatures associated with an EVB, conclude it to be a Match, a No Match, or be NOT in agreement.

Results of Experiment II

Pooled Consensus of Three Non-FDES

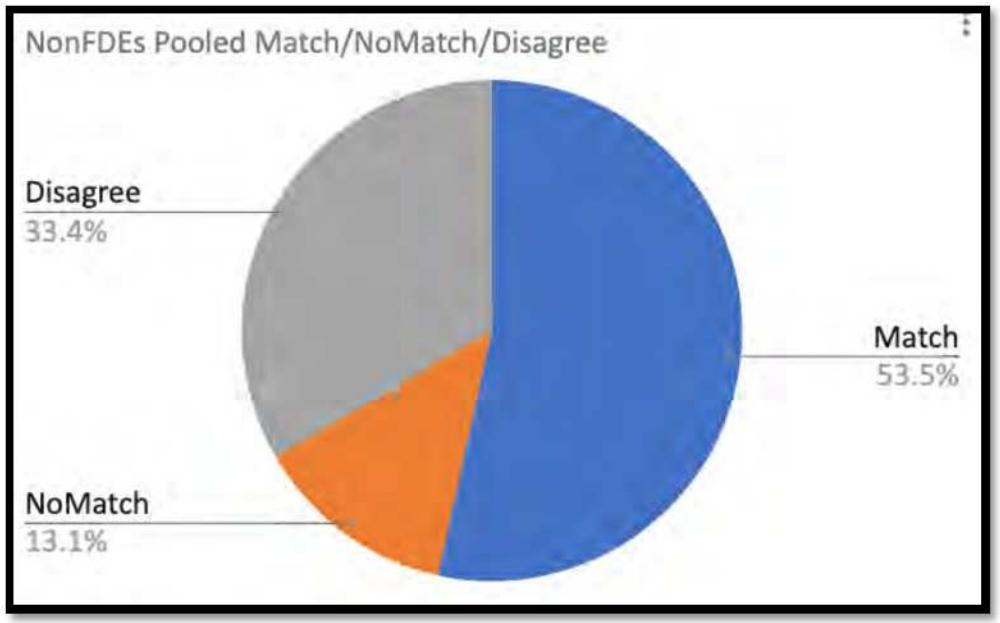


Assessments	Counts	Rate (%)
Match	1,481	53.5%
No Match	**363**	**13.1%**
Disagree	926	33.4%

13.1% non-FDE Pooled Consensus Signature Mismatch Rate

Results of Experiment II

Pooled Consensus of Three Non-FDES



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No Match	**363**	**13.1%**
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13.1% non-FDE Pooled Consensus Signature Mismatch Rate

1.3% Maricopa Signature Mismatch Rate

Experiment II: Summary from Non-FDEs

Total Number of Voters Submitting EVBs	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
Non-FDEs Average Mismatch Rate	**28.5%**
Number of EVBs That Should Have Been Cured	544,897
Non-FDEs Pooled Consensus Mismatch Rate	**13.1%**
Number of EVBs That Should Have Been Cured	250,469

Experiment II: Summary from Non-FDEs

Minimum of 250,469 EVBs Should Have Been Cured

Total Number of Voters Submitting EVBs	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
Non-FDEs Average Mismatch Rate	**28.5%**
Number of EVBs That Should Have Been Cured	544,897
Non-FDEs Pooled Consensus Mismatch Rate	**13.1%**
Number of EVBs That Should Have Been Cured	250,469

Experiment II: Key Findings

If Trained Novices – non-FDEs – reviewed the EVB signatures and the non-FDEs Pooled Signature Mismatch Rate of 13.1% is used, then at a minimum **250,469 EVBs** with mismatched signatures would have been detected cured;

Alternatively, if non-FDEs Average Signature Mismatch Rate of 28.5% is used, then at a maximum **544,897 EVBs** with mismatched signatures would have been detected and cured.

Therefore, conservatively, non-FDEs would have determined over 250,000 EVBs with mismatched signatures should have been cured in Maricopa.

Determining Two-Step Review Signature Mismatch Rate

First Trained Novices (non-FDEs) Review, Then Experts (FDEs)

Determining Two-Step Review Signature Mismatch Rate

- In Maricopa, the Initial Review involved Trained Staff first assessing pairwise signatures. If a ***No Match*** was detected by them, the EVB was sent to a Manager with greater expertise to determine if indeed it was a ***No Match*** and needed to be cured.

- In this Study, the non-FDEs are assumed to be equivalent to the Trained Staff; and, the FDEs are assumed to be equivalent to the Manager.

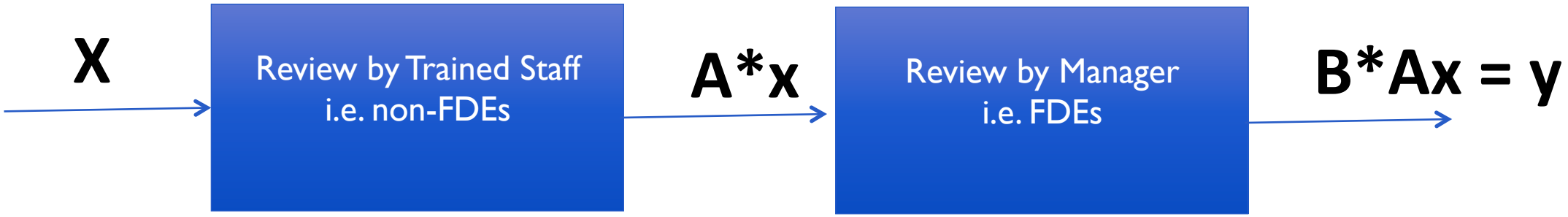
- The goal is to determine the *two-step review signature mismatch rate* to determine the number of EVBs that would have been sent to curing after the two-step process.

- A first calculation is performed to determine the number of EVBs that would have been classified as ***No Match*** by the non-FDEs.

- A second calculation is performed to find the *concurrence signature mismatch rate* of FDE with non-FDE to determine what percentage of the EVBs presented to the FDEs classified as ***No Match*** by the non-FDEs would be deemed ***No Match*** by the FDE.

- A third calculation is performed to determine a two-step review signature mismatch rate.

Determining Two-Step Review Signature Mismatch Rate



Where: **x** is the Total number of EVBs reviewed by non-FDEs

A is the non-FDE Signature Mismatch Rate

A*x is the Total number of EVBs classified as ***No Match*** by non-FDEs

B is the Concurrence Signature Mismatch Rate

B*Ax or **y** is the Total number of EVBs classified as ***No Match*** by non-FDEs determined to indeed be ***No Match*** by FDEs

A*B is the Two-Step Review Signature Mismatch Rate

First Calculation

non-FDEs Signature Mismatch Rate = A

First Calculation

non-FDEs Signature Mismatch Rate = A

Measures	A = Rate (%)
Non-FDEs Average Mismatch Rate	**28.5%**
Non-FDEs Pooled Consensus Mismatch Rate	**13.1%**

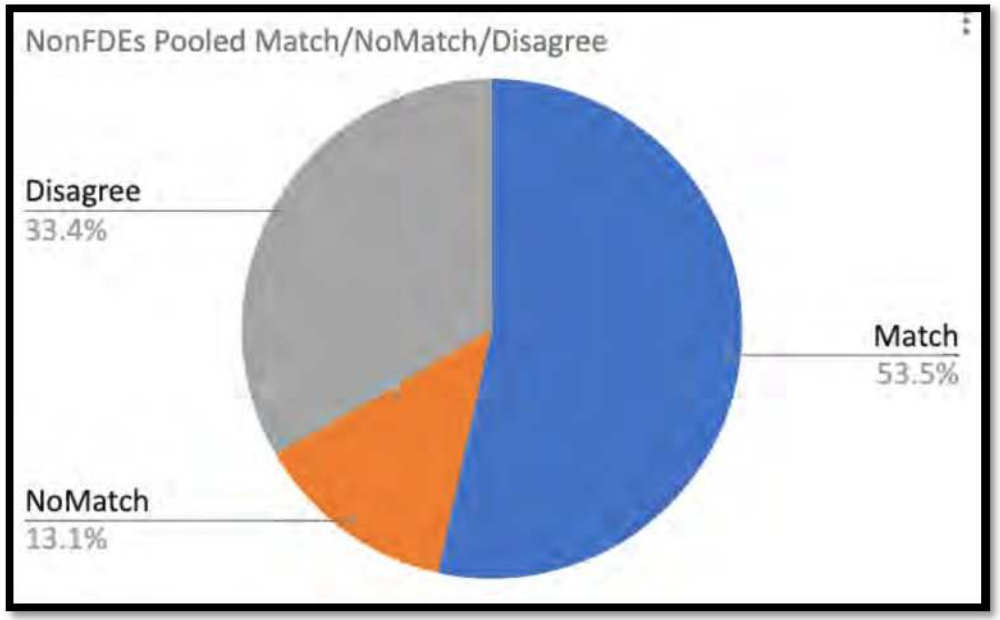
The non-FDEs signature mismatch rate, ***variable A***, can be either 13.1% or 28.5% depending on if the Non-FDEs Average or Pooled Consensus Mismatch rate, respectively, is selected.

Second Calculation

Determining Concurrence Signature Mismatch Rate = B

Non-FDEs Pooled Consensus

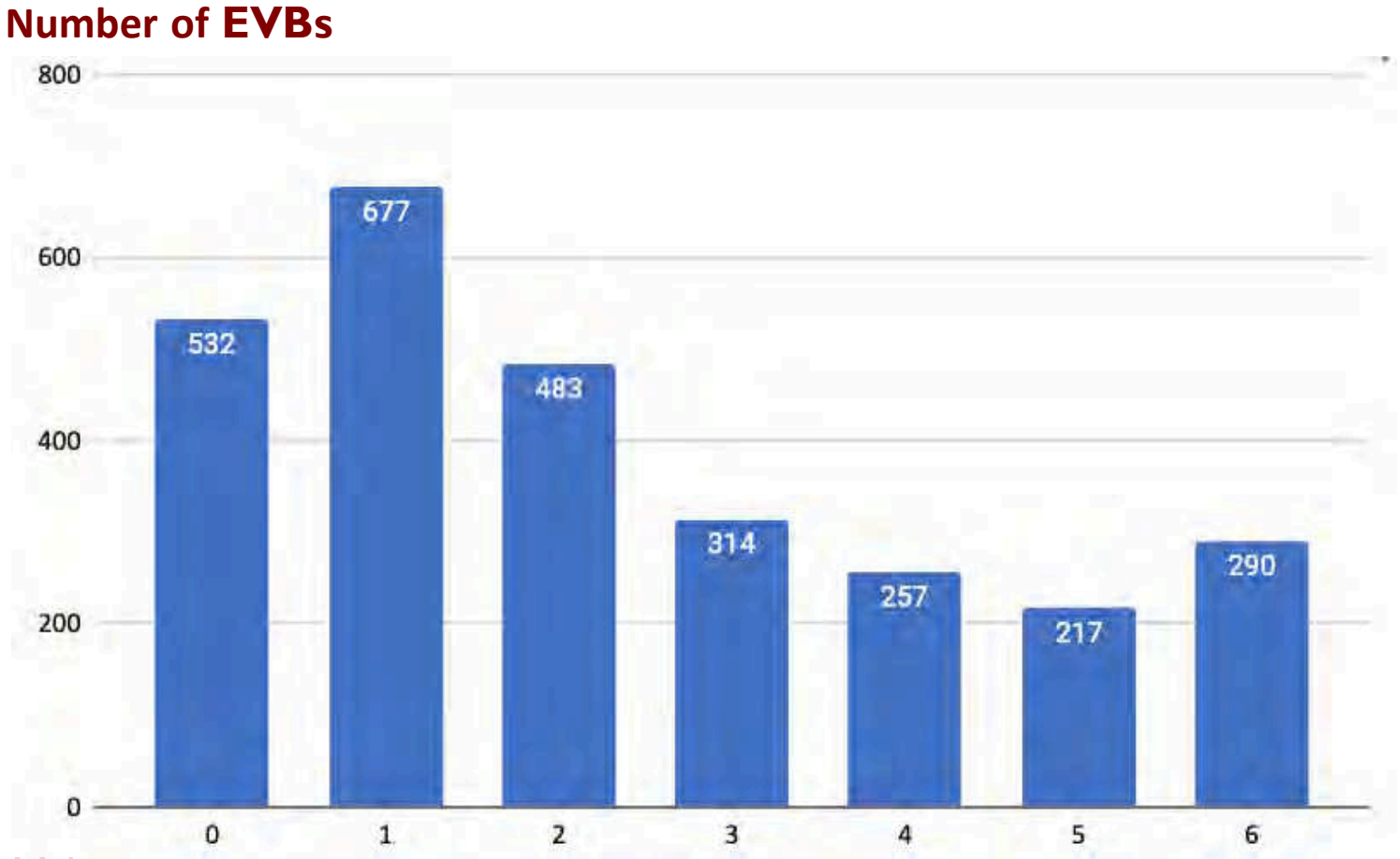
- Pooled consensus of signatures is the same EVBs that ALL Trained Novices (non-FDEs) concluded were ***No Match***: **363**



Assessments	Counts	Rate (%)
Match	1,481	53.5%
No Match	**363**	**13.1%**
Disagree	926	33.4%

FDEs and non-FDEs Pooled Consensus

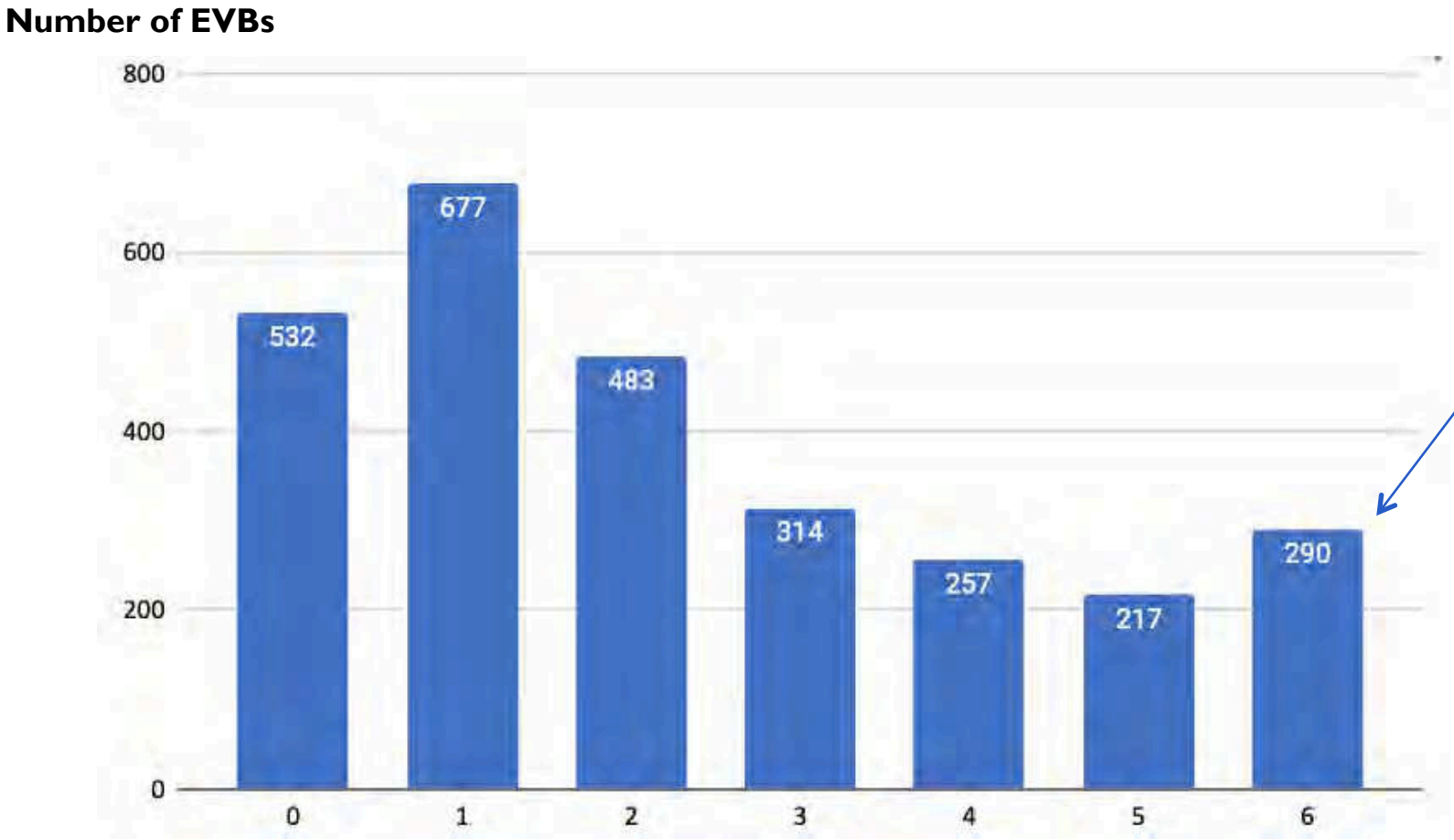
Common non-FDE & FDE Signature Mismatches



The x-axis denotes **how many reviewers** agree that a set of pairwise signatures are Mismatches. The y-axis denotes the number of pairwise signature sets. For example, the far left bar reports that zero (0) reviewers agreed 532 pairwise signature sets are Mismatches i.e. meaning they are all Matches. Alternatively, the far right bar reports that all six (6) reviewers agreed 290 pairwise signature sets are Mismatches.

FDEs and non-FDEs Pooled Consensus

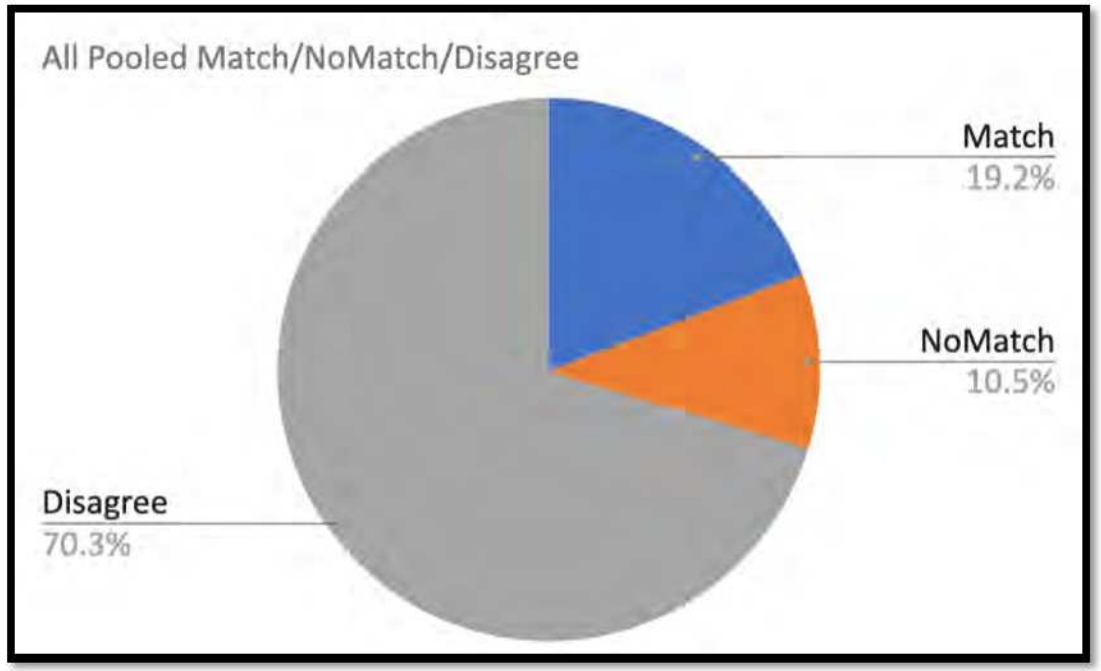
Common non-FDE & FDE Signature Mismatches: 290



All 6 Agree Same **290** EVB Signatures Are Mismatches

FDEs and non-FDEs Pooled Consensus

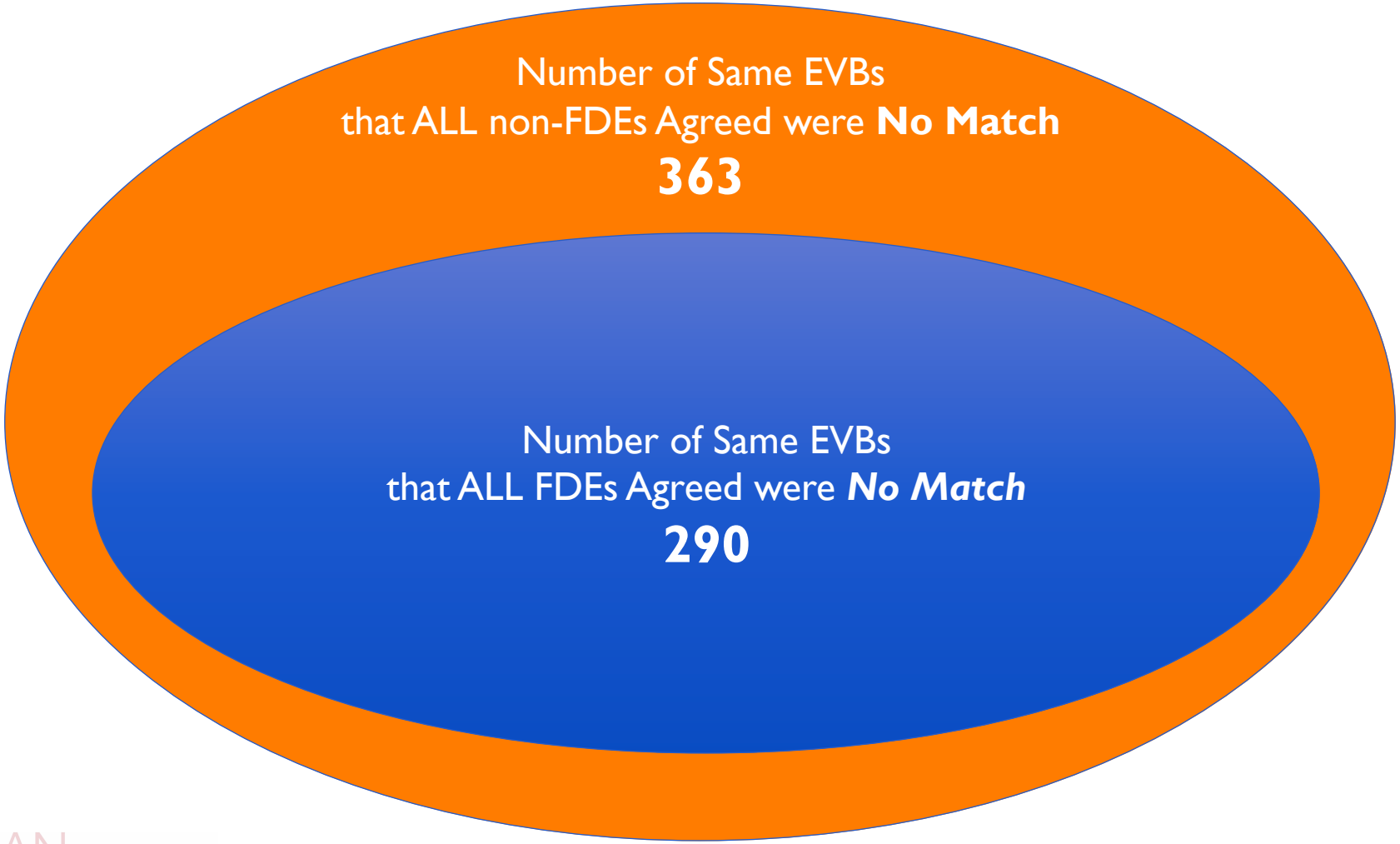
Common non-FDE & FDE Signature Mismatches: 290



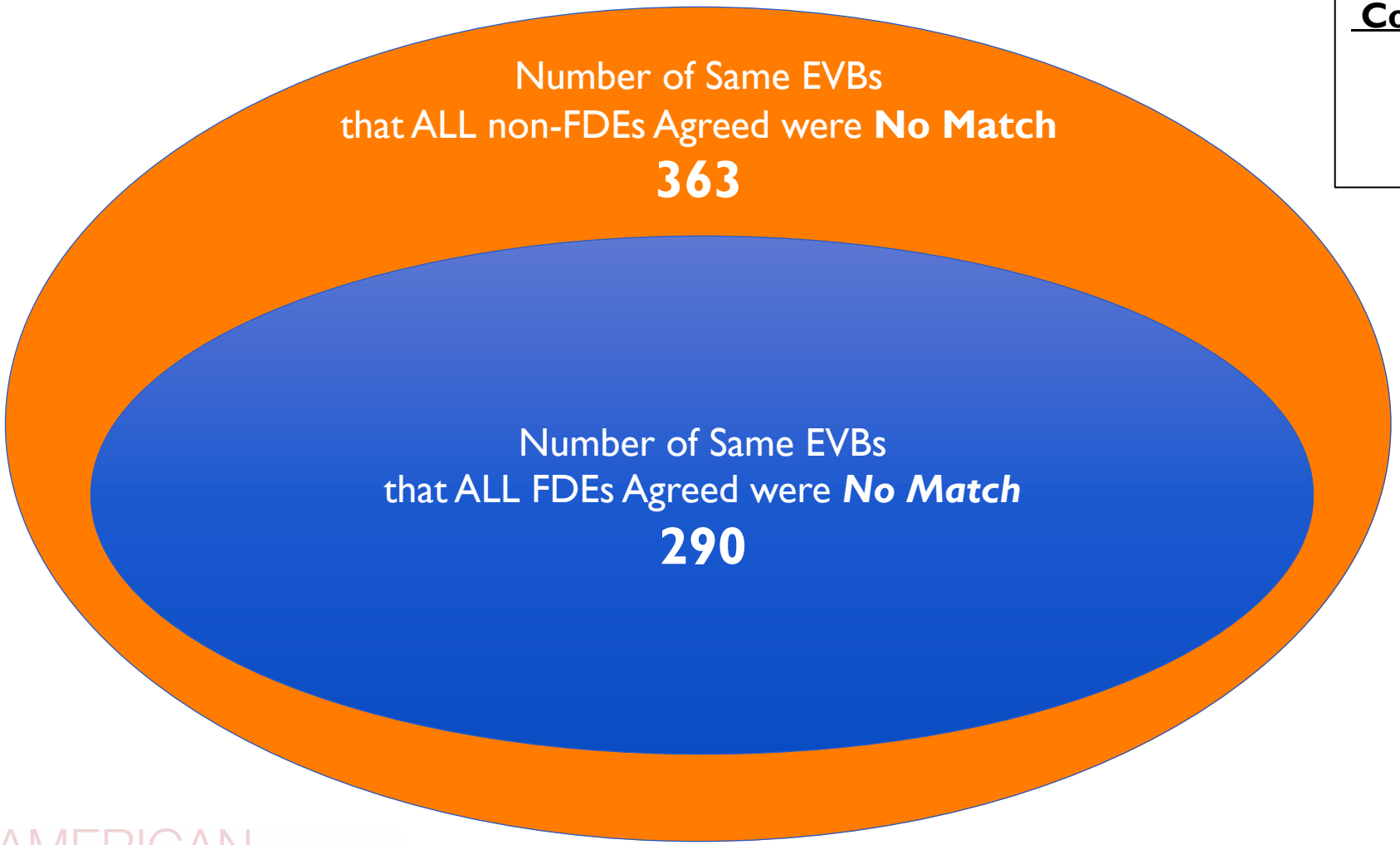
Assessments	Counts	Rate (%)
Match	532	19.2%
No Match	**290**	**10.5%**
Disagree	1,948	70.3%

EVBs Flagged by ALL Non-FDEs (A*x) as *No Match*

EVBs (in blue) ALL FDEs Agree are *No Match*



Calculation of Concurrence Signature Mismatch Rate



Concurrence Signature Mismatch Rate

B = 290/363
= 79.9%

79.9%

Third Calculation

Determining Two-Step Review Signature Mismatch Rate = A*B

Third Calculation: Two-Step Review Signature Mismatch Rate

A*B Has Two Possibilities

Measures	A	B	A*B
Using Non-FDES Average Mismatch Rate	28.5%	79.9%	22.8%
Using Non-FDEs Pooled Consensus Mismatch Rate	13.1%	79.9%	10.5%

Third Calculation: Two-Step Review Signature Mismatch Rate

A*B Has Two Possibilities

Measures	A	B	A*B
Using Non-FDES Average Mismatch Rate	28.5%	79.9%	22.8%
Using Non-FDEs Pooled Consensus Mismatch Rate	13.1%	79.9%	10.5%

Two Possibilities for Number of EVBs That Should Have Been Cured Per Two-Step Verification Initial Review Process

Total Number of Early Voting Mail Ballots	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
Using Non-FDES Average Mismatch Rate	**22.8%**
Number of EVBs That Should Have Been Cured	435,917

Two Possibilities for Number of EVBs That Should Have Been Cured Per Two-Step Verification Initial Review Process

Total Number of Early Voting Mail Ballots	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
Using Non-FDES Average Mismatch Rate	**22.8%**
Number of EVBs That Should Have Been Cured	435,917
Using Non-FDEs Pooled Consensus Mismatch Rate	**10.5%**
Number of EVBs That Should Have Been Cured	200,751

Two Possibilities for Number of EVBs That Should Have Been Cured Per Two-Step Verification Initial Review Process

Minimum of 200,751 EVBs Should Have Been Cured

Total Number of Early Voting Mail Ballots	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
Using Non-FDES Average Mismatch Rate	**22.8%**
Number of EVBs That Should Have Been Cured	435,917
Using Non-FDEs Pooled Consensus Mismatch Rate	**10.5%**
Number of EVBs That Should Have Been Cured	200,751

Discussion

Discussion

Summary Analysis

- In Maricopa County, 1,911,918 early voting mail ballots (EVBs) were received and counted
- The County reported 1.31% of all EVBs or 25,000 EVBs had signature mismatches requiring curing
- The County reported that 0.031% of all EVBs or 587 EVBs were confirmed mismatches post-curing

Discussion

Potential Scenarios of Signature Mismatch Rates

Measures	Mismatch Rate (%)	EVBs to be Cured	Maximum Cured by Maricopa	EVBs to be Disallowed Post-Curing	Maricopa Disallowed Post-Curing
Non-FDEs Average	28.5%	544,897	25,000	12,533	587
Non-FDEs Pooled Consensus	13.1%	250,469	25,000	5,761	587
FDEs Average	49.0%	936,840	25,000	21,547	587
FDEs Pooled Consensus	21.0%	401,503	25,000	9,235	587
2-Step non-FDEs Average	22.8%	435,917	25,000	10,026	587
2-Step non-FDEs Pooled Consensus	10.5%	200,751	25,000	4,617	587

Discussion

Potential Scenarios of Signature Mismatch Rates

Measures	Mismatch Rate (%)	EVBs to be Cured	Maximum Cured by Maricopa	EVBs to be Disallowed Post-Curing	Maricopa Disallowed Post-Curing
Non-FDEs Average	28.5%	544,897	25,000	12,533	587
Non-FDEs Pooled Consensus	13.1%	250,469	25,000	5,761	587
FDEs Average	49.0%	936,840	25,000	21,547	587
FDEs Pooled Consensus	21.0%	401,503	25,000	9,235	587
2-Step non-FDEs Average	22.8%	435,917	25,000	10,026	587
2-Step non-FDEs Pooled Consensus	10.5%	200,751	25,000	4,617	587

Discussion

Summary Analysis

- In Maricopa County, 1,911,918 early voting mail ballots (EVBs) were received and counted
- The County reported 1.31% of all EVBs or 25,000 EVBs had signature mismatches requiring curing
- The County reported that 0.031% of all EVBs or 587 EVBs were confirmed mismatches post-curing
- As the results show, a minimum of 200,751 ±2.5% EVBs should have been cured
  - This is at a 99% Confidence Level. The Pilot Study was at a 95% Confidence Level with ±4.4% Margin of Error
- Based on this Extended Study that yields a minimum signature mismatching rate of 10.5% and the County's post-curing rate of 2.3%, 4,617 EVBs at minimum would have been disallowed
- The results herein are based on **using the minimum signature mismatch rate** AND **assumes that the County's 2.3% post-curing numbers are accurate**.

Discussion

Summary Analysis

- In Maricopa County, 1,911,918 early voting mail ballots (EVBs) were received and counted
- The County reported 1.31% of all EVBs or 25,000 EVBs had signature mismatches requiring curing
- The County reported that 0.031% of all EVBs or 587 EVBs were confirmed mismatches post-curing
- As the results show, a minimum of 200,751 ±2.5% EVBs should have been cured
  - This is at a 99% Confidence Level. The Pilot Study was at a 95% Confidence Level with ±4.4% Margin of Error
- Based on this Extended Study that yields a minimum signature mismatching rate of 10.5% and the County's post-curing rate of 2.3%, 4,617 EVBs at minimum would have been disallowed
- In this Extended Study, genuine signatures were acquired from a Maricopa Deeds' repository. Given signatures do change over time, this Study could be updated using the County's genuine signatures used during their signature verification in the 2020 General Election.
- The results herein are based on **using the minimum signature mismatch rate** AND **assumes that the County's 2.3% post-curing numbers are accurate**.

Conclusion

Conclusion

- Maricopa County Election Dept. states it has a “rigorous signature verification process.”
- Of the 1,911,918 EVB signatures verified, the County reported only 25,000 were flagged as signature mismatches requiring review – “curing;” and after curing, the County concluded only 587 of the 25,000 (2.3%) to be “Bad Signatures.”
- This Extended Study confirms the findings of the earlier Pilot Study and concludes that the process used for signature verification in Maricopa is a **flawed signature verification process.**

Conclusion

- The Extended Study found if FDEs alone were used to review the EVB signatures, then at a minimum over 400,000 mismatched signatures should have been cured given ALL three FDEs concurred that 21.0% of the same EVBs (582 of 2,770) were signature mismatches;
- If non-FDEs alone were used to review the EVB signatures, then at a minimum over 250,000 mismatched signatures should have been cured given ALL three non-FDEs concurred that 13.1% of the same EVBs (363 of 2,770) were signature mismatches; and,
- If non-FDEs and FDEs BOTH were used to review the EVB signatures in a two-step process (non-FDEs reviewing first, then FDEs), then at a minimum over 200,000 mismatched signatures should have been cured given a two-step signature mismatch rate of 10.5%, wherein 290 of 2,770 would be classified as signature mismatches.

Future Research and Questions

Future Research and Questions

- Why did Maricopa County report “up to 25,000” were cured? What is the exact number of cured EVBs?
- There should be at least two (2) EVB envelope images for each EVB that was cured. According to Maricopa when an EVB is cured, a copy of the original EVB envelope is copied, stamped “MCTEC VERIFIED & APPROVED,” and an image is made.
- EchoMail found from its original September 2021 research, presented to the AZ Senate, that 17,126 unique voters had at least two (2) EVB envelope images. This means only 17,126 not “up to 25,000” were cured. Further research is needed is required to resolve this matter.
- One area of Future Research is to review ALL EVB envelope images that contain a “MCTEC VERIFIED & APPROVED” stamp and validate if the number containing those stamps match the total count cured
- Why does the County in its Signature Verification Guide train reviewers to allow any EVB envelope that has “MCTEC VERIFIED & APPROVED” stamp? How can a EVB envelope have such a stamp BEFORE curing?
- There are many questions on how signature matching rates are affected by training and context, which should be actively explored.
- A future study is planned providing an economic analysis of signature verification and review.

ESII ELECTION SYSTEMS INTEGRITY INSTITUTE

AN EXTENDED STUDY

Extended Study Confirms At Minimum Over 200,000 Mail Ballots With Mismatched Signatures Counted Without Review ("Curing") in Maricopa County, Arizona 2020 General Election

Dr. Shiva Ayyadurai, MIT Ph.D.

S.B. Electrical Engineering & Computer Science, M.I.T.
S.M. Visual Studies, M.I.T. Media Laboratory
S.M. Mechanical Engineering, M.I.T.
Ph.D. Biological Engineering, M.I.T.

Study Completed: February 23, 2022
Reviewed with AZ Senate Liaison: March 1, 2022
Delivered to AZ Senate: March 2, 2022
Delivered to AZ Attorney General: March 2, 2022

Delivered to:

Honorable Senator Karen Fann
President of the Senate
Arizona State Senate
1700 West Washington Street
Phoenix, AZ 85007

Honorable Mark Brnovich
Attorney General of Arizona
Office of Attorney General
2005 N. Central Avenue
Phoenix, AZ 85004-2926

ESII ELECTION SYSTEMS INTEGRITY INSTITUTE

From:	Shiva Ayyadurai
To:	Karen Fann
Cc:	Randy Pullen; Kory Langhofer
Subject:	Updates to Extended Study on Signature Verification.
Date:	Monday, March 7, 2022 10:54:22 AM
Attachments:	ESII-Signature-Verification-Final-Report-Extended-Study-Updated-Redacted.pdf

Dear Honorable Senator Fann:

I hope this email finds you well. I have attached an updated redacted version of the Extended Study report. This Report replaces the previous Report and is the most up-to-date including refinements to our pooled consensus calculation.

As we shared in the earlier version of this Study, one of our constraints is that the County did not provide us with the signature files they use for signature matching. Our dataset of genuine signatures used in this Study are from Deeds and documents found at https://recorder.maricopa.gov/recdocdata/. In our acquisition of those signatures, we used a combination of technology and humans to locate the signatures for our data set.

In this updated report of the Extended Study, to err on the side of **being more conservative** in our signature mismatching rate calculations, we have :

i) Applied more constraints to the original 2,770 data set with greater restrictions on the name matching.

ii) More significantly, in the updated analysis, we have **eliminated ALL pairwise signatures (290)** wherein ALL six reviewers classified them to be No Match. When ALL six reviewers believe a set of pairwise signatures are NO MATCH, it could be one of two possibilities: They are indeed a NO MATCH or the genuine signature we are using is not genuine. In the updated analysis, we take the position that when ALL six reviewers state that they are a No Match, that this is due to the signature not being genuine. This approach may lead to false negatives - pairwise sets with genuine signature - being removed; however, it significantly reduces error i.e. the probability of this Study having signatures which are not genuine.

Relative to point (2), if the County is willing to provide your office the Signature files, we can update our Study. Given that constraint, we take this conservative approach. For your reference, in the updated report, our team is including some examples of such false negatives that were removed, but are indeed genuine signatures.

The application of the two (2) constraints reduced our data set from 2,770 to 2,379; however, this is still at a confidence level of 99% and margin of error of +/- 2.7%.

The number of EVBs to be cured per this Study are at a minimum 215,856 even after applying the new constraints. Given that these number of EVBs are ~10x higher than the EVBs cured by the County, we hope we may acquire the signature files, SOPs, and the process the County used during 2020. That would allow us to re-run/update our analysis and resolve any discrepancies. We are here to sign any NDA's to assure confidentiality for the County. If we have ALL of their Signature files, we can also use our machine learning algorithms to do a full analysis of all 1.9M+ EVBs.

In summary, the updated Study concludes even after removal of the 391 pairwise

signatures to reduce likelihood of error, the County should have cured at minimum over 200,000 EVBs.

Thank you for your efforts.

Sincerely,
Dr. Shiva Ayyadurai

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Office of V.A. Shiva Ayyadurai, Ph.D.
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AN EXTENDED STUDY - Redacted

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AUTHOR'S BIO

Dr. Shiva Ayyadurai, MIT PhD, S.M.M.E., S.M.V.S., S.B.E.E., the inventor of email and polymath, holds four degrees from MIT, is a world-renowned engineer, systems scientist, inventor and entrepreneur. He is a Fulbright Scholar, Lemelson-MIT Awards Finalist, India's First Outstanding Scientist and Technologist of Indian Origin, Westinghouse Science Talent Honors Award recipient, and a nominee for the U.S. National Medal of Technology and Innovation. He holds multiple patents, is the author of twenty books, and has published original research, in leading peer-reviewed high-impact scientific journals including *IEEE, IJPRAI, Nature Neuroscience, CELL Biophysical Journal,* that have received thousands of citations. He has started seven successful high-tech companies, received numerous industry awards, consults for Global 2000 organizations and government, and has been invited to present Keynote and Distinguished lectures at leading institutions such as NSF, NIH, FDA, Harvard, and at MIT, where he delivered the Presidential Fellows Lecture.[1]

In 1978, as a 14-year-old, he was recruited as a Research Fellow by the University of Medicine and Dentistry of New Jersey (UMDNJ), in Newark, NJ after graduating with Honors from a special program in Computer Science at the Courant Institute of Mathematical Science at NYU. At UMDNJ, he invented email – ***the system*** as we know it today – when he was the first to convert the old-fashioned *interoffice paper-based mail system* consisting of the Inbox, Outbox, Memo (To:, From:, Date:, Subject:, Cc:, Bcc:), Attachments, Folders, etc. into its electronic equivalent by writing 50,000 lines of code to create a software system, which he named "Email," – a term never used before in the English language – and went on to be awarded the first U.S. Copyright *TXu 111-775* for "EMAIL, COMPUTER PROGRAM FOR ELECTRONIC MAIL SYSTEM" recognizing him as the inventor of email at a time when Copyright was the only legal mechanism to protect software inventions. Only in 1994 did the Federal Circuit recognize software as a "digital machine" allowing for software patents. Email is not the simple exchange of text messages. Dr. Shiva has never claimed to be the inventor of electronic messaging, which predates email - the system that he created in 1978.[2,3]

Recognizing his talents in software programming, UMDNJ gave him the opportunity to conduct medical research focused on developing pattern recognition classification methods for categorization of sleep signature patterns from babies with Sudden Infant Death Syndrome (SIDS). His research was published in IEEE and presented at the IEEE-EMBS conference in Espoo, Finland. Since that time and for more than forty years, his research and development efforts in academia and industry have been focused in the field of pattern recognition classification systems, systems science, and development of large-scale computational systems for analysis of diverse signals and signatures across a range of industries: biology and medicine, engineering (e.g. aeronautical, civil, mechanical, electrical), banking, finance, and, government, as well as across a diversity of applications including handwriting recognition of courtesy amounts on bank checks, automatic analysis and classification of electronic documents e.g. email, ultrasonic and radar wave signature classification for non-destructive evaluation (NDE), signals analysis of Tadoma

[1]Dr. Shiva Ayyadurai, Biography and Curriculum Vitae, https://vashiva.com/about-va-shiva-ayyadurai/
[2]Facts on the invention of email, https://www.inventorofemail.com/thefacts/
[3]The Man Who Invented Email, TIME, https://techland.time.com/2011/11/15/the-man-who-invented-email/

AUTHOR'S BIO (CONT.)

feature identification, biomarker analysis for determining signatures of efficacy for multi-combination therapies, image analysis for cardiology, and signal detection of fluid flow anomalies in fluidized bed reactors.

He earned a Bachelors in Electrical Engineering and Computer Science, a Masters in Mechanical Engineering, and another Masters in Visual Studies from the MIT Media Laboratory. In the midst of his PhD research in 1993, where he aimed to create a generalized platform – Information Cybernetics – for pattern recognition, he won an industry-wide competition sponsored by the White House, Executive Office of the President, to automatically analyze and classify President Clinton's email, resulting in his developing EchoMail® - a platform for automatic classification of electronic documents –, and subsequently launching EchoMail, Inc., a company that grew to nearly $200 million in market valuation. EchoMail today applies its technologies across a diversity of applications.

In 2003, he returned to MIT complete his doctoral work in systems biology in the department of Biological Engineering where he developed CytoSolve®, a scalable computational systems biology platform for mathematically modeling the whole cell. Following his PhD, Dr. Shiva was selected for a Fulbright Fellowship returning him to India where he discovered the systems theoretic basis of eastern systems of medicine resulting in Systems Health®, a new educational program that provides a scientific foundation for integrative medicine. In 2012, Dr. Shiva launched CytoSolve, Inc. with the aim of modeling complex diseases and biomolecular processes to discover multi-combination medicines. His efforts led to CytoSolve earning an FDA allowance for a multi-combination therapy for pancreatic cancer in a record eleven months, developing innovative nutraceutical products, and garnering numerous industry and academic partnerships.

As an educator dedicated to the field of systems science and systems thinking, Dr. Shiva pioneered Systems Visualization, a course he taught at MIT to graduate and undergraduate students, which integrated systems theory, narrative story telling, metaphors, and data science to provide a pedagogy for visualization of complex systems. He founded the International Center for Integrative Systems, a research and educational institution and home to Innovation Corps and R.A.W./C.L.E.A.N. Food Certified, for broader applications of systems science.

Dr. Shiva has appeared in The MIT Technology Review, TIME, The Wall Street Journal, New York Times, NBC News, USA Today and other major media. Dr. Shiva was named Top 40 Under 40 in the Improper Bostonian. He continues his passion for entrepreneurialism as Managing Director of General Interactive to incubate, mentor and fund new startups in various areas including healthcare, media, biotechnology, information technology, to name a few.

Dr. Shiva is a member of Sigma-Xi, Eta Kappa Nu, and Tau Beta Pi.

ESII ELECTION SYSTEMS INTEGRITY INSTITUTE

A Publication of the Election Systems Integrity Institute

The Election Systems Integrity Institute ("ESII") is dedicated to providing independent research and infrastructure to support Election Systems Integrity. This publication documents the work completed by EchoMail, Inc., which was commissioned by the Arizona State Senate to perform the work in this study.

Notes on Update

- This updated Extended Study advances on the previous version published on March 2, 2022
- Specifically, the updates in this version are as follows:
  1) A refinement of the pooled consensus measure is done based on every time an *individual* pairwise signature is reviewed by either a set of FDEs or non-FDEs. This measure is the probability out of how many times among a set of either FDEs or non-FDEs that the same pair of signatures associated with an EVB is concluded to be a Match or a No Match. This obviates the need for average signature mismatch rate and the previous pooled consensus. This refinement is applied to the calculation of the signature mismatch rates in Experiment I, Experiment II, and the Two-Step Review, across all 2,770 pairwise signatures.
  2) Application of additional constraints on which signatures from the Deeds repository are included
  3) Relative to (2), these constraints include:
     a) Restrictions on middle initial comparison when acquiring signatures from the Deeds repository
     b) Removal of **all** 290 signature mismatches that all reviewers classified as No Match
  4) Based on (3), **391 were removed** from the original data set of 2,770. This reduced the data set to 2,379, which is used re-calculate Experiment I, Experiment II, and the Two-Step Review in Analysis B.

Table of Content

Executive Summary

Executive Summary

- At minimum, 215,856 early voting mail ballots (EVBs) should have been cured in Maricopa versus the ~25,000 cured by the County in the 2020 General Election.

Measures	Mismatch Rate (%)	EVBs to be Cured	Maximum Cured by Maricopa	EVBs to be Disallowed Post-Curing	Maricopa Disallowed Post-Curing
Non-FDEs Pooled Consensus Analysis A – Expt I	28.50%	544,897	25,000	12,533	587
FDEs Pooled Consensus Analysis A - Expt II	48.98%	936,840	25,000	21,547	587
2-Step Pooled Consensus Analysis A	22.27%	425,784	25,000	9,793	587
Non-FDEs Pooled Consensus Analysis B – Expt I	18.02%	344,528	25,000	18,025	587
FDEs Pooled Consensus Analysis B – Expt II	41.15%	786,754	25,000	7,924	587
2-Step Pooled Consensus Analysis B	11.29%	215,856	25,000	4,965	587

Executive Summary

- At minimum, 215,856 early voting mail ballots (EVBs) should have been cured in Maricopa versus the ~25,000 cured by the County in the 2020 General Election.
- This updated Extended Study ("the Study") along with the Pilot Study are the first to calculate signature mismatch rates of EVBs for Experts - Forensic Document Examiners (FDEs), Trained Novices (non-FDEs), and in a Two-Step Review process using non-FDEs and FDEs.
- One constraint of this Study in not having access to the signature files from the County.
- Given the nearly 10x difference in EVBs to be cured between this Study and the County's actually number cured, if the County were to provide their signature files, an update to this Study can be performed.

Abstract

ABSTRACT

- An initial Pilot Study was conducted using 499 EVB signature images that were randomly selected from a database of 1,911,918 EVB envelope images from Maricopa in order to have a 95% Confidence Level such that the real value would be within ±4.4% Margin of Error of the measured value.[3]
- In that Pilot Study, six reviewers – 3 experts (Forensic Document Examiners – FDEs) and 3 trained novices (non-FDEs) – who were presented pairwise images of signatures from the EVB envelope and a genuine signature, ALL concurred 60 of the 499 (12%) EVBs to be signature mismatches.[3]
- The Pilot Study concluded that 229,430 EVBs should have been cured versus the "upwards of 25,000" that Maricopa County reported cured.[3]
- Though the results from Pilot Study were compelling, it was decided an Extended Study should be conducted using a much larger sample size.

[3] Ayyadurai, Shiva, "Irreconcilable Differences – Over 200,000 Mail Ballots With Mismatched Signatures Counted Without Being Reviewed ("Cured") in Maricopa: First Study to Calculate Signature Matching Rates to Provide a Quantitative Framework for Assessing Signature Verification of Mail Ballots," Election Systems Integrity Institute (ESII), Cambridge, MA, February 22, 2022,

ABSTRACT

- This Study used an initial sample size of 2,770 – five times larger than Pilot Study - having a 99% Confidence Level so the real value would be within ±2.5% Margin of Error of the measured value to perform a first set of analysis. This analysis is in the section marked “Analysis A.”
- This Study used a revised sample size of 2379 – after imposing additional constraints to ensure more genuine signatures from the Deeds’ repository – having a 99% Confidence Level so the real value would be within ±2.7% Margin of Error of the measured value to perform a second set of analysis. This analysis is in the section marked “Analysis B.”
- Specifically, in this update:
    1) Additional constraints are applied to the original 2,770 data set with greater restrictions on the name matching of signatures acquired from the Deeds repository.

ABSTRACT

2) ALL pairwise signatures (290) wherein ALL six reviewers classified them to be No Match **are removed**. When ALL six reviewers believe a set of pairwise signatures are NO MATCH, it could be one of two possibilities: either the pair are indeed a NO MATCH or the genuine signature from the Deeds' repository is not genuine. Herein, the latter possibility is applied across all the 290. This choice may lead to false negatives – pairwise sets with genuine signature being removed; however, it significantly reduces the possibility for error i.e. the probability of this Study having signatures which are not genuine.

3) Relative to point (2), some examples of false negative pairs that were removed but indeed had genuine signatures are provided.

ABSTRACT

- This Study found:
  - If Experts - Forensic Document Examiners (FDEs) – alone were used to review the EVBs, then at a minimum 786,753 EVBs should have been cured or at a maximum 936,457 EVBs.
  - If Trained Novices – non-FDEs – alone were used to review the EVBs, then at a minimum 344,528 EVBs should have been cured or at a maximum 544,897 EVBs.
  - If non-FDEs and FDEs BOTH were used to review the EVB signatures in a two-step process (non-FDEs reviewing first, then FDEs), then at a minimum 215,856 EVBs should have been cured or at a maximum 425,784 EVBs.

ABSTRACT

- The Study reveals that at minimum 215,856 early voting mail ballots (EVBs) should have been cured in Maricopa versus the ~25,000 in the 2020 General Election.
- If the County were to provide its signature file used in the 2020 General Election, this study can not only be updated but also enable our machine learning algorithms to perform a full analysis of all 1.9M+ EVBs.

Background

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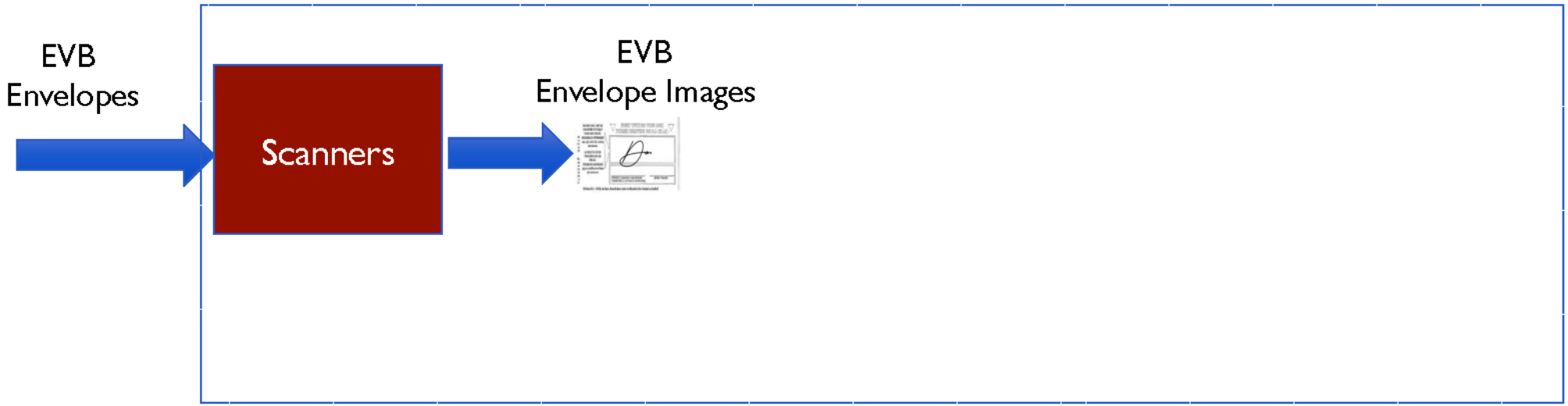

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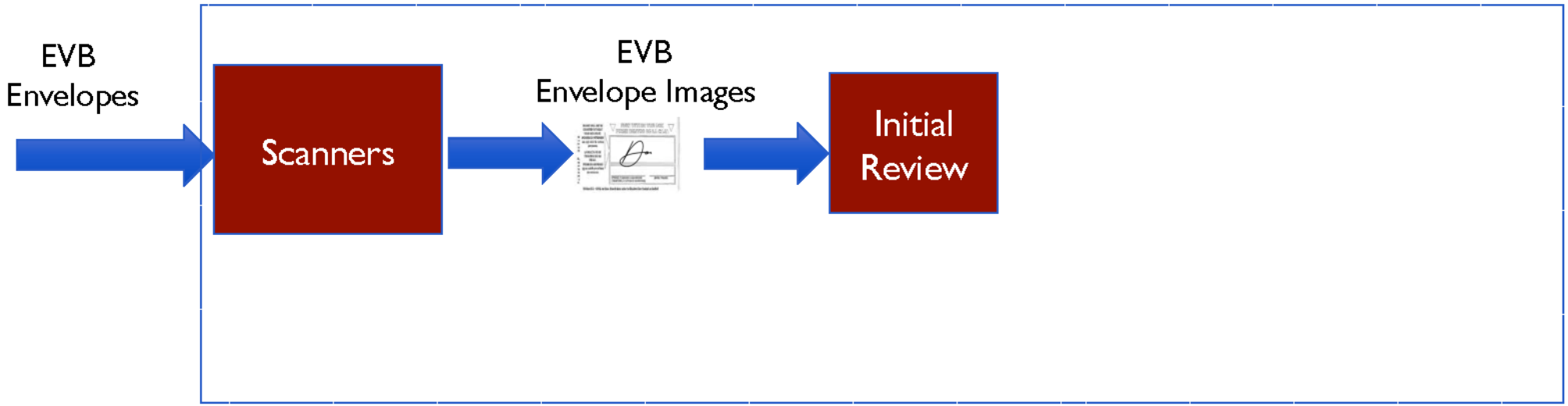

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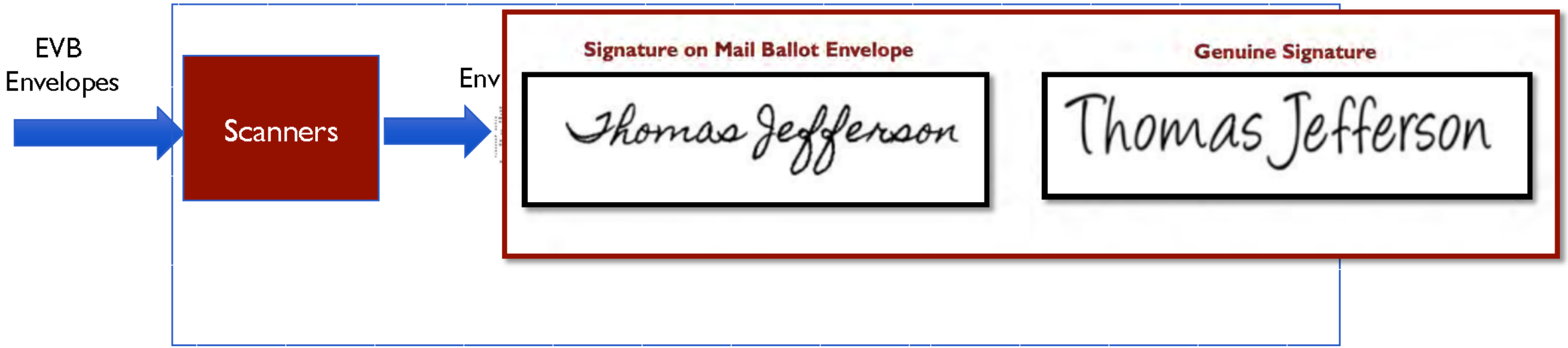

- EVB envelopes are scanned to produce EVB envelope images
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  - Trained Staff review 100% of all EVB envelope images following County's procedures to determine if EVB signature is a *Match* or *No Match* with genuine signature on file

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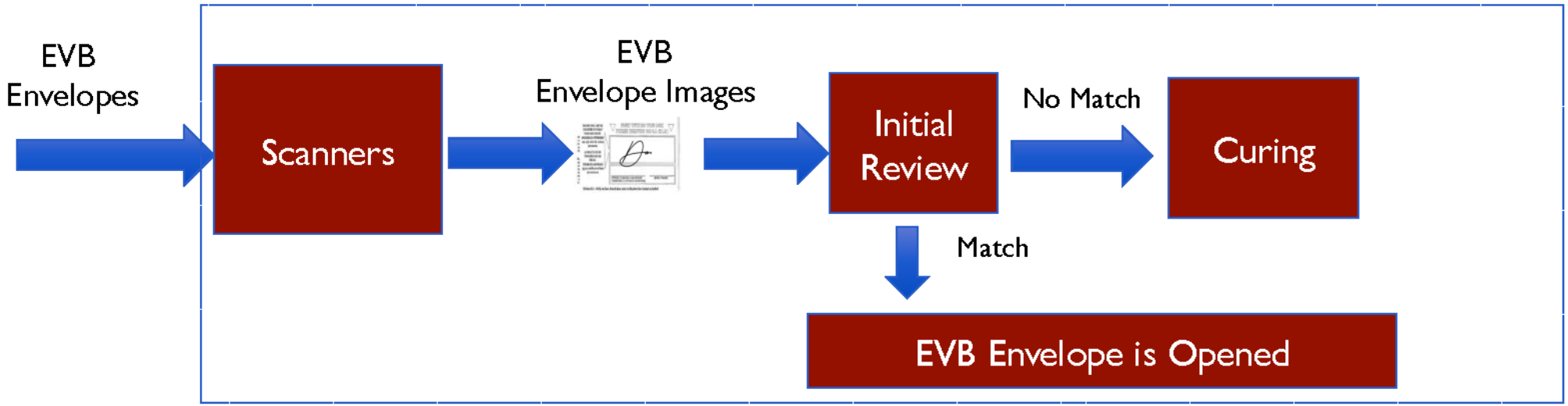

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  - Trained Staff review 100% of all EVB envelope images following County's procedures to determine if EVB signature is a *Match* or *No Match* with genuine signature on file (takes 4 to 30 seconds)
  - Any *No Match* is sent to Manager (with more expertise) to determine if it should be cured or not

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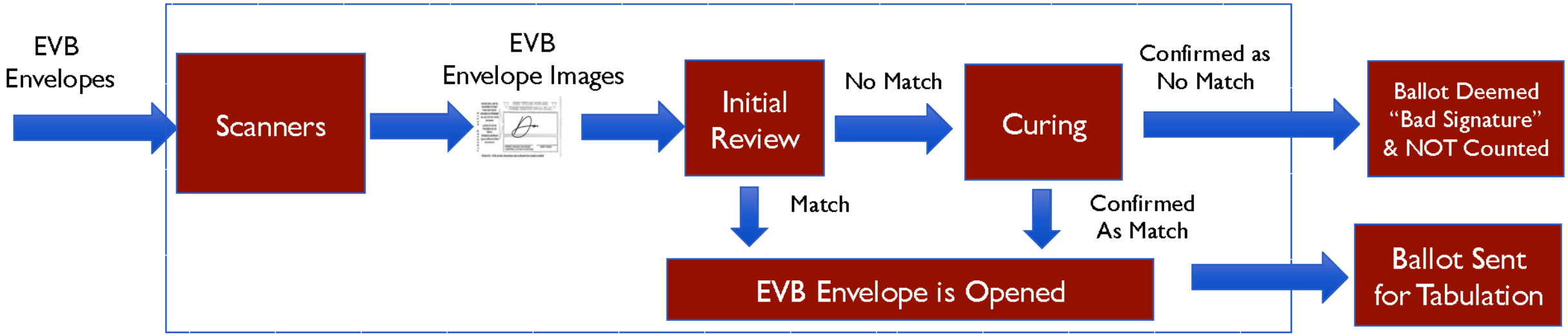

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  - Any *No Match* is sent to Manager (with more expertise) to determine if should it be cured or not
- Curing includes review by bipartisan teams & contacting voter to determine if *No Match* Initial Review is a "Bad Signature" or a *Match*

Results of Signature Verification In Maricopa County

2020 General Election

Total Number of Voters Submitting EVBs	**1,911,918**
Maximum Number of EVBS that Were Cured by Maricopa	**25,000***
Percentage Cured as a Total of All EVBs	1.31%
EVBs Determined to be "Bad Signatures" AFTER Curing	**587**
Percentage "Bad Signatures" as a Total of All EVBs	0.031%
Percentage "Bad Signatures" as a Total of EVBs Cured	2.3%

*County reported "upwards of 25,000" were cured. EchoMail in its earlier report [4] presented to the Arizona State Senate that it uncovered 17,322 duplicate EVB envelope images from 17,126 unique voters. The County stated these duplicate images were an artifact of the curing process, which means that 17,126 EVBs were cured. The County has yet to report the exact number of EVBs cured.

[4] Ayyadurai, Shiva, "Pattern Recognition Classification of Early Voting Ballot (EVB) Return Envelope Images for Signature Presence Detection: An Engineering Systems Approach to Identify Anomalies to Advance the Integrity of U.S. Election Processes," Presented to AZ State Senate, September 24, 2021.

Methodology

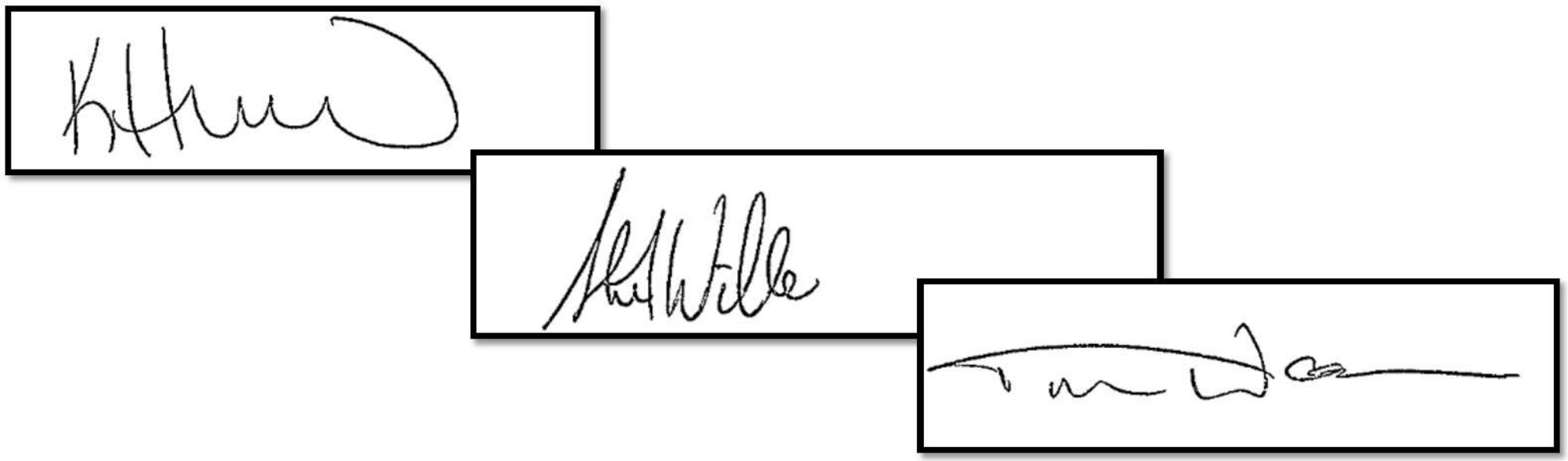
Methodology

- **Step 1**: Select a representative statistical sample from population of 1,911,918 early voting mail ballots (EVBs) to have a **Confidence Level of 99%** and a **Margin of Error of ±2.5%;**

- To achieve this, a **Sample Size of 2,770** is selected

Methodology

- **Step 2**: Organize a data set of 2,770 envelope signatures by random sampling of Maricopa's 1.9M+ EVB envelope images:



Methodology

- **Step 3**: Create data set of 2,770 genuine signatures matching first, middle initial, and last name 2,770 envelope signatures:
  - Genuine signatures are sourced from Maricopa's publicly accessible Deeds' repository
  - 2,770 Deeds' genuine signatures are extracted
  - It should be noted that the source of genuine signatures used in this study may be different from source of genuine signatures used by County; however, experts in forensic document examination share that signatures from a Deeds repository may likely be more valid given such signatures are Notarized

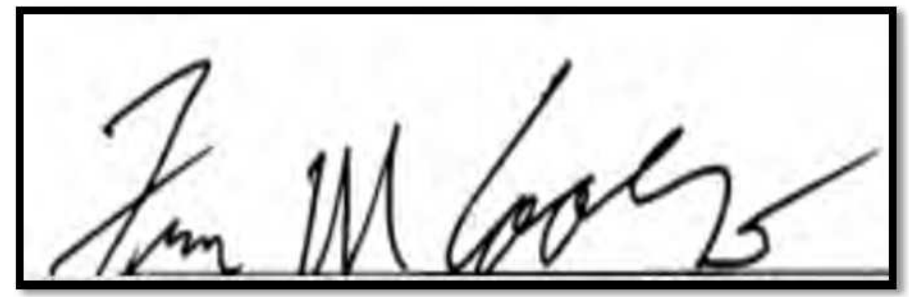
If the County provides the genuine signatures in their files for the 2,770 samples used herein, this Extended Study can be updated.

Methodology

- **Step 4**: Create pairwise dataset of 2,770 envelope signatures and 2,770 genuine signatures

Signature on Mail Ballot Envelope

Genuine Signature



- Reviewer is given TWO choices: ***Match*** or ***No Match***

Methodology

- **Step 5**: Given the County did not provide their signatures on file to EchoMail, additional constraints are applied to remove non-genuine signatures in the Deeds repository from the original 2,770 data set. These constraints are: 1) restrictions on name matching; and, 2) removal of pairwise signatures classified as ***No Match*** by ALL six reviewers as these are assumed **conservatively <u>not</u>** be a ***No Match*** but rather an error in the signature acquired from the Deeds repository.
- Relative to (1), a combination of technology and human is employed to assess if the person in Deeds repository is the person on the EVB envelope. This is done by matching the first name, middle name/initial, and last name and address when needed and if possible. The middle initial is essential to match (along with first and last name). Close review was performed on the middle name/initial match. When that match is found to be correct, it is accepted; otherwise, the address is then checked. If the address does not match, then the signature is not used.

Analysis A: Initial Set of 2,770 Samples

Experiment I

Determination of Signature Mismatching Rates of EVBs Using Experts - Forensic Document Examiners (FDEs)

Experiment I

Experts: Forensic Document Examiners (FDEs)

- Three FDEs were recruited and asked to apply their training
- Presented 2,770 pairwise images to review for no more than 30 sec
- Recorded each FDEs **Match** and **No Match** selections
- Calculate **FDEs Pooled Consensus Signature Mismatch** rate

Experiment I

Experts: Forensic Document Examiners (FDEs)

"Pooled Consensus" means the probability out of how many times among ALL three FDEs that the same pair of signatures associated with an EVB is concluded to be a Match or a No Match.

Experiment I

Experts: Forensic Document Examiners (FDEs)

- Three FDEs were recruited and asked to apply their training
- Presented 2,770 pairwise images to review for no more than 30 sec
- Step 1: Record each FDEs **Match** and **No Match** selections
- Step 2: Calculate **FDEs Pooled Consensus Signature Mismatch** rate
  - For each pairwise signature set, across the 2,770 pairwise images, calculate the probability that a FDE concludes it is a mismatch
  - Determine the distribution of probabilities
  - Determine the mean of the probabilities across the 2,770 to determine the FDEs pooled consensus signature mismatch rate

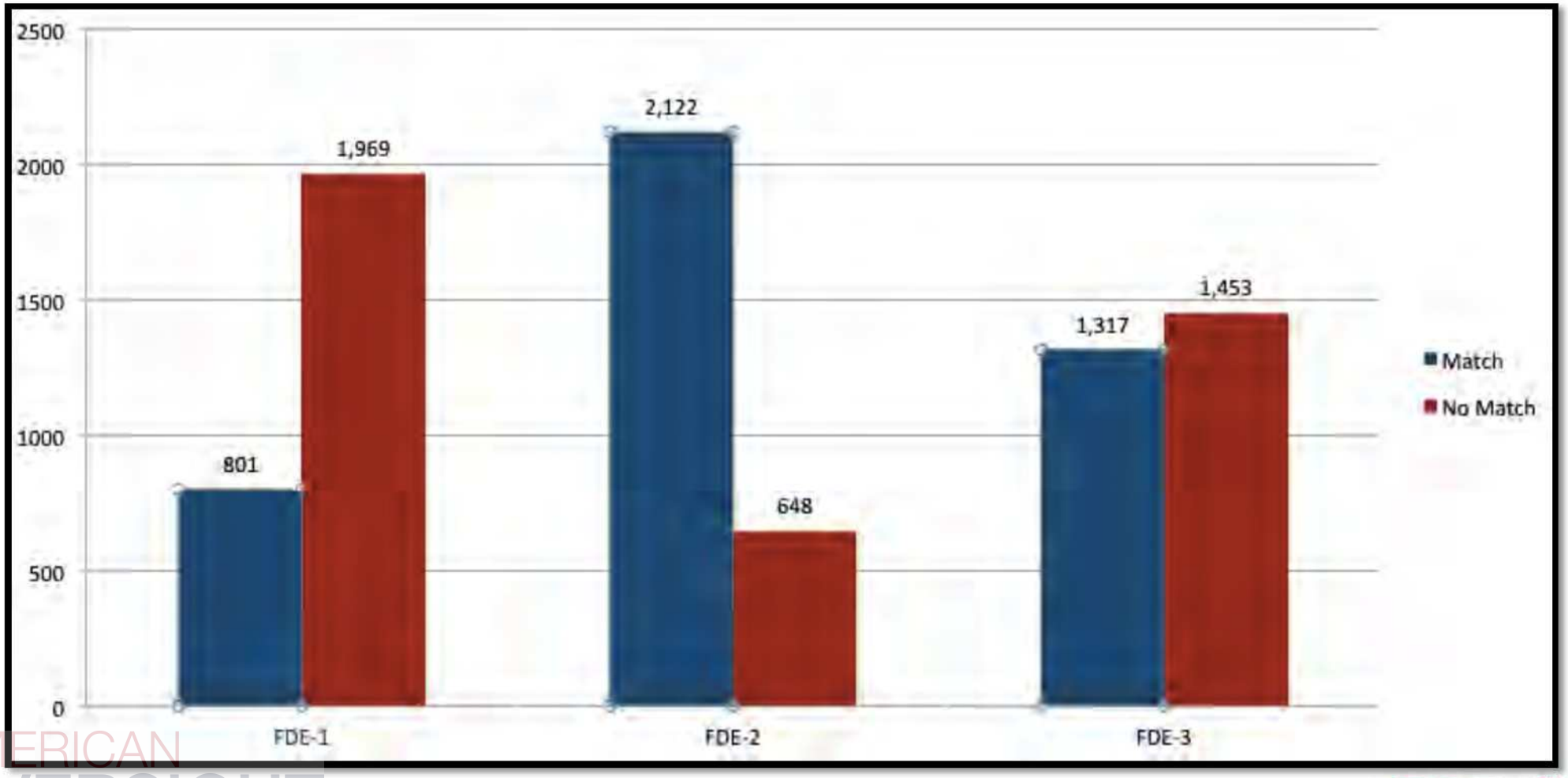
Experiment I

Step 1 Results: Match and No Match Counts for FDEs

FDEs	Match	No Match	Signature Mismatch Rate (%)
FDE-1	801	1,969	71.1%
FDE-2	2,122	648	23.4%
FDE-3	1,317	1,453	52.5%

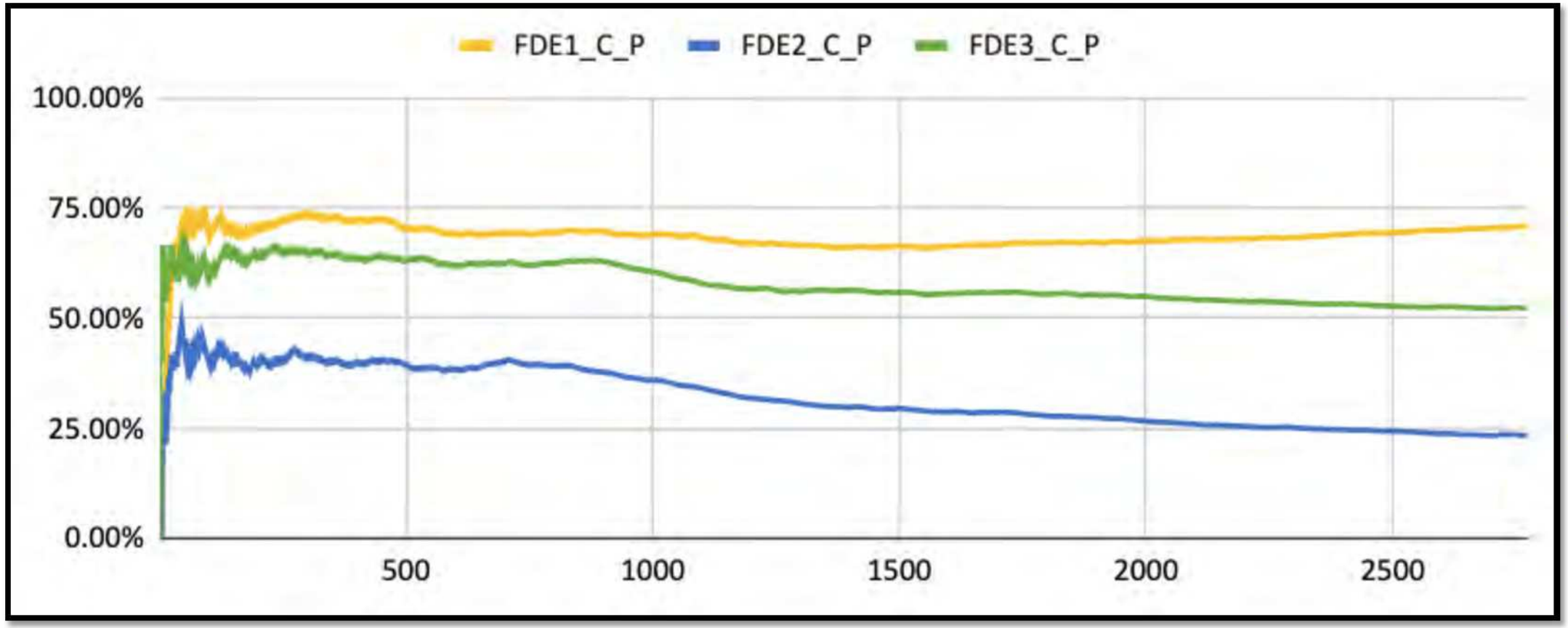
Experiment I

Step 1 Results: Match and No Match Counts for FDEs



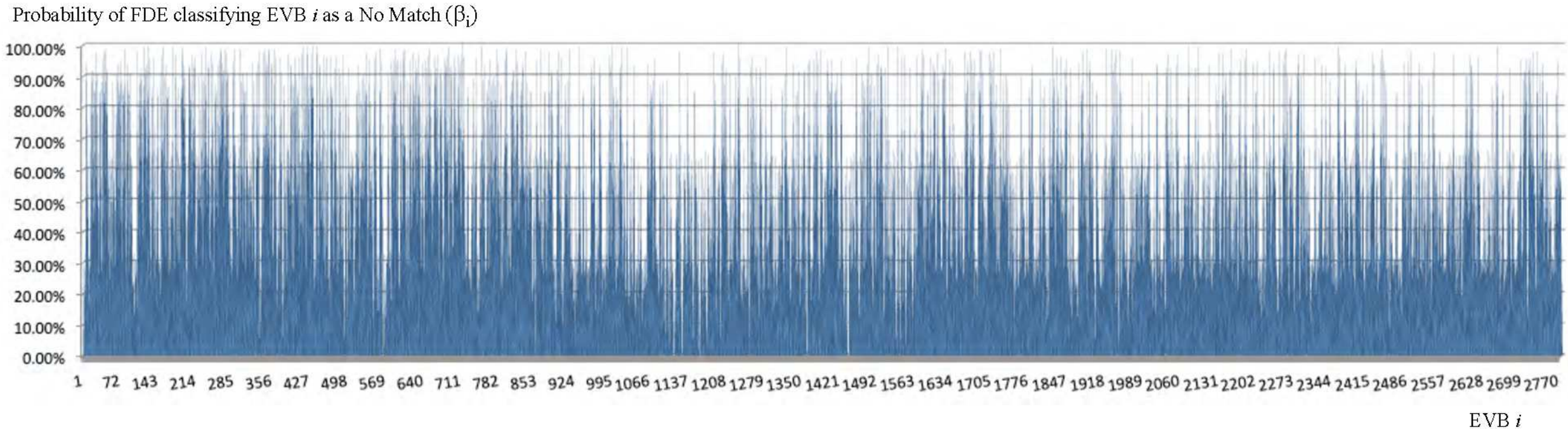
Experiment I

Step 1 Results: Temporal Match and No Match Counts of FDEs



Experiment I

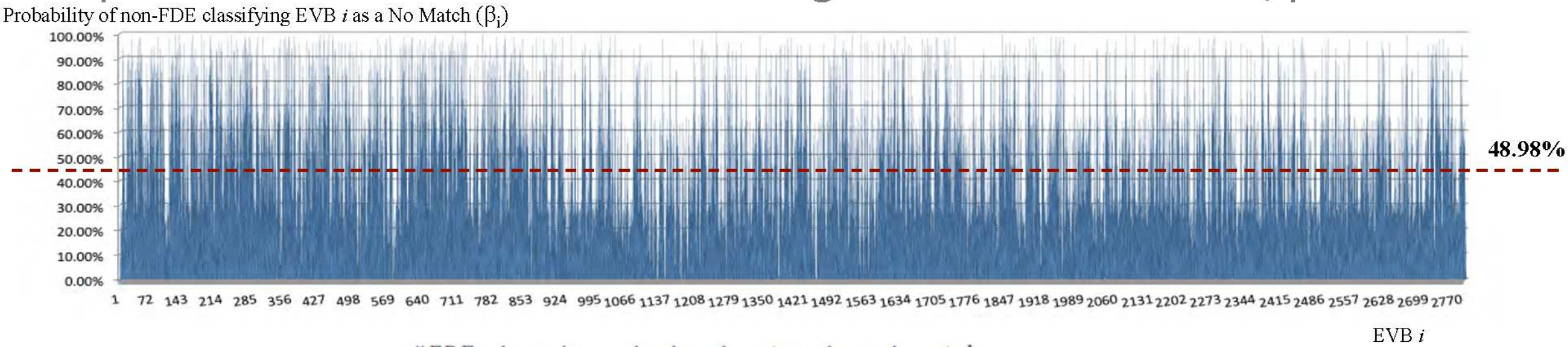
Step 2 Results: Probability of an FDE classifying a particular EVB as mismatch*



*Each bar denotes the "pooled consensus" –the probability out of how many times among ALL three FDEs that the same pair of signatures associated with an EVB is concluded to be a Match or a No Match.

Experiment I

Step 2 Results: FDE Pooled Consensus Signature Mismatch Rate, β = 48.98%

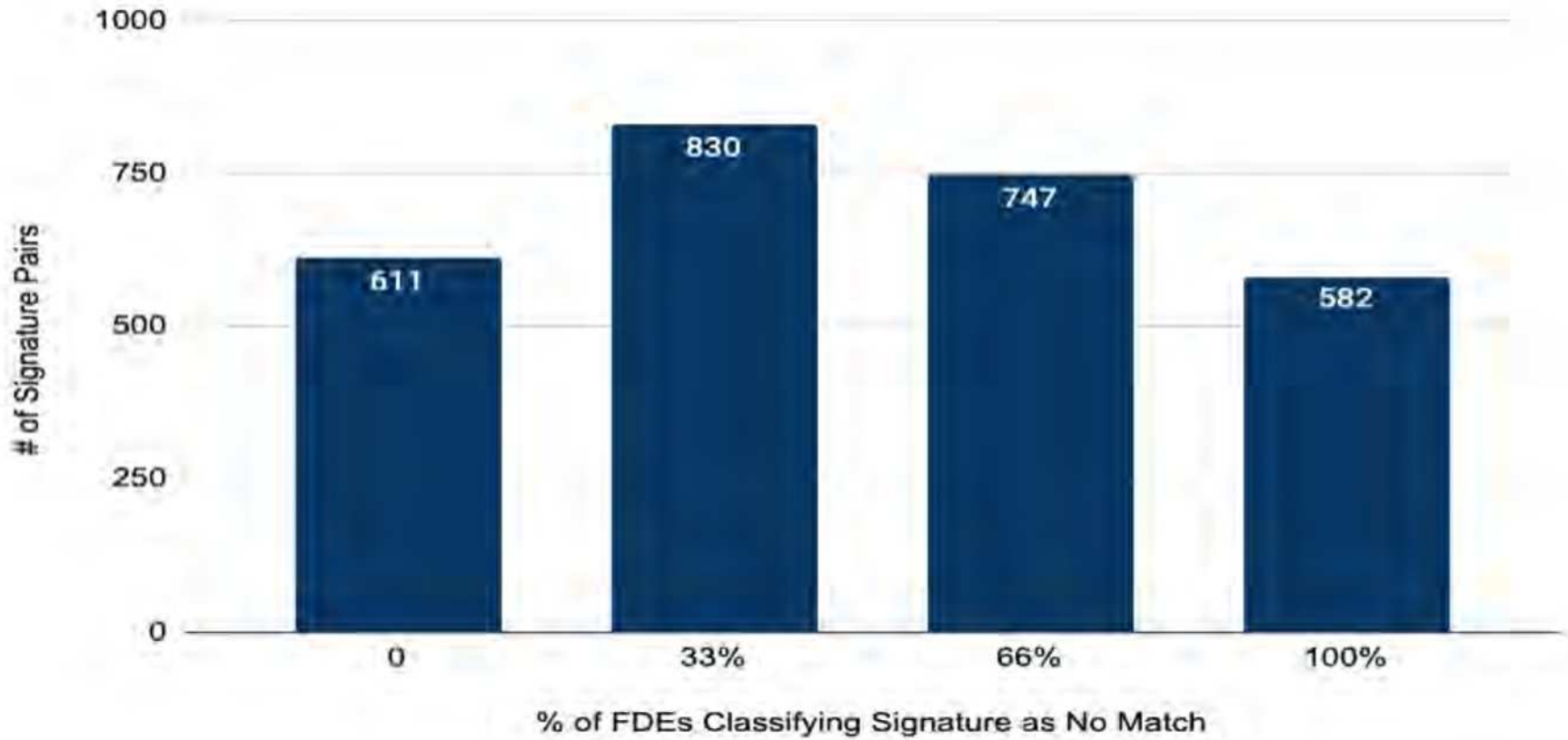


$$\beta_i = \frac{\#FDEs\ Agreeing\ pairwise\ signature\ is\ a\ mismatch}{3}$$

$$\beta = \frac{1}{2770}\sum_{i=1}^{2770}\beta_i \quad = \mathbf{48.98\%}$$

Experiment I

Step 2 Results: Grouping of Pooled Consensus Probabilities of FDEs by Counts of Signature Pairs



Experiment I

Result: FDEs Would Have Flagged 936,457 EVBs for Curing

Total Number of Voters Submitting EVBs	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
FDEs Pooled Consensus Signature Mismatch Rate	**48.98%**
Number of EVBs That Should Have Been Cured	936,457

Experiment II

Determination of Signature Mismatching Rates of EVBs Using Trained Novices – non-Forensic Document Examiners (non-FDEs)

Experiment II

Trained Novices: non-FDEs (non-Forensic Document Examiners)

- Three non-FDEs were given the County's Signature Verification Guide[5]:

[5] Maricopa County Elections Department, "Signature Verification Training," Powerpoint Presentation.

Experiment II

Trained Novices: non-Forensic Document Examiners (non-FDEs)

- Three non-FDEs were recruited and asked to apply their training
- Presented 2,770 pairwise images to review for no more than 30 sec
- Recorded each non-FDEs **Match** and **No Match** selections
- Calculate **non-FDEs Pooled Consensus Signature Mismatch** rate

Experiment II

Trained Novices: non-Forensic Document Examiners (non-FDEs)

"Pooled Consensus" means the probability out of how many times among ALL three non-FDEs that the same pair of signatures associated with an EVB is concluded to be a Match or a No Match.

Experiment II

Trained Novices: non-Forensic Document Examiners (non-FDEs)

- Three non-FDEs were recruited and asked to apply their training
- Presented 2,770 pairwise images to review for no more than 30 sec
- Step 1: Record each non-FDEs **Match** and **No Match** selections
- Step 2: Calculate non-**FDEs Pooled Consensus Signature Mismatch** rate
  - For each pairwise signature set, across the 2,770 pairwise images, calculate the probability that a non-FDEs concludes it is a mismatch
  - Determine the distribution of probabilities
  - Determine the mean of the probabilities across the 2,770 to determine the non-FDEs pooled consensus signature mismatch rate

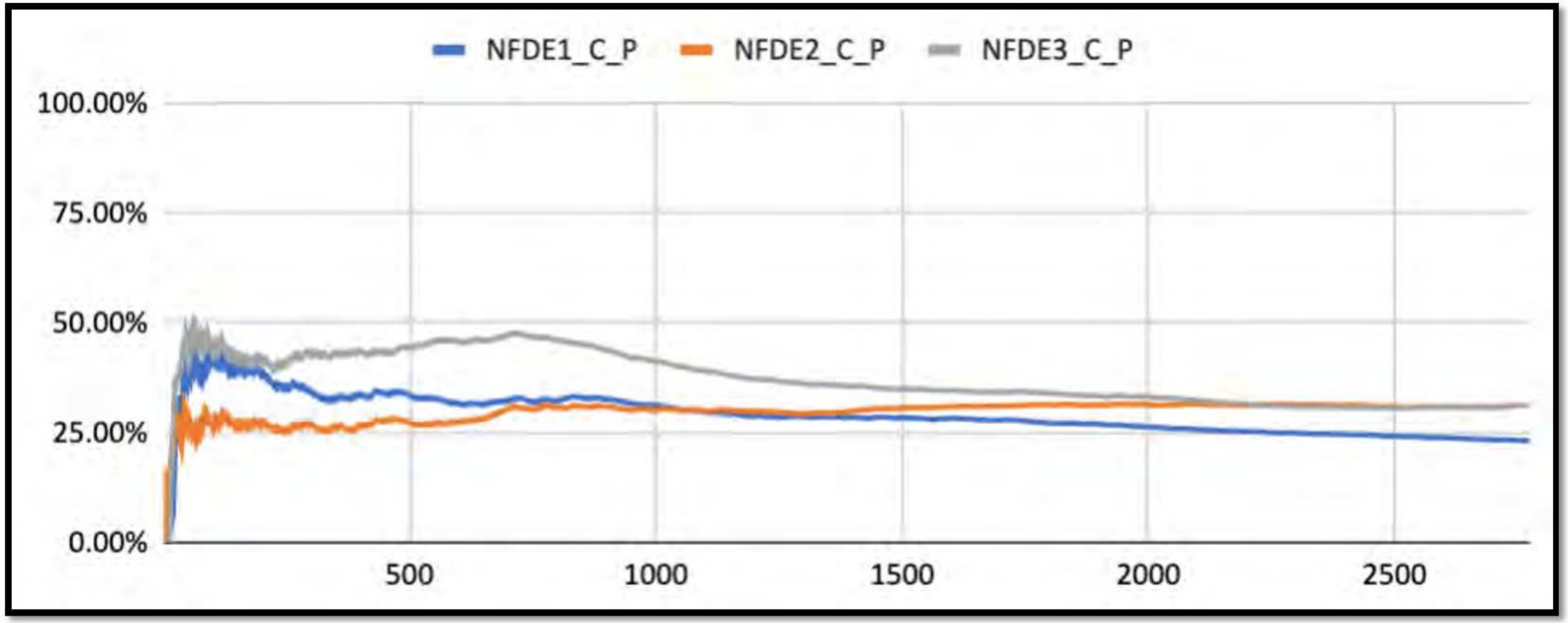
Experiment II

Step 1 Results: Match and No Match Counts for non-FDEs

Non-FDEs	Match	No Match	Signature Mismatch Rate (%)
non-FDE-1	2,129	641	23.1%
non-FDE-2	1,906	864	31.2%
non-FDE-3	1,907	863	31.2%

Experiment II

Step 1 Results: Temporal Match and No Match Counts of non-FDEs

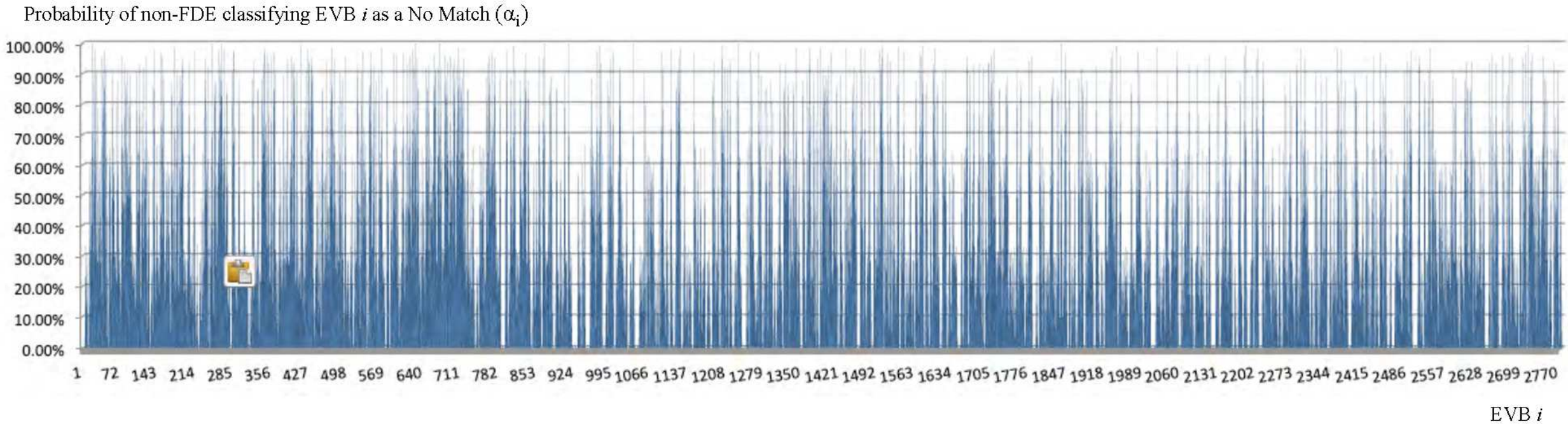


31.2%

23.1%

Experiment II

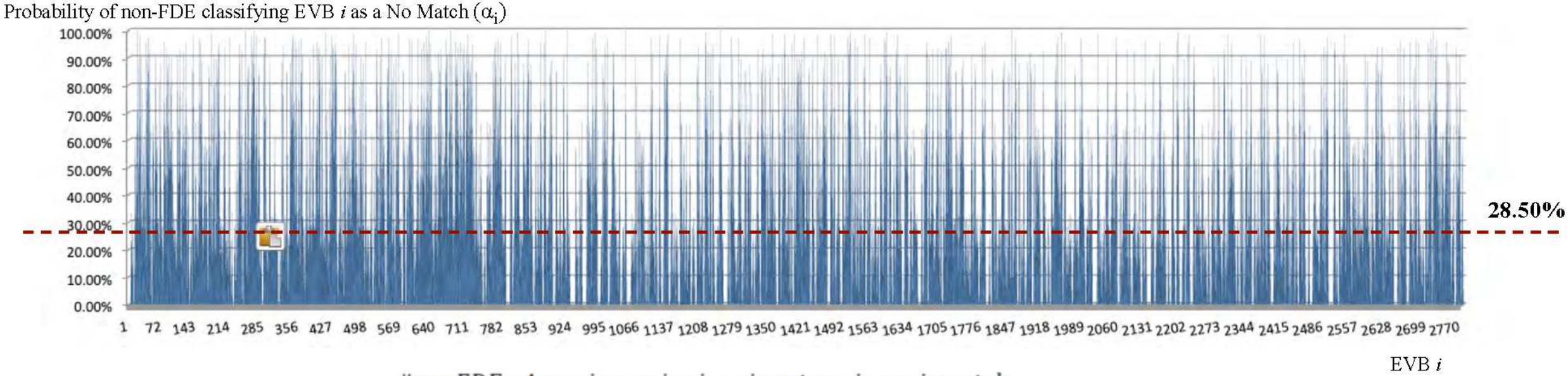
Step 2 Results: Probability of an non-FDE classifying a particular EVB as mismatch*



*Each bar denotes the "pooled consensus" –the probability out of how many times among ALL three FDEs that the same pair of signatures associated with an EVB is concluded to be a Match or a No Match.

Experiment II

Step 2 Results: non-FDE Pooled Consensus Signature Mismatch Rate, α = 28.5%

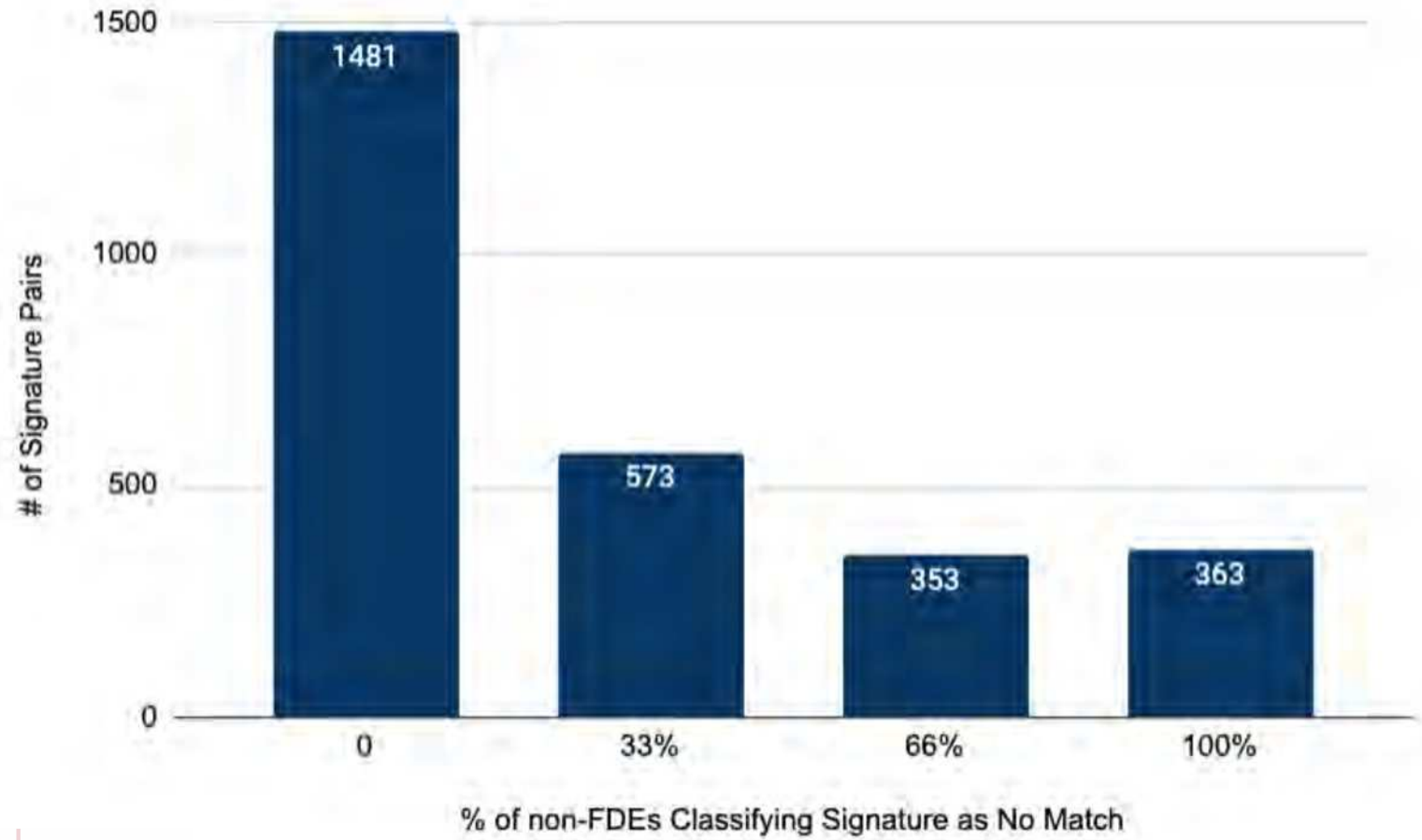


$$\alpha_i = \frac{\#nonFDEs\ Agreeing\ pairwise\ signature\ is\ a\ mismatch}{3}$$

$$\alpha = \frac{1}{2770}\sum_{i=1}^{2770}\alpha_i \quad = \mathbf{28.50\%}$$

Experiment II

Step 2 Results: Grouping of Pooled Consensus Probabilities of non-FDEs by Counts of Signature Pairs



Experiment II

Result: non-FDEs Would Have Flagged 544,897 EVBs for Curing

Total Number of Voters Submitting EVBs	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
non-FDE Pooled Consensus Signature Mismatch Rate	**28.50%**
Number of EVBs That Should Have Been Cured	544,897

Determining Two-Step Review Signature Mismatch Rate

First Trained Novices (non-FDEs) Review, Then Experts (FDEs)

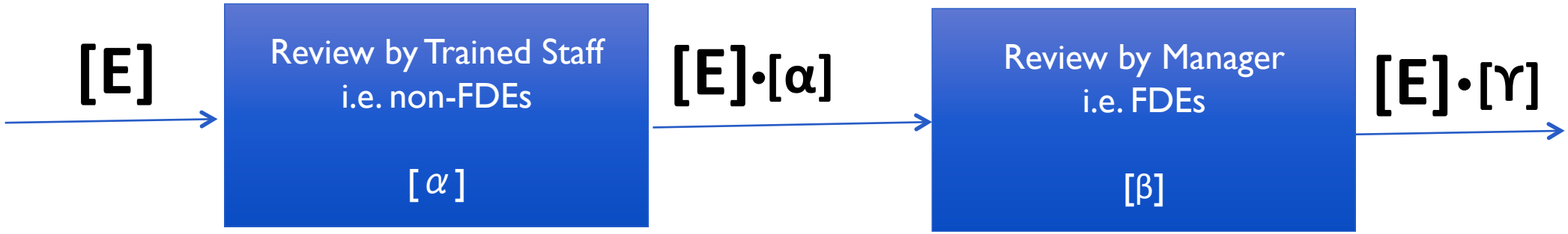
Determining Two-Step Review Signature Mismatch Rate

- In Maricopa, the Initial Review involved Trained Staff first assessing pairwise signatures. If a ***No Match*** was detected by any one of them, the EVB was sent to a Manager with greater expertise to determine if indeed it was a ***No Match*** and needed to be cured.

- In this Study, the non-FDEs are assumed to be equivalent to the Trained Staff; and, the FDEs are assumed to be equivalent to the Manager.

Determining Two-Step Review Signature Mismatch Rate

The goal is to determine the *two-step review signature mismatch rate, ϒ,* to determine the number of EVBs that would have been sent to curing after the two-step process.



Where: **[E]** is unit vector of size 2,770 representing the pairwise signatures reviewed by each non-FDE

[α] is a vector of the pooled consensus mismatch rates α_i for each EVB_i for *i* = 1 to 2,770

[E]•[α] is the total number of EVBs classified as ***No Match*** by non-FDEs

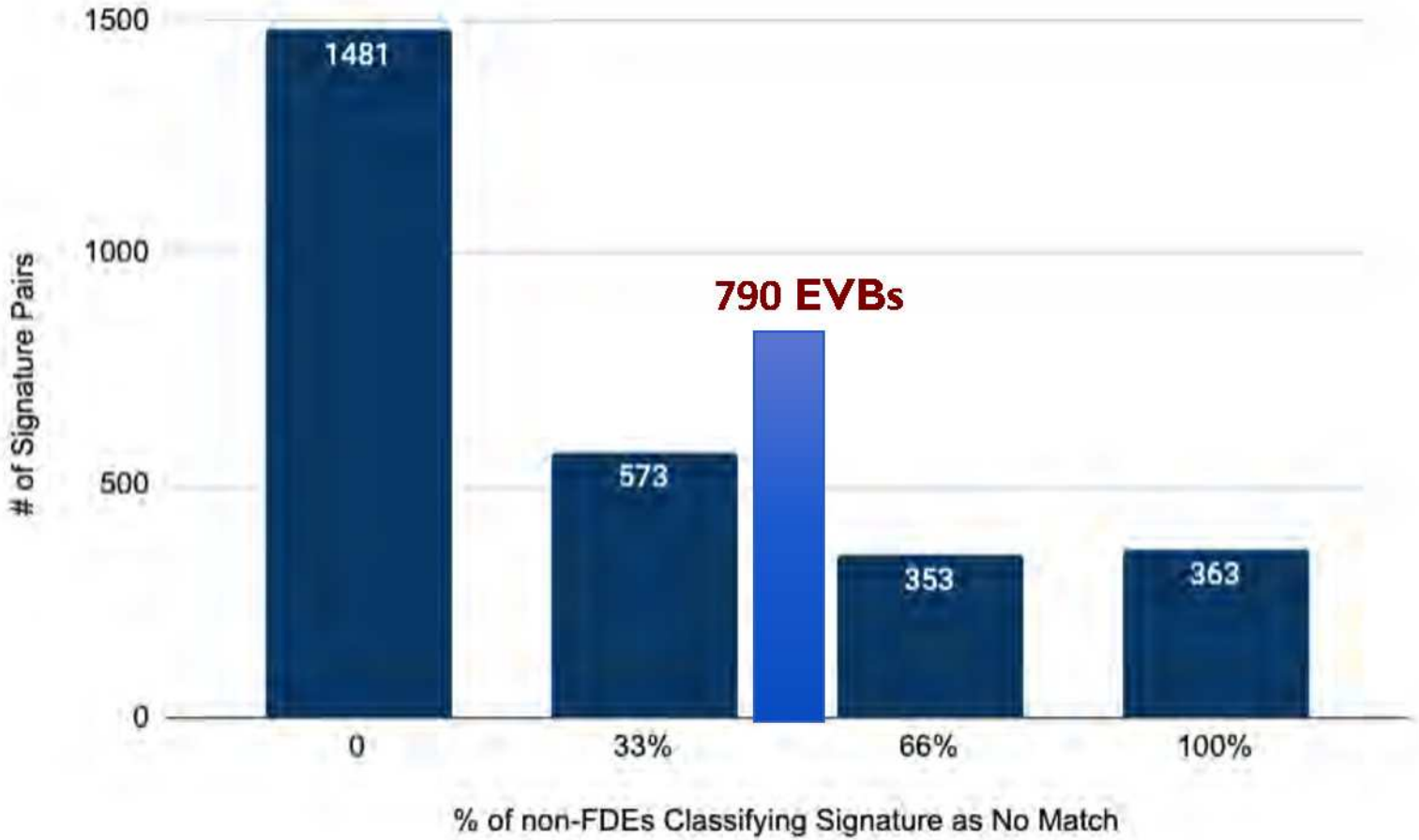
[β] is a vector of the pooled consensus mismatch rates β_i for each EVB_i for *i* = 1 to 2,770

[ϒ] is vector of joint probabilities **[α]x[β]** such that γ_i is the joint probability that for EVB_i the pooled consensus of FDEs classified it as ***No Match*** after pooled consensus non-FDEs classified as ***No Match***.

[E]•[ϒ] is the number of EVBs that the pooled consensus of FDEs classified as ***No Match*** after the pooled consensus of non-FDEs classified as ***No Match.***

Calculation of EVBs Determined by non-FDEs to be No Match

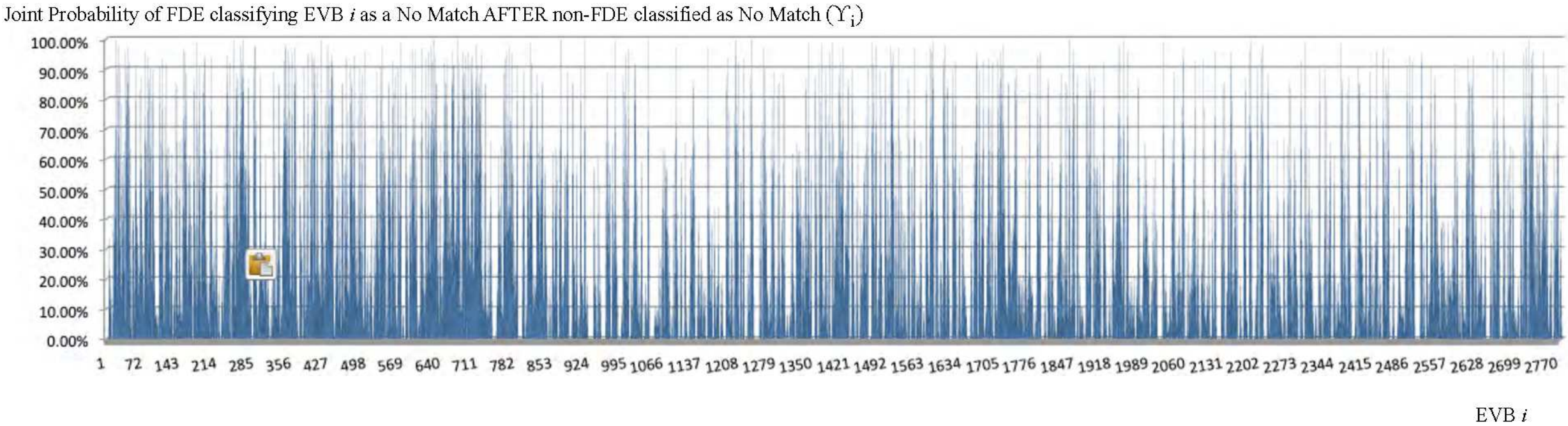
[E]•[α]



[E]·[α]= 790 EVBs

790 EVBs flagged as No Match by non-FDEs.

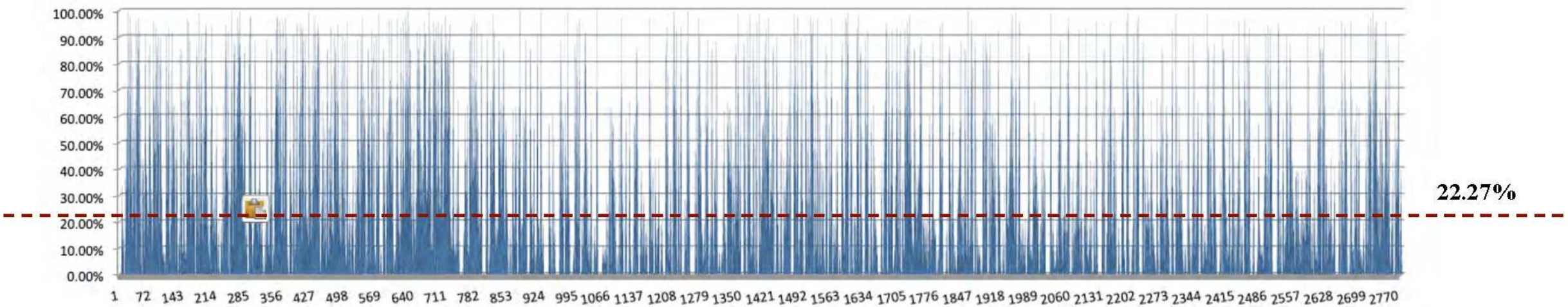
Calculation of [ϒ] = [α] x [β], the Joint Probability
Two-Step Review Signature Mismatch Rate



Calculation of [ϒ] = [α] x [β], the Joint Probability

Two-Step Review Signature Mismatch Rate

Joint Probability of FDE classifying EVB *i* as a No Match AFTER non-FDE classified as No Match (Υ_i)

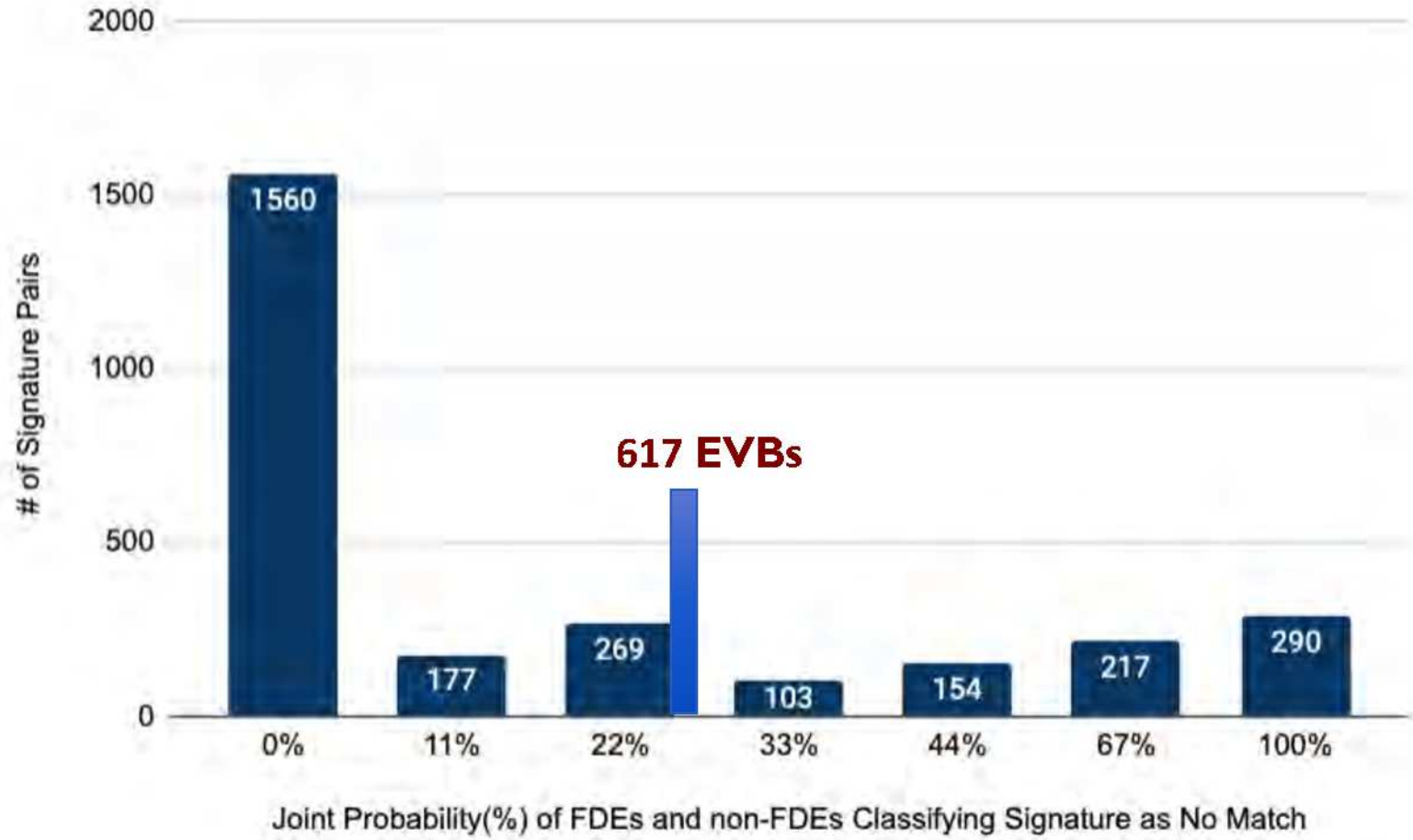


$$\gamma_i = \alpha_i * \beta_i$$

$$\gamma = \frac{1}{2770} \sum_{i=1}^{2770} \gamma_i \quad = 22.27\%$$

Calculation of EVBs To Be Cured: [E]•[ϒ]

Use of Calculated Joint Probability ϒ to Determine Number of EVBs to Be Cured = 617 EVBs



[E]·[ϒ]= 617 EVBs

617 EVBs would be flagged for curing. These are the EVBs determined as as NO MATCH following FDE review of EVBs flagged by non-FDEs as NO MATCH.

Two-Step Review Signature Mismatch Rate

Result: non-FDEs Would Have Flagged 544,897 EVBs for Curing

Total Number of Voters Submitting EVBs	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
Two-Step Review Signature Mismatch Rate	**22.27%**
Number of EVBs That Should Have Been Cured	425,784

Analysis A Summary

Measures	Mismatch Rate (%)	EVBs to be Cured	Maximum Cured by Maricopa	EVBs to be Disallowed Post-Curing	Maricopa Disallowed Post-Curing
Non-FDEs Pooled Consensus Analysis A – Expt I	28.50%	544,897	25,000	12,533	587
FDEs Pooled Consensus Analysis A - Expt II	48.98%	936,457	25,000	21,547	587
2-Step Pooled Consensus Analysis A	22.27%	425,784	25,000	9,793	587

Analysis A Summary

- If Experts - Forensic Document Examiners (FDEs) – alone were used to review the EVBs, then 936,457 EVBs should have been cured.
- If Trained Novices – non-FDEs – alone were used to review the EVBs, then 544,897 EVBs should have been cured.
- If non-FDEs and FDEs BOTH were used to review the EVB signatures in a two-step process (non-FDEs reviewing first, then FDEs), then 425,784 EVBs should have been cured.
- The original data for Analysis A including images is found in PDF:
  - Analysis-A-Extended-Study.pdf
- The original date for Analysis A not including images is found in the XLS file:
  - Analysis-A-Extended-Study.xls

Additional Constraints for Updated Analysis

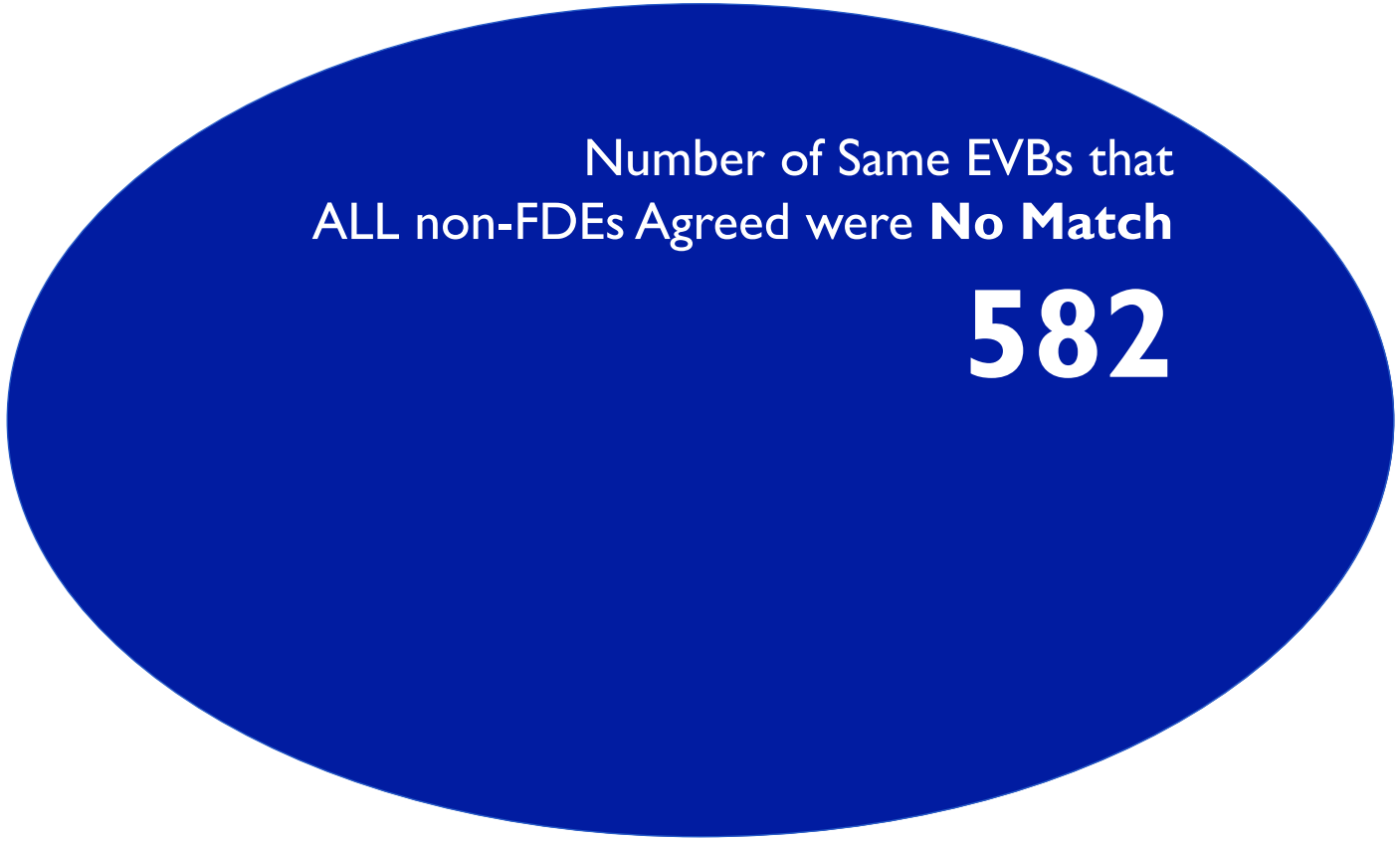
Application of Constraints to Remove Pairwise Signatures That May Have Non-genuine Signatures from Deeds' Repository

Updated Analysis With Additional Constraints

- Specifically, in this update:
  1) Additional constraints are applied to the original 2,770 data set with greater restrictions on the name matching of signatures acquired from the Deeds repository. **This removed 101 more pairwise signatures.**

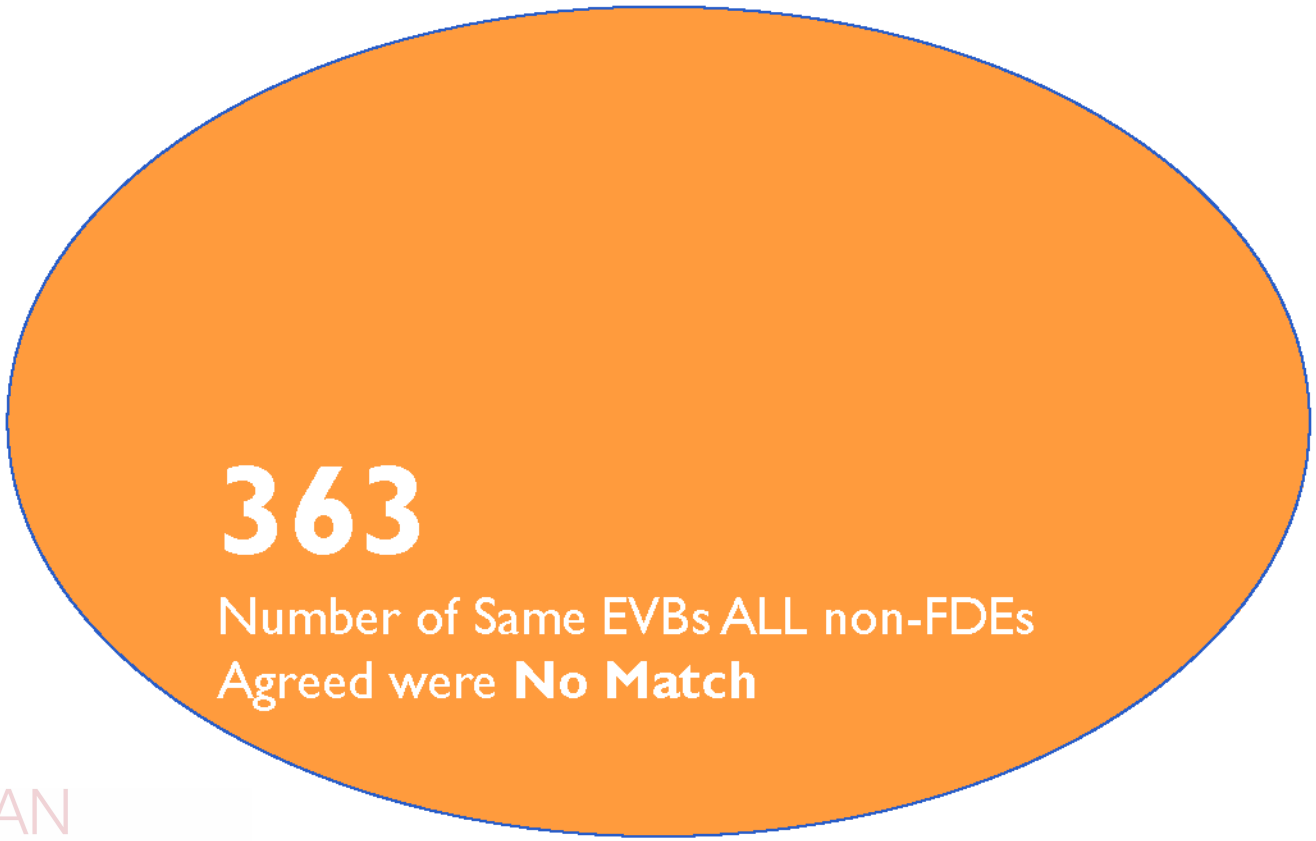
Updated Analysis With Additional Constraints

Determination of Number of EVBs ALL 6 Reviewers Flagged as NO MATCH



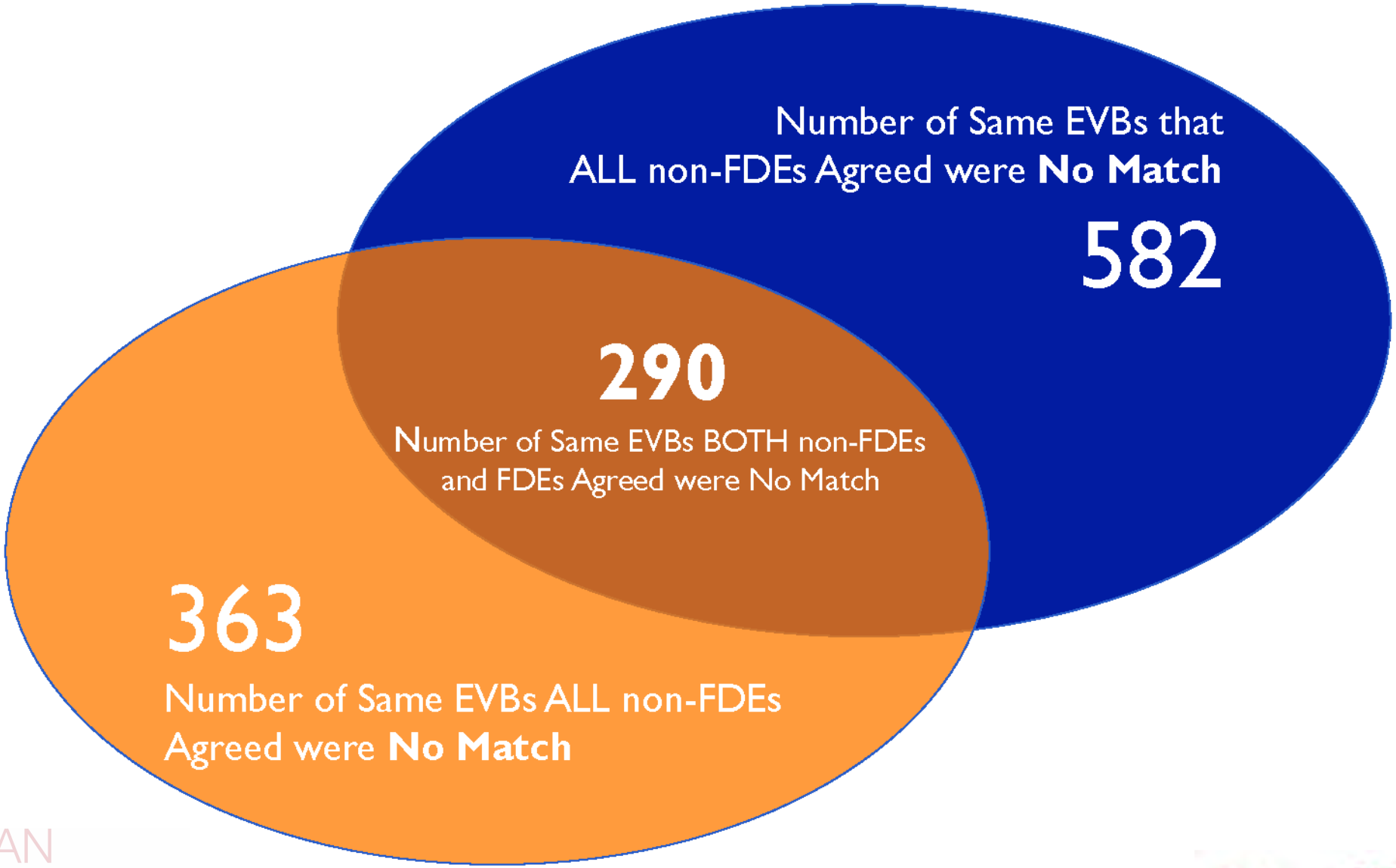
Updated Analysis With Additional Constraints

Determination of Number of EVBs ALL 6 Reviewers Flagged as NO MATCH



Updated Analysis With Additional Constraints

Determination of Number of EVBs ALL 6 Reviewers Flagged as NO MATCH



Updated Analysis With Additional Constraints

- Specifically, in this update:
  1) Additional constraints are applied to the original 2,770 data set with greater restrictions on the name matching of signatures acquired from the Deeds repository. This removed 101 more pairwise signatures
  2) ALL pairwise signatures (290) wherein ALL six reviewers classified them to be No Match are removed. When ALL six reviewers believe a set of pairwise signatures are NO MATCH, it could be one of two possibilities: the pair are indeed a NO MATCH or the genuine signature being used is not genuine. Herein, the latter possibility is applied across all the 290. This choice may lead to false negatives – pairwise sets with genuine signature being removed; however, it significantly reduces likely error i.e. the probability of this Study having signatures which are not genuine.
  3) After (1) & (2), **391 pairwise signatures were removed** from the original data set of 2,770 to create a new data set of 2,379.
  4) Relative to point (2), some examples of pairwise signatures that are false negatives, which were removed with a highly likely genuine signature from the 290 set are displayed in the next section.

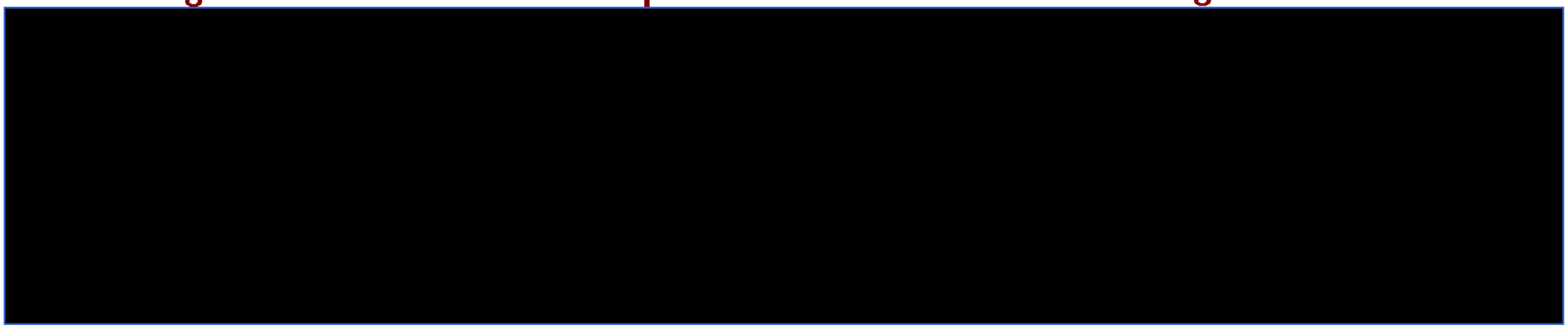
Examples of False Negatives from 290 Set*

*The full set of 290 is in a PDF file named: No-Match-Set-of-290.pdf

Example of False Negative

Pairwise Signature Removed from Set of 290 Where All 6 Reviewers Said No Match
But the Genuine Signature appears to be genuine give first name, middle initial, last name, and address match

Signature on Mail Ballot Envelope | **Genuine Signature***

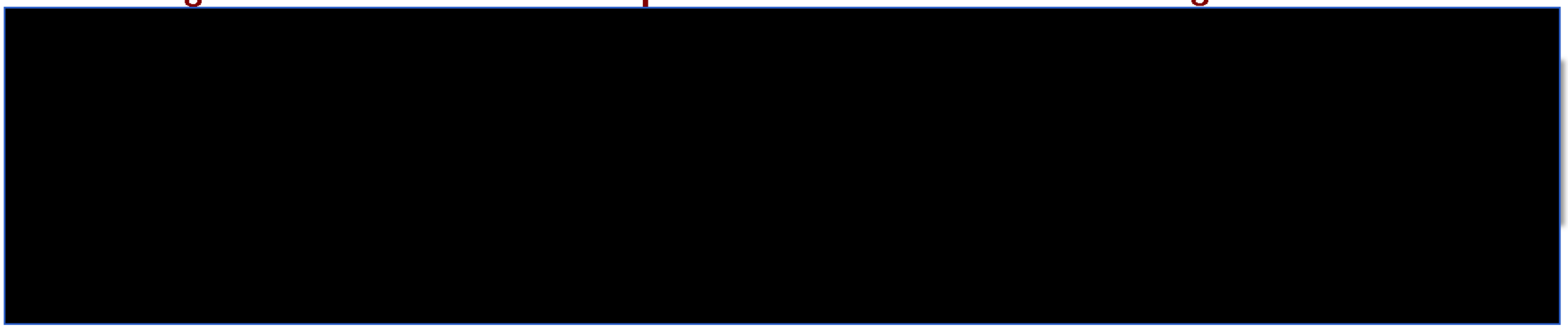


***For the genuine signature the first name, middle initial, last and address match.**

Example of False Negative

Pairwise Signature Removed from Set of 290 Where All 6 Reviewers Said No Match
But the Genuine Signature appears to be genuine give first name, middle initial, last name, and address match

Signature on Mail Ballot Envelope | **Genuine Signature***

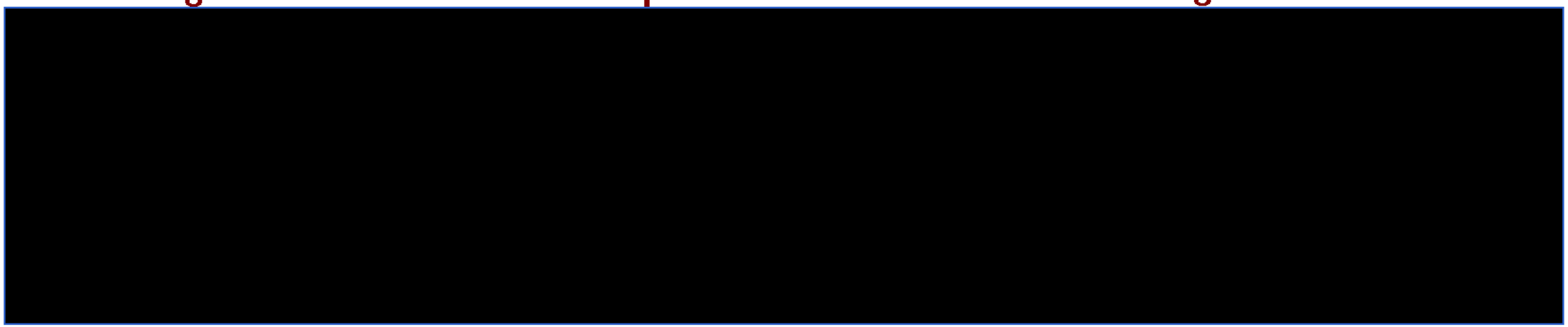


***For the genuine signature the first name, middle initial, last and address match.**

Example of False Negative

Pairwise Signature Removed from Set of 290 Where All 6 Reviewers Said No Match
But the Genuine Signature appears to be genuine give first name, middle initial, last name, and address match

Signature on Mail Ballot Envelope | **Genuine Signature***



***For the genuine signature the first name, middle initial, last and address match.**

Summary of Updated Analysis Constraints

After application of the constraints 101 were removed for name matching exceptions and an additional 290 were removed for being flagged as NO MATCH by all six reviewers.

A total of 391 was removed from the 2,770 set reducing the sample size to 2,379.

This reduced sample size of 2,379 has a 99% Confidence Level so the real value would be within ±2.7% Margin of Error of the measured value.

The full set of 290 that were removed is in a PDF file named: No-Match-Set-of-290.pdf

Analysis B: Reduce Set of 2,379 Samples

Experiment I

Determination of Signature Mismatching Rates of EVBs Using Experts - Forensic Document Examiners (FDEs)

Experiment I

Experts: Forensic Document Examiners (FDEs)

- Three FDEs were recruited and asked to apply their training
- Presented 2,379 pairwise images to review for no more than 30 sec
- Recorded each FDEs **Match** and **No Match** selections
- Calculate **FDEs Pooled Consensus Signature Mismatch** rate

Experiment I

Experts: Forensic Document Examiners (FDEs)

"Pooled Consensus" means the probability out of how many times among ALL three FDEs that the same pair of signatures associated with an EVB is concluded to be a Match or a No Match.

Experiment I

Experts: Forensic Document Examiners (FDEs)

- Three FDEs were recruited and asked to apply their training
- Presented 2,379 pairwise images to review for no more than 30 sec
- Step 1: Record each FDEs **Match** and **No Match** selections
- Step 2: Calculate **FDEs Pooled Consensus Signature Mismatch** rate
  - For each pairwise signature set, across the 2,379 pairwise images, calculate the probability that a FDE concludes it is a mismatch
  - Determine the distribution of probabilities
  - Determine the mean of the probabilities across the 2,379 to determine the FDEs pooled consensus signature mismatch rate

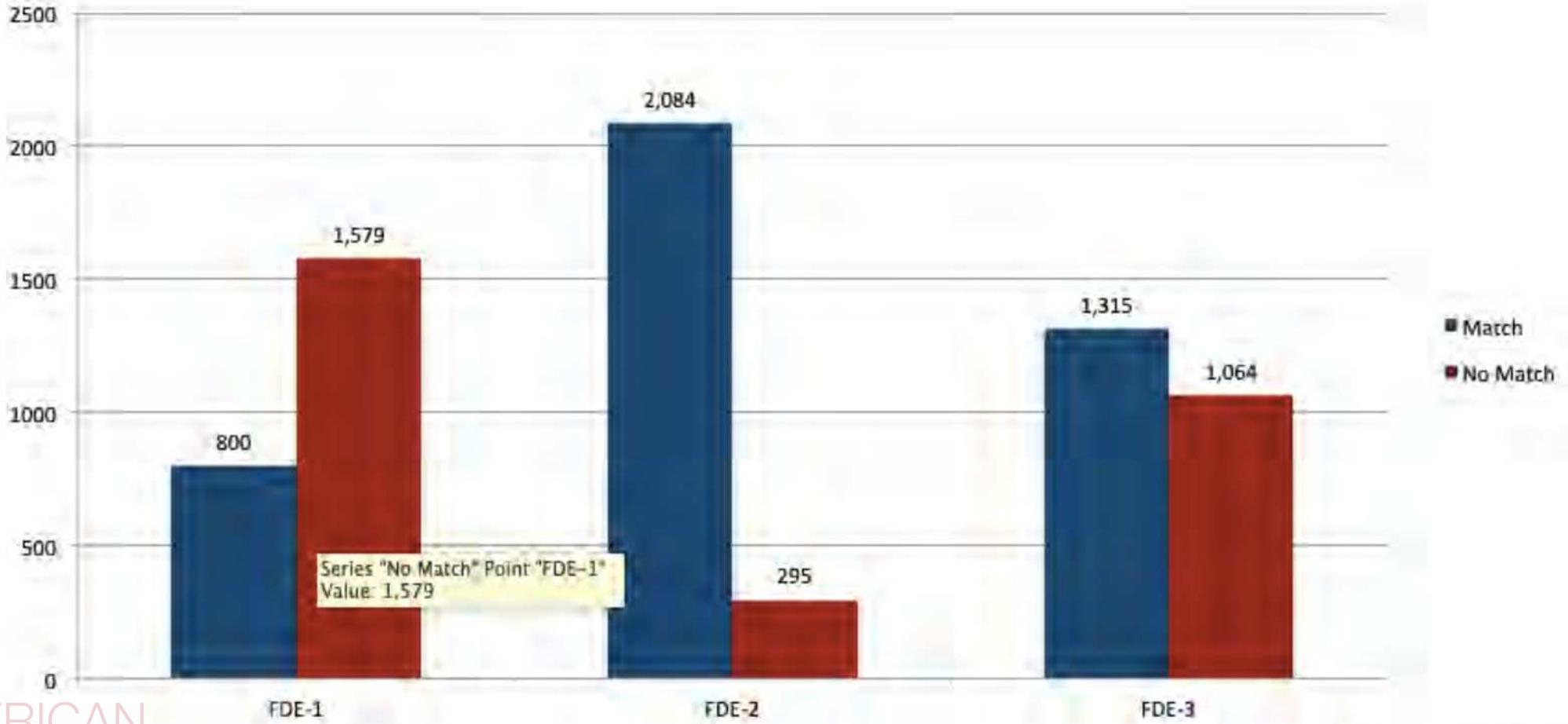
Experiment I

Step 1 Results: Match and No Match Counts for FDEs

FDEs	Match	No Match	Signature Mismatch Rate (%)
FDE-1	800	1,579	66.4%
FDE-2	2,084	295	12.4%
FDE-3	1,315	1,064	44.7%

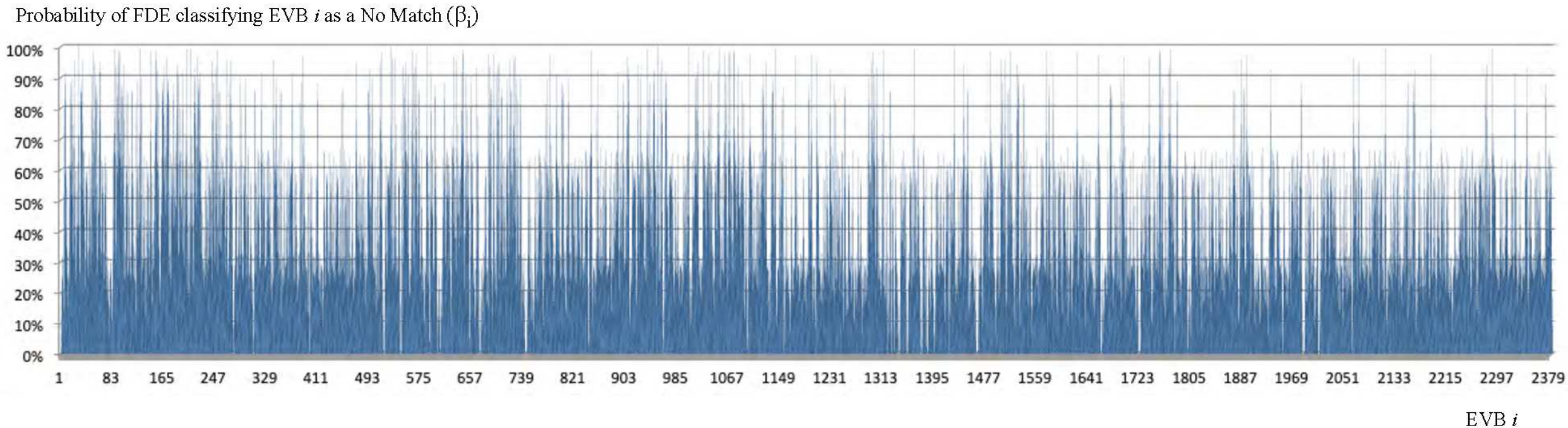
Experiment I

Step 1 Results: Match and No Match Counts for FDEs



Experiment I

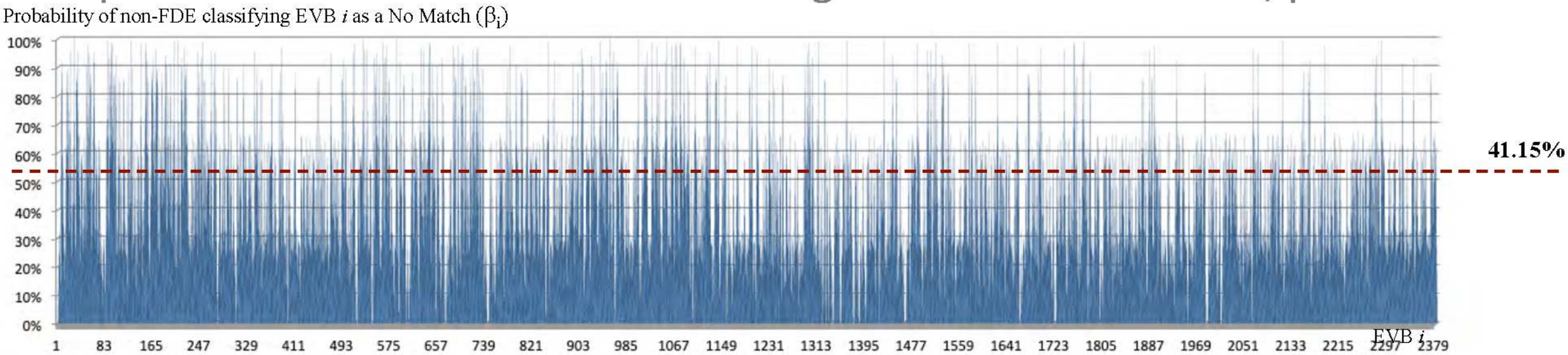
Step 2 Results: Probability of an FDE classifying a particular EVB as mismatch*



*Each bar denotes the "pooled consensus" –the probability out of how many times among ALL three FDEs that the same pair of signatures associated with an EVB is concluded to be a Match or a No Match.

Experiment I

Step 2 Results: FDE Pooled Consensus Signature Mismatch Rate, β = 41.15%

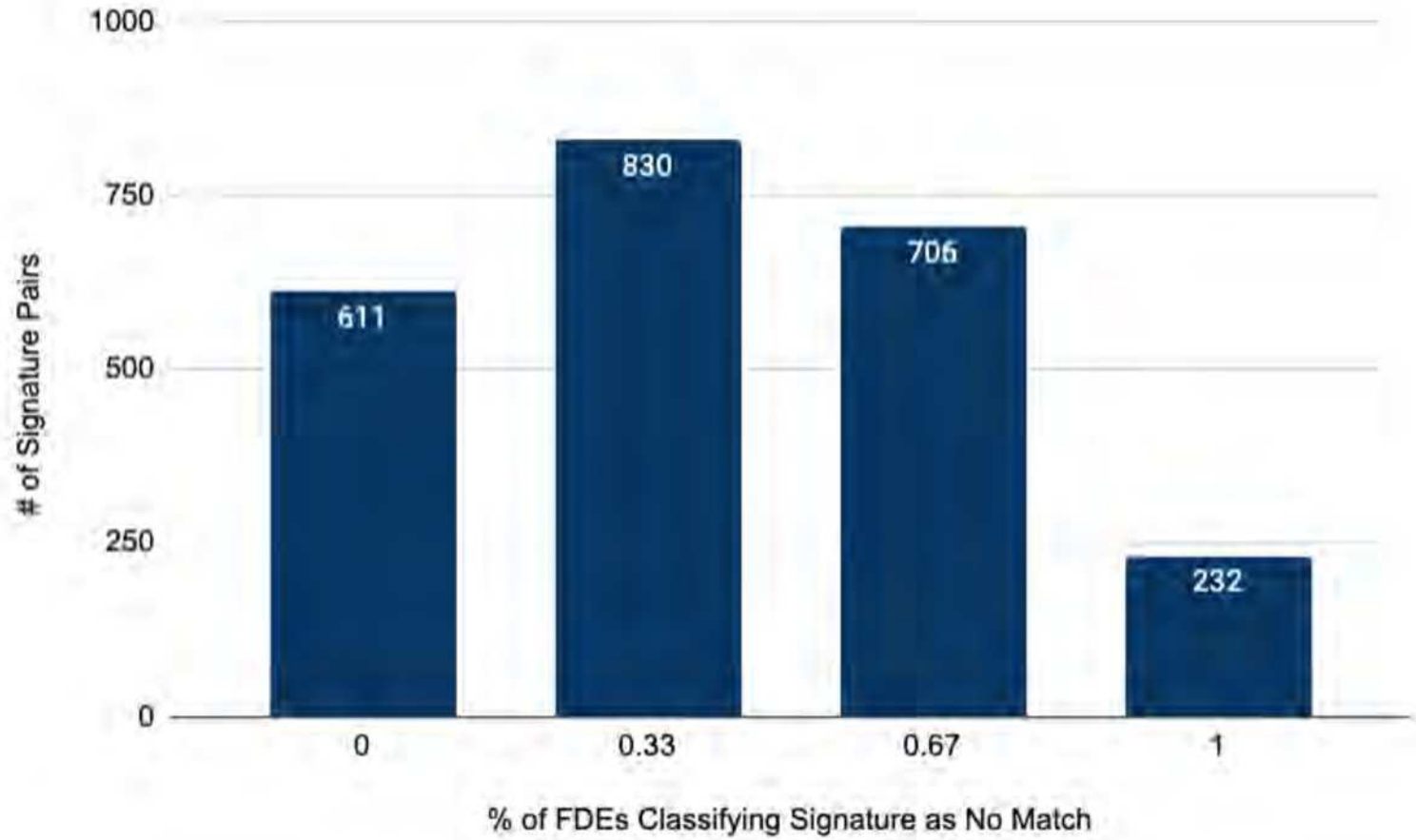


$$\beta_i = \frac{\#FDEs\ Agreeing\ pairwise\ signature\ is\ a\ mismatch}{3}$$

$$\beta = \frac{1}{2379}\sum_{i=1}^{2379}\beta_i \quad = \mathbf{41.15\%}$$

Experiment I

Step 2 Results: Grouping of Pooled Consensus Probabilities of FDEs by Counts of Signature Pairs



Experiment I

Result: FDEs Would Have Flagged 786,753 EVBs for Curing

Total Number of Voters Submitting EVBs	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
FDEs Pooled Consensus Signature Mismatch Rate	**41.15%**
Number of EVBs That Should Have Been Cured	786,753

Experiment II

Determination of Signature Mismatching Rates of EVBs Using Trained Novices – non-Forensic Document Examiners (non-FDEs)

Experiment II

Trained Novices: non-FDEs (non-Forensic Document Examiners)

- Three non-FDEs were given the County's Signature Verification Guide[5]:

[5] Maricopa County Elections Department, "Signature Verification Training," Powerpoint Presentation.

Experiment II

Trained Novices: non-Forensic Document Examiners (non-FDEs)

- Three non-FDEs were recruited and asked to apply their training
- Presented 2,379 pairwise images to review for no more than 30 sec
- Recorded each non-FDEs **Match** and **No Match** selections
- Calculate **non-FDEs Pooled Consensus Signature Mismatch** rate

Experiment II

Trained Novices: non-Forensic Document Examiners (non-FDEs)

"Pooled Consensus" means the probability out of how many times among ALL three FDEs that the same pair of signatures associated with an EVB is concluded to be a Match or a No Match.

Experiment II

Trained Novices: non-Forensic Document Examiners (non-FDEs)

- Three non-FDEs were recruited and asked to apply their training
- Presented 2,379 pairwise images to review for no more than 30 sec
- Step 1: Record each non-FDEs **Match** and **No Match** selections
- Step 2: Calculate non-**FDEs Pooled Consensus Signature Mismatch** rate
  - For each pairwise signature set, across the 2,770 pairwise images, calculate the probability that a non-FDEs concludes it is a mismatch
  - Determine the distribution of probabilities
  - Determine the mean of the probabilities across the 2,770 to determine the non-FDEs pooled consensus signature mismatch rate

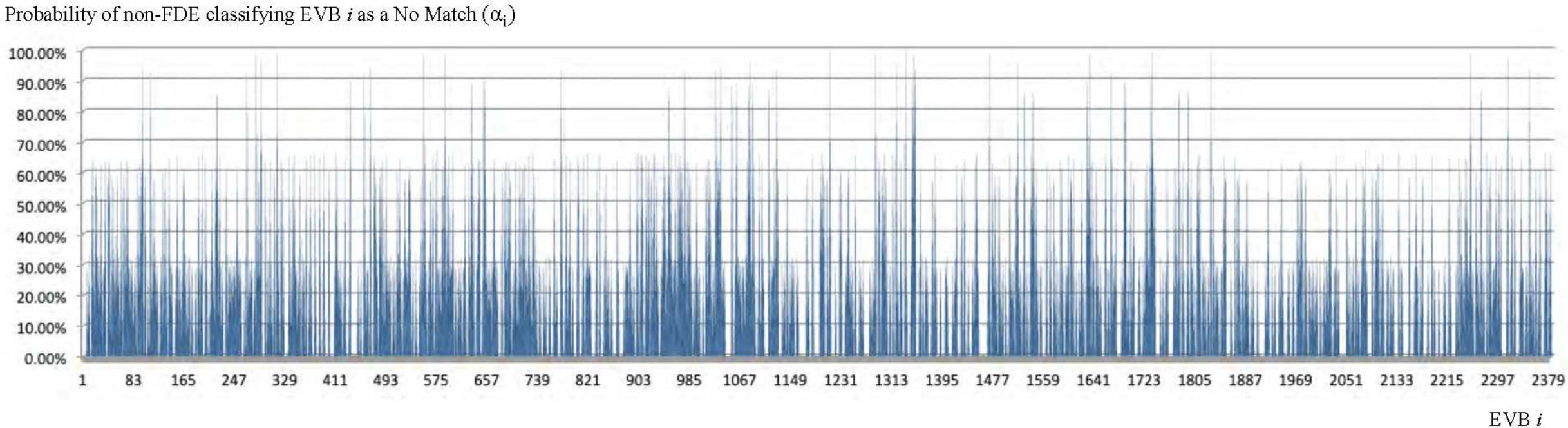
Experiment II

Step 1 Results: Match and No Match Counts for non-FDEs

Non-FDEs	Match	No Match	Signature Mismatch Rate (%)
non-FDE-1	2,078	301	12.7%
non-FDE-2	1,899	480	20.2%
non-FDE-3	1,871	508	21.4%

Experiment II

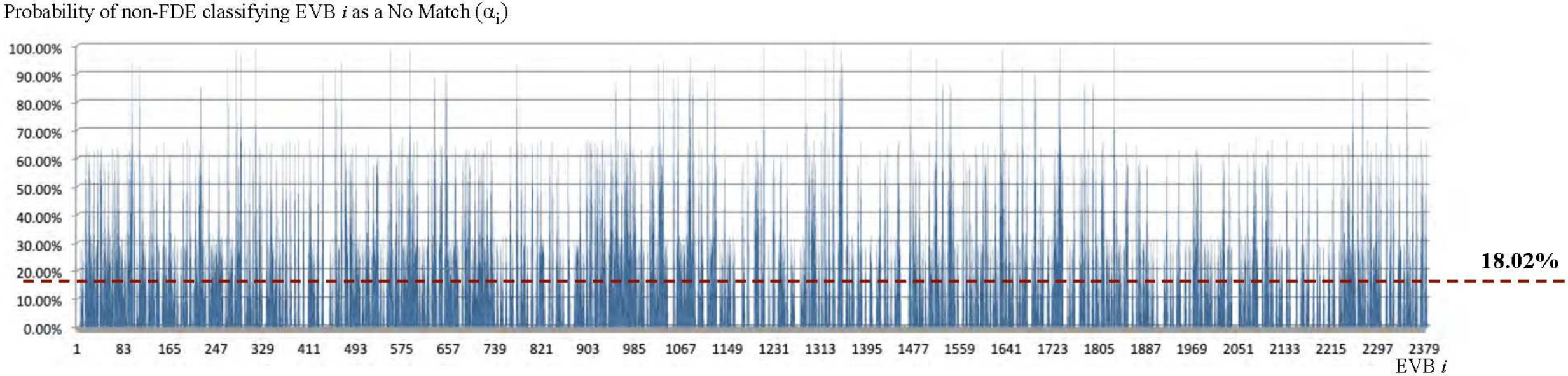
Step 2 Results: Probability of an non-FDE classifying a particular EVB as mismatch*



*Each bar denotes the "pooled consensus" –the probability out of how many times among ALL three FDEs that the same pair of signatures associated with an EVB is concluded to be a Match or a No Match.

Experiment II

Step 2 Results: non-FDE Pooled Consensus Signature Mismatch Rate, α = 18.02%

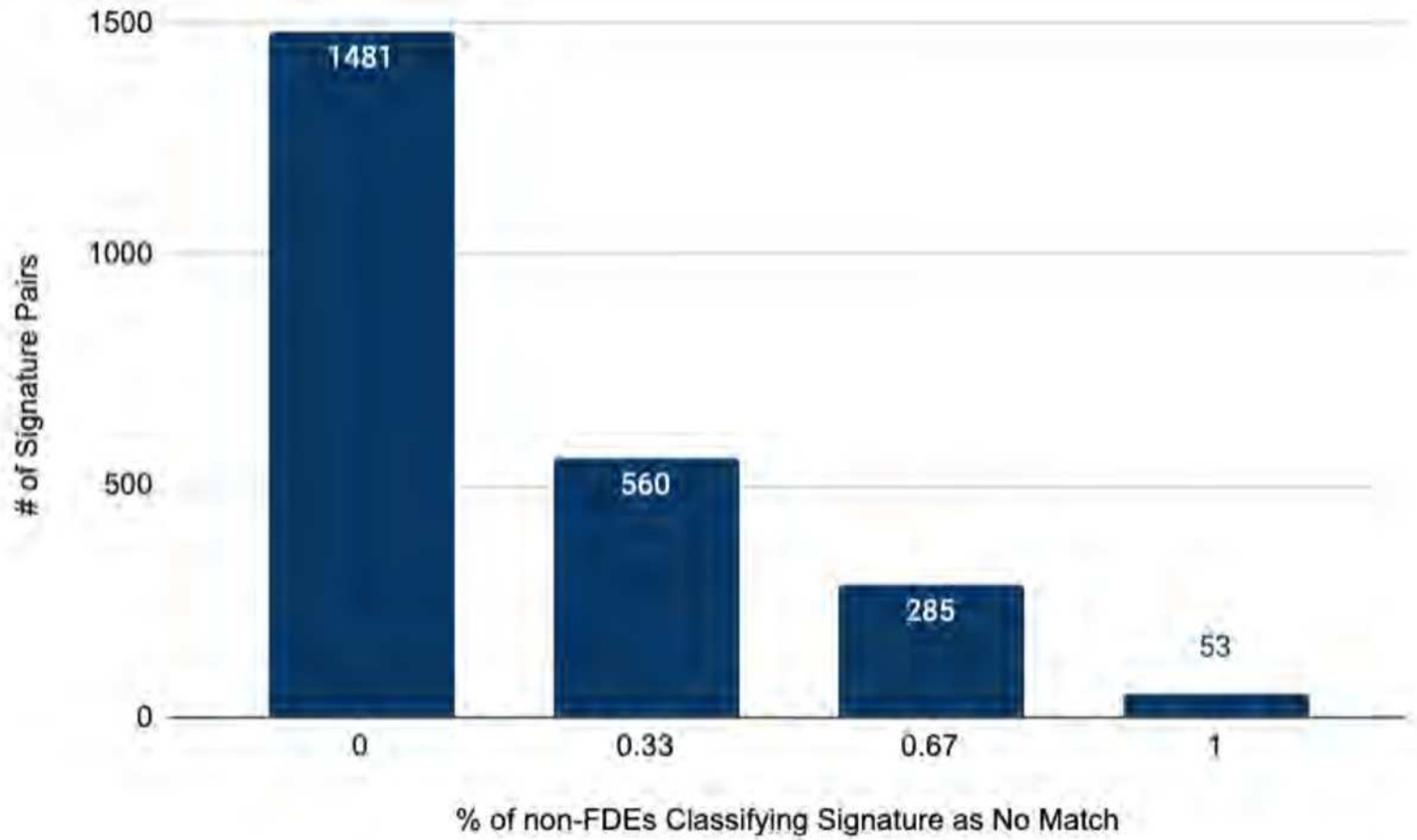


$$\alpha_i = \frac{\#nonFDEs\ Agreeing\ pairwise\ signature\ is\ a\ mismatch}{3}$$

$$\alpha = \frac{1}{2379}\sum_{i=1}^{2379}\alpha_i \quad = \mathbf{18.02\%}$$

Experiment II

Step 2 Results: Grouping of Pooled Consensus Probabilities of non-FDEs by Counts of Signature Pairs



Experiment II

Result: non-FDEs Would Have Flagged 344,528 EVBs for Curing

Total Number of Voters Submitting EVBs	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
non-FDE Pooled Consensus Signature Mismatch Rate	**18.02%**
Number of EVBs That Should Have Been Cured	344,528

Determining Two-Step Review Signature Mismatch Rate

First Trained Novices (non-FDEs) Review, Then Experts (FDEs)

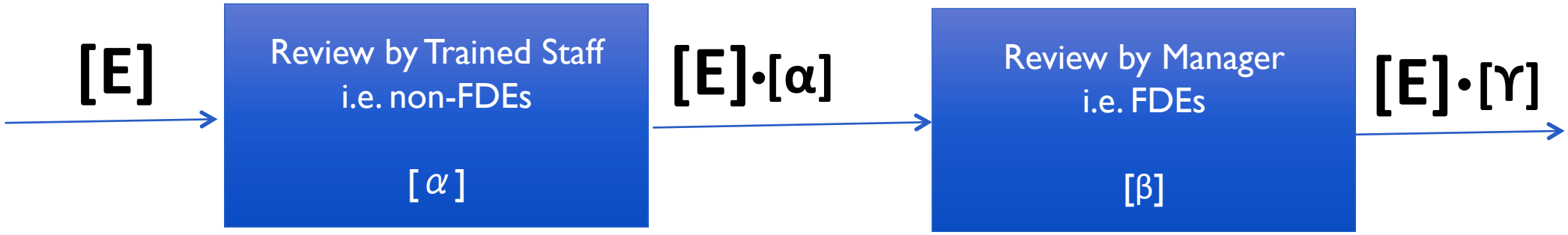
Determining Two-Step Review Signature Mismatch Rate

- In Maricopa, the Initial Review involved Trained Staff first assessing pairwise signatures. If a ***No Match*** was detected by any one of them, the EVB was sent to a Manager with greater expertise to determine if indeed it was a ***No Match*** and needed to be cured.

- In this Study, the non-FDEs are assumed to be equivalent to the Trained Staff; and, the FDEs are assumed to be equivalent to the Manager.

Determining Two-Step Review Signature Mismatch Rate

The goal is to determine the *two-step review signature mismatch rate, ϒ,* to determine the number of EVBs that would have been sent to curing after the two-step process.



Where: **[E]** is unit vector of size 2,379 representing the pairwise signatures reviewed by each non-FDE

[α] is a vector of the pooled consensus mismatch rates α_i for each EVB_i for *i* = 1 to 2,379

[E]•[α] is the total number of EVBs classified as ***No Match*** by non-FDEs

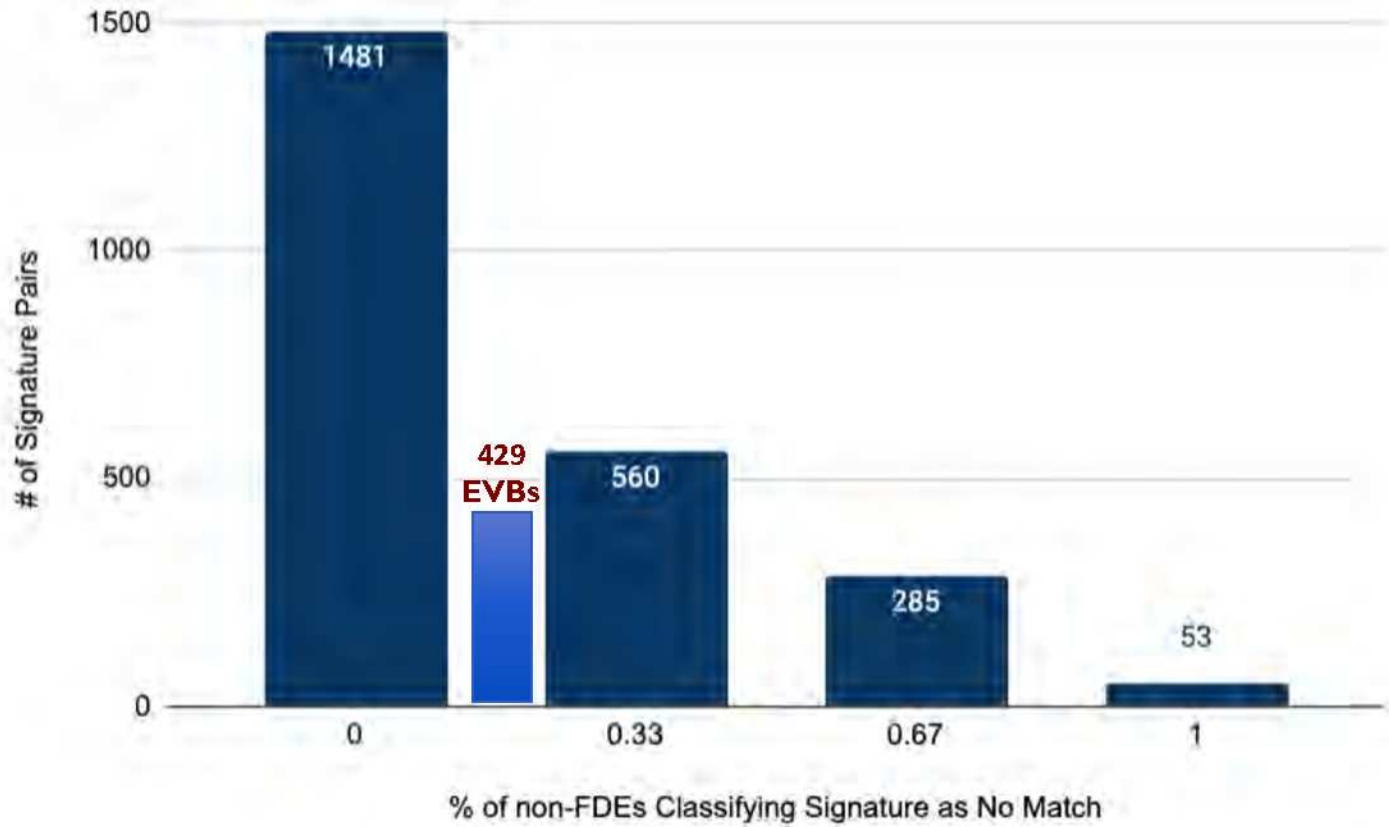
[β] is a vector of the pooled consensus mismatch rates β_i for each EVB_i for *i* = 1 to 2,379

[ϒ] is vector of joint probabilities **[α]x[β]** such that Υ_i is the joint probability that for EVB_i the pooled consensus of FDEs classified it as ***No Match*** after pooled consensus non-FDEs classified as ***No Match***.

[E]•[ϒ] is the number of EVBs that the pooled consensus of FDEs classified as ***No Match*** after the pooled consensus of non-FDEs classified as ***No Match.***

Calculation of EVBs Determined by non-FDEs to be No Match

[E]•[α]

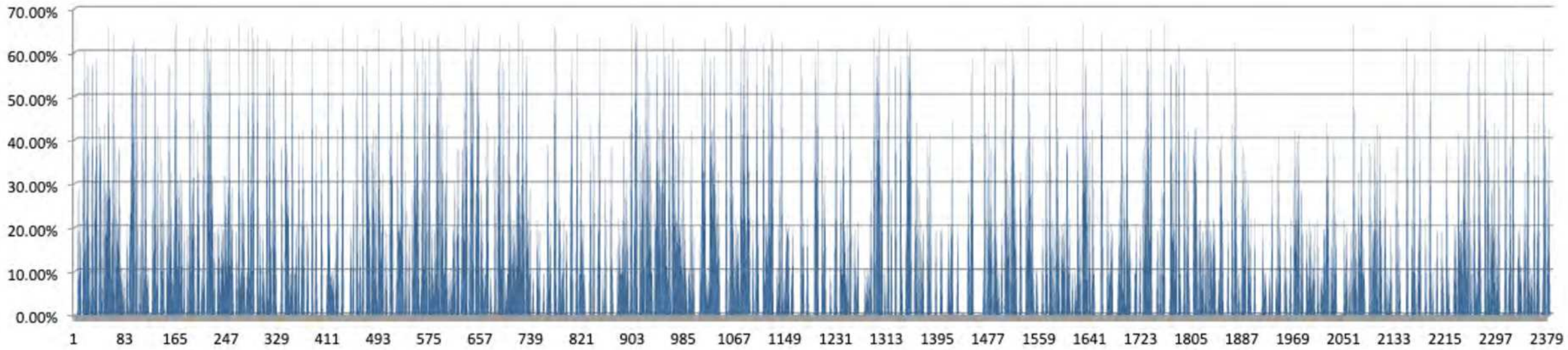


[E]·[α]= 429 EVBs

429 EVBs flagged as No Match by non-FDEs.

Calculation of [ϒ] = [α] x [β], the Joint Probability
Two-Step Review Signature Mismatch Rate

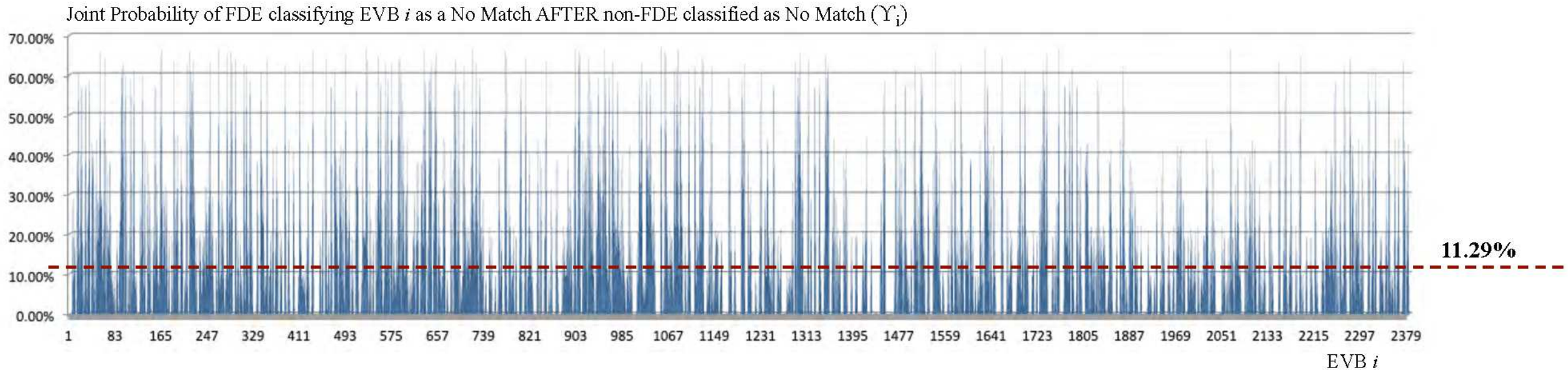
Joint Probability of FDE classifying EVB *i* as a No Match AFTER non-FDE classified as No Match (Υ_i)*



*Mismatch rate does not exceed ~67%

Calculation of [ϒ] = [α] x [β], the Joint Probability

Two-Step Review Signature Mismatch Rate

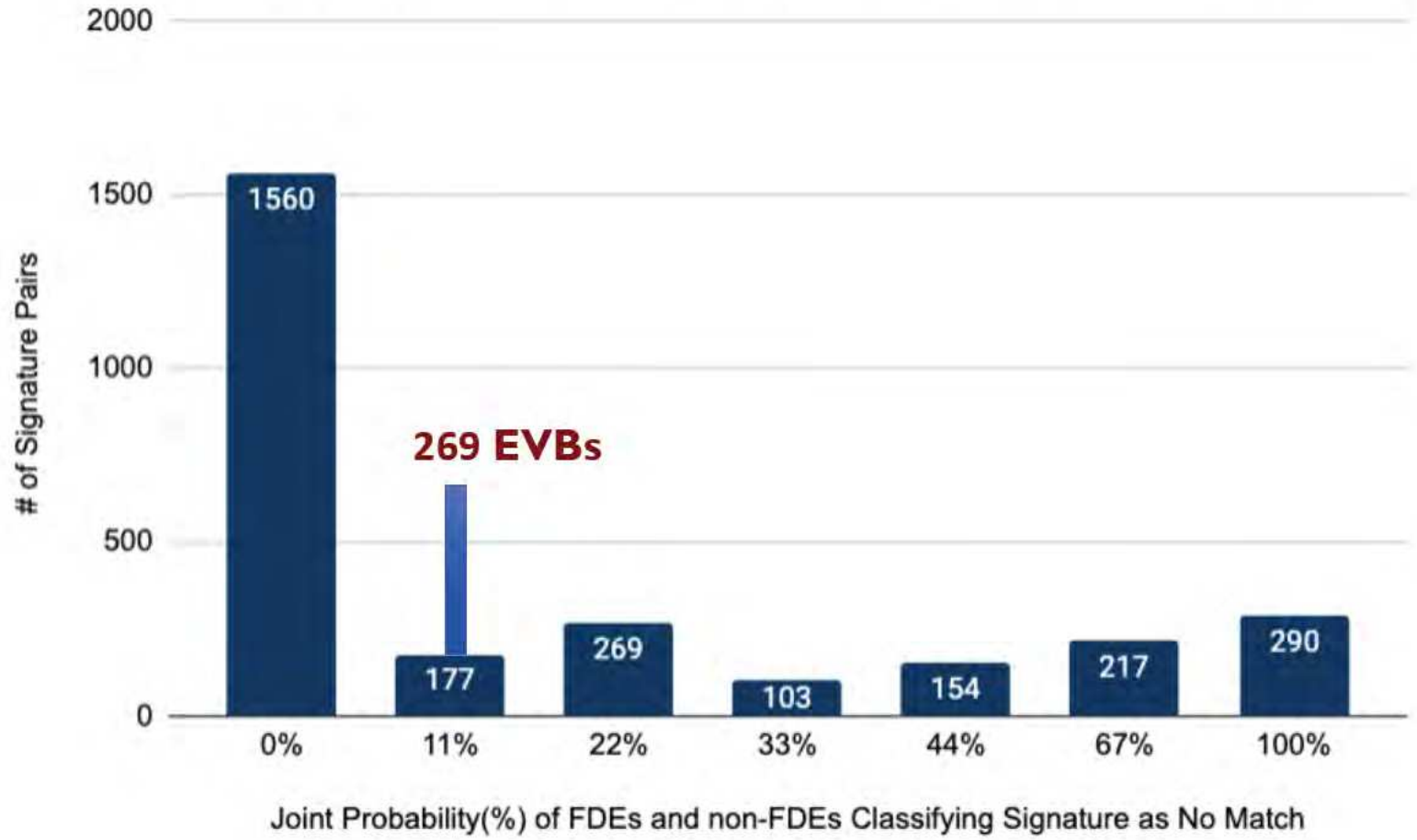


$$\gamma_i = \alpha_i * \beta_i$$

$$\gamma = \frac{1}{2379} \sum_{i=1}^{2379} \gamma_i \qquad = 11.29\%$$

Calculation of EVBs To Be Cured: [E]•[ϒ]

Use of Calculated Joint Probability ϒ to Determine Number of EVBs to Be Cured = 269 EVBs



[E]·[ϒ]= 269 EVBs

269 EVBs would be flagged for curing. These are the EVBs determined as as NO MATCH following FDE review of EVBs flagged by non-FDEs as NO MATCH.

Two-Step Review Signature Mismatch Rate

Result: non-FDEs Would Have Flagged 215,856 EVBs for Curing

Total Number of Voters Submitting EVBs	**1,911,918**
Maricopa Mismatch Rate Before Curing	**1.31%**
Maximum Number of EVBs Actually Cured	25,000
Two-Step Review Signature Mismatch Rate	**11.29%**
Number of EVBs That Should Have Been Cured	215,856

Analysis B Summary

Measures	Mismatch Rate (%)	EVBs to be Cured	Maximum Cured by Maricopa	EVBs to be Disallowed Post-Curing	Maricopa Disallowed Post-Curing
Non-FDEs Pooled Consensus Analysis B – Expt I	18.02%	344,528	25,000	18,025	587
FDEs Pooled Consensus Analysis B – Expt II	41.15%	786,754	25,000	7,924	587
2-Step Pooled Consensus Analysis B	11.29%	215,856	25,000	4,965	587

Analysis B Summary

- If Experts - Forensic Document Examiners (FDEs) – alone were used to review the EVBs, then 786,753 EVBs should have been cured.
- If Trained Novices – non-FDEs – alone were used to review the EVBs, then 344,528 EVBs should have been cured.
- If non-FDEs and FDEs BOTH were used to review the EVB signatures in a two-step process (non-FDEs reviewing first, then FDEs), then 215,856 EVBs should have been cured.
- The original data for Analysis B including images is found in PDF:
  - Analysis-B-Extended-Study.pdf
- The original date for Analysis A not including images is found in the XLS file:
  - Analysis-B-Extended-Study.xls

Discussion

Discussion

Summary Analysis

- In Maricopa County, 1,911,918 early voting mail ballots (EVBs) were received and counted
- The County reported 1.31% of all EVBs or 25,000 EVBs had signature mismatches requiring curing
- The County reported that 0.031% of all EVBs or 587 EVBs were confirmed mismatches post-curing

Discussion

Potential Scenarios of Signature Mismatch Rates

Measures	Mismatch Rate (%)	EVBs to be Cured	Maximum Cured by Maricopa	EVBs to be Disallowed Post-Curing	Maricopa Disallowed Post-Curing
Non-FDEs Pooled Consensus Analysis A – Expt I	28.50%	544,897	25,000	12,533	587
FDEs Pooled Consensus Analysis A - Expt II	48.98%	936,457	25,000	21,547	587
2-Step Pooled Consensus Analysis A	22.27%	425,784	25,000	9,793	587
Non-FDEs Pooled Consensus Analysis B – Expt I	18.02%	344,528	25,000	18,025	587
FDEs Pooled Consensus Analysis B – Expt II	41.15%	786,754	25,000	7,924	587
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Potential Scenarios of Signature Mismatch Rates

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Discussion

Summary Analysis

- In Maricopa County, 1,911,918 early voting mail ballots (EVBs) were received and counted
- The County reported 1.31% of all EVBs or 25,000 EVBs had signature mismatches requiring curing
- The County reported that 0.031% of all EVBs or 587 EVBs were confirmed mismatches post-curing
- As the results show, a minimum of 215,856 ±2.7% EVBs should have been cured
- Based on this Extended Study that yields a minimum signature mismatching rate of 11.29% and the County's post-curing rate of 2.3%, 4,965 EVBs at minimum would have been disallowed
- In this Extended Study, genuine signatures were acquired from a Maricopa Deeds' repository. Given signatures do change over time, this Study could be updated using the County's genuine signatures used during their signature verification in the 2020 General Election.
- The results herein are based on **using the minimum signature mismatch rate** AND **assumes that the County's 2.3% post-curing numbers are accurate**.

Conclusion

Conclusion

- Maricopa County Election Dept. states it has a “rigorous signature verification process.”
- Of the 1,911,918 EVB signatures verified, the County reported only 25,000 were flagged as signature mismatches requiring review – “curing;” and after curing, the County concluded only 587 of the 25,000 (2.3%) to be “Bad Signatures.”
- This Extended Study confirms the findings of the earlier Pilot Study and concludes that the process used for signature verification in Maricopa is a **flawed signature verification process.**

Conclusion

- The Extended Study found if FDEs alone were used to review the EVB signatures, then at a minimum 786,754 EVBs would have found to have mismatched signatures and sent to curing.
- If non-FDEs alone were used to review the EVB signatures, then at a minimum 344,528 would have found to have mismatched signatures and sent to curing.
- If non-FDEs and FDEs BOTH were used to review the EVB signatures in a two-step process (non-FDEs reviewing first, then FDEs), then at a minimum 215,856 EVBs would have found to have mismatched signatures and sent to curing.
- One constraint of this Study in not having access to the signature files from the County.
- Given the nearly 10x difference in EVBs to be cured between this Study and the County's actually number cured, if the County were to provide their signature files, an update to this Study can be performed.

Future Research and Questions

Future Research and Questions

- Why did Maricopa County report “up to 25,000” were cured? What is the exact number of cured EVBs?
- There should be at least two (2) EVB envelope images for each EVB that was cured. According to Maricopa when an EVB is cured, a copy of the original EVB envelope is copied, stamped “MCTEC VERIFIED & APPROVED,” and an image is made.
- EchoMail found from its original September 2021 research, presented to the AZ Senate, that 17,126 unique voters had at least two (2) EVB envelope images. This means only 17,126 not “up to 25,000” were cured. Further research is needed is required to resolve this matter.
- One area of Future Research is to review ALL EVB envelope images that contain a “MCTEC VERIFIED & APPROVED” stamp and validate if the number containing those stamps match the total count cured
- Why does the County in its Signature Verification Guide train reviewers to allow any EVB envelope that has “MCTEC VERIFIED & APPROVED” stamp? How can a EVB envelope have such a stamp BEFORE curing?
- There are many questions on how signature matching rates are affected by training and context, which should be actively explored.
- A future study is planned providing an economic analysis of signature verification and review.

ESII ELECTION SYSTEMS INTEGRITY INSTITUTE

AN EXTENDED STUDY - Redacted

Extended Study Confirms At Minimum Over 200,000 Mail Ballots With Mismatched Signatures Counted Without Review ("Curing") in Maricopa County, Arizona 2020 General Election

Dr. Shiva Ayyadurai, MIT Ph.D.

S.B. Electrical Engineering & Computer Science, M.I.T.
S.M. Visual Studies, M.I.T. Media Laboratory
S.M. Mechanical Engineering, M.I.T.
Ph.D. Biological Engineering, M.I.T.

Study Completed: February 23, 2022
Reviewed with AZ Senate Liaison: March 1, 2022
Delivered to AZ Senate: March 2, 2022
Delivered to AZ Attorney General: March 2, 2022
Updated & Re-Delivered: March 7, 2022

Delivered to:

Honorable Senator Karen Fann
President of the Senate
Arizona State Senate
1700 West Washington Street
Phoenix, AZ 85007

Honorable Mark Brnovich
Attorney General of Arizona
Office of Attorney General
2005 N. Central Avenue
Phoenix, AZ 85004-2926

From: Shiva Ayyadurai
To: fannm@cableone.net; Randy Pullen
Subject: Re: Counterfeit Ballot Report
Date: Friday, February 4, 2022 6:55:22 AM

What I sent last night was quick notes. I will put into a more formal 3-5 page document.

On Thu, Feb 3, 2022 at 10:09 PM Shiva Ayyadurai <vashiva@vashiva.com> wrote:

> Also, all graphs on the provisionals are simply restatement of the canvass data, now rebranded and conflated as "kinematic artifact detection." Also as I shared earlier, the ghost voters in that are hyperboles at best as in the SunDevil precinct, for example. Recall that they had supposedly 87% ghost voters, but the precinct is ASU - student don't have utility bills.
>
> Sent from my iPhone
>
> > On Feb 3, 2022, at 9:55 PM, Shiva Ayyadurai <Vashiva@vashiva.com> wrote:
> >
> > Per your request, I spent time reviewing the nonsense.
> >
> > It was painful to read this utter rubbish. It is filled with blatant prevarications that demand either a full blown criminal investigation of fraud of the author of this rubbish or at minimum complete disassociation from him to ensure integrity of the election integrity efforts and to honor those who are truly doing the real work to identify real problems.
> >
> > Here are just a few of the points:
> >
> > 1) Page 7 :
> >
> > The printers do not place MIC codes.
> >
> > The yellow dots are random.
> >
> > Total misrepresentation to state the ballots are printed in foreign countries
> >
> > There is NO legal requirement to put MIC codes on the ballots
> >
> > 2) Page 9
> > The assertion that if ballots are misaligned that means they are counterfeit, is pure rubbish
> >
> > On ballot-on-demand printers, mis-alignment is normal.
> >
> > In fact, the mis-alignment is easily corrected by software during processing. We've shown it in our own ballot image processing work.

Any computer science student can write some basic code for homography to handle this.

3) Page 10-12

False. This is not evidence of the use of unauthorized ballot papers.

To assert, using irrelevant and bogus pictures, that multiple types of ballot papers were used is a pure fabrication.

Further, asserting this the basis of excessive adjudication is utter nonsense. Total BS built on a pile of BS.

Then asserting the bleed through was caused by such paper leading to adjudication is false. Our ballot image analysis reveals there is absolutely no basis in fact for this.

4) Bottom of page 16

The claim 335,000 ballots were affected, has no basis. Zero evidence.

Alignment problems are easily taken care of in software.

5) Bottom of page 17.

Alignment is easy to handle.

The point is misaligned printing did not cause adjudication! Our ballot image analysis demonstrates this.

6) Pg.17-22.

Repetition of the same inaccurate info on alignment. These nonsensical, incomprehensible graphs, are irrelevant.

7) Pg. 23
The ballot on demand printers didn't have color ink. This is normal to convert color to gray scale.

Misrepresenting the facts.

"Reprint" - false assertions w/o any basic in fact

8) p. 26
False.

9) Fold as asserted here not an issue as EVBs folded by humans.

10) The canvassing has nothing to do with his "kinematic" work.

Sent from my iPhone
On Fri, Jan 28, 2022 at 3:59 PM Randy Pullen <rpullen13@gmail.com> wrote:

> Jonan's report
> With best regards,
>
> Randy Pullen
>
> ---------- Forwarded message ---------
> From: **Karen Fann** <karenefann@outlook.com>
> Date: Fri, Jan 28, 2022 at 1:47 PM
> Subject: FW: Counterfeit Ballot Report
> To: Randy Pullen <rpullen13@gmail.com>
>
> Is this the same report Dr. Shiva was referring to when he told us about how Jovan's data wasn't correct?
>
> ---
>
> **From:** Sonny Borrelli <Sonny4LD5@hotmail.com>
> **Sent:** Thursday, January 27, 2022 10:00 PM
> **To:** Karen Fann <fannm@cableone.net>
> **Subject:** Counterfeit Ballot Report
>
> See attached.

--
Office of V.A. Shiva Ayyadurai, Ph.D.
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1.617.631.6874 | vashiva.com | twitter: @va_shiva

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