September X, 2020

The Honorable Alex Padilla
Secretary of State
1500 11th Street
Sacramento, CA 95814

Cc: Los Angeles County Registrar Dean Logan and Los Angeles County Supervisors

RE: Request for requirements before giving final certification to Voting Solutions for All People (VSAP 2.1)

Dear Secretary Padilla:

The organizations and individuals listed below write to you because we are gravely troubled by remaining fundamental security flaws in Voting Solutions for All People (VSAP) 2.1, and to respectfully request that you require additional conditions on the final approval of VSAP 2.1 to earn voters' trust in the integrity of elections in Los Angeles and wherever it might be used in the future.

Los Angeles's VSAP 2.1 has the potential to positively influence the election system market as the nation's first publicly-owned voting system with ballot marking devices while also improving accessibility for voters with disabilities in Los Angeles County. But Los Angeles County has not yet complied with SB 360's provisions for research and development that require disclosure of the source code used, a failure which leaves

unfulfilled the promise that VSAP 2.1 could become the nation's first open-source voting system[1]. We ask the County and State to work diligently to comply with SB 360 and to lead California and the nation toward increased election transparency and security by releasing VSAP 2.1's source code as open-source under a prudent governance plan.

We are appreciative that the State imposed key certification requirements in your January 24th 2020 conditional approval, particularly the conditions that enhance security and require the option for voters to use hand-marked paper ballots. However, we remain concerned that VSAP 2.1 still has serious flaws that necessitate further conditions on approval.

Though we understand it is not possible for Los Angeles to resolve most of these issues before the November 2020 election, we respectfully request that you impose the first condition before the election and impose the remainder before granting full certification prior to following elections.

1) VSAP 2.0 must be re-designed to either (a) use separate, ordinary ballot boxes for all ballots rather than using the BMDs as ballot boxes, or (b) to redirect the BMD's paper path so that no ballot ever passes under the printhead after being reviewed by the voter including as a result of unauthorized, malicious, and/or faulty software and/or firmware.

We recognize that VSAP 2.1's design was intended to give all voters, even those that can't handle a paper ballot, the opportunity to mark, verify, and cast a paper ballot privately and independently and we commend the intention of this mechanism. However, VSAP 2.1's design includes a major inherent security flaw in that the ballot passes under the printhead after the voter has cast it. This security flaw exists even though the printhead is normally lifted by VSAP 2.1 software when the ballot is reinserted. The problem is that if the software is hacked, it can direct the printhead to tamper with the verified ballot.

University of California at Berkeley Professor Dr. Philip Stark, inventor of risk-limiting audits, summarized the danger in VSAP 2.1's current design in his January 20th 2020 public comment:

> "The design of the VSAP BMD is defective from a security perspective: the ballot passes under the printhead after the voter last sees the paper. This allows the 'opportunity to mark' flaw.[2] The use of a cam to lift the printhead while the ballot is cast is not adequate protection because that cam is itself controlled by software. The paper path for casting the ballot should not include the printhead. The ballot box should be physically separate from the BMD, or at least not in the same path as the printer."

The easiest solution would be to require the automatic feed mechanism for cast ballots in VSAP 2.1's BMDs to be disabled and to remove the attached ballot boxes. In addition, the County should provide unattached ordinary ballot boxes into which voters can deposit the ballots printed by the BMDs after the voters have had a chance to review and verify their votes, as is done in every other California county that uses BMDs These

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[1] SB 360's explicitly stated intent included that "California receive the benefits of the publicly funded development of a nonproprietary voting system in the state." Section 19202(e)(1) allowed local jurisdictions to contract and pay for "Research and development of a new voting system that has not been certified or conditionally approved by the Secretary of State and uses only nonproprietary software and firmware with disclosed source code…" Though Los Angeles County contracted with Smartmatic to develop VSAP, it has not yet disclosed the source code it created and used, and so California has not yet received the benefits that SB 360 intended and explicitly called for.

[2] "Serious design flaw in ESS ExpressVote touchscreen: 'permission to cheat'", 9/14/2018, https://freedom-to-tinker.com/2018/09/14/serious-design-flaw-in-ess-expressvote-touchscreen-permission-to-cheat/

separate ballot boxes should not include any device that could theoretically print votes, alter votes, or render votes illegible, as the current VSAP 2.1 BMDs do.

This will reduce the risk profile of the VSAP 2.1 system. Los Angeles could make the same kind of accommodations for voters with disabilities as do other California counties that use BMDs and separate ordinary ballot boxes.

Using separate ballot boxes should also speed up the overall voting process. Voters would leave their BMD to cast their ballot in an ordinary ballot box as soon as they verify their printed ballot, rather than having to spend extra time to reinsert the ballot into the BMD to cast it which is an additional process that will always be unfamiliar to many voters. This would free up BMDs more quickly for other voters.

It would almost certainly also lessen the jamming problem that plagued the County's BMDs. Though the County's report identified faulty gears that caused jamming, printer paper paths will always be vulnerable to jamming. Requiring voters to insert their ballot for a second time after they've verified it, as opposed to casting it in a separate ordinary ballot box as in other counties, doubles the risk of jamming due to faulty insertions.

Please also require that voters must be directed by signage, and also verbally by poll workers, to carefully review their choices on the ballot after it is printed by the BMD. Studies have shown that this may help more voters catch errors or fraudulent activity.

If the County still thinks it's crucial to use the BMDs as ballot boxes, it should be possible to redesign VSAP 2.1's BMDs paper path to ensure that it never passes the cast ballot under a printhead including as a result of unauthorized, malicious, and/or faulty software and/or firmware. We understand this change would take time. Until then, or if that is too costly, requiring the automatic feed mechanisms of the BMDs to be disabled after ballots are printed and that ordinary ballot boxes be used instead, as in other counties, is necessary to avoid this major security flaw.

2) VSAP 2.1 must be re-designed to not rely on QR codes or barcodes for tabulation.

We are also gravely concerned that VSAP 2.1 uses QR codes for tabulation. Although voters can easily verify the selections that the BMD prints on their ballot in their own language, they cannot easily verify the QR codes that VSAP 2.1 will actually use to tally votes.

This concern is shared broadly by computer scientists and election security experts who instead recommend that jurisdictions not use ballot-marking devices that print QR codes or barcodes.[3] In the seminal election security publication released last year by The National Academies of Sciences, Engineering, and Medicine the authors stated that barcode-based devices "raise security and verifiability concerns".[4]

As described in a discussion document from the U.S.'s National Institute of Standards and Technology (NIST):

> "Malicious or faulty production of a barcode may cause a vote capture device to present the voter with different ballot selections than what will be interpreted by the voting machine. If barcodes are

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[3] See, e.g., Hursti, Harri. Presentation to the Presidential Advisory Commission on Election Integrity, September 12, 2017; Andrew W. Appel, Richard A. Demillo, Philip B. Stark, "Ballot-Marking Devices (BMDs) Cannot Assure the Will of the Voters," pp. 16-17, April 21, 2019, https://ssrn.com/abstract=3375755.

[4] "Securing the Vote: Protecting American Democracy," National Academies of Sciences, Engineering, and Medicine, p. 80, https://www.nap.edu/catalog/25120/securing-the-vote-protecting-american-democracy.

used for tabulation of cast ballots, <u>any modification of a voter's ballot selections may go undetected and impact the election results</u>."[5]

Although the State's conditional approval admirably requires that the jurisdiction verify that the information in the QR code or barcode matches the voter-verified human-readable text when conducting post-election audits, it's not enough. The number of ballots verified in this fashion may be too small to catch sophisticated malicious discrepancies, and there would be major questions about how to handle any discrepancies found.

Colorado's Secretary of State has disallowed the use of QR codes and other printed barcodes saying they pose a threat to election security and verifiability of ballots. Here's an excerpt from that state's September 16th 2019 press release:

> "<u>Colorado Secretary of State Jena Griswold announced that Colorado will stop using ballots with QR codes</u>. The removal of QR codes will increase the security of vote tabulation and ensure voters can accurately verify that their ballots are correctly marked… Although voters can see their vote choices, they cannot verify that the QR code is correct... <u>QR codes could be among the next target of an attack and are potentially subject to manipulation</u>."

We acknowledge that modifying VSAP 2.1's tabulation method to use optical character recognition (OCR) to tally the actual voter-verified human-readable text instead of relying on QR codes would likely take time. However, it should be completely feasible to make the change in time for the 2022 primary elections. Both the Hart InterCivic Verity Voting system[6] and Smartmatic BMD A4-600[7] use OCR to tally votes on ballots printed by their ballot marking devices. This change is absolutely crucial for ballots to be truly voter-verified.

3) Please require that poll-workers proactively offer voters the option of using regular hand-marked paper ballots if they didn't bring their Vote-by-Mail ballot

We are pleased that the conditional certification of VSAP 2.1 included the requirement that all polling locations offer voters the option to hand mark a paper ballot. This provision recognizes that many voters prefer hand-marked paper ballots and many election experts believe they have inherent advantages including creating a paper trail that ⎯ unlike a BMD printout ⎯ cannot be hacked which increases voter confidence.

Nevertheless, using <u>write-in</u> absentee ballots will be highly problematic because requiring voters to actually handwrite their selections ⎯ offices, candidates, ballot measure numbers, etc. ⎯ will slow voters down dramatically, induce errors that may disenfranchise voters, and make votes hard to read and count. <u>It also violates California Elections Code Section 13103's requirements</u> that all ballots must list the title of each office and all the qualified candidates in addition to the titles and summaries of measures. Although write-in ballots may be the only solution available for the November election, this issue must be rectified for the following elections.

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[5] NIST discussion paper, https://collaborate.nist.gov/voting/pub/Voting/CyberSecurity/BarcodesEncodingPaperJune14-2019.pdf, June 14, 2019.

[6] "New Jersey Certifies Newest Hart InterCivic Voting System", June 4, 2019, New Jersey Certifies Newest Hart InterCivic Voting System

[7] "Smartmatic Response to eRFI – New Voting System", August 24, 2018, https://sos.ga.gov/admin/files/Smartmatic%20RFI_Redacted.pdf

We therefore urge you to change the conditional certification provisions so they require all vote centers to offer standard, printed paper ballots, either printed in advance or at the time by ballot-on-demand printers, as in many other California counties.

Furthermore, poll workers must be required to proactively offer the option to use a hand-marked paper ballots to voters because voters might not otherwise know of the option. In fact, there were multiple reports by voters in the March 2020 primary that the poll workers themselves didn't know that voters could use the write-in absentee ballot option, and in a number of cases the vote centers didn't even have them despite the requirement in the January 24th 2020 conditional approval. Requiring poll workers to offer the option to use standard printed paper ballots would lessen the burden on BMDs and reduce the opportunities for them to jam while, most importantly, ensuring that voters know about the option to use a hand-marked paper ballot.

Summary

We understand that before the November election it would be impracticable to redesign the paper paths of the BMDs, rewrite the tabulation software to read the human-verifiable text rather than QR codes, and create ballot-on-demand printers. However, before the election it should be feasible to have voting centers use ordinary ballot boxes, as is done in every other county that uses BMDs, while removing the ballot boxes in VSAP 2.1's BMDs.

Therefore, we respectfully request that the State conditionally certify VSAP 2.1's use for the November election only if the County uses separate, ordinary ballot boxes for all ballots rather than using the BMDs as ballot boxes, and that the other conditions for certification listed above be met before granting final certification for the 2022 primary elections and beyond.

In a time when foreign governments and other bad actors are attacking our election systems, it is incumbent upon you as Secretary of State to address these issues to lessen voters' well-founded doubts about election security. Given the vast resources of those who would attack our elections, such vulnerabilities must be addressed, whether they're easy or difficult to exploit, because voter confidence and the accuracy of our elections are the cornerstone of our democracy.

Thank you.

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