

STATE OF CALIFORNIA
SECRETARY OF STATE
OFFICE OF VOTING SYSTEMS TECHNOLOGY ASSESSMENT

In the Matter of:)
)
PUBLIC HEARING:)
)
DOMINION VOTING SYSTEMS)
)
IMAGECAST REMOTE 5.2 REMOTE)
)
ACCESSIBLE VOTE BY MAIL)
)
SYSTEM)
_____)

PUBLIC HEARING

Secretary of State Building

1500 11th Street

Sacramento, California

April 27, 2018

9:00 A.M.

Reported by:

Peter Petty

APPEARANCES

STAFF

Susan Lapsley, Administration

NaKasha Robinson, OVSTA

Rodney Rodriguez, OVTSA

Todd Ross, OVTSA

CONTRACTORS/CONSULTANTS

Mike Santos, SLI Compliance

PUBLIC COMMENT

Fred Nisen, Disability Rights California

1 APRIL 27, 2018, 9:03 A.M.

2 SACRAMENTO, CALIFORNIA

3 MS. LAPSLEY: All right. Good morning. Well,
4 it's a couple minutes after nine. We'll go ahead and get
5 started. I'd first like to introduce Staff, and then we'll
6 kind of cover the ground rules of this public hearing.

7 Here on stage, we have Todd Ross, who is a member
8 of the Office of Voting Systems Technology Assessment,
9 OVTSA. I'll let Mike -- we'll hold off on Mike, because
10 you're not a member of OVTSA. You don't count as Staff.
11 NaKesha Robinson, also a member of OVTSA. And down here we
12 have Rodney Rodriguez, also with OVTSA. Rodney will be
13 handling the timing of public comments, as well as speaker
14 cards, and making sure that everything runs smoothly here
15 as far as sound and getting everyone what they need.

16 Just a few ground rules. There's no food or
17 drink in the auditorium. We will be taking public comment
18 about the following -- about Dominion Voting Systems
19 ImageCast Remote 5.2, Remote Accessible Vote By Mail
20 System. RAVBM is the abbreviation of that.

21 The Staff Reports, consultant's reports and other
22 tests are available on our website at
23 www.sos.ca.gov/elections/votingsystemsvendors/dominion.
24 For the system being heard, the Staff Report will be given,
25 then the consultant's report. After that the vendor will

1 have an opportunity to respond, and then it will be open
2 for public comment. All those requesting to speak during
3 the public comment period for the system must complete a
4 speaker request card, which is available -- they are
5 available at the entrance. If you didn't get one and would
6 like one, please raise your hand and let Rodney know and he
7 can run one to you.

8 Speaking time will be limited to three minutes.
9 The timekeeper will advise when 2 minutes 30 seconds has
10 elapsed, and then again when 3 minutes has elapsed. Rodney
11 wanted to use a big hook today, but we wouldn't let him.
12 So he'll let you know by holding up a notice card. A
13 speaker may use additional time that has been ceded to them
14 by a maximum of two other people who have signed a speaker
15 card request. If you wish to cede your time to another
16 speaker, please that person's name in addition to your own
17 name on your speaker's request card.

18 We have a small house today, so I won't give my
19 normal comments about people coming a long ways and being
20 respectful. I assume, looking at the faces here, everyone
21 is very respectful, except for may Waldeep up there in the
22 corner, who has his drink in hand.

23 Please note that the court stenographer is taking
24 a transcription of the meeting today. This means that if
25 you speak, your name and your comments will be part of the

1 public record. They will be posted on our internet website
2 at some point, so please state your name clearly for the
3 stenographer prior to beginning.

4 The public hearing is also being videotaped,
5 which will also be part of the public record.

6 Written public comments on this item can be
7 submitted to Voting Systems at sos.ca.gov, or by U.S. Mail
8 to the Secretary of State's Office, Attention: Voting
9 System Comments, at 1500 11th Street, 6th Floor,
10 Sacramento, California 95814. Any written comments
11 submitted to the Secretary of State, whether they be via
12 email or U.S. Postal, will become, also, part of the
13 record.

14 With that, we'll go ahead and we will turn it
15 over to NaKisha to give the Staff Report.

16 MS. ROBINSON: All right. Good morning,
17 everyone. Dominion Voting Systems submitted an application
18 for the ImageCast Remote 5.2 System on September 5th, 2017.
19 ImageCast Remote 5.2 is a vendor-hosted application solely
20 for the purposes of ballot marking, pursuant to Elections
21 Code sections 303.3 and 19283. ImageCast Remote 5.2 was
22 evaluated against the applicable portions of the California
23 Voting Systems Standards, or CVSS.

24 Upon receipt of a completed application the
25 Secretary of State released a Request for Quote for

1 assistance with source code review, telecommunications and
2 security review, as well as usability, accessibility and
3 privacy testing.

4 Through a formal California contracting process
5 the Secretary of State awarded a contract to SLI
6 Compliance, a division of Gaming Laboratories
7 International, LLC, to assist with testing.

8 Dominion Voting Systems Remote 5.2 Remote
9 Accessible Vote By Mail System application is a web-based
10 interface. The voter can optionally use a screen reader to
11 navigate through the -- through the screens. After marking
12 their cast vote record and reviewing their selection, the
13 voter must print their selections. The printed paper-cast
14 record is returned to the local elections official, where
15 it will be remade into a ballot. The printed paper-cast
16 record and the ballot are kept together for auditing
17 purposes.

18 Accessibility and functional testing of the
19 system was conducted by SOS staff. The functional test was
20 conducted at the Secretary of State's Office in Sacramento,
21 California during the month of November 2017.

22 End-user accessibility testing was conducted in
23 three waves. Wave one user accessibility testing was
24 performed by nine volunteers throughout the State of
25 California from November 30th to December 1st, 2017. Wave

1 two took place from December 4th to December 8th, 2017,
2 concluding with wave three from December 18th to December
3 22nd, 2017, where we had 29 volunteer testers. The
4 additional testing was conducted by SLI during the month of
5 March 2018.

6 For the functional test, the Secretary of State's
7 Office provided Dominion with three test ballot data sets
8 of California elections: one, the State of California
9 Primary Election, which was comprised of a fictional
10 jurisdiction; two, a State of California General Election,
11 which was also a fictional jurisdiction; and last, a local
12 jurisdiction fictional ranked choice election.

13 The system was also exercised for under-votes,
14 over-votes and write-ins. The system successfully warned
15 users of under-votes and over-votes, as well with write-in
16 candidates, it does have a 50 character limit.

17 During accessibility, usability and privacy
18 testing, again, we conducted three waves. And, also, SLI
19 conducted accessibility, usability and privacy testing.

20 During the testing with the end-users that were
21 recruited statewide, the testers were asked to complete
22 pre-test and post-test surveys, documenting such
23 information as demographics, the technology that was used
24 for testing, and the testers post-test experience using the
25 system. The survey results of each are included in

1 Attachment A of the Staff Report. Please note that
2 personal identifying information has been redacted.

3 During the testing conducted with end-users,
4 there are approximately 15 technical issues that were
5 identified. Each has a response and/or mitigation, which
6 can be found in the Staff Report.

7 SLI conducted an additional accessibility,
8 usability and privacy test, as well. Phase one of SLI's
9 testing was a review of the ImageCast Remote 5.2
10 documentation of usability and accessibility performed
11 during system development. Phase two included all
12 accessibility and usability testing. And phase three
13 included privacy testing. Additional details regarding
14 SLI's testing can be found in the Staff Report, as well as
15 during the next presentation, Mike Santos will elaborate a
16 little bit further.

17 During usability testing, SLI identified one
18 requirement that was not met. That is CVSS 3.2.7.C.2.
19 Review of that requirement showed that navigation keys, up
20 and down arrows, tab did have repetitive effect. Dominion
21 will address that by adjusting their use procedures
22 accordingly.

23 During accessibility testing by SLI, additional
24 testing was also conducted against the applicable portions
25 of section 508. And during that testing, it was determined

1 that all requirements were satisfactorily met.

2 During privacy testing, SLI evaluated ImageCast
3 Remote for compliance with California Elections Code
4 requirements within an RAVBM system, in addition to the
5 applicable portions of the CVSS. During that testing, all
6 requirements were satisfactorily met and/or covered.

7 And next, during the security and
8 telecommunications testing, SLI conducted a documentation
9 review, functional security testing, and telecommunications
10 and data transmission testing. A summary of each of the
11 applicable standards, as well as whether those standards
12 were met, are covered within the Staff Report.

13 During the security and telecommunication's
14 testing, SLI did identify two potentially high security
15 vulnerabilities, one being potential cross-sites scripting
16 opportunity and select components of the system. Dominion
17 has provided a vendor mitigation, as well as a response,
18 which can be found within the Staff Report. The second
19 issue, potential sequel injection vulnerabilities arise
20 when user-controllable data is incorporated into database
21 sequel queries in an unsafe manner. And again, Dominion
22 did provide a vendor response, as well as mitigation to
23 that vulnerability.

24 And then finally, during the software review
25 testing, the purpose of this testing was to review and

1 identify any discrepancies within the software code and
2 compliance with the California Voting System Standards.
3 During that testing, SLI discovered one discrepancy. There
4 were 180 source code requirements found to be at issue with
5 the RAVBMS source code base reviewed. As a result, 108
6 discrepancies were written against the code base. Dominion
7 did provide a mitigation in response to that, as well.

8 And one other item I'd like to go back to, during
9 our end-user testing, one of our test volunteers did
10 identify or make some comments that I did not get a chance
11 to address during the Staff Report, so I'd like to address
12 those now. It is regarding the PIN feature within
13 Dominion's RAVBM system.

14 So the PIN is a feature that can be turned on and
15 off, just like the capture functionality. Depending upon
16 how the jurisdictions and/or the SOS provides guidance on
17 using those -- issuing PINs. The system also provides
18 options to have a PIN issued via telephone and/or a
19 postcard. And also to be very clear, the RAVBM cast vote
20 record will be remade into a ballot. And while we
21 understand Dominion does have the capability to read those
22 cast vote records directly within their voting system, we
23 must have an official ballot. So all the RAVBM cast vote
24 records will be remade.

25 And with that, that concludes my presentation of

1 the Staff Report.

2 Next up, we'll have Mike Santo from SLI.

3 MR. SANTOS: Good morning. I am Mike Santos from
4 SLI Compliance. As NaKasha just mentioned, we were tasked
5 with doing source code review, security and vulnerability
6 testing, as well as accessibility, usability and privacy
7 testing.

8 In terms of source code review, there were
9 approximately 319,000 lines of source code and comments
10 that were subjected to review. Some of the criteria that
11 we were using for the review process was adherence to
12 applicable standards of the CVSS, adherence to other
13 applicable coding format conventions and standards,
14 including best practices for the coding languages being
15 used, analysis of the program logic and branching
16 structure, as well as evaluating whether the system is
17 designed in a way that allows meaningful analysis.

18 Also, as NaKasha mentioned, during the source
19 code review there were 180 source code discrepancies that
20 were found. They were -- they covered six different
21 requirements.

22 There were some 80 instances that were noted
23 where lines of source code exceeded more than 120
24 characters in length, 71 instances that were noted where
25 numbers were not set to a constant, 23 instances that were

1 noted where variable declarations were without comment, 10
2 instances were noted where no default case existed, 2
3 instances were noted where variable names were not
4 differing by more than one character were being utilized,
5 and there was 1 instance noted where inconsistent
6 indentation was implemented. So that was the findings from
7 the functional system source code review.

8 We also performed a vulnerability review on the
9 source code where we were searching for exposures to
10 commonly-exploited vulnerabilities, evaluating the use and
11 correct implementation of cryptography of key management,
12 evaluating the likelihood of security failures being
13 detected in terms of like audit mechanisms and where the
14 data could be subject to tampering, evaluating the risk
15 that a user can escalate their capabilities beyond those
16 authorized, evaluating the design and implementation to
17 ensure that sound generally-accepted engineering practices
18 are being followed and that the code is being written
19 defensively, evaluating for embedded exploitable code that
20 could be triggered to effect the system.

21 We evaluated the code for dynamic memory access
22 features which would permit the replacement of certified
23 executable code or control data or insertion of exploitable
24 code or data. And we also were evaluating the code for use
25 of runtime scripts, instructions or other control data that

1 can affect the operation of security-relative functions or
2 the integrity of the data itself.

3 So upon looking through those 319,000 lines of
4 code for those criteria, no vulnerabilities were found
5 within the system. And as a result, no findings were
6 written against the code base with regards to
7 vulnerability.

8 We were also tasked with a security review. We
9 looked at various aspects of security, including general
10 access control, access control identification, access
11 control authorization, and general access control.

12 Let's see here, in terms of general access
13 control, we were looking for authentication that included
14 methods for both the voter-facing application, as well as
15 the administrative application. The security -- the
16 general access control security was tested on the
17 architecture pieces, client application, administrative
18 application, which were accessible remotely.

19 In terms of access control identification, the
20 system was determined to use a client server system to
21 authenticate registered users and serve up the correct
22 ballot for a particular voter using pre-defined ballot
23 rules and voters that can be imported by the jurisdiction.
24 Role-based access controls were determined to be in place
25 for administrative login purposes.

1 With regards to access control authorization, all
2 administrative access is controlled by username, password
3 combinations, and there is a role-based administrative
4 access in place. Also, the ability to assign voters to
5 different electoral groups or electoral districts, it gives
6 the ability to assign ballots to voters in accordance with
7 specific CVSS rules.

8 For access control analysis, we attempted XSS
9 (phonetic) attacks, sequel injection attacks, direct re-
10 listings, and scans attempting to pull directory file lists
11 scanned for default, http login pages. We scanned for
12 robot text files and pulled SSL certification information.
13 We performed a full vulnerability scan, as well.

14 Sorry.

15 For telecommunications and data transmission, the
16 system utilizes electrical transmissions, and the ballot is
17 sent by SSL. No receipt is utilized to verify the
18 transmission. The client generates a blank ballot which
19 does not contain voting selections, so once the ballot is
20 delivered and until the ballot package is saved there are
21 no external communications between the voter and the ballot
22 delivery system. All interactions remain local to the
23 voter's environment.

24 In terms of security vulnerabilities, we were
25 tasked with determining, A, if there were security

1 vulnerabilities, and B, if there were, to try to indicate
2 the level of exploitation that the vulnerability would
3 require access by.

4 And those are broken down into four different
5 categories: a voter, who usually has low knowledge of the
6 voting machine and design and configuration; a poll worker,
7 who usually also has a low knowledge of the voting design
8 and configuration, but has more access to anything, which
9 in the case of an RAVBM system (indiscernible) going to
10 have poll workers; election official insiders who have a
11 wide range of knowledge of the voting design and
12 configuration and may have unrestricted access to the
13 machine for long periods of time; as well as a fourth
14 category of a vendor insider that has great knowledge of
15 the voting machine design and configuration and have
16 unlimited access to the machine before it's delivered to
17 the purchaser, and thereafter may have unrestricted access
18 with performing warranty and maintenance service, and when
19 providing election administrative services.

20 The ability to tamper with the client site
21 application is always present due to the fact that there
22 are no server site verifications or validations in place
23 after the ballot has been generated. So at that point, you
24 know, somebody can sit there for days on end and do
25 whatever they want to that ballot. In this context,

1 however, the ability to effect large numbers of ballots is
2 reliant upon server site compromise, which may also include
3 distributed denial (phonetic) of service attacks.

4 The voter is given the ability to proof and
5 confirm ballot selections within the system, as well as the
6 printed paper ballot, so there is a final confirmation
7 screen with the system. And then once you've printed your
8 paper ballot, you have that ability to do a final check of
9 that ballot prior to submitting it or being cast.

10 Security testing of the server site hosting
11 security included application scanning and vulnerability
12 scanning. The results of the scanning revealed potential
13 vulnerabilities that is estimated would have a minimal
14 impact on the overall security of the application being
15 tested. And those were basically what NaKasha mentioned a
16 few minutes ago and, I guess, is in the final reports on
17 the website.

18 The third area that we were tasked with reviewing
19 was the usability and accessibility testing, as well as
20 privacy testing.

21 In terms of usability and accessibility testing,
22 some of the items that we were looking at were that the
23 system allows the voter, at the voter's choice -- it's kind
24 the basics of voting the ballot, that the system would
25 allow the voter, at the voter's choice, to submit an under-

1 voted ballot without correction. That would provide the
2 voter the opportunity to correct the ballot for an under-
3 vote before the ballot is cast and counted.

4 It would prevent voters from selecting more than
5 the allowable number of choices for each contest, so it
6 doesn't allow over-voting.

7 It provides feedback to the voter before final
8 casting of the ballot that identifies specific contests for
9 which the voter has selected fewer than the allowable
10 number of choices, providing the voter the opportunity to
11 correct the ballot.

12 It allows the voter to change a vote within a
13 contest before advancing to the next contest, to provide
14 navigation controls that allow the voter to advance to the
15 next contest or go back to the previous contest before
16 completing the vote on the contests currently being
17 presented. So it's really just checking, you know, a lot
18 of the -- some of the basic rules, the no over-voting,
19 letting you know if you've under-voted, and allowing you to
20 vote, basically, any contest in any manner in any order
21 that that voter prefers. A voter was able to vote
22 appropriate contests in any manner or order they wished and
23 was notified when under-voting, and was prevented from
24 over-voting.

25 We were also looking at cognitive issues,

1 completeness of instructions, availability of assistance
2 from the system, plain language being used, context before
3 actions, no bias among choices, ballot design, conventional
4 use of colors, icons and languages, as well as perceptual
5 issues, including accommodation for color blindness and no
6 reliance solely on color so that color coding is not used
7 as the sole means of conveying information.

8 Interaction issues, we were looking at no page
9 scrolling being allowed, unambiguous feedback for voter's
10 selection, so that was very obvious that what they were
11 selecting as their choice. We looked for accidental
12 activation, size and separation of touch areas, repeating
13 keys, timing issues, initial system response times, maximum
14 completed response time for vote confirmation, maximum
15 completed system response time for all operations, and
16 voter inactivity time.

17 As NaKasha mentioned, we did see an issue with
18 the no repeating keys, that key presses were allowed to be
19 repeated. And it sounds like Dominion Voting Systems has
20 implemented a mitigation for that.

21 In terms -- we were also looking at alternative
22 languages, general support for alternative languages,
23 complete information in an alternative language,
24 auditability of records for English readers, and voter
25 control of language. An issue that was seen in terms of

1 voter control with the language that the system allows the
2 voter to select among the available languages throughout
3 the voting session, while preserving the current votes.

4 So once a voter selects a language and they
5 download that ballot, the connection to the server is
6 broken and that ballot is local only to that device that
7 the voter is voting on. So should they decide to change
8 languages, they would need to go back and access a whole
9 new ballot and it would not carry over anything that they
10 had voted in the first language to a second language, so
11 that was one thing that was noted.

12 There were a number of requirements that were
13 related to hardware in the voting environment where the
14 voter would be casting their ballot that were deemed not
15 applicable as the voter will be utilizing their own
16 equipment, so we really couldn't speak to hardware-oriented
17 items.

18 In terms of privacy, some of the categories were
19 visual privacy, auditory privacy, and no receipts. And
20 again, this was as a Remote Access Vote-By-Mail System.
21 The voting will occur in an environment of the voter's
22 choosing. And all privacy issues will be reliant upon
23 where they choose to cast their -- or to mark their
24 ballots.

25 Some final requirements that were looked at were

1 related to, I think this is Rule 19295, RAVBM system
2 Requirements, that the system shall not have the
3 capability, including an optional capability, to use a
4 remote server to mark a voter's selections, transmit it to
5 the server from the voter's computer via the internet,
6 store any voter identifiable selections on any remote
7 server, or tabulate votes. And it was verified that, as I
8 mentioned a little bit earlier, that once the ballot is
9 delivered to the voter's personal environment, all
10 connections are removed and there are no remote servers to
11 do any of those things.

12 And that basically concludes --

13 MS. LAPSLEY: Okay.

14 MR. SANTOS: -- SLI's report.

15 MS. LAPSLEY: Great. Thank you, Mike.

16 So with that, is anyone -- is there anyone from
17 Dominion that would like to respond to either the Staff
18 Report or the consultant's report?

19 UNIDENTIFIED MALE: No, thank you.

20 MS. LAPSLEY: No, thank you? All right.

21 With that, we'll go ahead and move to public
22 comments. And right now we have one public speaker card
23 and that's from Mr. Fred Nisen with Disability Rights of
24 California.

25 Mr. Nisen?

1 UNIDENTIFIED MALE: Thank you. We're from
2 Disability Rights California, and I'm going to be reading
3 his testimony.

4 (On behalf of Fred Nisen.)

5 "Hi. My name is Fred Nisen. I am the Supervising
6 Attorney of the Voting Rights Practice Group at
7 Disability Rights California, California's protection
8 and advocacy system for people with disabilities.

9 "I, along with other members of my staff, participated
10 in the testing of Dominion's ImageCast Remote 5.2.
11 After reading through the reports online, these are my
12 following comments.

13 "This PIN process is too cumbersome. It would require
14 the voter have to have some dedication to not give up
15 during this process. I understand that people are
16 concerned with security at this time. However, just
17 giving people more hoops to jump through will not make
18 the system more secure and will scare away people who
19 could benefit from having vote-by-mail be made
20 accessible to them without having to waive their right
21 to a private and independent vote. I have a reason to
22 believe that Dominion is willing to work with counties
23 to make their process less burdensome for voters with
24 disabilities.

25 "As a condition of approval, the Secretary of State's

1 Office should require that the voter verification be a
2 one-step process, asking for voter I'D, name and date
3 of birth, similar to other RAVBM systems.

4 "Personally, I found the system easy to use, once I
5 was able to get to the ballot. However, one of our
6 staff members who uses the Java screen reading
7 software on his computer also tested the system,
8 including the problems with the audio instructions on
9 how to complete a write-in candidate selection. He
10 also found a problem with the audio instructions on
11 how to return to the previous screen.

12 "I also noted in the Staff Report that the Secretary
13 of State's Office expects counties to remake all the
14 ballots that come in using this Remote Accessible
15 Vote-By-Mail System. It is my understanding that when
16 counties are using an ImageCast Voting System, as well
17 as ImageCast Remote 5.2, they can simply be slipped
18 into the ballot box when it is removed from the
19 envelope. This would make the voter's choices as
20 private as any other vote-by-mail voters since they do
21 not have to use copy to a paper ballot.

22 "In fact, I understand that a county that uses
23 Dominion ICX Ballot Marking Device as their
24 accessibility voting system can use the ICX to
25 duplicate the remote ballot. I am not advocating that

1 a county purchase a particular system, but if a county
2 uses ImageCast to count their ballots and they use
3 this Accessible Vote-By-Mail System, they should be
4 able to input the Accessible Vote-By-Mail ballots
5 directly into the ballot counter. This would ensure
6 that the voter has a private and independent ballot to
7 the ballot box without anybody filling out a ballot
8 for them.

9 "Thank you."

10 MS. LAPSLEY: Great. Thank you.

11 Thank you, Mr. Nisen.

12 Seeing no other members of the public wishing to
13 have -- to make public comment, we will be accepting public
14 comment through May 6th, again, as I indicated before, to
15 the Voting Systems at sos.ca.gov email address. People can
16 feel free to send them electronically, or via U.S. Mail to
17 Secretary of State, Attention: Voting System Comment, 1500
18 11th Street, 6th Floor, Sacramento, California 95814.

19 And that with, we'll go ahead and conclude this
20 public hearing. Again, I thank everyone for coming and for
21 your time today. Thank you.

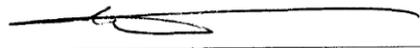
22 (The hearing concluded at 9:39 a.m.)
23
24
25

REPORTER'S CERTIFICATE

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were reported by me, a certified electronic court reporter and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

IN WITNESS WHEREOF, I have hereunto set my hand this 10th day of May, 2018.



PETER PETTY
CER**D-493
Notary Public

CERTIFICATE OF TRANSCRIBER

I do hereby certify that the testimony in the foregoing hearing was taken at the time and place therein stated; that the testimony of said witnesses were transcribed by me, a certified transcriber and a disinterested person, and was under my supervision thereafter transcribed into typewriting.

And I further certify that I am not of counsel or attorney for either or any of the parties to said hearing nor in any way interested in the outcome of the cause named in said caption.

I certify that the foregoing is a correct transcript, to the best of my ability, from the electronic sound recording of the proceedings in the above-entitled matter.



May 10, 2018

MARTHA L. NELSON, CERT**367