



# Field Audit Report

**Dominion Voting Systems Democracy  
Suite (D-Suite) 5.5-B Voting System  
Maricopa Post-Election Field Audit**

Approved by: \_\_\_\_\_  
*Jack Cobb*

**Jack Cobb, Laboratory Director**

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## 1.0 INTRODUCTION

The purpose of this report is to document the procedures that Pro V&V, Inc. followed to perform a Post-Election Field Audit of the Dominion Voting Systems Democracy Suite (D-Suite) 5.5-B Voting System Maricopa County Board Elections. The Post Election Field Audit was conducted in Maricopa County, Arizona, from February 2, 2021 through February 5, 2021. The audit was conducted at the following location:

Maricopa County Elections  
510 South 3<sup>rd</sup> Avenue  
Phoenix, Arizona 85003

## 1.1 References

The documents listed below were utilized in the development of this Report:

- Pro V&V Test Plan No. TP v. 01-03-MAR-01.03, *“Dominion Voting Systems D-Suite 5.5-B Voting System Maricopa Post-Election Field Audit”*
- Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines (VVSG) Version 1.0, Volume I, “Voting System Performance Guidelines”, and Volume II, “National Certification Testing Guidelines”
- Election Assistance Commission Testing and Certification Program Manual, Version 2.0
- Election Assistance Commission Voting System Test Laboratory Program Manual, Version 2.0
- National Voluntary Laboratory Accreditation Program NIST Handbook 150-2016, “NVLAP Procedures and General Requirements (NIST Handbook 150)”, dated July 2016
- National Voluntary Laboratory Accreditation Program NIST Handbook 150-22, 2008 Edition, “Voting System Testing (NIST Handbook 150-22)”, dated May 2008
- United States 107<sup>th</sup> Congress Help America Vote Act (HAVA) of 2002 (Public Law 107-252), dated October 2002
- Pro V&V, Inc. Quality Assurance Manual, Version 7.0
- EAC Requests for Interpretation (RFI) (listed on [www.eac.gov](http://www.eac.gov))
- EAC Notices of Clarification (NOC) (listed on [www.eac.gov](http://www.eac.gov))

## **1.2 Terms and Abbreviations**

The terms and abbreviations applicable to the development of this Test Report are listed below:

“EAC” – United States Election Assistance Commission

“EMS” – Election Management System

“HAVA” – Help America Vote Act

“ICC” – ImageCast Central

“ICP2” – ImageCast Precinct 2

“ISO” – International Organization for Standardization

“NOC” – Notice of Clarification

“QA” – Quality Assurance

“RFI” – Request for Interpretation

“VSTL” – Voting System Test Laboratory

“VVSG” – Voluntary Voting System Guidelines

## **1.3 Background**

The Maricopa County Board of Elections contracted with Pro V&V to conduct a Post-Election Field Audit to ensure the software and hardware certified for use in Maricopa County are the same as the software and hardware used in the conduction of the November 2020 General Election. Maricopa also requested that Pro V&V perform a network analysis and an accuracy test.

## **1.4 System Description**

The D-Suite 5.5-B Voting System is a paper-based optical scan voting system consisting of the following major components: The Election Management System (EMS), the ImageCast Central (ICC), and the ImageCast Precinct 2 (ICP2). The D-Suite 5.5-B Voting System configuration is a modification from the EAC approved D-Suite 5.5 system configuration.

## **1.5 Scope**

The Post-Election Field Audit evaluated the EMS and ICC workstations and servers by comparing the SHA-256 hash value to the known SHA-256 hash values. In addition, a malware detection tool was run on each workstation/server to establish whether any malware/virus or malicious software was running on the workstations/servers. Pro V&V utilized the tool to extract the firmware from a sample of thirty-five

ICP2 units. These extractions were then placed on the Pro V&V laptop to generate the SHA-256 hash value for the firmware. These hash values were compared to known hash values for the Election Assistance Commission Federal Test Campaign. In addition to these evaluations, Pro V&V conducted a network analysis to ensure the network is a “Closed Network” incapable of reaching the internet. Pro V&V also conducted an Accuracy Test to meet the requirements of the 2005 Voluntary Voting Systems Guidelines (VVSG).

## **2.0 AUDIT OVERVIEW**

The evaluation of the D-Suite 5.5-B Voting System consisted of removing a copy of the software/firmware from each component and evaluating the software/firmware against a known SHA-256 hash value outside of the system, running the malware detection tool to verify no malicious software was resident on the workstations/servers, performing a network analysis, and executing an accuracy test.

## **3.0 AUDIT PROCESS AND RESULTS**

The following procedure outlines the steps that the evaluation team will execute to evaluate the D-Suited 5.5-B under the scope defined in Section 1.5.

### **3.1 General Information**

The evaluation was conducted under the guidance of Pro V&V by personnel verified by Pro V&V to be qualified to perform the evaluation.

### **3.2 Audit Configuration**

The evaluation utilized system configurations of the D-Suite 5.5-B Voting System and its components that were setup by Maricopa personnel. Pro V&V had complete access and control of the equipment being audited.

### **3.3 Procedures and Summary Findings**

#### **ICP2 Software Verification**

To perform the verification, the Pro V&V test team randomly selected thirty-five units for evaluation. A team member then photographed the seals and the device. All seals that needed to be removed were then removed. After all photographs were taken, the team member removed any compact flash cards under county supervision and placed them on top of the machine being evaluated. The team member then inserted two compact flash cards (one blank and the other containing the firmware extraction tool). The unit was plugged in and powered on with the security token iButton press on the iButton reader. A password was entered and a tech iButton was then read by the ICP2 and the option to “Extract Firmware” was selected. The original compact flash cards were then reinserted into the ICP2. The team member then took the compact

flash card containing the exported firmware to a Pro V&V laptop to compare the SHA-256 hash values to the known value from previous testing.

Summary Findings

All SHA-256 hash values retrieved from the units sampled matched the known value from certification testing. No discrepancies were noted at any time during this portion of the evaluation.

The serial numbers of the units selected along with the corresponding seal numbers are detailed in the table below.

**Table 3-1 ICP2 Software Verification Serial and Seal Numbers**

ICP2 Serial Number	Seal Number	
	Front	Back
FAL19460086	IS143365	1004649
FAL19460030	IS437104	1004719
FAL19330163	IS439376	1004217
FAL19450094	IS419918	1004579
FAL19380033	IS439358	1004621
FAL19460025	IS136178	1004786
FAL19450035	IS441937	1004032
FAL19390009	IS149173	1004260
FAL19380263	IS129272	1004955
FAL19283163	IS1642553	1004904
FAL19450002	IS136177	1004743
FAL19460023	IS437315	1004568
FAL19450257	IS439331	1004216
FAL19320179	IS437217	10041912
FAL19450000	IS1642634	1004973
FAL19450119	ISIS146739	1004997
FAL19252973	IS1642766	1004971
FAL19450133	IS1640855	1004830
FAL19450196	IS1640979	1004572
FAL19380044	IS148896	1004314

**Table 3-1 ICP2 Software Verification Serial and Seal Numbers (continued)**

ICP2 Serial Number	Seal Number	
	Front	Back
FAL19460080	IS439339	1004320
FAL19320062	IS439396	1004204
FAL19450068	IS1640786	1004530
FAL19450007	IS1639766	1004747
FAL19450040	IS149919	1004461
FAL19450274	IS439195	1004097
FAL19450241	IS439431	1004375
FAL19460044	IS437295	1004988
FAL19460089	IS437291	1004672
FAL19460042	IS143032	1004752
FAL19450004	IS162418	1004531
FAL19460068	IS437240	1004498
FAL19450034	IS143031	1004491
FAL19450062	IS143686	1004587
FAL19460105	IS1640785	1004125

**ICP2 Hardware Verification**

To perform the verification, the Pro V&V test team selected five units for evaluation. A team member then photographed the seals and the device. All seals that needed to be removed were then removed. After all photographs were taken, the team member removed the necessary security screws from the bottom of the ICP2. Once the screws were removed the cover was removed. The team member then used the hardware verification guide to visually inspect the hardware components and subcomponents against known photographs, part numbers and identifying marks.

**Summary Findings**

All units inspected were verified to contain the correct hardware components and subcomponents. No discrepancies were noted at any time during this portion of the evaluation.

The serial numbers of the units selected along with the corresponding seal numbers are detailed in the table below.

**Table 3-2 ICP2 Hardware Verification Serial and Seal Numbers**

ICP2 Serial Number	Seal Number
FAL19380033	1004580
FAL19450257	***
FAL19320179	1004481
FAL19320062	1004029
FAL19450040	1004708

*\*\*\*Note: There are various acceptable reasons for a seal to be unattached, such as: the unit was a spare, the seal was broken in transit, or the poll worker had to remove it on election night and return it to the Board of Elections with the elections results.*

**EMS and ICC Workstations/Servers Verification**

To perform the verification, the Pro V&V test team was granted access to the workstations/servers from qualified Board of Elections Employees. Once access was achieved, a team member navigated to the folder containing the DVS software and copied the software onto a brand new USB drive. The USB was then inserted into the Laboratory laptop and a SHA-256 hash value was generated. A comparison was made between the generated hash value and the known hash value. The hard drive from the ICC workstation/server was then removed and placed into a cloning device. The hard drive was then “cloned”. After completion, the hard drive was placed into equipment from Pro V&V’s laboratory that is an exact sample of the same ICC workstation/server. The equipment was then booted up. The Pro V&V test team was granted access to the workstations/servers from qualified Board of Elections Employees. Once that was achieved, a USB containing a malware/virus scanning software was run to scan the equipment for malware/viruses.

**Summary Findings**

All units inspected were verified to contain the correct hardware components and subcomponents. No discrepancies were noted at any time during this portion of the evaluation.

Identification information of the units inspected is detailed in the table below.

**Table 3-3 EMS and ICC Workstations/Servers Verification Details**

Scanner Information	Computer	
	Model	Serial Number
<i>ICC Client Workstation</i>		
HP-0124K28	OptiPlex 7060	2JGJ3W2
HP-0124K29	OptiPlex 7060	2FDK3W2
HP-0190K29	OptiPlex 7060	2K6M3W2
HP-0192K29	OptiPlex 7060	2JYM3W2
C-GF307234	OptiPlex 3050	8NCCB03
C-GFY00088	OptiPlex 3050	4RMZNX2
C-GF302006	OptiPlex 3050	4RPOPX2

**Table 3-3 EMS and ICC Workstations/Servers Verification Details**

Scanner Information	Computer	
	Model	Serial Number
C-GFY00019	OptiPlex 3050	4RNZ7X2
C-GFY00347	OptiPlex 3050	4RPVNX2
<i>Adjudicatoion Client Workstation</i>		
N/A	Dell Precision Tower 3420	87NDHL2
N/A	Dell Precision Tower 3431	DVDZG13
N/A	Dell Precision Tower 3431	DVFTG13
N/A	Dell Precision Tower 3431	G4NFZ23
<i>EMS Client</i>		
N/A	Dell Precision 3420	27BD8M2
N/A	Dell Precision 3420	BNWVCH2
N/A	Dell Precision 3420	86PQXK7
N/A	Dell Precision 3420	B0ZRMN2

**Network analysis**

While onsite, qualified Pro V&V personnel evaluated the network architecture to determine the process and procedure to be followed. All steps were documented in the engineering notebook.



## Summary Findings

Pro V&V test team members evaluated the physical wiring of the network, the managed switch, clients, and the server. All wiring is housed in an exposed channel hanging from the ceiling. Different color wires are used for different device types such as printers, PCs, or tabulators. For the server, commands were run to test connectivity to a known internet address and public IP addresses. None for these commands returned successful execution from the server or from the clients. Pro V&V determined that the network it evaluated is a “Closed Network” and does not have access to the internet.

## Accuracy Test

An Accuracy Test was performed to ensure the 5.5-B system correctly captures, stores, consolidates, and reports the specific ballot selections, and absence of selections, for each ballot position. To perform the test, the test deck provided by Maricopa Board of Elections was inserted into each tabulator and processed to reach a total of at least 1,549,703 ballot positions.

## Summary Findings

An Accuracy Test was performed on the ICP 2 precinct scanner, ICC HiPro Workstation, and the ICC Canon DR-G1130 over a two day period. Using the test deck that was provided by Maricopa County, all votes were tallied and adjudicated resulting in an accurate ballot count. The ICC workstations were scanned on the first day. Ballots were imported into RTR and adjudicated resulting in accurate numbers. The ICP 2 ballots were scanned on the second day and were scanned by volunteers from the “League of Women Voters”. Board of Elections staff acted as poll workers if the volunteers had any issues.

Two anomalies recorded during the execution of this test:

- A ballot jam was recorded on audit unit 10. It could not be determined if the ballot was tabulated. The Pro V&V test team isolated the ballot until the polls were closed. It was determined the ballot was tabulated and the ballot was returned to the ballot bin.
- On audit unit 11, after the close of polls it was determined that a ballot jammed and was rerun through tabulation because the total ballots cast was plus 1. The tabulator was rezeroed and all ballots were rescanned.

Ballots were imported into RTR and Adjudicated resulting in accurate numbers.

#### **4.0 CONCLUSIONS**

Based on the results obtained during the Field Audit, Pro V&V determines the D-Suite 5.5-B Voting System, on all evaluated components, is the voting system software and hardware certified for use in Maricopa County and are the same as the software and hardware used in the conduction of the November 2020 General Election.