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GRP Consulting Group, LLC

***ALLEGHENY COUNTY PRE November 3, 2015
Municipal Primary Election ES&S
IVOTRONICS FIRMWARE VERIFICATION STUDY***

EXECUTIVE SUMMARY

Developed for:

***ALLEGHENY COUNTY
DIVISION OF ELECTIONS
STATE OF PENNSYLVANIA***

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1. INTRODUCTION: ALLEGHENY COUNTY ES&S iVOTRONICS FIRMWARE VERIFICATION STUDY

The Allegheny County, Pennsylvania Division of Elections requested GRP Consulting Group to audit and verify the firmware source code on twenty (20) ES&S iVotronic DRE voting machines before conducting the November 3, 2015 Municipal Primary Election. The devices to be audited were randomly selected from the counties 4700 devices. The purpose was to verify that the samples have in residence on the U1 designated Electronic Erasable Programmable Read Only Memory (EEPROM) chip the firmware version 9.1.4.1 and that all applied firmware versions are accurate and true to the State of Pennsylvania's Trusted Build as held in escrow by the Secretary of State's Office in Harrisburg. The study was accomplished by applying the *'Allegheny County iVotronic Firmware Verification Protocol'* and was performed on location at the Allegheny County Division of Elections warehouse; located at 901 Pennsylvania Ave., Pittsburgh, Pennsylvania. GRP Consulting Group and Allegheny County staff performed this firmware audit on September 14, 2015.

It is the finding of GRP Consulting Group that the firmware verification audit applied to the resident code on the sample population was found to be unaltered versions of the 9.1.4.1 firmware.

1.1 Approach

1.1.1 Study's Focus

The focus of the exercise was:

1. Implementation of a fair and statically correct random selection process.
2. Deploy the verification protocol, known as the *'Allegheny County iVotronic Firmware Verification Protocol'*, to verify on twenty (20) randomly chosen ES&S iVotronics DRE voting devices that they hold in residence on the U1 designated EEPROM chip the exact, true and unaltered version of the 9.1.4.1 certified firmware source code as held in escrow at the Secretary of State's office.

1.1.2 Study's Concentration

The GRP Consulting Group analyst was tasked to independently apply a repeatable and validated verification protocol to verify that the ES&S firmware version 9.1.4.1 that resides in escrow by the Secretary of State's office and is resident on the Allegheny County iVotronic Direct-Recording Entry (DRE) - touch screen voting devices – are exact, true and unaltered versions of the certified firmware source code.

1.1.3 Study's Phases

GRP Consulting Group organized the project primary phases, each incorporating the flexibility to accommodate additional requirements, as they may have become known. The general strategy employed was comprised of the following aspects:

1. Setup, configure and control the verification environment and the parameters associated with each verification cycle;
2. Apply the protocol to verify that before the November 3, 2015 Municipal Primary Election the 9.1.4.1 firmware on the iVotronic DREs is the true and certified version of the firmware and has not been altered;
3. Execute twenty (20) verification cycles;
4. Conduct reviews and analyses of all verification results and anomalies obtained during the twenty (20) verification execution cycles;
5. Advise the County on possible root cause(s) of any and all anomalies; and
6. Prepare and deliver a report of the verification activities, the results of all verification executions, and conclusions and recommendations in Executive Summary and Final Report formats.

2. FINDINGS

GRP Consulting Group was engaged by the Allegheny Division of Elections on site at 901 Pennsylvania Ave., Pittsburgh, PA on September 14, 2015 ; the purpose of the engagement was to apply the '*Allegheny County iVotronic Firmware Verification Protocol*' to verify the ES&S iVotronic firmware version 9.1.4.1 is resident on the Allegheny County iVotronic population.

On September 14, 2015, the GRP Consulting Group analyst completed the verification process of the firmware on twenty (20) Allegheny County iVotronics chosen at random from the population of approximately 4700 machines. It is the findings of GRP Consulting Group that the firmware version 9.1.4.1 residing on the twenty (20) randomly chosen machines, do represent the population, and furthermore, that the firmware version as resident on the U1 designated Electronic Erasable Programmable Read Only Memory (EEPROM) chip is an exact, true, and unaltered version of the NVLAP federally certified trusted build as held in archive at SysTest Labs and in escrow by the Pennsylvania Secretary of State in Harrisburg, PA.