



ENGINEER CHANGE ORDER (ECO) ANALYSIS FORM

Manufacturer: Election Systems & Software (ES&S)

System: ExpressVote Universal Voting System Hardware 1.0 (ExpressVote HW1.0)

ECO Number: 1100

ECO Description: Update Process Verification

Overview:

An examination was performed to confirm that the update process documented in ES&S Engineering Change Order (ECO) 1100 results in identical executable files as those found in the trusted build and the process does not add any additional software to the ExpressVote HW1.0.

Components Affected: ExpressVote HW1.0

Affected Systems:

Federal: EVS 5200, EVS 5203, EVS 5210, EVS 5220, EVS 5240, EVS 6000, EVS 6020, EVS 6030, EVS 6040, EVS 6043

State: EVS 5241, EVS 5320, EVS 5340, EVS 5341, EVS 6040 AZ, EVS 6050, FL EVS 4520 v1r2, FL EVS 4530 v1r2, FL EVS 4530 v2r3

Supporting Documentation:

Original ECO 1100 - EV 1.0 Copyright Information Final 10.6.20.pdf (*ES&S ECO*)

ECO1100_Appendix.pdf (*Results when ExpressVote Firmware Hash Does Not Match*)

Engineering Analysis:

Pro V&V analyzed the system architecture of the ExpressVote HW1.0. The sysload.bmp file is called by the bootloader(BLDR) process in the course of a device booting up. This file can be found in the root of the prod_release.IMG file that is the Trusted Build firmware. The process for installing the prod_release.img for use by the device is to “burn” the prod_release.img image to a Universal Serial Bus Embedded Disk Card (USB EDC). Once the USB EDC is “burnt”, the mounting area must be unlocked and the cover must be removed from the device. This USB EDC has to mount on 9 pins on the device. This process requires a screw driver, 5.5 millimeter bit driver, and has to be done carefully to ensure the pins are all mounted and no pin is bent.



USB EDC

An alternative to this method is to run an "Update". This process utilizes a different disk file image. The update.img file that is created during the Trusted Build process can be burnt to a USB flash drive and inserted into the USB ports located on the left side of the device. This process does not update the operating system, but does update the application software and the two firmware components InputOutputBoard.S19 and ScannerPrinterEngine.S19.

It has been discovered that the update process does not update the sysload.bmp. This causes an issue where the last sysload.bmp placed on the USB EDC will remain even if the update process is run for one or more versions.

Engineering Recommendation:

Pro V&V believes because all seven sysload.bmp files have been EAC certified and they are only used to display the copyright information while the device is booting, this should be a De Minimus change. It is Pro V&V's conclusion that the systems listed in this ECO Analysis could remain certified if running any of the following sysload.bmp files:

***Note some of the SHA-256 hashes are the same because the sysload.bmp is used in multiple versions.

EV 1.0 Firmware Version	SHA-256 Hash
1.4.0.0	e173f1a084bb5fac2e19962aeb4f6ecd529e30cc9b0a64411cda80e4b4089686
1.4.1.0	de99ddc620c6260e5e4dd4d26486b82f8a5c2297fc5169b31607b61563f974de
1.4.1.2	b3a230dc5ff31311a9f83b5bfee22ac96291c57f0c84abd05852aabf605ebbe3
1.4.1.7	07015a3e4d71e8683d3bf21b3d427f007a89b35d236767aedd35c4d94c3d8a12
1.4.2.0	de99ddc620c6260e5e4dd4d26486b82f8a5c2297fc5169b31607b61563f974de
1.4.3.0	ff4c1b668dbda1e7b23ba41547c62b53385afc836fd60717bc04739d9383b2aa
1.4.3.1	07015a3e4d71e8683d3bf21b3d427f007a89b35d236767aedd35c4d94c3d8a12
1.5.0.0	07015a3e4d71e8683d3bf21b3d427f007a89b35d236767aedd35c4d94c3d8a12
1.5.2.0	07015a3e4d71e8683d3bf21b3d427f007a89b35d236767aedd35c4d94c3d8a12
1.5.2.1	e39d71e88398beb836ee95973be1daec2bdbe091619891d8026fbfa15ae1798e
1.5.3.0	e39d71e88398beb836ee95973be1daec2bdbe091619891d8026fbfa15ae1798e

Reviewer:

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