# ES&S 6110

The Election Systems and Software (ES&S) release of the EVS 6.1.1.0 election system was examined in Austin on August 21, 2020. This release is a modification to the 6.1.0.0 release which was previously certified in Texas. This release was certified by the federal Elections Assistance Commission (EAC) in June 2020. Due to the Covid-19 social distancing requirements, my review of the system was done remotely.

The upgrades to the 6.1.1.0 system from the 6.1.0.0 system were modifications to the Electionware (EMS) software and the MS-Windows operating system. Therefore, the focus was to review the functional changes to Electionware.

None of the voting devices and ancillary products were updated. A test election was voted and tallied to validate that the system's effectiveness and security were not compromised by the upgrade.

The following table lists the modified 6.1.1.0 components used for the examination.

Table 1 - Releases for Proprietary Hardware/Software Components

| Hardware/Software | Version/Firmware # | Location |
|---|---|---|
| **Software** | | |
| Electionware (EMS) | 6.0.1.0 | Central office |
| Event Log Service | 2.0.0.0 | Central office |
| Removable Media Service | 2.0.0.0 | Central office |
| **Hardware** | | |
| ExpressVote HW1.0 (BMD) | 4.0.0.0 | Precinct |
| ExpressVote HW2.1  (BMD or tabulator) | 4.0.0.0 | Precinct |
| DS200 precinct scanner | 2.30.0.0 | Precinct or central |
| ExpressTouch (DRE) | 1.0.3.0 | Precinct |
| ExpressVote - XL (BMD) | 1.0.3.0 | Precinct |
| DS450 scanner | 3.4.0.0 | Central office |
| DS850 scanner | 3.4.0.0 | Central office |

For a detailed explanation of all the hardware components and applications of the 6.1.1.0 system please refer to the EAC's certification test report.

**Changes**

- Arial fonts are now included with the system allowing jurisdictions more flexibility for the ballot layout.

- Provided the option for increased physical RAM on the EMS in the client, server and/or standalone configurations. This provides an increased amount of virtual RAM available to Electionware.

- Added critical Windows security updates.

- Added an updated JAR file to prevent relocated JAI classes from loading. This prevents the Internal Error displayed when attempting to view ExpressVote XL write-in images.

- Modified Password Policy - the Microsoft Windows password policy is set to not expire on the EMS.

- Created an additional Postgres database index to enhance the security and performance of the database.

  An additional user logging message to enhance the transparency and security of the database. This additional logging is included within the Reporting module to assist users during ballot adjudication.

- Removed all empty entries in the CVR export report.

- Resolved a bug that caused an incorrect write-in image snippet to be assigned to the exported cast vote record (CVR). The incorrect snippet would be displayed in the adjudication screen in the EMS.

**Findings**

- The responses provided on Form-101 are acceptable.

- The Technical Data Package (TDP) documentation appears to be updated with the new information.

- The system software was successfully built and witnessed by SOS staff. A sample of the hash values were verified to match the values of the EMS executables that were used in the EAC testing.

- The voted test ballots were recorded and tallied correctly.

- The additional RAM was not tested during the examination, but it is safe to assume that the upgrade would reduce processing times and increase throughput for CPU intensive processes.

- There were no changes to the database tables or data file formats. This allows a jurisdiction to create a new election setup on a 6.1.0.0 version system, and then migrate the setup to the 6.1.1.0 version after the EMS has been upgraded.

- The addition of an index on a Postgres table adds a database level integrity check to prevent duplicate records from being uploaded into the EMS table. It creates a unique index on the **results.batch** table. Also, an operator loading the batch would get an indication that a record already exists in the table. The Postgres log message would be useful to determine if a batch was processed more than once.

  This modification was previously reviewed by me and subsequently approved by means of the de minimis ECO (engineering change order) approval process.

- The JAR file was added to prevent stock JAI classes from loading. The installation instructions are easy to follow, but I can see that for some jurisdictions, installation may be difficult or error prone. In that case, I hope ES&S will provide assistance free of charge, but not via a remote connection. Help should be provided either by phone, video conferencing, or in person.

  This modification was previously reviewed by me and subsequently approved by means of the de minimis ECO (engineering change order) approval process.

- The new "never expire" password setting is too lenient. I believe it should be set for no longer than 6 months. Additionally,  a jurisdiction should have a policy to change passwords at the beginning of each election cycle. Also, a user's account should be disabled immediately once they are no longer working for the jurisdiction.

- The ES&S hash validation program continues to be unnecessarily difficult and error prone. Since this is the way jurisdictions verify that they are running the certified software, the validation program should be improved. It needs to be simplified and made

more robust to prevent errors and/or false results.

- The EMS software upgrade can be done either by ES&S or by the jurisdiction. The hash validation should be performed by the jurisdiction.

  The ES&S hash software/firmware validation programs continue to be unnecessarily difficult to perform and error prone. Since this is the way jurisdictions verify that they are running the certified software, the validation program must be improved. It needs to be easier to run, require less human input, and be more robust to prevent errors and/or false results.

## Conclusion

The modifications to the EMS were minor and presented no loss of functionality. There is a potential for a loss of security because of the more lenient password expiration. This can be mitigated by an election administration policy to force renewal on a schedule, even though it will not be enforced by the MS-Windows operating system.

I believe the system examined meets the requirements of the Texas Election Code. I recommend certification of the EVS 6.1.1.0 system.

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