

ATTACHMENT 2: VVSG GAP ANALYSIS

STAR-Vote VVSG Gap Analysis									
Discrepancy	Compliant			Non-Material Discrepancy		Non-Compliant			
	2005	2007	2012	Explanation of Gap					
Testing of all memory locations prior to use for storing election data	✖ 5.4.2	✓ n/a	✖ 5.4.2	Modern COTS non-volatile storage devices are too large for a systematic testing of all memory locations to be performed practically. As such to meet these requirements, we would have to pre-select locations on the drive to use and limit the size of potential data. This requirement would extend to volatile memory as well. Pre-selecting volatile or non-volatile memory locations is disperferred as it makes attacks substantially easier than randomly assigned memory locations and, indeed, is very hard to achieve with a COTS operating system since most now include memory randomization inside their virtual memory system as a defense mechanism. Additionally, pre-selecting memory locations makes the system more vulnerable to small memory failures which are generally corrected by modern COTS systems simply by recognizing the failure and seamlessly using a different location. Limiting the size of data would be irrational given the space we have available in modern COTS systems and the detail its use permits in audit logs.					
Confirmation of data transmission	⚠ 6.2.7	✓ n/a	⚠ 6.2.5	At various points it is required that the user be notified whenever a data transmission is successful. Due to our high-volume message passing system, there would be times when the user was receiving notifications several times per second, which is impractical and a usability nightmare. As a result, we prefer a "notify on failure" approach.					
Requirement that all software to be used with the voting system be documented.	✖ 7.4.4	✓ n/a	✖ 7.4.4	Part of our logic in using a COTS operating system is the knowledge that newer versions of that operating system might become available, and newer or unanticipated hardware could be used. These two facts explicitly disallow the requirement that the system document all "software (such as operating systems and drivers) to be installed on the [...] voting system".					
Certification of Cryptographic Modules	⚠ 7.5.1	⚠ 5.1.1	⚠ 7.5.1	Certain cryptographic operations required by STAR-Vote are new enough to not have received NIST approval. Additionally, due to their state of the art nature, there may not be any FIPS 140-2 level 1 or higher validated cryptographic module implementing them. We will seek FIPS certification of our cryptography module, but cannot assure this at this time.					
Ballot image randomization	✓ n/a	✓ n/a	⚠ 7.8.3	Part of our system for detecting tamper evidence is a hash chain which, by design, enforces the ordering of ballot images. However, because our ballot images are not human readable and are never converted (or convertible) to a human-readable format, this does not endanger privacy.					
Side-by-side comparison of the electronic summary and the paper record	✓ n/a	⚠ 4.4.2	✓ n/a	We don't allow this both for usability and privacy reasons.					
Physical tamper evidence mechanisms / hardware security	✓ 7.3	✖ 5.8	⚠ 6.4.2	⚠ 7.3	Embedded physical tamper evidence mechanisms are impractical to demand of COTS hardware. We firmly believe that the combination of procedural physical security measures -- including tamper-evident seals, tamper evident storage containers/bags, etc. -- end-to-end cryptography and a voter verified paper record provide the same level of confidence, and indeed an even more robust assurance of the system's correct operation, than embedded physical tamper evidence.				
Providing the opportunity to void the ballot / paper record in the voting machine	⚠ 7.9.2	✓ n/a	⚠ 7.8.2	Under our system, the voting station does not know and, indeed, cannot know whether or not the voter intends to void the paper, nor can it mark the paper as void. Instead, our system treats a ballot as cast only once its paper record has been placed in a ballot box, and we permit voiding of the printed record by approaching a poll worker who marks the paper record void, and enables the voter to create a new ballot.					
				prevent any smart number of people from having the physical access necessary to violate the anonymity of votes in the electronic records.					
Capability of every Tabulator to produce certain reports	✓ n/a	✓ n/a	⚠ 2.4.4	"Tabulator" is no longer a meaningful concept in our system, as the data is combined and decrypted in a shared, distributed manner in which no one machine is the "tabulator". However, all required reports can be generated regarding the tabulation process, the tally is independently verifiable, and a complete log of each machine's contribution will be available for review.					
Requirement for the use of sans-serif fonts	⚠ 3.1.5	⚠ 3.2.5	⚠ 3.2.5	With modern high pixel density displays, there is growing evidence that serif fonts may be preferable both for ease of reading and for providing additional visual cues for limited vision voters. Given the high pixel density of displays available in typical COTS hardware today, we may permit serif fonts for use on very high pixel density displays.					
Providing the same accessibility interfaces when reviewing the paper record that the voter had when making his selections	✓ 3.2.2	✓ n/a	⚠ 3.2.2	Under our existing plan, one or more stations would be provided to read a paper record to a disabled voter through headphones, and optical magnifiers would be available to assist limited-vision voters. While this is not technically the same interface as required in the 2012 VVSG, we believe it more than fulfills its purpose.					
Immunity to large power surges	✓ n/a	⚠ 6.3.4	✓ n/a	The requirements around immunity to unusual voltage spikes will not be possible to meet using COTS hardware. However, the introduction of COTS surge protectors as part of the setup procedure would achieve the same end.					
Various product marking / labelling and manufacturing log requirements	⚠ 4.3.6	✖ 6.4	✖ 4.3.4 8.2	It is not possible to meet requirements around product marking, labelling, or manufacturing logging when the devices being used are COTS.					
Requirement that independent processes be used for data storage	⚠ 4.1.4	✓ n/a	✓ n/a	As a design decision, we will not be using independent processes for data storage. This decision is due to the increased attack surface provided by relying on interprocess communication. The goal of process-independent data storage is achieved through real-time massively redundant data replication across the network.					

STAR-Vote VVSG 2005 (1.0) Detailed Gap Analysis				
Regarding	Section	OK	Explanation of Gap / Notes	[] No Requirements
Functional Requirements				
Overall System Capabilities	2.1			
Security	2.1.1	✓		
Accuracy	2.1.2	✓		
Error Recovery	2.1.3	✓		
Integrity	2.1.4	⚠	2.1.4 (l) requires that DREs have the capability to retrieve ballot images in a human-readable form. We meet this need through maintenance of a human-readable paper record placed in the ballot box. In STAR-Vote, one privacy protection mechanism is that it is impossible to reconstruct a readable ballot image from the electronic system prior to the Risk Limiting Audit.	
System Audit	2.1.5	✓		
Election Management System	2.1.6	✓		
Vote Tabulating Program	2.1.7	✓		
Ballot Counter	2.1.8	✗	Requiring a physical ballot counter is impractical with COTS hardware, and its value would not be meaningful given STAR-Vote's challenge protocol. No ballots are officially "cast" until their paper record is placed in a ballot box, so no meaningful relationship will exist between the physical counters and the number of cast ballots. We believe the protections provided by our end-to-end encryption, hash chaining, and data redundancy provide far more useful and robust evidence. A software ballot counter can be added if deemed necessary.	
Telecommunications	2.1.9	✓		
Data Retention	2.1.10	✓		
Pre-Voting Capabilities	2.2	✓		
Ballot Preparation	2.2.1	✓		
Election Programming	2.2.2	✓		
Ballot and Program Installation & ...	2.2.3	✓		
Readiness Testing	2.2.4	✓		
Verification at the Polling Place ...	2.2.5	✓		
Verification at the Central Locati ...	2.2.6	⚠	By design, Election Trustees' computers, which are involved in the tallying process, are not accessible to election officials and are custodied during the election by the various Trustees. This process makes it very difficult for any small group, including election officials, to materially affect the tally, and is robust to the loss, damage, or destruction of a small number of these devices (the exact number is configurable). This will limit the ability of election officials to engage in pre-election testing of this hardware as required in 2.2.6.	
Voting Capabilities	2.3			
Opening the Polls	2.3.1	✓		
Activating the Ballot	2.3.2	✓		
Casting a Ballot	2.3.3	⚠	2.3.3.3 (q) requires access to plain-text ballot images. See 2.1.4 above.	
Post-Voting Capabilities	2.4			
Closing the Polls	2.4.1	✓		
Consolidating Vote Data	2.4.2	✓		
Producing Reports	2.4.3	✓		
Broadcasting Results	2.4.4	✓		
Maintenance, Transportation, an ...	2.5	✓		
Usability and Accessibility Requirements				
Usability Requirements	3.1	✓		
Usability Testing	3.1.1	✓		
Functional Capabilities	3.1.2	✓		
Alternative Languages	3.1.3	✓		
Cognitive Issues	3.1.4	✓		
Visual Display Characteristics	3.1.5	⚠	With modern high pixel density displays, there is growing evidence that serif fonts may be preferable both for ease of reading and for providing additional visual cues for limited vision voters. Given the high pixel density of displays available in typical COTS hardware today, we may permit serif fonts for use on very high pixel density displays. Supporting reading of paper ballots for limited-vision voters is achieved through optical magnification.	
Interaction Issues	3.1.6	✓		
Privacy	3.1.7	✓		
Accessibility Requirements	3.2	✓		
General	3.2.1	✓		
Vision	3.2.2	✓		
Dexterity	3.2.3	✓		
Mobility	3.2.4	✓		
Hearing	3.2.5	✓		
Speech	3.2.6	✓		
English Proficiency	3.2.7	✓		

<input checked="" type="checkbox"/> Compliant	<input type="checkbox"/> Non-Material Discrepancy	<input checked="" type="checkbox"/> Non-Compliant	<input type="checkbox"/> No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Cognition	3.2.8	<input checked="" type="checkbox"/>	
Hardware Requirements			
Performance Requirements	4.1		
Accuracy Requirements	4.1.1	<input checked="" type="checkbox"/>	
Environmental Requirements	4.1.2	<input checked="" type="checkbox"/>	
Election Management System Re ...	4.1.3	<input checked="" type="checkbox"/>	
Vote Recording Requirements	4.1.4	<input type="checkbox"/>	<p>As discussed previously, STAR-Vote does not allow the reconstruction of individual plaintext ballots from the electronic record, violating the DRE requirements in 4.1.4.3 (b) v. The paper record fulfills the purpose of this requirement. Furthermore, as a design decision, we will not be using independent processes for data storage as required for by 4.1.4.3 (b) iii. This decision is due to the increased attack surface provided by relying on interprocess communication. The goal of process-independent data storage is achieved through real-time massively redundant data replication across the network.</p>
Paper-based Conversion Require ...	4.1.5	<input checked="" type="checkbox"/>	
Tabulation Processing Requirements	4.1.6	<input checked="" type="checkbox"/>	
Reporting Requirements	4.1.7	<input checked="" type="checkbox"/>	
Vote Data Management Requirements	4.1.8	<input checked="" type="checkbox"/>	
Physical Characteristics	4.2		
Size	4.2.1	<input checked="" type="checkbox"/>	
Weight	4.2.2	<input checked="" type="checkbox"/>	
Transport and Storage of Precincts	4.2.3	<input checked="" type="checkbox"/>	
Design, Construction, and Maintenance	4.3		
Materials, Processes, and Parts	4.3.1	<input checked="" type="checkbox"/>	
Durability	4.3.2	<input checked="" type="checkbox"/>	
Reliability	4.3.3	<input checked="" type="checkbox"/>	
Maintainability	4.3.4	<input checked="" type="checkbox"/>	
Availability	4.3.5	<input checked="" type="checkbox"/>	
Product Marking	4.3.6	<input type="checkbox"/>	<p>The use of COTS hardware means that there will be no hardware available which meets the Product Marking requirements of section 4.3.6. This section's requirements could be met through the use of information added to the device by county personnel, or in the least preferred case, by manually affixing custom plates to the selected device's exterior. However, the use of COTS arguably makes the purpose of these required plates moot.</p>
Workmanship	4.3.7	<input checked="" type="checkbox"/>	
Safety	4.3.8	<input checked="" type="checkbox"/>	
Software Requirements			
Scope	5.1		
Software Design and Coding Standards	5.2	<input checked="" type="checkbox"/>	
Selection of Programming Languages	5.2.1	<input checked="" type="checkbox"/>	
Software Integrity	5.2.2	<input checked="" type="checkbox"/>	
Software Modularity and Program Structure	5.2.3	<input checked="" type="checkbox"/>	
Control Constructs	5.2.4	<input checked="" type="checkbox"/>	
Naming Conventions	5.2.5	<input checked="" type="checkbox"/>	
Coding Conventions	5.2.6	<input checked="" type="checkbox"/>	
Comment Conventions	5.2.7	<input checked="" type="checkbox"/>	
Data and Document Retention	5.3	<input checked="" type="checkbox"/>	
Audit Record Data	5.4	<input checked="" type="checkbox"/>	
Pre-election Audit Records	5.4.1	<input checked="" type="checkbox"/>	
System Readiness Audit Records	5.4.2	<input checked="" type="checkbox"/>	<p>5.4.2 (d) requires the explicit testing of all data paths and memory locations to be used prior to voting. No in-system process can successfully verify and audit, in any meaningful way, the integrity of data paths against malicious attackers which could mimic valid logs. As such, our defense of using trusted boot and signed executables offers superior evidence of validity. Additionally, memory randomization is a superior defense against malicious memory access as compared to testing of pre-defined memory locations, as it precludes the explicit targeting of pre-known memory locations by malicious code. The use of memory randomization precludes the effective testing of memory locations as required. Finally, as a matter of course, ballots which are known to be "test ballots" are meaningless from a security perspective, as a sophisticated attacker would detect that a given ballot was a "test" and withhold modification until real ballots were being cast.</p>
In-process Audit Records	5.4.3	<input checked="" type="checkbox"/>	
Vote Tally Data	5.4.4	<input checked="" type="checkbox"/>	
Vote Secrecy on DRE Systems	5.5	<input checked="" type="checkbox"/>	
Telecommunications Requirements			
Scope	6.1		
Design, Construction, and Maintenance	6.2		
Accuracy	6.2.1	<input checked="" type="checkbox"/>	
Durability	6.2.2	<input checked="" type="checkbox"/>	

Compliant	Non-Material Discrepancy	Non-Compliant	[] No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Reliability	6.2.3		
Maintainability	6.2.4		
Availability	6.2.5		
Integrity	6.2.6	n/a	
Confirmation	6.2.7		6.2.7 requires confirmation of successful or unsuccessful data transmission upon every occurrence. Due to our model of massive data redundancy and constant message passing, meeting this requirement would lead to potentially hundreds of notifications of successful transmission per second in large polling locations. As such, we prefer a "notification of failure" model, with an implicit success assumption when no notification is provided. We believe our network protocol is robust enough to prevent undetected errors.
Security Requirements			
Scope	7.1		
Access Control	7.2		
General Access Control	7.2.1		
Physical Security Measures	7.3		
Polling Place Security	7.3.1		
Central Count Location Security ...	7.3.2		
Software Security	7.4		
Software and Firmware Installati ...	7.4.1		
Protection Against Malicious Sof ...	7.4.2		
Software Distribution and Setup ...	7.4.3		
Software Distribution	7.4.4		Part of our logic in using a COTS operating system is the knowledge that newer versions of that operating system might become available, and newer or unanticipated hardware could be used. These two facts explicitly disallow the requirement of 7.4.4 that the system document all "software (such as operating systems and drivers) to be installed on the [...] voting system".
Software Reference Information ...	7.4.5		
Software Setup Validation	7.4.6		
Telecommunications and Data Tr ...	7.5		
Maintaining Data Integrity	7.5.1		Certain cryptographic operations required by STAR-Vote are new enough to not have received NIST approval. We will seek FIPS certification of our cryptography module, but cannot assure this at this time.
Protection Against External Thre ...	7.5.2		
Monitoring and Responding to E ...	7.5.3		
Shared Operating Environment	7.5.4		
Incomplete Election Returns	7.5.5		
Use of Public Communication Net ...	7.6	n/a	
Wireless Communication	7.7	n/a	
Independent Verification Systems	7.8		
Overview	7.8.1		
Basic Characteristics of IV Syste ...	7.8.2		
Voter Verifiable Paper Audit Trail ...	7.9		
Display and Print a Paper Record ...	7.9.1		
Approve or Void the Paper Recor ...	7.9.2		7.9.2 requires that the voting system itself provide a means of voiding the printed paper record. Under our system, the voting station does not know and, indeed, cannot know whether or not the voter intends to void the paper, nor can it mark the paper as void. Instead, our system treats a ballot as cast only once its paper record has been placed in a ballot box, and we permit voiding of the printed record by approaching a poll worker who marks the paper record void, and enables the voter to create a new ballot.
Electronic and Paper Record Stru ...	7.9.3		
Equipment Security and Reliabilit ...	7.9.4		
Preserving Voter Privacy	7.9.5		
VVPAT Usability	7.9.6		Note: 7.9.6 (b) met via optical magnifiers
VVPAT Accessibility	7.9.7		

STAR-Vote VVSG 2007 (2.0 Draft) Detailed Gap Analysis				
Regarding	Section	OK	Explanation of Gap / Notes	
Usability, Accessibility, and Privacy Requirements				
Overview	3.1			
General Usability Requirements	3.2	✓		
Performance Requirements	3.2.1	✓		
Functional Capabilities	3.2.2	✓		
Privacy	3.2.3	✓	Note: The requirement for different font sizes on paper records will be met via optical magnifiers	
Cognitive Issues	3.2.4	✓		
Perceptual Issues	3.2.5	⚠	With modern high pixel density displays, there is growing evidence that serif fonts may be preferable both for ease of reading and for providing additional visual cues for limited vision voters. Given the high pixel density of displays available in typical COTS hardware today, we may permit serif fonts for use on very high pixel density displays.	
Interaction Issues	3.2.6	✓		
Alternative Languages	3.2.7	✓		
Usability for Poll Workers	3.2.8	⚠	3.2.8.2-A requires equipment be independently certified for compliance with the safety requirements of UL 60950-1. While UL 60950-1 is applicable to COTS hardware, finding hardware which has been independently tested, or seeking independent testing may not be feasible given the use of COTS hardware.	
Accessibility Requirements	3.3	✓		
General	3.3.1	✓	Note: 3.3.1-E met via optical magnifiers and audio readers.	
Low Vision	3.3.2	✓		
Blindness	3.3.3	✓		
Dexterity	3.3.4	✓		
Mobility	3.3.5	✓		
Hearing	3.3.6	✓		
Cognition	3.3.7	✓		
English Proficiency	3.3.8	✓		
Speech	3.3.9	✓		
Security and Audit Architecture				
Overview	4.1			
Requirements for Supporting Audit ...	4.2			
Ballotbook Audit	4.2.1	✓		
Hand Audit of IVVR Record	4.2.2	✓		
Ballot Count and Vote Total Audit	4.2.3	✓		
Additional Behavior to Support Audit	4.2.4	✓		
Electronic Records	4.3			
Records Produced by Voting Devices	4.3.1	✓		
Records Produced by Tabulators	4.3.2	✓		
Records Produced by the EMS	4.3.3	✓		
Digital Signature Verification	4.3.4	✓		
Ballot Counter	4.3.5	⚠	Requiring a physical ballot counter is impractical with COTS hardware, and its value would not be meaningful given STAR-Vote's challenge protocol. No ballots are officially "cast" until their paper record is placed in a ballot box, so no meaningful relationship will exist between the physical counters and the number of cast ballots. We believe the protections provided by our end-to-end encryption, hash chaining, and data redundancy provide far more useful and robust evidence of the number of ballots cast. A software ballot counter can be added if deemed necessary, but again will not have any relationship to the actual number of ballots cast.	
Independent Voter-Verifiable Rec ...	4.4			
General Requirements	4.4.1	✓		
VVPAT	4.4.2	⚠	4.4.2.3-A requires that the voter have the opportunity to see the paper and electronic screens side by side, which we have explicitly disallowed to preserve privacy. Furthermore, 4.4.2.5-A requires that a printed record provide information sufficient to find its corresponding electronic record. While this is technically possible if Election Trustees participate, it is not possible under normal circumstances for auditors to make this link.	
PCOS Systems	4.4.3	n/a		
General Security Requirements				
Cryptography	5.1			
General Cryptographic Implementations	5.1.1	⚠	Certain cryptographic operations required by STAR-Vote are new enough to not have received NIST approval. Additionally, due to their state of the art nature, there may not be any FIPS 140-2 level 1 or higher validated cryptographic module as required by 5.1.1-A. We will seek FIPS certification of our cryptography module, but cannot assure this at this time.	
Digital Signatures for Election Results	5.1.2	✓	Note: Hardware TPMs will be required in COTS hardware to meet this requirement.	
Key Management for Signature Keys	5.1.3	✓	Note: Hardware with an internal entropy source is necessary to meet this requirement. To my knowledge this would restrict hardware choices to Intel processors of the Ivy Bridge generation or later. Introduction of a 3rd party hardware entropy source is unrealistic and introduces additional design fragilities.	

<input checked="" type="checkbox"/> Compliant	<input type="checkbox"/> Non-Material Discrepancy	<input checked="" type="checkbox"/> Non-Compliant	<input type="checkbox"/> No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Election Signature Key	5.1.4	<input checked="" type="checkbox"/>	The requirement that device-specific Election Signature Keys be used to sign all election related data is supported by our design. However, those ESKs are created and signed by an Election Certification Authority which is unique to that election date. This allows for centralization of valid certificate creation which is necessary for enforcing device roles in the polling location network and protecting against the introduction of fraudulent records by 3rd parties.
Setup Inspection	5.2		
Voting Device Software Inspecti ...	5.2.1	<input checked="" type="checkbox"/>	
Voting Device Election Informati ...	5.2.2	<input checked="" type="checkbox"/>	
Voting Equipment Properties Insq ...	5.2.3	<input type="checkbox"/>	Note: "Without the use of software" is ambiguous. Under our interpretation, battery level indication provided by the operating system counts as "without the use of software." If this interpretation is incorrect, it is our opinion that no applicable COTS device currently on the market will meet the requirements for a power source charge indicator, a cabling connectivity indicator, or a communications status indicator as required by 5.2.3-A, 5.2.3-B, and 5.2.3-D, respectively.
Software Installation	5.3	<input checked="" type="checkbox"/>	
Access Control	5.4		
General Access Control	5.4.1	<input checked="" type="checkbox"/>	
Access Control Identification	5.4.2	<input checked="" type="checkbox"/>	
Access Control Authentication	5.4.3	<input checked="" type="checkbox"/>	
Access Control Authorization	5.4.4	<input checked="" type="checkbox"/>	Dual person control as required by 5.4.4-C falls outside the realm of COTS operating systems.
System Integrity Management	5.5		
Electronic Devices	5.5.1	<input checked="" type="checkbox"/>	
Removable Media	5.5.2	<input checked="" type="checkbox"/>	
Backup and Recovery	5.5.3	<input checked="" type="checkbox"/>	
Malicious Software Protection	5.5.4	<input checked="" type="checkbox"/>	We explicitly disallow the introduction of antivirus or antimalware software into any element of the air-gapped system, since such software by design hooks into every facet of the operating system and processes, and therefore represents a substantial increase in the vulnerable attack surface of the voting system. Additionally, for such software to be useful an ability to connect to the internet would have to be provided to allow for "updates", introducing an unacceptable infection path into the system. Relying on the end-to-end encryption provides far more robust guarantees that the correct code has executed, and does so without introducing new vulnerabilities.
Communication Security	5.6		
Physical Communication Security ...	5.6.1	<input checked="" type="checkbox"/>	
Data Transmission Security	5.6.2	<input checked="" type="checkbox"/>	
Application Communication Sect ...	5.6.3	<input checked="" type="checkbox"/>	
System Event Logging	5.7		
General System Event Logging	5.7.1	<input checked="" type="checkbox"/>	
System Event Log Management ...	5.7.2	<input checked="" type="checkbox"/>	
System Event Log Protection	5.7.3	<input checked="" type="checkbox"/>	
Physical Security for Voting Devic ...	5.8		
Unauthorized Physical Access	5.8.1	<input checked="" type="checkbox"/>	Physical tamper evidence mechanisms are impractical to demand of COTS hardware. We continue to believe that the combination of end-to-end cryptography and a voter verified paper record provides substantially more robust assurance of the system's correct operation than costly and relatively less effective physical tamper evidence.
Physical Port and Access Least Ft ...	5.8.2	<input type="checkbox"/>	COTS hardware will in virtually all cases contain ports in excess of what is required for device testing and auditing. These ports can be physically disabled if necessary.
Voting Device Boundary Protecti ...	5.8.3	<input checked="" type="checkbox"/>	
Information Flow	5.8.4	<input type="checkbox"/>	5.8.4-B's requirement for port tamper evidence will be difficult to implement given the requirement for COTS hardware to rely on standard multi-function ports (such as USB) for providing accessibility peripheral connectivity. Given the design goal of making every device an accessible device, there must be at least one such open port on every device, which does not display tamper evidence when accessed.
Door Cover and Panel Security	5.8.5	<input checked="" type="checkbox"/>	
Secure Ballot Box	5.8.6	<input checked="" type="checkbox"/>	
Secure Physical Lock and Key	5.8.7	<input checked="" type="checkbox"/>	
Physical Encasing Lock	5.8.8	n/a	
Power Supply	5.8.9	n/a	
General Core Requirements			
General Design Requirements	6.1	<input checked="" type="checkbox"/>	
Voting Variations	6.2		
Hardware and Software Performa ...	6.3		
Reliability	6.3.1	<input checked="" type="checkbox"/>	
Accuracy/Error Rate	6.3.2	<input checked="" type="checkbox"/>	
Misfeed Rate	6.3.3	<input checked="" type="checkbox"/>	
Electromagnetic Compatibility (E ...	6.3.4	<input type="checkbox"/>	The requirements around immunity to unusual voltage spikes will not be possible to meet using COTS hardware. However, the introduction of COTS surge protectors as part of the setup procedure would achieve the same end.
Electromagnetic Compatibility (E ...	6.3.5	<input checked="" type="checkbox"/>	

<input checked="" type="checkbox"/> Compliant	<input type="checkbox"/> Non-Material Discrepancy	<input checked="" type="checkbox"/> Non-Compliant	<input type="checkbox"/> No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Other Requirements	6.3.6	<input checked="" type="checkbox"/>	
Workmanship	6.4		
Software Engineering Practices	6.4.1		
Scope	6.4.1.1		
Selection of Programming Lan...	6.4.1.2	<input checked="" type="checkbox"/>	
Selection of General Coding Cr...	6.4.1.3	<input checked="" type="checkbox"/>	
Software Modularity and Prog...	6.4.1.4	<input checked="" type="checkbox"/>	
Structured Programming	6.4.1.5	<input checked="" type="checkbox"/>	
Comments	6.4.1.6	<input checked="" type="checkbox"/>	
Executable Code and Data Inte...	6.4.1.7	<input checked="" type="checkbox"/>	
Error Checking	6.4.1.8	<input checked="" type="checkbox"/>	
Recovery	6.4.1.9	<input checked="" type="checkbox"/>	
Quality Assurance and Configura...	6.4.2	<input checked="" type="checkbox"/>	6.4.2.2 requires the use of model-specific tamper-resistant physical tags and manufacturing logs by unit. However, the use of COTS hardware effectively undermines the meaningfulness of these requirements.
General Build Quality	6.4.3	<input checked="" type="checkbox"/>	
Durability	6.4.4	<input checked="" type="checkbox"/>	
Maintainability	6.4.5	<input checked="" type="checkbox"/>	6.4.5-C Requires certain nameplates and labels which simply will not exist on COTS hardware.
Temperature and Humidity	6.4.6	<input checked="" type="checkbox"/>	
Equipment Transportation and S...	6.4.7	<input checked="" type="checkbox"/>	
Archival Requirements	6.5		
Archivalness of Media	6.5.1	<input checked="" type="checkbox"/>	
Procedures Required for Correct ...	6.5.2	<input checked="" type="checkbox"/>	
Period of Retention (Informative ...	6.5.3		
Integratability and Data Export/Ir...	6.6	<input checked="" type="checkbox"/>	
Procedures Required for Correct S...	6.7	<input checked="" type="checkbox"/>	
Requirements by Voting Activity			
Election Programming	7.1	<input checked="" type="checkbox"/>	
Ballot Preparation, Formatting, ar...	7.2	<input checked="" type="checkbox"/>	
Procedures Required for Correct ...	7.2.1	<input checked="" type="checkbox"/>	
Equipment Setup for Security an...	7.3		
Logic and Accuracy Testing	7.3.1	<input checked="" type="checkbox"/>	
Opening Polls	7.4	<input checked="" type="checkbox"/>	
Casting	7.5		
Issuance of Voting Credentials at ...	7.5.1	<input checked="" type="checkbox"/>	
General Voting Functionality	7.5.2	<input checked="" type="checkbox"/>	
Voting Variations	7.5.3	<input checked="" type="checkbox"/>	
Recording Votes	7.5.4	<input checked="" type="checkbox"/>	
Redundant Records	7.5.5	<input checked="" type="checkbox"/>	
Respecting Limits	7.5.6	<input checked="" type="checkbox"/>	
Procedures Required for Correct ...	7.5.7	<input checked="" type="checkbox"/>	
Closing Polls	7.6	<input checked="" type="checkbox"/>	
Procedures Required for Correct ...	7.6.1	<input checked="" type="checkbox"/>	
Counting	7.7		
Integrity	7.7.1	<input checked="" type="checkbox"/>	
Voting Variations	7.7.2	<input checked="" type="checkbox"/>	
Ballot Separation	7.7.3	<input checked="" type="checkbox"/>	
Misfed Ballots	7.7.4	n/a	
Accuracy	7.7.5	n/a	
Consolidation	7.7.6	<input checked="" type="checkbox"/>	
Procedures Required for Correct ...	7.7.7	<input checked="" type="checkbox"/>	
Reporting	7.8		
General Reporting Functionality ...	7.8.1	<input checked="" type="checkbox"/>	
Audit, Status, and Readiness Rep ...	7.8.2	<input checked="" type="checkbox"/>	
Vote Data Reports	7.8.3	<input checked="" type="checkbox"/>	
Procedures Required for Correct ...	7.8.4	<input checked="" type="checkbox"/>	

STAR-Vote VVSG 2012 (1.1 Draft) Detailed Gap Analysis				
Regarding	Section	OK	Explanation of Gap / Notes	
Functional Requirements				
			Compliant	Non-Material Discrepancy
Overall System Capabilities	2.1			
Security	2.1.1	✓		
Accuracy	2.1.2	✓		
Error Recovery	2.1.3	✓		
Integrity	2.1.4	⚠	2.1.4 (i) requires that DREs have the capability to retrieve ballot images in a human-readable form. We meet this need through maintenance of a human-readable paper record placed in the ballot box. In STAR-Vote, one privacy protection mechanism is that it is impossible to reconstruct a readable ballot image from the electronic system prior to the Risk Limiting Audit.	
System Audit	2.1.5	⚠	STAR-Vote ensures log integrity through massive duplication of election-relevant events between all computers in a polling location, and via the use of hash chains which provide tamper evidence. We believe this a substantial improvement over system-imposed file access controls as physical access to the device renders file access controls ineffective for even a moderately sophisticated attacker, whereas massive duplication and hash chaining provides genuine evidence that logs have not been modified.	
Election Management System	2.1.6	✓		
Vote Tabulating Program	2.1.7	✓		
Ballot Counter	2.1.8	✗	Requiring a physical ballot counter is impractical with COTS hardware, and its value would not be meaningful given STAR-Vote's challenge protocol. No ballots are officially "cast" until their paper record is placed in a ballot box, so no meaningful relationship will exist between the physical counters and the number of cast ballots. We believe the protections provided by our end-to-end encryption, hash chaining, and data redundancy provide far more useful and robust evidence. A software ballot counter can be added if deemed necessary.	
Telecommunications	2.1.9	✓		
Data Retention	2.1.10	✓		
Pre-Voting Capabilities	2.2	✓		
Ballot Preparation	2.2.1	✓		
Election Programming	2.2.2	✓		
Ballot and Program Installation	2.2.3	✓		
Readiness Testing	2.2.4	✓		
Verification at the Polling Place	2.2.5	✓		
Verification at the Central Location	2.2.6	⚠	By design, Election Trustees' computers, which are involved in the tallying process, are not accessible to election officials and are custodied during the election by the various Trustees. This process makes it very difficult for any small group, including election officials, to materially affect the tally, and is robust to the loss, damage, or destruction of a small number of these devices (the exact number is configurable). This will limit the ability of election officials to engage in pre-election testing of this hardware as required in 2.2.6.	
Voting Capabilities	2.3			
Opening the Polls	2.3.1	✓		
Activating the Ballot	2.3.2	✓		
Casting a Ballot	2.3.3	✓		
Post-Voting Capabilities	2.4			
Closing the Polls	2.4.1	✓		
Consolidating Vote Data	2.4.2	✓		
Producing Reports	2.4.3	✓		
Electronic Reports	2.4.4	⚠	"Tabulator" is no longer a meaningful concept in our system, as the data is combined and decrypted in a shared, distributed manner in which no one machine is the "tabulator". However, all required reports can be generated regarding the tabulation process, the tally is independently verifiable, and a complete log of each machine's contribution will be available for review. Additionally, as stated above, STAR-Vote does not allow a mechanism for reconstructing individual ballot images electronically until the Risk Limiting Audit phase. Printed records exist for each cast ballot.	
Election Night Reporting	2.4.5	✓		
Maintenance, Transportation, and Security	2.5	✓		
Usability and Accessibility Requirements				
General Usability Requirements	3.2	✓		
General Usability	3.2.1	✓		
Functional Capabilities	3.2.2	✓	Note: 3.2.2.1 (g) met through optical magnification.	
Voter Privacy	3.2.3	✓		
Voter Instructions, Plain Language, etc.	3.2.4	✓		
Visual Display Characteristics	3.2.5	⚠	With modern high pixel density displays, there is growing evidence that serif fonts may be preferable both for ease of reading and for providing additional visual cues for limited vision voters. Given the high pixel density of displays available in typical COTS hardware today, we may permit serif fonts for use on very high pixel density displays. Supporting reading of paper ballots for limited-vision voters is achieved through optical magnification.	
Voter-Interface Interaction	3.2.6	✓		
Alternative Languages	3.2.7	✓		
Usability for Poll Workers	3.2.8	✓		
Accessibility Requirements	3.3	✓		

<input checked="" type="checkbox"/> Compliant	<input type="checkbox"/> Non-Material Discrepancy	<input checked="" type="checkbox"/> Non-Compliant	<input type="checkbox"/> No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
General Accessibility	3.3.1	<input checked="" type="checkbox"/>	Note: 3.3.1 (e) met through optical magnification.
Enhanced Visual Interfaces	3.3.2	<input checked="" type="checkbox"/>	
Audio-Tactile Interfaces	3.3.3	<input checked="" type="checkbox"/>	
Enhanced Input and Control Chara ...	3.3.4	<input checked="" type="checkbox"/>	Note: 3.3.4 (b) met via 3.5 mm jack to USB accessory such as Swifty
Design for Mobility Aids	3.3.5	<input checked="" type="checkbox"/>	
Enhanced Auditory Interfaces	3.3.6	<input checked="" type="checkbox"/>	
Design in Support of Cognitive Disa ...	3.3.7	<input checked="" type="checkbox"/>	
English Proficiency	3.3.8	<input checked="" type="checkbox"/>	
Speech Not Required	3.3.9	<input checked="" type="checkbox"/>	
Hardware Requirements			
Performance Requirements	4.1		
Accuracy Requirements	4.1.1	<input checked="" type="checkbox"/>	
Environmental Requirements	4.1.2	<input checked="" type="checkbox"/>	
Election Management System Re ...	4.1.3	<input checked="" type="checkbox"/>	
Vote Recording Requirements	4.1.4	<input type="checkbox"/>	As discussed previously, STAR-Vote does not allow the reconstruction of individual plaintext ballots from the electronic record, violating the DRE requirements in 4.1.4.3 (c). The paper record fulfills the purpose of this requirement. Furthermore, as a design decision, we will not be using independent processes for data storage as required for DREs by 4.1.4.3 (b) iii. This decision is due to the increased attack surface provided by relying on interprocess communication. The goal of process-independent data storage is achieved through real-time massively redundant data replication across the network.
Paper-based Conversion Require ...	4.1.5	<input checked="" type="checkbox"/>	
Tabulation Processing Requirem ...	4.1.6	<input checked="" type="checkbox"/>	
Reporting Requirements	4.1.7	<input checked="" type="checkbox"/>	
Vote Data Management Require ...	4.1.8	<input checked="" type="checkbox"/>	
Physical Characteristics	4.2		
Size	4.2.1	<input checked="" type="checkbox"/>	
Weight	4.2.2	<input checked="" type="checkbox"/>	
Transport and Storage of Precin ...	4.2.3	<input checked="" type="checkbox"/>	
Design, Construction, and Mainte ...	4.3		
Materials, Processes, and Parts ...	4.3.1	<input checked="" type="checkbox"/>	
Durability	4.3.2	<input checked="" type="checkbox"/>	
Reliability	4.3.3	<input checked="" type="checkbox"/>	
Product Marking	4.3.4	<input type="checkbox"/>	The use of COTS hardware means that there will be no hardware available which meet the Product Marking requirements of section 4.3.4. This section's requirements could be met through the use of information added to the device by county personnel, or in the least preferred case, by manually affixing custom plates to the selected device's exterior. However, the use of COTS arguably makes the purpose of these required plates moot.
Workmanship	4.3.5	<input checked="" type="checkbox"/>	
Safety	4.3.6	<input checked="" type="checkbox"/>	
Software Requirements			
Software Configuration	5.1	<input checked="" type="checkbox"/>	
Software Design and Coding Stan ...	5.2	<input checked="" type="checkbox"/>	
Scope	5.2.1		
Selection of Programming Langu ...	5.2.2	<input checked="" type="checkbox"/>	
Selection of General Coding Stan ...	5.2.3	<input checked="" type="checkbox"/>	
Software Modularity and Program ...	5.2.4	<input checked="" type="checkbox"/>	
Structured Programming	5.2.5	<input checked="" type="checkbox"/>	
Header Comments	5.2.6	<input checked="" type="checkbox"/>	
Executable Code and Data Integri ...	5.2.7	<input checked="" type="checkbox"/>	
Error Checking	5.2.8	<input checked="" type="checkbox"/>	
Data and Document Retention	5.3	<input checked="" type="checkbox"/>	
Audit Record Data	5.4	<input checked="" type="checkbox"/>	
Pre-election Audit Records	5.4.1	<input checked="" type="checkbox"/>	
System Readiness Audit Records ...	5.4.2	<input checked="" type="checkbox"/>	5.4.2 (d) requires the explicit testing of all data paths and memory locations to be used prior to voting. No in-system process can successfully verify and audit, in any meaningful way, the integrity of data paths against malicious attackers which could mimic valid logs. As such, our defense of using trusted boot and signed executables offers superior evidence of validity. Additionally, memory randomization is a superior defense against malicious memory access as compared to testing of pre-defined memory locations, as it precludes the explicit targeting of pre-known memory locations by malicious code. The use of memory randomization precludes the effective testing of memory locations as required. Finally, as a matter of course, ballots which are known to be "test ballots" are meaningless from a security perspective as a sophisticated attacker would detect that a given ballot was a "test" and withhold modification until real ballots were being cast.
In-process Audit Records	5.4.3	<input checked="" type="checkbox"/>	

<input checked="" type="checkbox"/> Compliant	<input type="checkbox"/> Non-Material Discrepancy	<input checked="" type="checkbox"/> Non-Compliant	<input type="checkbox"/> No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Vote Tally Data	5.4.4	<input checked="" type="checkbox"/>	
Vote Secrecy on DRE and EBM Sy ...	5.5	<input checked="" type="checkbox"/>	
Telecommunications Requirements			
Scope	6.1		
Design, Construction, and Mainte ...	6.2		
Accuracy	6.2.1	<input checked="" type="checkbox"/>	
Durability	6.2.2	<input checked="" type="checkbox"/>	
Reliability	6.2.3	<input checked="" type="checkbox"/>	
Integrity	6.2.4	n/a	
Confirmation	6.2.5	<input type="checkbox"/>	6.2.5 requires confirmation of successful or unsuccessful data transmission upon every occurrence. Due to our model of massive data redundancy and constant message passing, meeting this requirement would lead to potentially hundreds of notifications of successful transmission per second in large polling locations. As such, we prefer a "notification of failure" model, with success assumed when no notification is provided. We believe our network protocol is robust enough to prevent undetected errors.
Security Requirements			
Scope	7.1		
Access Control	7.2		
General Access Control	7.2.1	<input checked="" type="checkbox"/>	
Access Control Identification	7.2.2	<input checked="" type="checkbox"/>	
Access Control Authentication	7.2.3	<input checked="" type="checkbox"/>	
Access Control Authorization	7.2.4	<input checked="" type="checkbox"/>	
Physical Security Measures	7.3	<input type="checkbox"/>	The use of COTS hardware potentially conflicts with hardware physical security measures prescribed by 7.3. It is our firm opinion that the presence of both a massively duplicated tamper-evident audit log and an independent paper vote record more than provide for the physical security which this section aims to achieve, and does so in a substantially more robust and meaningful way.
Polling Place Security	7.3.1	<input checked="" type="checkbox"/>	
Central Count Location Security ...	7.3.2	<input checked="" type="checkbox"/>	
Software Security	7.4		
Software and Firmware Installati ...	7.4.1	<input checked="" type="checkbox"/>	
Protection Against Malicious Sof ...	7.4.2	<input checked="" type="checkbox"/>	
Software Distribution and Setup ...	7.4.3	<input checked="" type="checkbox"/>	
Software Distribution	7.4.4	<input checked="" type="checkbox"/>	Part of our logic in using a COTS operating system is the knowledge that newer versions of that operating system might become available, and newer or unanticipated hardware could be used. These two facts explicitly disallow the requirement of 7.4.4 that the system document all "software (such as operating systems and drivers) to be installed on the [...] voting system".
Software Reference Information ...	7.4.5	<input checked="" type="checkbox"/>	
Software Setup Validation	7.4.6	<input checked="" type="checkbox"/>	
Telecommunications and Data Tr ...	7.5		
Maintaining Data Integrity	7.5.1	<input type="checkbox"/>	Certain cryptographic operations required by STAR-Vote are new enough to not have received NIST approval. Additionally, due to their state of the art nature, there may not be any FIPS 140-2 level 1 or higher validated cryptographic module as required by 7.5.1 (b). We will seek FIPS certification of our cryptography module, but cannot assure this at this time.
Protection Against External Thre ...	7.5.2	<input checked="" type="checkbox"/>	
Monitoring and Responding to E ...	7.5.3	<input checked="" type="checkbox"/>	
Shared Operating Environment	7.5.4	<input checked="" type="checkbox"/>	
Election Returns	7.5.5	<input checked="" type="checkbox"/>	
Use of Public Communications Ne ...	7.6	n/a	
Wireless Communications	7.7	n/a	
Voter Verifiable Paper Audit Trail ...	7.8		
Display and Print a Paper Record ...	7.8.1	<input checked="" type="checkbox"/>	
Approve or Void the Paper Recor ...	7.8.2	<input type="checkbox"/>	7.8.2 requires that the voting system itself provide a means of voiding the printed paper record. Under our system, the voting station does not know and, indeed, cannot know whether or not the voter intends to void the paper, nor can it mark the paper as void. Instead, our system treats a ballot as cast only once its paper record has been placed in a ballot box, and we permit voiding of the printed record by approaching a poll worker who marks the paper record void, and enables the voter to create a new ballot.
Electronic and Paper Record Str ...	7.8.3	<input type="checkbox"/>	7.8.3 (a) requires randomization of the ordering of ballot images. We explicitly disallow ballot image randomization due to the use of hash chaining to provide tamper evidence. The goal of anonymity protection afforded by ballot randomization is instead guaranteed in a more meaningful manner in our system through encryption of vote tallies, and through the use of a distributed mixnet in our ultimate decryption process that makes it impossible for any one individual (or even a small group of colluding individuals) to trace specific plaintext votes back to a specific voter.
Equipment Security and Reliabilit ...	7.8.4	<input checked="" type="checkbox"/>	
Preserving Voter Privacy	7.8.5	<input checked="" type="checkbox"/>	
VVPAT Usability	7.8.6	<input checked="" type="checkbox"/>	Note: 7.8.6 (b) met via optical magnifiers
VVPAT Accessibility	7.8.7	<input checked="" type="checkbox"/>	
Quality Assurance and Configuration Management			
Standards-based Framework for Q ...	8.1	<input checked="" type="checkbox"/>	

<input checked="" type="checkbox"/> Compliant	<input type="checkbox"/> Non-Material Discrepancy	<input checked="" type="checkbox"/> Non-Compliant	<input type="checkbox"/> No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Configuration Management Requir ...	8.2	<input checked="" type="checkbox"/>	8.2 requires the use of model-specific tamper-resistant physical tags and manufacturing logs by unit. However, the use of COTS hardware effectively undermines the meaningfulness of these requirements.

ATTACHMENT 3: TEXAS ELECTION CODE GAP ANALYSIS

STAR-Vote Election Code Gap Analysis Summary		
Summary of Notable Discrepancies		
Discrepancy	Status	Explanation of Gap
Sequential Ballot Numbering	☒ 51.033 64.007	51.033 (e) and 64.007 (d) require that spoiled ballots be deposited into a spoiled ballot box. With STAR-Vote, no ballot is ever considered "spoiled," because any ballot not deposited into a ballot box at a polling location or marked as provisional becomes part of the live parallel testing system used to verify that STAR-Vote terminals are correctly recording votes. A voter may vote a ballot, and rather than casting it, cancel and retain the ballot for testing the system. The contents of the corresponding electronic record may be verified against their retained, cancelled ballot at a later date.
Sequential Ballot Numbering	ⓘ 52.062	Ballots are supposed to be numbered sequentially -- We believe that this is effectively superseded by the permissions from 121.001 and 124.062(b), but this may require clarification.
Different sizing of the squares for straight party and standard races	ⓘ 52.071	The square for indicating a vote for a straight party will be displayed at the same size as the square used next to candidates in races, in contradiction of 52.071(a). Uniform presentation of options in all races is preferred for usability, simplicity of code, and generalizability of the STAR-Vote code base. Further, we believe this may be superseded by 121.001.
Partial Results and Precinct Returns	ⓘ 65.014 65.015 66 (B) 127.067	The system does not make possible tallying within polling locations, and therefore cannot partial returns to be created at the polling location when the polls are closed. For a discussion of how we can meet some of the goals of precinct tallies, see 65.014.
No "Original Ballot Register" Created	ⓘ 66.026	There will not technically be an "original of the ballot register" as the register will be printed on demand.
Definition of "Voting System Equipment"	ⓘ 121.003	The definition of "Voting System Equipment" would require a subtle reinterpretation for STAR-Vote, and for the use of COTS equipment in general. In particular, rather than certifying a specific model of a specific machine, we would need the certified "Voting System Equipment" to be any off the shelf computer conforming to hardware constraints approved by the Secretary of State's office (e.g. screen size, brightness, and contrast, CPU architecture, ports included, availability of a hardware entropy source, etc.). At worst, it would require certification of a certain computer and its future models, provided they stay within a certain hardware range.
Legality of purchasing an uncertified voting system	ⓘ 122.031	122.031 (c) makes it illegal to "sell, lease, or otherwise provide a voting system or voting system equipment that the person knows has not been approved", without any reference to it being sold, leased, or provided with the intention of deploying it for use in elections. As such, we will need to be very clear that having STAR-Vote written for us is not the purchase or procurement of "a voting system".
Hardware and Software Counters	☒ 122.033	Requirements for public / protective counters from 122.033 (3) and (4) met through software. 122.033 (1)'s Requirement for a security system preventing operation of the machine met through operating system security measures and a Trusted Platform Module / trusted boot. Requirement for registering counters as per 122.033 (2) not possible -- possible workaround would be to maintain registering counters in software which retain an encrypted count of each candidate, and which can ultimately be decrypted later by the trustees if necessary.
What level of modification will require re-approval?	ⓘ 122.061 123.063	"Modified in design" is ambiguous. Does requiring that a voting system or equipment "modified in design" be approved imply that any change require re-approval? In particular, do bug fixes and other minor software alterations constitute modifications of the design? Do changes in the hardware purchased for use with the system, so long as that hardware still stays within the specified ranges as discussed in 121.003? In computer science "design" refers to the intended behaviors of the system, not the specific implementation.
Contents of Report	ⓘ 123.063	Clarification will be required regarding 123.063 (3) -- this item requires that as part of the county's annual report, it state that the voting system "has not been modified since the date of filing of the authority's previous report, or if modified, that approval of the modified design has been sought [...]" . We believe that under the notion of certifying hardware "within certain pre-defined ranges of hardware specification" as discussed in 121.003 above, purchase of additional hardware which was dissimilar from that purchased previously, but remained within those hardware specification ranges would not constitute a "modification" under this section, but the Secretary of State's office will have to ultimately arbitrate its interpretation.
Broad Software Certification	☒ 129.055	This section stipulates that "only software certified by the secretary of state [...] may be loaded on the equipment." This may be problematic given that the Secretary of State would be required to certify, broadly, the operating system and any newer versions of it that may become available, plus whatever drivers become available and are necessary (say, to support a newer version of the hardware, or an accessibility device), plus whatever updates (including security updates) become available.

STAR-Vote Election Code Detailed Gap Analysis						
Regarding	Section	OK	Explanation of Gap / Notes			
✓ Compliant 🟡 Non-Material Discrepancy ✗ Non-Compliant [] No Requirements						
Regarding	Section	OK	Explanation of Gap / Notes			
Title 1. Introductory Provisions						
No Applicable Statutes Found						
Title 2. Voter Qualifications and Registration						
No Applicable Statutes Found						
Title 3. Election Officers and Observers						
No Applicable Statutes Found						
Title 4. Time and Place of Elections						
No Applicable Statutes Found						
Title 5. Election Supplies / Chapter 51. Election Supplies						
Procuring, Allocating, and Distributing Ballot Boxes	51 (A)					
[...]		n/a				
Election Equipment	51 (B)					
Approval of Ballot and Voting Boxes		n/a				
Voting Booths	51.032	✓				
Number and Use of Ballot Boxes	51.033	✗	51.033 (e) and 64.007 (d) require that spoiled ballots be deposited into a spoiled ballot box. With STAR-Vote, no ballot is ever considered "spoiled," because any ballot not deposited into a ballot box at a polling location or marked as provisional becomes part of the five parallel testing system used to verify that STAR-Vote terminals are correctly recording votes. A voter may vote a ballot, and rather than casting it, cancel and retain the ballot for testing the system. The contents of the corresponding electronic record may be verified against their retained, cancelled ballot at a later date.			
Specifications for Ballot Boxes	51.034	✓				
Title 5. Election Supplies / Chapter 52. Ballot Form, Content, and Preparation						
Preparing the Ballot	52 (A)					
Official Ballot	52.001	n/a				
Authority Preparing Ballot	52.002	n/a				
Placing Candidate's Name on Ballot	52.003	n/a				
Failure to Place Candidate's Name on Ballot	52.004	n/a				
Ballot Content Determined According to Law	52.005	✓				
Correcting Ballot	52.006	n/a				
Notice of Correction by Authorizing Official	52.0061	n/a				
Notice of Correction by Certain Candidates	52.0062	n/a				
Unlawful Preparation of Ballots	52.0063	n/a				
Destruction of Incorrect Ballots	52.0064	n/a				
Specimen Ballot	52.007	✓				
Name on Ballot	52 (B)					
Form of Name on Ballot	52.031	✓	Note: Supported, but not enforced by system.			
Candidates with Same or Similar Names	52.032	✓	Note: Supported, but not enforced by system.			
Titles Prohibited	52.033	✓	Note: Supported, but not enforced by system.			
Name on Ballot More Than One Line	52.034	✓	Note: Supported, but not enforced by system.			
Form of Ballot	52 (C)					
Printing of Ballots	52.061	n/a				
Numbering of Ballots	52.062	🟡	Ballots are supposed to be numbered sequentially -- We believe that this is effectively superseded by the permissions from 121.001 and 124.062(b), but this may require clarification.			
Designation of Election and Date	52.063	n/a				
Designation as Official Ballot	52.064	✓				
Arrangement of Ballot with Particular Candidates	52.065	n/a				
Arrangement of Ballot With No Candidates	52.066	n/a				
Non-Aligned Candidate Designation	52.067	✓				
Office Title to Appear on Ballot	52.068	✓				
Unexpired Term	52.069	✓	Note: Supported, but not enforced by system.			
Voting Square and Instruction for Straight Party Voting	52.070	✓				
Voting Square and Instruction for Straight Party Voting	52.071	🟡	The square for indicating a vote for a straight party will be displayed at the same size as the square used next to candidates in races, in contradiction of 52.071(a). Uniform presentation of options in all races is preferred for usability, simplicity of code, and generalizability of the STAR-Vote code base. Further, we believe this may be superseded by 121.001.			
Propositions	52.072	✓	Note: 52.072(c) and (d) are supported, but not enforced by system.			
Voting Square and Instruction for Straight Party Voting	52.073	✓	Note: Supported, but not enforced by system.			
Provisional Ballot for Certain Voting Rights	52.074	✓				
Order of Parties, Offices, Names, and Other Information	52 (D)					

Regarding	Section	OK	Compliant	Non-Material Discrepancy	Non-Compliant	[] No Requirements
			Explanation of Gap / Notes			
Party Columns	52.091	✓		Note: Fulfilled through the ability to, by default, sort candidates by party, with the party order specified. Default ordering may be overridden during ballot preparation.		
Offices Regularly Filled at Gener ...	52.092	✓		Note: Supported, but not enforced by system.		
Offices of Political Subdivision C ...	52.093	n/a				
Names of Candidates	52.094	✓		Note: Supported, but not enforced by system.		
Propositions	52.095	n/a				
Title 6. Conduct of Elections / Chapters 61 - 63						
<i>No Applicable Statutes Found</i>						
Title 6. Conduct of Elections / Chapter 64. Voting Procedures						
Voting Generally	64 (A)					
Voter to Select and Prepare Ball ...	64.001	n/a				
Occupancy of Voting Station	64.002	n/a				
Marking the Ballot for Candidate ...	64.003	✓				
Marking the Ballot for Straight P ...	64.004	✓				
Marking the Ballot for Write-In C ...	64.005	✓				
Marking the Ballot for Measure ...	64.006	✓				
Spoiled Ballot	64.007	✗	See 51.033 (e).			
Depositing Ballot	64.008	n/a	Note: Superseded by 121.001			
Voter Unable to Enter Polling Pl ...	64.009	✓	Curb-side voting is explicitly supported by STAR-Vote.			
Unlawfully Permitting or Prevent' ...	64.010	✓	STAR-Vote provides additional protections against depositing of unlawful ballots by verifying the legitimacy of each printed vote record as it is deposited.			
Unlawfully Depositing Ballot	64.011	✓				
Illegal Voting	64.012	n/a				
Assisting Voter	64 (B)					
	[...]	n/a				
Title 6. Conduct of Elections / Chapter 65. Counting Votes and Preparing Returns						
Counting Votes Generally	65 (A)					
Counting Officers	65.001	n/a				
Time for Counting	65.002	n/a				
Rotating Ballot Boxes No. 1 and ...	65.003	n/a				
Tally Lists	65.004	n/a	Superseded by 121.001			
Tallying the Votes	65.005	n/a				
Replacing Member of Counting T ...	65.006	n/a				
Tallying Straight-Party Votes	65.007	✓				
Tallying Write-In Votes	65.008	✓	Note: we can't offer the same transparency with write in votes that we can with the rest of the system currently, but we can offer the same statistical guarantees via the risk limiting audit process.			
Counting Irregularly Marked Ball ...	65.009	n/a				
Ballots Not Counted	65.010	✓				
Overtvoting	65.011	n/a				
Depositing Ballot in Ballot Box N ...	65.012	n/a				
Ballot Register	65.013	✓				
			The system does not make possible tallying within polling locations, and therefore cannot enable partial returns to be created at the polling location when the polls are closed. We can meet various goals of these lists through secondary means: We can publish a hash of the encrypted vote data which can be verified against what arrives at central tabulation, as well as a hash of the public audit data generated by the polling location which can be verified against the public audit data released for that polling location. Alternatively, we can publish encrypted tallies for every race / measure voted on, which the trustees can then publish proofs that the final polling location tallies match the local encrypted tallies.			
Preparing the Precinct Returns ...	65.014	⚠				
Announcing Partial Results	65.015	⚠	It is not possible to offer partial results under our existing system.			
Verification and Counting of Pro ...	65 (B)					
Duty of Early Voting Ballot Boar ...	65.051	n/a				
Duty of Voter Registrar	65.052	n/a				
Delivery of Provisional Ballots ...	65.053	n/a				
Accepting Provisional Ballot	65.054	n/a				
Presentation of Identification fo ...	65.0541	n/a				
Disposition of Accepted Provisic ...	65.055	n/a				
Disposition of Rejected Provisio ...	65.056	n/a				
Processing Accepted Provisional ...	65.057	✓				
Preservation of Provisional Votii ...	65.058	n/a				
Notice to Provisional Voter	65.059	n/a				

<input checked="" type="checkbox"/> Compliant	<input type="checkbox"/> Non-Material Discrepancy	<input checked="" type="checkbox"/> Non-Compliant	<input type="checkbox"/> No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Disclosure of Social Security, Dri ...	65.060	n/a	
Title 6. Conduct of Elections / Chapters 66 - 68			
<i>No Applicable Statutes Found</i>			
Title 6. Conduct of Elections / Chapter 66. Disposition of Records and Supplies After Election			
General Provisions	66 (A)		
	[...]	n/a	
Assembling Records for Distributi ...	66 (B)		
Assembling Election Records	66.021	n/a	
Contents of Envelope No. 1	66.022		Election returns for the precinct will be created at central tabulation, and will not be available for the precinct judge to include as required until central tabulation is complete. See 66.015 for further discussion.
Contents of Envelope No. 2	66.023		See 66.022.
Contents of Envelope No. 3	66.024		See 66.022.
Contents of Envelope No. 4	66.0241	n/a	
Contents of Ballot Box No. 3	66.025		See 66.022.
Contents of Ballot Box No. 4	66.026		There will not technically be an "original of the ballot register" as the register will be printed on demand. It could be possible to print a register after the fact of the ballot numbers that were printed in the polling location.
Disposition of Records and Suppl ...	66 (C)		
	[...]	n/a	
Title 6. Conduct of Elections / Chapter 67. Canvassing Elections			
Canvassing Elections	67 (A)		
Applicability of Chapter	67.001	n/a	
Canvass of Precinct Returns	67.002	n/a	
Time for Local Canvass	67.003	n/a	
Procedure for Local Canvass	67.004		
Determining Official Result of El ...	67.005	n/a	
Local Election Register	67.006	n/a	
County Election Returns	67.007		
Separate County Returns for Go ...	67.008		
Forms and Instructions for Coun ...	67.009	n/a	
County Returns Canvassed by Gc ...	67.010	n/a	
County Returns Canvassed by Le ...	67.011	n/a	
Time for Canvass by Governor	67.012	n/a	
Procedure for Canvass by Gover ...	67.013	n/a	
Determining Official Result of El ...	67.014	n/a	
State Election Register	67.015	n/a	
Certificate of Election	67.016	n/a	
Reporting Precinct Results to Se ...	67.017		
Title 6. Conduct of Elections / Chapter 68. Tabulation of Unofficial Results of Certain Races by Secretary of State			
Conduct of Tabulation	68 (A)		
	[...]	n/a	
Duties of Local Election Officials f ...	68 (B)		
Applicability of Subchapter	68.031	n/a	
Delivery of Returns and Voted B ...	68.032		
Counting of Early Voting Ballots	68.033	n/a	
Transmission of Results to Secre ...	68.034		
Elections Advisory Committee	68 (C)		
	[...]	n/a	
Title 7. Early Voting / Subtitle A. Early Voting / Chapters 81 - 84			
<i>No Applicable Statutes Found</i>			
Title 7. Early Voting / Subtitle A. Early Voting / Chapter 85. Conduct of Voting by Personal Appearance			
Time and Place for Voting; Electio ...	85 (A)		
	[...]	n/a	
Polling Place Procedure	85 (B)		
Accepting Voter	85.031	n/a	
Early Voting Clerk to Sign Ballots ...	85.0311		Note: Will require some sort of electronic signature. The digital signing of all ballot data may suffice.
Security of Early Voting Ballot Bo ...	85.032		
Security of Voting Machine	85.033		
Voter Unable to Enter Polling Pla ...	85.034	n/a	

<input checked="" type="checkbox"/> Compliant	<input type="checkbox"/> Non-Material Discrepancy	<input type="checkbox"/> Non-Compliant	<input type="checkbox"/> No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Assisting Voter	85.035	n/a	
Electioneering Prohibited	85.036	n/a	
Bystanders Excluded; Unlawful F...	85.037	n/a	
Branch Early Voting Polling Place	85 (C)		
[...]	n/a		
Title 7. Early Voting / Subtitle A. Early Voting / Chapters 86. Conduct of Voting by Mail			
No Applicable Statutes Found			
Title 7. Early Voting / Subtitle A. Early Voting / Chapter 87. Precessing Early Voting Results			
Early Voting Ballot Board	87 (A)		
[...]	n/a		
Delivering Materials to Board	87 (B)		
[...]	n/a		
Accepting Early Voting Ballot Vot ...	87 (C)		
[...]	n/a		
Processing Manually Counted Ba ...	87 (D)		
[...]	n/a		
Processing Ballots Counted at Cei ...	87 (F)		
Delivery of Ballots to Counting S...	87.101	n/a	
Duplicating Paper Ballots for Aut ...	87.102	<input checked="" type="checkbox"/>	Clarification: Original paper ballots transmitted by mail are scanned, and corresponding electronic vote records are created for inclusion in tabulation and auditing processes.
Counting Ballots and Preparing F...	87.103	<input checked="" type="checkbox"/>	
Disposition of Early Voting Ballo ...	87.104	n/a	
Miscellaneous Provisions	87 (G)		
Early Voting Rosters	87.121	n/a	
Precinct Early Voting List	87.122	n/a	
Disposition of Ballot Transmittal ...	87.1221	<input checked="" type="checkbox"/>	
Delivering Other Records and Su ...	87.123	n/a	
Early Voting Votes Reported By I ...	87.1231	<input checked="" type="checkbox"/>	
Preservation of Early Voting Elec ...	87.124	n/a	
			Note: Under current plans, the trustees will have to meet a final time after the acceptance of all by-mail and late ballots in order to provide the same transparency to these parts of the overall tally as the rest of the vote. However, without this second meeting, full transparency can still be provided to the tally for in-person voting and early / by-mail votes duplicated electronically at the time of the initial election-day tabulation, and the remaining ballots can simply be added to this tabulation manually -- if additional transparency is desired, it is always possible to have the trustees meet later and provide the proofs that the electronic records match the resulting tally for those votes. This is a procedural question, but seemed important enough to raise.
Counting of Certain Late Ballots ...	87.125	<input checked="" type="checkbox"/>	
Electronic Recording of Ballot N ...	87.126	n/a	
Title 7. Early Voting / Subtitle B. Special Forms of Early Voting / Chapter 101. Voting by Resident Federal Postcard Applicant			
General Provisions	101 (A)		
[...]	n/a		
Submission of Federal Postcard A ...	101 (B)		
Form and Contents of Application	101.051	n/a	
Submitting Application	101.052	<input checked="" type="checkbox"/>	
Action by Early Voting Clerk on C ...	101.053	n/a	
Applying for More than One Elec ...	101.054	n/a	
FPCA Voter Registration	101.055	n/a	
Method of Providing Ballot; Req ...	101.056	n/a	
Return of Voted Ballot	101.057	n/a	
Official Carrier Envelope	101.058	n/a	
E-Mail Transmission of Balloting I ...	101 (C)		
Purpose	101.101	n/a	
Request for Balloting Materials	101.102	<input checked="" type="checkbox"/>	
Confidentiality of E-Mail Address	101.103	n/a	
Elections Covered	101.104	<input checked="" type="checkbox"/>	
Balloting Materials to be Sent by ...	101.105	<input checked="" type="checkbox"/>	
Methods of Transmission to Voter	101.106	<input checked="" type="checkbox"/>	
Return of Ballot	101.107	<input checked="" type="checkbox"/>	
Tracking of Balloting Materials	101.108	n/a	
Rules	101.109	n/a	

Regarding	Section	Compliant	Non-Material Discrepancy	Non-Compliant	No Requirements
		OK	Explanation of Gap / Notes		
Title 7. Early Voting / Subtitle B. Special Forms of Early Voting / Chapter 102. Late Voting by Disabled Voter					
Eligibility	102.001	n/a			
Contents of Application	102.002	n/a			
Submitting Application	102.003	n/a			
Reviewing Application and Provi ...	102.004	n/a			
Marking and Sealing Ballot	102.005	✓			
Method of Returning Marked Ba ...	102.006	n/a			
Processing Results	102.007	✓			
Entry on Early Voting Roster	102.008	n/a			
Entry on Precinct Early Voting List	102.009	n/a			
Title 7. Early Voting / Subtitle B. Special Forms of Early Voting / Chapter 103. Late Voting Because of Death in Immediate Family					
Eligibility	103.001	n/a			
Form and Contents of Application	103.002	n/a			
Submitting Application	103.003	n/a			
Voting Procedure; Processing Re ...	103.004	✓			
Entry on Early Voting Roster	103.005	n/a			
Entry on Precinct Early Voting List	103.006	n/a			
Title 7. Early Voting / Subtitle B. Special Forms of Early Voting / Chapter 104. Voting on Election Day by Disabled Voter from Voting System Precinct					
Eligibility	104.001	n/a			
Form and Contents of Application	104.002	n/a			
Time and Place for Voting	104.003	n/a			
Voting Procedure	104.004	✓			
Processing Results	104.005	✓			
Entry on Early Voting Roster	104.006	n/a			
Title 7. Early Voting / Subtitle B. Special Forms of Early Voting / Chapter 105. Voting by Military Personnel or Other Persons Overseas					
Electronic Transmission of Com ...	105.001	✓			
State Write-In Ballot	105.002	✓			
Use of Federal Write-In Absente ...	105.003	✓			
Title 7. Early Voting / Subtitle B. Special Forms of Early Voting / Chapter 106. Voting on Election Day by Person on Space Flight					
Applicability	106.001	n/a			
Voting Permitted	106.002	✓			
Title 7. Early Voting / Subtitle C. Restricted Ballot / Chapter 111. General Provisions					
Restricted Ballot	111.001	n/a			
General Conduct of Voting	111.002	✓			
Application Required	111.003	n/a			
Contents of Application	111.004	n/a			
Preparing Restricted Ballot	111.005	✓			
Manually Counting Electronic Sy ...	111.006	n/a			
Restricted Ballot Roster	111.007	n/a			
Noting Restricted Ballot Voter o ...	111.008	n/a			
Excluding Voter from Precinct E ...	111.009	n/a			
Title 7. Early Voting / Subtitle C. Restricted Ballot / Chapter 112. Voting Limited Ballot after Changing County of Residence					
Limited Ballot	112.001	n/a			
Eligibility	112.002	n/a			
Residence in Precinct Situated in ...	112.003	n/a			
Offices and Measures on which ' ...	112.004	n/a			
Submitting Application for Mail I ...	112.005	n/a			
Place for Voting by Personal App ...	112.006	n/a			
Verifying Registration Status of ...	112.007	n/a			
Determining Offices and Measur ...	112.008	n/a			
Preparing Voting Machine	112.009	✓			
Substituting Mail Ballots for Voti ...	112.010	n/a			
Information on District Compositi ...	112.011	n/a			
Notification to Voter Registrar ...	112.012	n/a			
Title 7. Early Voting / Subtitle C. Restricted Ballot / Chapter 113. Voting Presidential Ballot by Former Resident					
Presidential Ballot	113.001	n/a			
Eligibility	113.002	n/a			
Submitting Application for Mail I ...	113.003	n/a			

<input checked="" type="checkbox"/> Compliant	<input type="checkbox"/> Non-Material Discrepancy	<input checked="" type="checkbox"/> Non-Compliant	[] No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Time and Place for Voting by Person	113.004	n/a	
Personal Appearance Voting; Pre-Registration	113.005	<input checked="" type="checkbox"/>	
Cancelling Registration	113.006	n/a	
Title 8. Voting Systems / Chapter 121. General Provisions			
Applicability of Other Parts of the Law	121.001	n/a	
Pecuniary Interest of Secretary of State	121.002	n/a	
Definitions	121.003	<input type="checkbox"/>	The definition of "Voting System Equipment" would require a subtle reinterpretation for STAR-Vote, and for the use of COTS equipment in general. In particular, rather than certifying a specific model of a specific machine, we would need the certified "Voting System Equipment" to be any off the shelf computer conforming to hardware constraints approved by the Secretary of State's office (e.g. screen size, brightness, and contrast, CPU architecture, ports included, availability of a hardware entropy source, etc.). At worst, it would require certification of a certain computer and its future models, provided they stay within a certain hardware range.
Title 8. Voting Systems / Chapter 122. State Supervision Over Voting Systems			
Voting System Standards	122 (A)		
Voting System Standards	122.001	<input checked="" type="checkbox"/>	
Inspection of Voting Systems and Equipment	122.002	<input checked="" type="checkbox"/>	
Action by Secretary of State	122.003	n/a	
Preparation of Software by Secretary of State	122.004	<input checked="" type="checkbox"/>	Note: 122.004 (a) states: "The secretary of state may prepare any type of software for use with an electronic voting system." This statute, as constrained by 122.004 (b) should provide sufficient latitude to enable certification of STAR-Vote, despite its unique nature.
Venue for Offenses	122.005	n/a	
Approval of Voting System and Equipment			
Approval of System and Equipment	122.031	<input checked="" type="checkbox"/>	122.031 (c) makes it illegal to "sell, lease, or otherwise provide a voting system or voting system equipment that the person knows has not been approved", without any reference to it being sold, leased, or provided with the intention of deploying it for use in elections. As such, we will need to be very clear that having STAR-Vote written for us is not the purchase or procurement of "a voting system".
Requirements for Approval General	122.032	<input checked="" type="checkbox"/>	
Additional Requirements for Approval	122.033	<input checked="" type="checkbox"/>	Requirements for public / protective counters from 122.033 (3) and (4) met through software. 122.033 (1)'s Requirement for a security system preventing operation of the machine met through operating system security measures and a Trusted Platform Module / trusted boot. Requirement for registering counters as per 122.033 (2) not possible -- possible workaround would be to maintain registering counters in software which retain an <i>encrypted</i> count of each candidate, and which can ultimately be decrypted later by the trustees if necessary.
Additional Requirements for Election	122.0331	<input checked="" type="checkbox"/>	Note: would require the Secretary of State accepting that the operating system / drivers / other COTS software components do not require certification, or at least could be certified "within specified requirements" as discussed in 121.003 above for hardware.
Application for Approval and Fees	122.034	n/a	
Appointment of Examiners	122.035	n/a	
Examination and Report by Examiners	122.036	n/a	
Compensation of Examiners	122.037	n/a	
Public Hearing Required	122.0371	n/a	
Action by Secretary of State	122.038	n/a	
Report by Secretary of State	122.039	n/a	
Modification in Design of Approval			
Approval of Modified Design Request	122.061	<input type="checkbox"/>	"Modified in design" is ambiguous. Does requiring that a voting system or equipment "modified in design" be approved imply that <i>any</i> change require re-approval? In particular, do bug fixes and other minor software alterations constitute modifications of the design? Do changes in the hardware purchased for use with the system, so long as that hardware still stays within the specified ranges as discussed in 121.003? In computer science "design" refers to the intended behaviors of the system, not the specific implementation.
[...]	n/a		
Reexamination of Voting System			
Reexamination of Voting System	122 (D)		
[...]	n/a		
Title 8. Voting Systems / Chapter 123. Adoption and Acquisition of Voting System			
Adoption of Voting System	123 (A)		
Adoption of Voting System Requirements	123.001	n/a	
Modification of Adoption Action	123.002	n/a	
Restricting Voting System to Particular Function	123.003	n/a	
Restricting Voting System to Particular Function	123.004	<input checked="" type="checkbox"/>	
Multiple Methods of Voting at the Same Time	123.005	n/a	
Adoption of Voting System for Election	123.006	n/a	
Adoption of More than One Voting System	123.007	n/a	
Requirements Regarding Manual Voting	123.008	<input checked="" type="checkbox"/>	
Implementation of New Technology	123.009	n/a	

<input checked="" type="checkbox"/> Compliant	<input type="checkbox"/> Non-Material Discrepancy	<input checked="" type="checkbox"/> Non-Compliant	<input type="checkbox"/> No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Acquisition of Equipment Used in ...	123 (B)		
Acquisition of Equipment by Co ...	123.031	n/a	
Acquisition of Equipment by Poli ...	123.032	n/a	
Acquisition of Equipment by Poli ...	123.033	n/a	
Maintenance and Storage of Eq ...	123.034	n/a	
Voting System Equipment Contrac ...	123.035	<input checked="" type="checkbox"/>	Note: to meet this requirement, the STAR-Vote software will need to be created and deployed on demonstration units, certification pursued and granted by the Secretary of State's office, a contract negotiated to purchase the selected hardware for STAR-Vote, and then that contract submitted by Travis County to the Secretary of State's office for approval before execution. It is unclear if the purchase of test equipment or demonstration equipment which then was used as part of the final STAR-Vote deployment would be a violation of this section, though we do not believe it would violate its intent.
Venue for Offenses	123.036	n/a	
Annual Voting System Report	123 (C)		
Annual Report Required	123.061	n/a	
Filing Period	123.062	n/a	
Contents of Report	123.063	<input type="checkbox"/>	Clarification will be required regarding 123.063 (3) -- this item requires that as part of the county's annual report, it state that the voting system "has not been modified since the date of filing of the authority's previous report, or if modified, that approval of the modified design has been sought [...]" We believe that under the notion of certifying hardware "within certain pre-defined ranges of hardware specification" as discussed in 121.003 above, purchase of additional hardware which was dissimilar from that purchased previously, but remained within those hardware specification ranges would not constitute a "modification" under this section, but the Secretary of State's office will have to ultimately arbitrate its interpretation.
Review of Report	123.064	n/a	
Mandamus by Attorney General ...	123.065	n/a	
Additional Procedures Prescribe ...	123.066	n/a	
Title 8. Voting Systems / Chapter 124. Voting System Ballot			
Voting System Ballot Generally	124 (A)		
Straight-Party Arrangement	124.001	<input checked="" type="checkbox"/>	
Manner of Indicating Party Align ...	124.002	<input checked="" type="checkbox"/>	
Separate Listing of Unopposed C ...	124.003	<input checked="" type="checkbox"/>	
Sample Ballot	124.004	n/a	
Specimen Ballot	124.005	n/a	
Implementation of Provisional B ...	124.006	n/a	
Electronic Voting System Ballot	124 (C)		
Form of Electronic System Ballo ...	124.062	<input checked="" type="checkbox"/>	124.062(b) explicitly allows "electronic system ballots that comprise two or more separate parts." 124.062(c) explicitly allows "one or more printed code markings," enabling our barcodes, serial numbers, etc.
No Write-In Space Provided on C ...	124.063	<input checked="" type="checkbox"/>	Note: Allows us not to have a write-in option on races for which a certified write in is required, but no certified write-ins exist. Something to consider.
Instructions Required on Ballot ...	124.063	<input checked="" type="checkbox"/>	
Separate Ballot Part for Write-Ir ...	124.064	n/a	
Paper Ballot for Office of Precin ...	124.065	n/a	
Consultation with Programmer c ...	124.066	n/a	
Title 8. Voting Systems / Chapter 125. Conduct of Voting with Voting System			
Voting Systems Generally	125 (A)		
Allocation of Equipment Among ...	125.001	n/a	
Preparation of Equipment for Di ...	125.002	n/a	
Delivery of Equipment to Polling ...	125.003	n/a	
Installation of Equipment at Poll ...	125.004	<input checked="" type="checkbox"/>	
Maintaining Security of Equipme ...	125.005	<input checked="" type="checkbox"/>	
Malfunction of Equipment at Po ...	125.006	<input checked="" type="checkbox"/>	
Assisting Voter	125.007	n/a	
Depositing the Ballot	125.008	<input checked="" type="checkbox"/>	
Training Polling Place Personnel ...	125.009	<input checked="" type="checkbox"/>	
Presence of Voting System Tech ...	125.010	n/a	
Electronic Voting Systems	125 (C)		
Inspecting Equipment at Polling ...	125.061	<input checked="" type="checkbox"/>	
Providing Separate Ballot Part fc ...	125.0611	<input checked="" type="checkbox"/>	
Alternative Procedure to Rotatin ...	125.062	n/a	
Securing Equipment on Close of ...	125.063	<input checked="" type="checkbox"/>	

Compliant	Non-Material Discrepancy	Non-Compliant	[] No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Seals for Ballot Boxes	127.064		Note: Intriguingly, as each voting station device acts as a "ballot box" for the electronic vote records (given that both the electronic vote records and printed vote records are considered only evidence of voter intent, rather than "the ballot") it is notable that STAR-Vote actually fulfills ballot box requirements for both physical and electronic ballot boxes by effectively sealing the hash chain at the time that voting stops. We could further ensure complete compliance under this interpretation by having the presiding judge, an election clerk, and two or fewer watchers sign electronically at the end of the voting period, and embed those signatures into the hash chain to "seal" the electronic ballot box, and have the seal be signed. A similar procedure is already designated in STAR-Vote for opening the polls.
Sealing Ballot Box; Delivery to P...	127.065		
Sealing Deposit Slot; Delivery of ...	127.066		
Disposition of Election Records ...	127.067		As discussed in 66.022, we will not be able to provide precinct results until after central tabulation is completed.
Receiving Sealed Ballot Box at C ...	127.068		
Sorting Ballots	127.069		STAR-Vote only prescribes opening the ballot boxes for use in the risk-limiting audit. Additionally, write-in votes and damaged ballots need not be treated differently under STAR-Vote, so the sorting process is unnecessary.
Testing Tabulating Equipment	127 (D)		
Test of Tabulating Equipment Re ...	127.091		
Testing Authorities	127.092	n/a	
Times for Conducting Test	127.093		Note: Astoundingly, this section jibes nicely with the trustee tabulation concept. By running automated tests of the joint tabulation system 1) before distributing trustee computers (at least 48 hours before the election), 2) immediately before tabulation begins, and 3) immediately after tabulation completes, we meet these requirements and do so without putting undue burden on trustees (to gather at different or inconvenient times) or election officials.
Design of Test	127.094		
Determining Success of Test	127.095		
Conduct of First Test	127.096		
Conduct of Second Test	127.097		
Conduct of Third Test; Void Ball ...	127.098		
Security of Test Materials	127.099		Note: To provide best control of test data, we will provide two things: 1) a way to export the test data, results, and all data produced by the trustees during the test (mathematical proofs, mixed/decrypted plaintext vote list, etc.). 2) A printed report providing a hash of the data on the thumb drive (for later verification) and a summary of data and results.
Custody of Test Materials	127.100	n/a	
Processing Results at Central Cou ...	127 (E)		
Programmer for Tabulating Equi ...	127.121	n/a	
Approval of Program	127.122	n/a	
Security of Program	127.123		
Security of Automatic Tabulati ...	127.1231		Surprisingly, having distributed trustee computers held with the trustees prior to the election does not violate this section, so long as the trustees and their trustee computers are at the central counting station during tabulation.
Security of Voted Ballots	127.1232	n/a	
Early Processing of Ballots	127.124	n/a	
Preparing Ballots	127.125	n/a	
Duplicating Ballots	127.126	n/a	
Operating Equipment and Handli ...	127.127		This requirement met by making trustees officially "assistants to the tabulation supervisor".
Ballots Tabulated by Precinct	127.128	n/a	
Correction of Results after Equip ...	127.129	n/a	

<input checked="" type="checkbox"/> Compliant	<input type="checkbox"/> Non-Material Discrepancy	<input checked="" type="checkbox"/> Non-Compliant	<input type="checkbox"/> No Requirements
Regarding	Section	OK	Explanation of Gap / Notes
Manual Counting	127.130	<input checked="" type="checkbox"/>	
Tallying, Tabulating, and Reporting Results	127.1301	n/a	
Preparing Returns	127.131	<input checked="" type="checkbox"/>	
Announcing Unofficial Results	127.1311	<input checked="" type="checkbox"/>	
Disposition of Ballots, Returns, etc.	127.132	n/a	
Processing Results in System Withstand Risk Testing	127 (F)		
	[...]	n/a	
Additional Count of Electronic Voting Systems	127 (H)		
Partial Count of Electronic Voting Systems	127.201	<input checked="" type="checkbox"/>	This section is easy to fulfill, however its ad-hoc requirement to hand-count a fixed portion of the ballots is made obsolete by the use of risk limiting audits in STAR-Vote, which provide much more reliable and meaningful evidence that the system has functioned correctly. Note that while 127.201(g) excludes DREs from this section's requirements, I am assuming it will be applied to STAR-Vote due to the fact that we have printed vote records.
Count of Electronic Voting Systems	127.202	n/a	
Title 8. Voting Systems / Chapter 128. Computerized Voting Systems			
Computerized Voting System Standards	128.001	<input checked="" type="checkbox"/>	128.001 (c) is probably the best legal basis for the Secretary of State having the authority to modify existing procedures as needed for STAR-Vote.
Title 8. Voting Systems / Chapter 129. Direct Recording Electronic Voting Machines			
General Purpose	129 (A)		
Applicability	129.001	<input checked="" type="checkbox"/>	
General Procedures	129.002	<input checked="" type="checkbox"/>	
Pre-Election Acceptance and Testing	129 (B)		
Acceptance Testing	129.021	<input checked="" type="checkbox"/>	
Hardware Diagnostic Test	129.022	<input checked="" type="checkbox"/>	
Public Test of Logic and Accuracy	129.023	<input checked="" type="checkbox"/>	
Security of Test Materials	129.024	<input checked="" type="checkbox"/>	
Voting System Security	129 (C)		
Pre-Election Security Procedure	129.051	<input checked="" type="checkbox"/>	Note: Under this section for STAR-Vote the devices themselves will count as the "electronic information storage medium", and therefore would have this section apply. STAR-Vote isn't incompatible with this, however it adds an additional procedural layer of complexity.
Transport of Voting System Equipment	129.052	n/a	
Access to Voting System Equipment	129.053	n/a	
Network Connections and Wiring	129.054	<input checked="" type="checkbox"/>	Note: This section explicitly disallows any internet connection or use of wireless communication.
Equipment and Software	129.055	<input checked="" type="checkbox"/>	This section stipulates that "only software certified by the secretary of state [...] may be loaded on the equipment." This may be problematic given that the Secretary of State is unlikely to certify, broadly, the operating system and any newer versions of it that may become available, plus whatever drivers become available and are necessary (say, as new accessibility devices come on the market), plus whatever updates (including security updates) become available. Basically, to meet all our goals and comply with this section we would need the Secretary of State to certify "Operating System version X or higher, with such drivers and updates as its vendor regularly provides and which are designed for the hardware in use with STAR-Vote at the time." Alternatively, we may be able to get around this by claiming that the paper records make STAR-Vote "not a DRE for legal purposes," but that will require further investigation.
Plan for Machine Failure	129.056	n/a	
Use of Machine in Early Voting	129.057	n/a	Note: This section disallows the use of the same devices for early voting and election day voting.
Title 9. Candidates			
No Applicable Statutes Found			
Title 10. Political Parties			
No Applicable Statutes Found			
Title 11. Presidential Elections			
No Applicable Statutes Found			
Title 12. Elections to Fill Vacancy in Office			
No Applicable Statutes Found			
Title 13. Recounts			
Compliant with and exceeds goals of all applicable statutes			
STAR-Vote supports recounts in accordance with Title 13. In addition, STAR-Vote exceeds those requirements by providing genuine statistical guarantees about the level of confidence in the reported outcome through Risk-Limiting Audits. Furthermore, STAR-Vote provides novel mechanisms for detecting and correcting irregularities through tamper-evident hash chains on electronic data and the creation of substantial supporting audit data for forensic analysis.			
Title 14. Election Contests			
No Applicable Statutes Found			
Title 15. Regulating Political Funds and Campaigns			
No Applicable Statutes Found			
Title 16. Miscellaneous Provisions			

