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WHITE PAPER

Secure Solutions for Enterprise Election Technology Architectures

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Our Success Follows Yours

Secure Solutions for Enterprise Election Technology Architectures

Executive Summary

Safeguarding the integrity of elections is paramount to sustain the model of free and nondiscriminatory democracy in the United States. In an era of close and controversial races, elections processes can be highly scrutinized by the media. In this context, potential security impacts can have a significant effect on voter confidence in the electoral process.

The many layered processes within an election jurisdiction are vulnerable to a range of security threats against participants, infrastructure, software, information, and materials. This document outlines CALIBRE's risk assessment approach to independently evaluating the physical and cyber security posture of an enterprise level election technology architecture throughout pre-election, Election Day, and post-election activities. These security and risk assessments provide recommendations on management practices and technical changes that can help assure election officials, voters, candidates, the media, and the general public that the election process is secure, accurate, reliable, and accessible.

Assessment of election technology and infrastructure must consider the continuous evolution of technology, the complex election environment, and the multiple stakeholders involved in these processes. CALIBRE's solutions provide a menu of offerings flexible enough to support customer needs regardless of their enterprise election technology architecture and the specific systems (i.e., voting systems, voter registration databases, electronic poll books, help desk tools, etc.) which it encompasses.

Our service offerings include:

- Security assessments of cyber, physical, and training environments
- Risk management and threat analysis, with recommended mitigation strategies
- Secure software life-cycle development, including standards, compliance, and verification
- Functional, operational, and penetration testing, including vulnerability scanning
- Overall program management throughout each level of the assessment process

The Need for Analysis

Physical and cyber security risks present a threat to our fair, open, transparent, and accessible election process. CALIBRE leverages widely accepted best practices for project management and security assessment execution to ensure all risks are identified and managed. The National Institute of Standards and Technology (NIST) Special Publication Series 800-53 and the International Organization of Standards (ISO) Series 27001 provide best practices for project management and security assessments. The National Security Agency's Information Assurance Module (NSA-IAM) provides clear guidance on pre-assessment, assessment, and post-assessment activities, as detailed below.

About CALIBRE

Founded in 1989, CALIBRE Systems, Inc. (CALIBRE) is an employee-owned management consulting and technology services company that provides government and industry with management analysis, technology solutions, and program support. CALIBRE is a preferred, trusted advisor to executive-level decision makers: we provide our customers with enduring solutions that make a difference.

CALIBRE's history of identifying and quantifying risks and issues related to voting legislation, policies, and practices provides a strong base to conduct a study to improve election technology. CALIBRE understands the election environment and has demonstrated the analytical and management processes required to develop collaborative solutions that are customized, integrated, and adaptable to state and local jurisdictions.

As a choice contractor for the Federal Voting Assistance Program (FVAP) and large election jurisdictions, CALIBRE continues to support voting modernization research, analysis, and testing.

Pre-Assessment	Assessment	Post Assessment
• Critically identify vulnerable information	• Demonstrate system	• Conduct additional documentation review
• Identify system configuration	• Review documentation	• Finalize analysis
• Set assessment scope		• Consult additional expertise
• Request documentation		• Generate recommendations
• Review documentation		• Coordinate final report
• Conduct pre-analysis		

CALIBRE's previous efforts for FVAP included extensive data collection (survey/interview); federal and state statute and policy analysis; online voting system functionality, accessibility, and security testing; and research, testing, and modification of software assurance tools to mitigate security weaknesses and vulnerabilities and validate the integrity of software source code from online voting system manufacturers. Our ongoing security assessments for local election jurisdictions include an initial review of current election processes and documentation, as well as interviews with key personnel and in-depth, on-site assessments of physical and cyber security processes, procedures, equipment, and facilities.

CALIBRE EXPERIENCE

- *Requirements definition, acquisition life-cycle support, testing, quality assurance, and federal/state/vendor communication for Electronic Voting Support Wizards (EVSWs)*
- *Research assessing administrative, logistical, policy, and cost considerations of online and kiosk-based voting systems*
- *Testing and certification services including development of test plans, testing schedules, test scenarios, and evaluation against state code*
- *Examination and/or re-examination of voting systems, reviews of submitted manufacturer technical data packages, reviews and evaluation of third-party test reports*
- *Development and review of relevant policies and procedures*

Additionally, our staff have conducted extensive accessibility research, analysis, and testing, including:

- The challenges of absentee and online voting for persons with disabilities
- Section 508 compliance of voting-related websites and online wizards
- Usability redesign of voting forms
- Privacy, usability, and accessibility testing of voting systems

Importantly, CALIBRE has extensive experience managing cyber security research, analysis, and testing efforts, including:

- Physical and cyber security risk assessments for large U.S. election jurisdictions
- Research and analysis of software assurance tools, intrusion detection and prevention systems, and intrusion recovery tools and techniques
- Risk comparison of mail-based and online absentee voting
- Operational and security testing of online voting systems
- Penetration security testing of online voting systems

Scope of Work

CALIBRE will provide security and risk assessments for the life-cycle of a state or local jurisdiction's enterprise level election technology architecture. We will accomplish this based on threat modeling and defined mitigation strategies using a threat vector approach:

>> Program Management

- Develop and manage overall statewide or local functional election model, including strategic communications and change management
- Implement risk management and continuous review of quality control
- Use integrated approach focused on change management and strategic communications

>> Security Assessments

- Conduct comprehensive assessments of cyber, physical, and training environments
- Develop a cyber security governance to establish and sustain a culture of security
- Create contingency and incident response plans

>> Risk Management and Threat Analysis

- Conduct detailed research and analysis, including policies, processes, and procedures relating to technical, operational, and managerial controls of the jurisdiction's election technology infrastructure
- Assess vulnerabilities and conduct impact analyses
- Use quantitative and qualitative risk analyses
- Recommend mitigation strategies and security controls

>> Secure Software Life-Cycle Development and Supply Chain Management Processes

- Define requirements based on required security, scalability, accessibility, transparency, and auditability
- Establish standards
- Conduct compliance and verification checks

>> Testing and Auditing

- Conduct functional, operational, and penetration testing
- Use multiple tools to conduct vulnerability scanning

Approach

CALIBRE believes that first and foremost, it is critical to gain a full understanding of an election jurisdiction's needs and requirements. This will require close interaction with the State Election Director and/or local election officials and staff members, as well as other critical stakeholders as desired by the customer. CALIBRE understands that budgets are limited, and jurisdictions must focus resources on solving issues that have the most impact. Our assessment teams quickly evaluate enterprise security processes, identify gaps, and provide reasonable alternatives to solve the most critical issues.

CALIBRE's experienced security professionals will recommend security controls in each of the following categories:

- People and policy security risks
- Operational security risks
- Physical security risks
- Third-party relationship risks
- Network security risks
- Platform security risks
- Application security risks

- Insecure software development life-cycle (SDLC) risks
- Training support

CALIBRE excels at program management of complex projects, and will design and implement an overall project management plan, including strategic communications and change management initiatives to ensure that key stakeholders are fully engaged with project progression. We will implement risk management and continuous quality control reviews as we develop and maintain a schedule of key events over the plan's execution timeframe to guide workload priorities and project deliverables. CALIBRE uses the schedule to ensure that all tasks are integrated to meet mission objectives.

If the scope of work evolves to include an enterprise-level solution, CALIBRE will coordinate with customers to adjust workload priorities and schedules to ensure contract objectives are met in a timely fashion and according to the election jurisdiction's needs and requirements.

Following is a representative list of tasks that can be customized as necessary to complete the assessment.

Task #	Task
1.0	Run a security assessment
1.1	Assess cyber, physical, and training environments
1.2	Evaluate incident response and recovery
1.3	Create contingency plans
1.4	Develop a cyber security governance
2.0	Conduct a risk management and threat analysis
2.1	Assessment preparation – identify purpose, scope, constraints, inputs, and analytical approaches for the assessment
2.2	Identify threat sources and threat events
2.3	Identify vulnerabilities and predisposing conditions for successful exploitation
2.4	Determine likelihood of specific threat events and adverse impacts to organizational operations and assets
2.5	Conduct a business impact assessment using Risk-Based Security Management (RBSM) approach to quantify incident costs prior to occurrence
3.0	Evaluate the secure software life-cycle development and supply chain management processes
3.1	Assess security requirements
3.2	Analyze attack surfaces and conduct threat modeling
3.3	Implement security steps using managed code
3.4	Conduct compliance and verification audits
4.0	Perform testing and auditing
4.1	Conduct functional testing
4.2	Conduct operational testing
4.3	Conduct penetration testing
4.4	Conduct vulnerability scanning
4.5	Conduct forensic investigations, if necessary

Conclusion

CALIBRE understands the diverse requirements of local jurisdictions, varying state environments and organizational cultures, and the need for innovative efforts to ensure accessible, secure, and transparent elections. CALIBRE's interdisciplinary team of experienced professionals is known for pioneering approaches and recommendations, and will apply their significant experience to solving our election customers' challenges. Our proven record developing collaborative, customized, integrated, and adaptable management solutions for complex projects, and our analytical processes will ensure the effective implementation and ongoing operation of modern election technology solutions, yielding a successful outcome for our customers' expectations.