

Executive Summary

Galois is a privately held U.S.-owned and -operated company established in 1999 in Portland, Oregon. We were founded to provide trustworthiness in critical systems. Galois is developing a set of high-assurance open source products in the elections space. Each of our products is built from the ground up with a focus on correctness, security, verifiability, transparency, and trustworthiness. Our open source software-only products reduce vendor dependence and increase customer independence, putting the power in the hands of election officials and, more importantly, the electorate. Since the product is open source, the customer and the public can have increased confidence in the system; it is transparent to peer-review and there is nothing secret or hidden from the public eye.

Our products are very versatile. They run on any modern commodity desktop, laptop, tablet, or smartphone, which leads to lower hardware costs for the client, shorter schedules for development and deployment, and lower costs of, and greater flexibility for, maintenance and support. Additionally, our products come with perpetual licenses so clients can use the products for as long as they like, for as many elections as they like, on as many systems as they like. The perpetual license and hardware flexibility means that clients can choose to upgrade hardware over time at their discretion and redeploy existing hardware for other purposes as they see fit. Moreover, if the customer desires, existing hardware they already own or lease can be temporarily used for the purposes of running elections.

Galois has a fifteen year proven track record at solving the most complex challenges of the most demanding federal and commercial customers. Galois's bespoke software products are internationally recognized as being some of the best technology in the world of high-assurance software systems. Consequently, we intend to fundamentally change the nature of elections systems design, development, and support and put the power back in the hands of the voting public.

Galois stands committed to outstanding delivery and execution of products and services and strives to bring together not only internationally-recognized technical and domain experts on its team, but also people who stand united in their commitment to improve democracy and its realization through e-Government systems. Our project teams provide experts in every area who have proven success towards that public service objective, and we present the same commitment to Dallas County through our proposed team on this project.

We believe the Galois is the right choice for Dallas County to establish a new era in area of verifiable elections software starting with this electronic poll book implementation. The extensive benefits that Galois will bring to the county can be summarized as follows:

- **Software:**
 1. Perpetual software license as opposed to annual licensing.
 2. Extremely low one-time cost of a perpetual license as opposed to an annual fee that accumulates quickly with every passing year. With Galois, subsequent years are free, whether it is year 2, 5 or 10!

3. *Lifetime warranty* on the software, defects will be fixed free of charge through the life of the software.
 4. Discounted upgrades to new versions.
- **Hardware:**
 1. County-owned hardware, as opposed to vendor-owned hardware provided under lease.
 2. No dedicated proprietary hardware, that is, *hardware independence*. County will have complete flexibility to use existing hardware, or if they choose new hardware, to use these devices for other day-to-day purposes when elections are not in progress.
 3. Inexpensive state-of-the-art equipment. By adopting the Galois solution, the county will be able to procure state-of-the-art equipment like iPads, tablets and laptops off the market and create useful assets that can be used simultaneously for other purposes or re-deployed as needed.
 4. Low one-time procurement fee for all hardware, as compared to annual lease payments to vendors. As a relative comparison, the county could spend less than half of an annual lease payment to own the hardware and not pay anything. Over a period of 5 years, that could mean one-tenth of the cost of leased electronic poll books.
 - **Security, Encryption, Technology:** Galois' expertise in security and encryption is a leader in this space, and the architecture of our new products is centered on this technology. That provides significant advancement in security as well as verifiability to the county.
 - **County Public Benefits from Overall Cost Benefits:** With the extensive savings on both licensing as well as owned, rather than leased, hardware, the county should be able to redeploy the funds for public improvements and betterment of other support systems for the citizens of the county.

We believe that the proposed Galois system will bring tremendous benefit to Dallas County and its citizens. It is a bold new path that we visualize and aim to define for our democracy, and Dallas County can be at the forefront of charting that new path as a leader for the State of Texas and our United States.

CATEGORY I: COMPANY PROFILE

Provide the following information:

The following details of the Respondent's qualifications and experience to perform the services sought through this Request for Proposal shall be provided in narrative form and in sufficient detail that the County is able to judge the firm's qualifications and experience. Specifically:

A. Business/Corporate Experience

- 1) Provide a description of Respondent's corporate purpose and approach as it pertains to an Electronic Poll Book or other services similar to those sought in this Request for Proposal.*

Galois is a privately held U.S.-owned and -operated company established in 1999 in Portland, Oregon. We were founded to provide trustworthiness in critical systems. Our core principles are: cherish learning and innovation, hold to authenticity, pursue deep trust, serve as stewards, and realize joy at work. Galois' policy is to provide Equal Employment Opportunity without regard to race, religion, creed, color, national origin, sex, age, disability, marital status, pregnancy, sexual orientation, citizenship, or veteran status. Galois is in compliance with all applicable EEO federal, state, and local requirements.

Galois specializes in the research and development of new technologies that solve the most difficult problems in computer science. We are passionate about the trustworthiness of critical systems, and work to ensure that the systems you depend on work as intended, and only as intended. Our team works closely with clients to achieve a balance between the privacy/cost/speed challenges involved in making systems more trustworthy. In general, every one of our projects involves the creation of bespoke high-assurance technology specific to that client's needs on aggressive timelines at reasonable cost.

We care deeply about real-world use of our R&D efforts and work diligently to transition them into use. Our clients—including the Defense Advanced Research Projects Agency (DARPA), Department of Homeland Security, Department of Defense, Department of Energy, NASA, and other members of the Intelligence Community—derive value working with us as trusted advisors and hold us to high standards for our work together.

Galois designs, develops, and support high-assurance systems. High-assurance systems are systems which cannot fail, because in failing they will cause a loss of life or a severe fiscal or operational loss. Standard high-assurance systems are, for example, avionics, aeronautics, transportation, nuclear power, biomedical, financial, and cyber-physical systems. Galois experts have worked on all of these.

Early in Galois' existence, employees recognized that democracy is a critical system, and thus Galois has had a long-term interest in developing technology for elections. With the arrival of internationally known digital elections expert Dr. Joseph Kiniry in

January 2014, Galois decided to deliberately pursue business in the space of elections technology. As such, we have designed and developed several high-assurance elections product prototypes and we are now pursuing commercial opportunities with those demonstrators. One such product is an electronic poll book, the focus of this proposal.

All of Galois' products within the space of elections support *verifiable elections*. A verifiable election is an election that provides evidence to the public that the election produced the outcome representing the will of the voters. Moreover, many of our products focus on producing evidence that an election is operated in a time- and cost-efficient fashion. Finally, all the evidence generated by our technologies, and all the data formats consumed and produced by our products, are open, preferably internationally standardized formats. Our products contain no proprietary hardware, software, or data formats.

Our electronic poll book, which is code named the Digital Voter List (or DVL for short), was originally developed by Dr. Kiniry and his students in Denmark in 2011–12. In fact, several DVL demonstrator implementations were developed as a part of the DemTech Research Project (<http://demtech.dk/>) at the IT University of Copenhagen. These systems were designed for use in elections in Denmark, which has needs quite similar to the client's in terms of core functionality. These DVL demonstrators include not only their implementations, but also full formal system specifications, from requirements down to formal code specifications describing the correct operation of the system.

Prior to working for Galois, Dr. Kiniry also provided commercial and public consultancy services to several governments on matters relating to elections, their technology, security, processes, and verifiability. Specific to electronic poll books, he critiqued the technology deployed experimentally in Denmark for local and national authorities and, as a consequence, led the development of several open source electronic poll book systems (discussed above) to provide a free, publicly owned alternative to the nation.

2) *Describe the Respondent's organizational structure, depicting clear lines of authority.*

Galois has a flat, peer-to-peer organizational structure. Its CEO is Dr. Rob Wiltbank, and the Chair of its Board of Directors is Dr. John Launchbury (currently on leave at DARPA).

Galois senior personnel who have nationally or internationally relevant experience include Dr. Joseph Kiniry (an internationally recognized expert in high-assurance systems, security, and elections), Ashish Puri (nationally recognized expert in development and implementation state-level IT systems, including the design and development of HAVA compliant Voter Registration and Election Management systems), Harri Hursti (international elections security expert), Maggie MacAlpine (national election processes and auditing expert), and Dr. Daniel Zimmerman (former professor at two institutions and internationally recognized expert in high-assurance systems design and development).

Senior personnel at Galois are internationally known researchers capable of managing and executing concurrent multi-year, multi-million dollar basic and applied research projects and product development. In general, the principal investigator of a given project holds the final authority for any project, the project's project lead is responsible for the execution of a project, the project's client caretaker is responsible for ensuring that the customer's concerns are understood and addressed, and, finally, the CEO holds the final accountability and authority over the company's business as a whole.

- 3) *Identify contracts that will exhibit a minimum of four (4) years of similar experience including each Election Cycle with multiple ballot styles that fully demonstrate/illustrate that the Respondent has the experience and ability to completely and timely perform all services contemplated by this RFP. Two of the contracts should be within the State of Texas.*

Galois has won and executed on dozens of multi-year, multi-million dollar R&D projects for numerous federal agencies including the Department of Defense, the Department of Homeland Security, and others. Galois' projects focus on the science and engineering necessary for the design and development of mission-critical and safety-critical systems that have fundamental correctness and security challenges.

Many of Galois' projects necessitate the solution of open problems in computer science and mathematics and result in not only high-assurance software and hardware prototypes, but also peer-reviewed publications in major scientific journals and conferences.

While Galois has not executed on election systems to date, it has focused on numerous systems that have many of the same challenges (correctness, security, usability, accessibility, etc.) and technologies (operating systems, programming languages, distributed systems, cryptography, etc.).

There has been a long-term recognition at Galois that elections are critical systems for public good. Given Galois' focus on trustworthy systems for public good, and the arrival of Dr. Joseph Kiniry, Galois has decided to make proposals to election authorities who are interested in high-assurance, open source, transparent, verifiable, publicly owned elections infrastructure.

Thus, we are offering to bring to the elections systems and services market the assurance one sees in other safety- and mission-critical high-assurance systems, but at low cost with publicly owned open source technology on low-cost COTS hardware.

Dr. Kiniry's experience in the area of elections is both from the perspective of a public employee (as he was a professor of computer science and mathematics at multiple universities for approximately twelve years) and as a scientist-activist.

He has worked on election systems for thirteen years; has audited the security, correctness, and reliability of numerous physical and internet-based voting systems; has developed high-assurance prototypes and products of several election

technologies (including, but not limited to, tallying, auditing, voting, ballot marking, and electronic poll book systems); and sits on the Board of Advisors of the main verifiable elections non-profit, Verified Voting.

Dr. Kiniry has formally advised three governments (The Netherlands, the Republic of Ireland, and Denmark) on matters relating to digital elections and has testified before two parliaments. He also has provided informal input and advice to the governments of Norway, Estonia, and the U.S.A.

He co-ran a multi-year research project on digital elections (called the DemTech project) and has supervised numerous BSc, MSc, and PhD theses focusing on elections technologies. His research group has developed several high-assurance peer-reviewed election software systems, including a tally system used in binding European elections for The Netherlands and an electronic poll book system meant to be used in Danish national elections (which is the foundation of this proposal).

Dr. Kiniry also regularly interacts with and provides input to federal agencies related to elections including the EAC, NIST, and FVAP, and several elections-related non-profits like the OSET Foundation, Common Cause, the Overseas Vote Foundation, U.S. Vote, and others.

Ashish Puri is working with Galois as the lead strategist in the state and local public sector space focused primarily on elections, and shares Dr. Kiniry's drive and passion for improving the elections space. Mr. Puri has worked in U.S. public sector delivery for over fourteen years and has been involved with the U.S. elections vertical for twelve years, holding several key client and delivery roles for Hewlett Packard and its subsidiary companies.

Mr. Puri engaged as the lead elections SME for 9 statewide VREMS projects for HAVA compliance in various roles in analysis, design, product development, project, portfolio and practice management, culminating in his leadership of the Elections practice servicing 13 U.S. states at Saber Corp, a company that was acquired by EDS/HP.

Mr. Puri brings deep understanding of development and implementation of elections products pertaining to election management, poll worker management, voter registration, petitions management, candidate filing, lobbying and campaign finance, election night reporting, external agency interfaces, VREMS to voting systems and tabulation interfaces and electronic poll books, amongst other things. He has successfully overseen the execution of post-implementation management and oversight support services to over 13 state clients in the elections space over multiple years. In addition to elections, Mr. Puri has managed key projects and practices in the areas of motor vehicles, child support, telecom, insurance, and health and human services.

- 4) *Provide a narrative summary of contract performance in the above-identified contracts, including any major adverse findings.*

Galois

Galois' typical contracts come in one of three forms:

1. A multi-year, multi-million dollar program (called a Broad Agency Announcement, or BAA) for an agency like the Department of Defense. Such a contract typically involves several collaborating companies and universities, has multiple deliverables and milestones to the client, has regular reporting and demonstration obligations, and the result of the project is a working high-assurance system with documentation, support, and accompanying peer-reviewed papers.
2. A multi-month, renewable Small Business Innovation Research (SBIR) project for the federal government that focuses on a more narrow problem than the aforementioned BAAs. This type of project both solves fundamental scientific and engineering challenges and keeps an eye on technology transfer business opportunities for the technology under development. SBIRs are typically a bit more “applied” than BAAs.
3. Short-term commercial projects for companies that have fundamental challenges intersecting with our expertise areas. These contracts have an even more applied nature, have aggressive time schedules, and are typically focused on systems that are to be used by very high-profile clients where the trustworthiness of the system is paramount. In these sorts of critical systems, if something goes wrong with the system, there is potential loss of life or loss of very high value materials (e.g., top secret materials) or resources (millions of dollars a minute).

In general, Galois' work, reputation, and way of doing business—based upon trustworthiness, authenticity, and transparency—means that virtually all our customers become repeat customers. Consequently, we are happy to introduce any potential client to any existing or past client as a referral.

Dr. Joseph Kiniry

Dr. Kiniry's past commercial and consultancy work has a very similar flavor to Galois'. He has raised funding for and executed on numerous multi-year, multi-million dollar research projects involving dozens of collaborators, performers, and technologies. Most of these projects resulted in open source high-assurance software systems, nearly all of which are publicly available on GitHub and other online collaboration systems. Likewise, his list of references for such commercial and consultancy work is extensive, and potential clients are welcome to speak with anyone he has ever worked with.

Ashish Puri

Mr. Puri has over 14 years managing and delivering large-scale, mission-critical projects in the U.S. public sector, having worked with agencies in 12+ U.S. states. He has managed COTS and Custom Software Development and System Deployment for multiple projects, and his key roles are highlighted below.

Project/Program Management – TCV \$2MM–\$70MM+

- Project Management and Oversight – MO SOS: \$14MM
- Project Delivery Management – CA DMV Modernization Program: \$25MM
- Portfolio Delivery Management – County of San Diego CA HHSA: \$15MM

Practice/Portfolio/Management – TCV \$15–\$50MM

- Project Operations and Delivery Management – Multiple Projects, Products, Architectures, and Technologies: >\$50MM
- Product Development and Multiple 9 States Customized Deployment: \$35MM
- Program/Portfolio Management — 13 Statewide Elections Systems: \$45MM

The following were the key areas of performance on these contracts:

- Full SDLC Operations and Project Delivery, Software Development, Configuration Management, Release Management
- Online Status and Progress Tracking
- Requirements Analysis, Specification Development – RTM, Functional and System Specifications, Functional and Technical Design
- Test Management — Test Plans, Test Scripts, Online Defect Tracking
 - Functional Testing including UAT, Go-Live Pilots, Mock Production Simulations
 - Technical Testing including System, Integration, Load and Stress Testing
- Data Conversion, Data Analytics, Custom and Ad-Hoc Reporting
- Production Cutover and Go-Live
- Post-Production Operations Support: Helpdesk Services, SLA Management

Below is a summary of Mr. Puri's role as the Practice Leader for Elections.

Project/Program Background at Start

- Goal: statewide system implementations in 10 months for HAVA compliance
- Contractual commits with penalties and liabilities
- High profile public projects with significant impact on company future
- Public-facing elections systems impacting citizens and prone to negative press

Challenges

- Aggressive timeframe: 10 months to complete development and implementation for 6 customizations
- Project delays: 3–6 months behind schedule
- Limited budget to complete commitments
- Incorrect team mix, teams not geared for service delivery, operational support
- Inadequate vendor accountability, lack of transparency, status

Remedies Implemented, Schedule:

- Reviewed, created master schedule across multiple sub-projects
- Prioritized common items, created parallel tracks for bridging gap
- Introduced a rigorous release schedule for frequent testing and early defect remediation

Remedies Implemented, Teams and Process:

- Reorganized teams, promoted ownership for outcomes

- Introduced focused functional, UAT prep teams, pre-UAT test practices
- Implemented an online development, delivery, and task tracking system with complete transparency and reporting for management and clients
- Introduced 3-tier structure for service delivery with dedicated help-desk

Outcomes Achieved:

- Improved project governance through transparency and metrics reporting
- Projects delivered on schedule in compliance with HAVA deadlines
- Client success replacing multiple legacy systems with a modernized system
- No change requests or cost overruns for our clients!
- Long-term operational stability by established dedicated teams that allowed for excellence in service delivery to our clients and drove customer satisfaction
- Deployed systems have been in use for running elections for over 8 years

5) *Provide the name and current telephone number and address for the specified contract manager for each identified contract.*

Contract references for Dr. Kiniry can be obtained from any reference mentioned on his included CV. Government ministers for whom he worked in The Netherlands and Ireland are no longer in the public sector, as that work is between five and thirteen years ago. Public documents on his work are available, both in peer-reviewed literature and in the parliamentary records of those governments. Within the state of Denmark, one can contact either the Head of Elections, Nicoline Nyholm Miller (Ministry of Economic Affairs and the Interior, Slotsholmsgade 10–12, 1216 København K, +45 72 28 24 00), or the Director of the Copenhagen Municipality (Thomas Jakobsen, Københavns Kommune Borgerservice, +45 33 66 33 66), for a reference regarding his work in Denmark. Other references in the elections domain includes any members of the Verified Voting Foundation Board of Directors or Board of Advisors, which includes many current and past election officials and Secretaries of State.

6) *Provide a summary of any exemplary or qualitative findings, recommendations, or other validations, demonstrating operational experience. (i.e., specialized accreditations, grant awards, etc.).*

Dr. Kiniry

Dr. Kiniry's work with the governments of The Netherlands, the Republic of Ireland, and Denmark has resulted in all three countries deciding to stop using, or avoid using in the first place, inappropriate, opaque, expensive digital elections technologies. In the case of The Netherlands and the Republic of Ireland this is now codified by law, and in the case of Denmark it is now codified by dictatum on the part of the Minister responsible for elections. Note that digital elections are banned or avoided in only four countries in Europe, in part due to Dr. Kiniry's work: The Netherlands, the Republic of Ireland, Denmark, and Germany.

Dr. Kiniry's research and development in elections and underlying technologies (e.g., software verification) has resulted in dozens of peer-reviewed articles in major conferences and journals and dozens of BSc, MSc, and PhD theses. To fund this

work, both before and since joining Galois, he has won around a dozen federal and state research grants whose total value is in excess of five million dollars.

Dr. Kiniry's work in elections has been recognized nationally both in the elections activist and research communities and in the media. He is on the Board of Advisors of Verified Voting, sits on the IEEE 1622 working group that is developing new international standards in elections technologies, and is a member of the Elections Verification Network. He is also regularly quoted in national media on matters related to elections technology and the security of systems of national importance, both commercial and governmental.

Ashish Puri

Mr. Puri's experience in the elections space is outlined in sections 4 and 5 above. Additional achievements include the development of a comprehensive VREMS product, project-level highlights include leading the requirements development for the state of Missouri (116 counties), designing the candidate filing, poll workers and election night reporting enhancement products, establishing a comprehensive national elections maintenance and operations support program, and establishing 3 new development centers with collaborative operational practices.

Mr. Puri is credited with leading the charge for successful development and delivery of 6 statewide voter registration and election management systems in the states of Oregon, Missouri, Montana, Missouri, Maryland, and Iowa in compliance with the HAVA mandate in 2006. In addition, as the leader of the Elections Practice, he was instrumental in winning the contracts for the states of Colorado, Wyoming, and New York and delivering systems as per the commitments of his parent organization. Upon request, we will be able to provide references from Election Directors, CIOs, and IT leaders that were in the Secretary/Department of State offices in these states. Additional information on work performed is also provided in Mr. Puri's resume.

- 7) *Provide information indicating whether the Respondent intends to provide 100% of services directly or intends to utilize subcontractors and if so, provide identification of all subcontractors delivering service delivery. Include a statement indicating the percentage of work to be completed by the Respondent and each subcontractor as measured by percentage of the total contract.*

Galois, Inc. has all the technical and project resources in-house who have worked on its Elections Product development and will be engaged with this project. Galois intends to execute 100% of the services proposed in this proposal and does not foresee using subcontractors.

- 8) *Provide details of all past or pending litigation or claims filed against your firm.*

No past or pending litigation claims have been filed against Galois.

B. Business/Corporate Entity Details (include the following information on Respondent and each subcontractor (if subcontracting is indicated);

1) Date established

Galois, Inc: October 1999

2) Ownership (public company, partnership, subsidiary, etc.)

Privately held (U.S.)

3) Primary type of Business

Computer science research and development services

4) Total number of employees

55

5) Indication of type of business (i.e. corporation, sole proprietorship, partnership). If the respondent is a corporation, indicate the date and state of incorporation. Provide list of all officers of the firm indicating the percentages of ownership of each officer and the name of the Board of Directors, if applicable.

Type of business: Corporation

Date and state of incorporation: October 1999, Oregon.

Current Officers - John Launchbury (59.7% ownership), Rob Wiltbank, Jodee LeRoux

Board of Directors: John Launchbury, Rob Wiltbank, Brad Smith, John Keith, and Pat Horner

6) Provide the Federal tax identification number or social security number, as applicable to the legal entity that will be performing as the Primary Contractor under any resulting Contract.

TIN: 93-1278540

C. Organizational Chart

1) Respondent shall provide an organization chart outlining the hierarchy of key contract personnel assigned under this RFP.

The key individuals involved in this project include Dr. Kiniry (Project Director), Mr. Ashish Puri (Project Manager), Harri Hursti (Security Lead), Maggie MacAlpine (Customer Caretaker), Dr. Dan Zimmerman (Technical Lead), Dr. Daniel Wagner (Product Engineer), and Mr. Tom DuBuisson (Cryptographer). All individuals report to Mr. Puri, who in turn reports to Dr. Kiniry.

- 2) *Provide resumes and qualifications of the key personnel assigned to the contract. Such information shall demonstrate the individual's related experience with respect to the work to be performed under this contract. Job descriptions should include specific job functions and minimum qualifications of the identified position(s).*

The following table shows the key personnel proposed on this project, along with their proposed role, job description, and relative experience.

Senior personnel are internationally known researchers capable of managing and executing concurrent multi-year, multi-million-dollar basic and applied research projects and product development. In general, the principal investigator of a given project holds the final authority for any project, the project's project lead is responsible for the execution of a project, the project's client caretaker is responsible for ensuring the customer's concerns are understood and addressed, and the CEO holds the final accountability and authority over the company's business as a whole.

Name	Proposed Role	Job Description	Experience
Joe Kiniry	Project Director	Executive oversight	29 Years: IT projects 12 Years: Elections 12 Years: Advising governments about IT
Ashish Puri	Project Manager	Project and Account Management, Overall project execution and delivery	18 Years: IT projects 14 Years: US Public sector 12 Years: Elections
Harri Hursti	Security Lead	Oversee design and implementation of the security requirements	20+ Years: IT security 10+ Years: Elections
Maggie MacAlpine	Customer Caretaker	Helps understand customer processes, field testing, training	5+ Years: Elections
Dr. Dan Zimmerman	Technical Lead	Lead the product architecture, technical design, system design	16 Years: High-assurance software engineering and distributed systems research and open source development
Dr. Daniel Wagner	Product Engineer	Work on the technical development of the product.	10+ Years: High-assurance software engineering
Mr. Tom DuBuisson	Cryptographer	Work on the development of security aspects of the product.	10+ Years: Cryptoanalyst

Resumes are appended.

- 1) *Provide the most recently issued audited financial statement (or if un-audited, reviewed in accordance with standards issued by the American Institute of Certified Public Accountant.) All statements shall include the following information:*
 - a) *Auditor's Report*
 - b) *Balance Sheet*
 - c) *Statement of Income*
 - d) *Statement of Retained Earnings*
 - e) *Statement of Cash Flow*
 - f) *Notes to financial statement*
 - g) *Any written management letter issued by the Auditor to the Respondent's management, its Board of Directors, or the Audit Committee, or , if no management letter was written, a letter from the Auditor, stating that there was no management letter written and that there were no material weaknesses in internal control or other reportable conditions.*

Galois is a privately held company and does not prepare audited financial statements. We have established a bank line of credit, yet reviewed financial statements are also not required by our bank. We have provided our internally generated balance sheet and income statement for 2014.

- 2) *If the year end of the most recent completed audit (or review) is earlier than nine (9) months prior to the issuance date of this RFP, then the most recent unaudited financial statement (consisting of items b, c, d, e and f above) shall also be provided by the respondent in addition to the audited statement required in Section 3.3.1.1. The unaudited financial data will be averaged with the recent fiscal year audited (or reviewed) financial statement data, in evaluating financial capability. Unaudited financial statements shall have been completed within the last six months prior to the release of the RFP and shall be certified as accurate by the signature of the respondent's CEO or CFO.*

The year end of the prepared financial statements are within 9 months of the date of the RFP.

- 3) *If relying on financial documentation of a parent corporation, the Respondent shall provide an original signed letter of commitment from the parent corporation's executive who is legally authorized to bind that parent corporation, certifying that the parent corporation is 100% financially responsible for respondent's performance of the contract.*
- 4) *If the respondent is a sole proprietor or non-corporate entity, bidder shall provide financial documentation that is sufficient for an independent CPA to evaluate financial capability including applicable bank and credit statements, income tax returns and other documents.*

NOTE: The County acknowledges that privately held corporations and other business entities are not required by law to have audited financial statements. In the event the respondent is a privately held corporation or other business entity whose financial statements ARE audited, such audited statements shall be provided. If the privately held corporation or other business entity does not have audited financial statements, then unaudited statements or other financial documentation sufficient to

provide the same information as is generally contained in an audited statement, and as required below, shall be provided. The County also acknowledges that a respondent may be a wholly-owned subsidiary of another corporation or exist in other business relationships where financial data is consolidated. Financial documentation is requested to assist Department in determining whether the respondent has the financial capability of performing the contract to be issued pursuant to this RFP. The respondent MUST provide financial documentation sufficient to demonstrate such capability including wherever possible, financial information specific to the bidder itself. All documentation provided should be of the type and detail regularly relied upon by the certified public accounting industry in making a determination or statement of financial capability.

- 5) The Respondent should have a Dun & Bradstreet credit-worthiness summary indicating scores of between 1 and 3, or low to moderate, on all categories rated in regard to creditworthiness. The respondent shall provide the name for the entity that will be performing as the contractor. If the respondent is relying upon the creditworthiness of a parent corporation, to qualify under this criterion, the respondent shall also provide the name for the parent corporation. If relying on the Dun & Bradstreet rating of a parent corporation, the respondent shall provide an original signed letter of commitment from the parent corporation's executive that is legally authorized to bind that parent corporation, certifying that the parent corporation is 100% financially responsible for respondent's performance of the contract.*

The Dun & Bradstreet number for Galois, Inc. is 098009918.

E. References

- 1) *The Respondent shall furnish a minimum of three (3) customer references that have purchased, installed and used an electronic poll book system from of the Respondents in the customers' election. In order to qualify as relevant current experience, services described by corporate references shall be ongoing or have been completed within the thirty-six (36) months preceding the issue date of this RFP. Reference(s) shall identify the type of services provided by the Respondent, dates of service provision, the firm/agency name of the entity, for which the services were provided, and the current telephone number and address of the reference. Reference(s) shall include a paragraph describing services performed and preferably similar in magnitude and scope to those requested in the RFP. The County reserves the right to contact reference sources not listed in the response.*

Galois has been working extensively with leading jurisdictions in the country for the development of elections-related systems, including electronic poll book systems, conforming to U.S. law. We have currently not deployed an electronic poll book solution in the U.S., but we have formally specified an electronic poll book system and developed several prototype electronic poll book systems conforming to that specification. Those electronic poll book systems were meant to be used in national elections in Denmark.

The demonstrable prototype that we will demonstrate for Dallas County officials is called the Aegis DVL (Digital Voter List) and is a Windows-based product. The product we intend to develop to conform to this RFP's broader set of requirements will conform to our existing formal specification, will be operating-system neutral, and will be high-assurance. Moreover, we will provide evidence-based guarantees about the system's correctness, security, operational capability, and maintainability.

F. Contact for Contract Administration

- 1) *The Respondent shall designate one person authorized to conduct Contract administration and function as the Contractor's Representative under the Contract resulting from this RFP and supply the following information;*

NAME:

TITLE:

COMPANY NAME: ADDRESS:

TELEPHONE NUMBER: FAX NUMBER:

E-MAIL ADDRESS:

Jodee LeRoux
General Counsel
Galois, Inc.
421 SW Sixth, Suite 300 Portland, OR 97204
P: (503) 808-7209, F: (503) 214-8120
E: jodee@galois.com

**CATEGORY III: TECHNICAL, METHODOLOGY APPROACH,
IMPLEMENTATION/TRANSITION PLAN
SERVICE LEVEL AGREEMENTS**

Provide an example of your firm's Service Level Agreement documents that you have used for similar engagements.

Galois, Inc., as well as its key personnel included under this response, has implemented many SLAs for various clients over the last two decades. Due to security and contractual constraints on these projects, we are unable to provide a sample SLA in this response. However, we will be happy to draft and negotiate a suitable SLA for this system with Dallas County that covers response times, performance metrics, system uptimes, and other support metrics as desired. Galois has a long-term commitment to providing excellent customer service in partnership with our clients, and SLAs are a realization of that strategic objective.

In general, because Galois' systems are high assurance, they include extraordinary guarantees of their correctness, security, and operational capability far in excess of SLAs provided by traditional organizations. For example, we can stipulate that a product is bug-free or has an uptime guarantee of five nines (99.999%) if it is in the client's interest.

PROCESS/METHODOLOGY

Provide description of standard processes. Areas of interest include escalation procedures, severity one procedures, and all other pertinent information deemed relevant.

Galois' process and methodology has two sides: One focuses on how we design and develop systems, and the other focuses on service guarantees and operational support for deployed systems.

Our systems engineering process and methodology is akin to what is used in other organizations that focus on safety- and mission-critical systems. We have a peer-reviewed software development process that results in systems which, in general, run correctly the first time and have zero bugs. Generally speaking, ours is a correctness-by-construction methodology, as each stage of the development process is coupled to the adjacent stages by underlying technologies that guarantee nothing goes wrong when refining from the general to the specific. The artifacts created in this process include, but are not limited to: formal domain models, formal requirements, scenarios of use, system events, formal static and dynamic models of the system, formal contracts of software modules, formal specifications of protocols, hand-written and automatically generated test benches, automatically generated evidence of non-functional properties (such as reliability and scalability), and formal proofs of correctness for protocol and system correctness properties.

In terms of our service guarantees and operational support, we use a model that is atypical in some ways because our systems are high-assurance and formally verified. We see almost no bug reports about our products, so a typical tiered support system is unnecessary. Instead, we provide a comprehensive support

solution that emphasizes transparency about the product and its capabilities and direct access to the team responsible for the product.

For our traditional projects, customers have direct telephone and email access to the project lead, direct access to the project's ticket system, and direct visibility into the development repository of the project. Support tickets filed into the system are typically triaged by team members within minutes of being filed, responses to issues are immediate, and fixes are prioritized by a conversation between the customer and the development team.

For the purposes of this project we envision that, if we are meant to provide field support during deployment and system use, we must augment this operational support method with a front-line team who can provide basic support to election officials and volunteers. We plan to provide support of this kind via an 800 number, an online text chat interface, or both.

DESKTOP SUPPORT SOFTWARE

Provide overview of software including core functionality, screen shots, web capabilities, and hardware/software requirements for end user, and all other pertinent information deemed relevant.

In our response to this query we presume the client is interested in an overview of the electronic poll book product, not exclusively the support subsystems of said product.

Our electronic poll book product is code-named DVL (for Digital Voter List). Our demonstration version is implemented in C# and runs on the Windows operating system. The product we intend to build for the client will run on a variety of COTS platforms, as stipulated in the Technical Requirements section later in this document.

DVL's core functionality aligns with the bulk of requirements stipulated by the client in the RFP: It can generate traditional poll books, generate voter cards and mailings, import voter rolls, authenticate and check in voters, log and report on system behavior, report on election properties, export voter lists, etc.

At this moment, it does not include support for some of the non-standard requirements stipulated by the client, such as integrated support for redirecting voters to their correct polling place, logging and reporting on elections volunteers' time, the ability to track the location of devices and disable them if stolen or misplaced, interoperability with the client's Voter Registration System, etc. These are necessary customizations that will be executed under contract for the client.

The atypical features of the DVL system are many and varied, and all focus on the reliability, security, and usability (on the part of elections officials and the voting public) of the system. The following are a few of those features.

- *Peer-to-peer:* The DVL's network design is peer-to-peer: there is no expensive, centralized server that is a single point of failure. Each computer

participating in a polling place or in a jurisdiction-wide election is equivalent to every other computer. The software installed on each computer is identical in feature and function. Within a single polling place, there is one electronic poll book manager system and one or more electronic poll book systems.

- *Wide variety of COTS hardware and OS foundations:* The DVL system runs on an enormous variety of COTS hardware and operating systems, giving the client great flexibility in cost, deployment, UI choice, and more. For example, a client may wish to have (a) several low-cost Android tablets for general-use electronic poll books, (b) one more expensive, larger, and more accessible iPad, and (c) a laptop for the initial manager system; and such systems can be leased or owned by the client, as they desire.
- *Flexibility in polling place and jurisdiction network setup:* Either a wired or wireless network can be used to permit DVL computers to communicate. Traditionally, one uses an inexpensive network switch and wires a set of laptop computers together using Ethernet cabling. The switch's uplink to the internet is typically facilitated by a DSL, cable modem, or LTE uplink. Alternatively, a wireless network switch can be used. Finally, and most radically, a DVL computer that has both wireless and LTE (say, an iPad that will act as the DVL manager for a polling place) can be used as a local hotspot, avoiding the need for any network equipment or cabling whatsoever.
- *Dynamic reconfiguration:* If a network or system failure takes place during the election, the DVL automatically reconfigures to adjust to the new situation. If the manager system fails, one of the existing electronic poll books is automatically promoted to become the new manager. If a polling place is particularly busy, a new electronic poll book can be brought online in two minutes. Likewise, if a polling place is small or slow, electronic poll books can simply be turned off and put away with no loss of service or data.
- *Database distribution and encryption:* The database used to record election information has three layers of protection: (1) access to the database itself is controlled via a local encrypted channel, (2) the database is encrypted on the poll book device, and (3) all non-public data stored within the encrypted database is encrypted by the DVL software. Moreover, all computation on that non-public data is performed without decrypting the data, so no non-public data is ever decrypted into clear text on disk, in memory, or on the network. This security architecture means that, even if a malicious party steals a system and has administrator rights on the system and administrator access to the DVL database, they can obtain no non-public information whatsoever.
- *Network security:* Communication within the peer-to-peer DVL network uses secure channels (TLS) to ensure communication integrity. Moreover, all data transmitted over the secure channels is encrypted and signed, ensuring both integrity and authenticity of the data. Finally, the DVL network protocol has been formally specified and verified for both correctness and security.
- *Distributed database updates:* Any data update on an electronic poll book device is made available to all other poll book devices automatically.
- *Trivial installation:* The DVL installs on mobile devices via Google Play and the Apple App Store. For traditional computers, it installs via a hands-off point-and-click installer. The systems on which the DVL product is installed need not be sanitized or re-installed in any fashion, as the software is

designed to operate correctly and securely even within compromised environments.

- *Secure and usable configuration and election management:* When a polling place is configured on election morning, the election supervisor responsible for that polling place must take responsibility for the election. Moreover, each electronic poll book must be paired with the manager system to ensure that only authentic systems are in use within the polling place. This process is accomplished in our demonstrator by having the DVL manager generate an election password that the election supervisor must record and remember—for example, by writing it on a piece of paper or taking a photograph of the manager's screen. For the product we intend to create for the client, this process will be dramatically simplified by using Tozny, an Android and iOS app that permits secure authentication to devices and software without the use of passwords or even touching the devices in question. In short, when the election supervisor authenticates herself on election day morning to the manager, she does so by pointing her cell phone's camera at the manager's screen. Likewise, to configure a new electronic poll book in a polling place, the election supervisor simply points their camera first at the manager's screen, then at the electronic poll book's screen. Finally, to close the election and export data, once again the election supervisor points her phone's camera at the manager's screen. This is a completely hands-off, trivial authentication procedure usable by even the computer averse or the disabled.

The system's look and feel is Google simple. Each UI for the DVL manager or the DVL electronic poll book contains exactly the information necessary for the appropriate step in the workflow of poll book use and no more. Built-in help is available in the form of a user's guide, FAQ, and live support via a chat session.

The user's guide is written in plain language and includes screen shots of the product. It is available in both printed and digital forms and will be available in both English and Spanish if the client desires such.

KEY PERFORMANCE INDICATORS

Provide your company score card with statistics and metrics across your client base. An example would be a percentage of missed and achieved SLA's.

Galois does not keep a formal scorecard on SLAs. That being said, we have a flawless track record on service delivery which is demonstrated in our performance on deliverables on over two dozen projects Galois has engaged in for federal and commercial clients. We will be happy to provide client references to validate our performance on this front.

REPORTING

Provide true examples of the standard set of reporting offered to a client, as well as ad hoc capabilities.

As part of its project management practices, Galois provides standard project status reports on a periodic basis; typically, these are weekly status reports or monthly

reports, per the client's needs. These reports cover the following information of interest to various stakeholders on the project:

1. work accomplished in the past reporting period,
2. work planned for the upcoming reporting period,
3. project budget, spend, backlog, and other financial information,
4. status of deliverables and milestones,
5. project risks, issues, and action items,
6. schedule and resource tracking against the project plan,
7. performance metrics as agreed with the client.

Galois proposes to provide similar reporting for this project, and the final report structure will be negotiated with the County project team during BAFO or at project kick-off.

In addition, Galois assigns a *client caretaker* for each project, separate from the project lead and other project developers, whose responsibility is to ensure that any client concerns are addressed in a timely fashion. As previously mentioned, Galois also offers transparency in the development process; this includes full visibility into the project's software repositories, ticket system, and other development artifacts throughout the duration of the project.

TECHNICAL REQUIREMENTS

Provide technical requirements of client for software, hardware, telecom, network, etc.

The electronic poll book software can run on the client's choice of the following commercial off-the-shelf (COTS) hardware platforms and operating systems:

- Any Apple iPad, iPhone or iPod touch running iOS 8 or later.
- Any Android phone or tablet running Android 4.0 or later.
- Any Apple Mac running Mac OS X 10.10 or later.
- Any Windows computer running Windows 7 or later.

The client need not choose a single hardware platform for deployment; any combination of devices meeting the above requirements may be used as electronic poll books, and the selection of devices can be changed by the client at any time.

Wired or wireless networking is required at each polling place, and each poll book device must be connected to the network. Networking can be provided by a wired or wireless network switch or by using one of the poll book devices as a wireless hotspot.

Each polling place must have broadband Internet access, provided either by a hard line (cable modem, DSL, etc.) or by an LTE cellular modem. If a phone or tablet is used to run the poll book software, its built-in LTE cellular modem can be used to provide this access. All poll book-related communications are encrypted.

OVERALL SCOPE OF WORK

The service Provider will provide a secure modern, electronic poll book solution that is an efficient, accurate, user friendly and a cost-effective replacement for the existing paper-based poll books and process. Solutions or components should also ensure to provide features such as the ability to track poll worker time and attendance, Ballot and Seal Certificates: reconcile ballots and ballot applications after the close of polls, and “help desk” assistance in the polling place should also be addressed in the proposal.

The electronic poll book is code-named the Digital Voter List (DVL). As previously mentioned, it consists of two main components, which are realized simply as different roles of the same software installation:

1. A DVL manager that
 - a. imports election (voter and ballot) data,
 - b. provisions electronic poll books before and during election day, and
 - c. outputs voter roll updates after election day; and
2. A DVL electronic poll book that enables voters to be checked in and presented with the appropriate ballots on election day.

Overview of the DVL Demonstrator

As mentioned previously, several DVL demonstrator implementations were developed as a part of the DemTech Research Project at the IT University of Copenhagen in 2011–13 and were designed for use in elections in Denmark. The key features of the DVL electronic poll book are:

- It provides all the following features of a poll book in a secure digital format:
 - o handles an arbitrary number of voters and ballot styles,
 - o permits voter authentication and ballot style determination,
 - o ensures a voter can check in exactly once to any machine participating in the electronic poll book network,
 - o has a simple interactive interface for easy voter search and information updates, and
 - o facilitates new election initiatives (such as early vote centers), disabled use, and a flexible choice of user experience in the client’s choice of deployment hardware.
- It integrates seamlessly with any VREMS application and consumes the election definition (voter roll, ballot style enumeration, etc.) in a simple fashion.
- It provides simple and secure updates to the digital poll book on election day that can be imported back into the VREMS, and hence codifies verified and committed to voter records as changes or new voting history.
- It eliminates vendor dependence on proprietary electronic poll books, as it can be used with any commodity device, thereby reducing the unnecessary cost and expense of dedicated hardware.

- It is transparent in its implementation and puts control in the hands of the client insofar as it is an open source product.
- It is a high-assurance system, so it provides evidence-based assurances of its correctness, security, and reliability akin to what is demanded of federal systems that protect our nation's top-secret information.

Several of the requirements stipulated in this RFP are not part of our existing DVL architecture or design, nor are they evident in the demonstrator implementation. We highlight exactly which requirements necessitate customization and evolution of our architecture and design, and which features we expect to be demonstrable for the client if we are welcomed to phase 2 of the evaluation process.

Requirements Compliance for the DVL Product

In general, the DVL product developed for the client will fulfill all of the requirements stipulated in the RFP and as negotiated with the client prior to signing a contract of execution.

At Galois, we formalize requirements in such a fashion that we derive a formal model of the system we intend to build for a client. Consequently, it is easy to determine if a requirement change requested by the client is new, redundant, or conflicts with the existing set of requirements. As such, we are happy to discuss requirement changes with the client before or after contract execution, but in each instance we will be able to provide evidence that said changes conform to the existing contract, are of little impact and thus are easy to accommodate, are of large impact and thus demand a contract extension, or are in contradiction to existing requirements and therefore need additional clarification.

In the following requirements section, for each requirement, we indicate if the requirement or feature is present in our existing architecture and design, if it is present in the DVL demonstrator, or if it necessitates an evolution in our architecture and design.

DALLAS COUNTY REQUIREMENTS

At a minimum, a selected vendor will be required to furnish a solution that provides the following:

1. Business Requirements:

- 1.1. *A method to electronically list, search, identify and authenticate eligible voters, including the ability to verify and compare voter status and signatures, on Election Day, Early Voting or Emergency Ballot, thereby eliminating the need to print paper poll books.*
- 1.1.1. *Statuses include, but are not limited to:*
 - 1.1.1.1. **Active** – Normal voter check-in.
 - 1.1.1.2. **Suspense** – Poll book states, “Statement of Residence Required” and voter must complete the statement of residence application.
 - 1.1.1.3. **Early Voted** – Poll book states, “Early Voted” and needs to offer the voter a provisional ballot. Ballot Board (BB) and the Early Voting by Mail team will research provisional ballot after it has been voted on to compare signatures, etc.
 - 1.1.1.4. **Mail Ballot Requested** – Poll book states, “Mail Ballot Requested” and needs to offer the voter a provisional ballot. Ballot Board (BB) and the Early Voting by Mail team will research provisional ballot after it has been voted on to compare signatures, etc.
 - 1.1.1.5. **Mail Ballot Returned** – Poll book states, “Mail Ballot Returned with Status (PB)” and needs to be research by elections headquarters before being offered a provisional ballot.
 - 1.1.1.6. **(E)-Exemption** – Poll book shows an (E) next to the voters VUID number. Voter is exempt from showing acceptable photo identification.
 - 1.1.1.7. **Similar Name Affidavit** – Voter must initial the similar name affidavit box in the poll book if there is not an identical match compared against their DL.
 - 1.1.1.8. **Republican (R)** – Poll book states, “Voted in Rep Primary” indicating the party the voter voted in.
 - 1.1.1.9. **Democrat (D)** – Poll book states, “Voted in Dem Primary” indicating the party the voter voted in.
 - 1.1.1.10. **Limited Ballot** – System needs to show voter has voted a limited ballot.
 - 1.1.1.11. **Provisional Ballot** – System needs to show voter has voted a provisional ballot.
 - 1.1.1.12. **State of Residence**
 - 1.1.1.13. **ID Required**
 - 1.1.1.14. **FPCA Ballot Mailed**
 - 1.1.1.15. **FPCA Ballot Returned**
 - 1.1.1.16. **Cancel PUR (Purged)**
 - 1.1.1.17. **Cancel MOC (Moved out of County)**
 - 1.1.1.18. **Cancel DEC (Deceased)**
 - 1.1.1.19. **Cancel FEL (Felon)**

The DVL architecture and design accommodate these requirements, although the design must be trivially extended to cover the full set of statuses required by the client. The DVL demonstrator will include support for a significant subset of these statuses.

- 1.2. *A method for Elections to easily and without vendor support; import, populate and store County and State wide voter registration information.*

The DVL architecture, design, and demonstrator application support this requirement completely via a simple CSV datafile format.

- 1.3. *A method to Lookup voters by any combination of, but not limited to:*
1.3.1. *Last Name*
1.3.2. *First Name*
1.3.3. *Date of Birth*
1.3.4. *Street Address*
1.3.5. *Texas Driver's License/Identification Number*
1.3.6. *State ID Number (VUID)*

The DVL architecture and design support this requirement completely. The DVL demonstrator will include support for a significant subset of these lookup methods.

- 1.4. *A method to Lookup voter address by any combination of, but not limited to: 1.4.1. Street Number*
1.4.2. *Street Name*
1.4.3. *Village, Town, City*

The DVL architecture and design support this requirement completely. The DVL demonstrator will include support for a significant subset of these lookup methods.

- 1.5. *A method to verify precinct assignment for any voter in the county or any address in the county and redirect voters to correct polling place location, if necessary.*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.6. *A method to ensure that updated voter registration information can be communicated to poll workers on any day or days on which voting is being conducted in as near to real-time as feasible, including, but not limited to, whether an individual had already voted, where that individual voter, and by what method that individual voted.*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.7. *A method to ensure that a voter is properly identified by the correct ballot style according to his or her residential address so that the voter is given the correct ballot containing all offices, candidates and public questions pertaining to the political subdivision, district, or precinct in which the voter is eligible to vote.*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.8. *A method to electronically record near to real-time as feasible, the fact that a voter has cast a ballot in an election; whether in person on Election Day, Absentee, Provisional, Limited Ballot, during Early Voting or Emergency Ballot, and update voter history.*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.9. *A method to electronically identify, list and communicate near to real-time as feasible to poll workers and to the central office all voters who may have previously cast a ballot in the same election, whether in person on Election Day, Absentee, Provisional, Limited Ballot, during Early Voting or Emergency Ballot so as to prevent such voter from casting another ballot in the same election.*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.10. *A method to capture and store data related to voting in person on Election Day, Absentee, Provisional, Limited Ballot, during Early Voting or Emergency Ballot, including but not limited to name and address information.*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.11. *A method to allow the Elections' administration staff at the Central Office and poll workers to communicate and share, in real time, voter registration information and voting history (i.e. Instant messaging).*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.12. *A method to allow the Elections' Early Voting by Mail administration staff at the Central Office to cancel a voter check-in for mail ballot voters or erroneous voter check-ins in real time.*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.13. *A solution that will track the location of all key components used with the system and disable any key component containing sensitive or confidential voter information if removed from an authorized location, accessed by unauthorized persons or used for an unauthorized purpose.*

The DVL architecture and design accommodate these requirements, but in a security-based fashion rather than an after-the-fact system tracking and data wipe mechanism. While the design can be trivially extended to cover this requirement, we recommend that, given our security architecture, this is an unnecessarily complex and expensive requirement. Hence, we are not including any effort or cost for this requirement at this time. We will provide more clarity about our point of view on this

and be happy to provide a recommended solution during BAFO or requirements clarification phase of the project if the county feels the need to do so.

- 1.14. *A system that will provide the capability to have multiple Early Voting or multiple Election Day elections simultaneously.*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.15. *A system that will provide “live” mode capability.*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.16. *A system that will provide peer-to-peer network capability for the polling location devices*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.17. *A system that has printing capabilities for maps and directions to all polling locations.*

The DVL architecture and design do not include support for this requirement, so they must be trivially evolved to accommodate this requirement. The demonstrator application does not support this requirement.

- 1.18. *A system that has multi-lingual capabilities (i.e. Spanish).*

The DVL architecture, design, and demonstrator application support this requirement completely. The second language supported by the demonstrator application is historically Danish, and it can be easily modified to support other languages (including Spanish).

- 1.19. *A system that has ADA capabilities (i.e. font size).*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.20. *A system that is secure and will prevent any unauthorized access to or dissemination of sensitive or confidential voter information.*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.21. *A system that is highly configurable and customizable.*

The DVL architecture, design, and demonstrator application support this requirement completely.

- 1.22. *A system that will be compatible and work seamlessly with the current Elections' Voter Registration System.*

The DVL architecture and design support this requirement completely. The demonstration application does not support this requirement, as we do not have the appropriate technical information to support Dallas County's current Elections' Voter Registration System.

- 1.23. *A system that will be capable to receive up to the second voter updates from the current Elections' Voter Registration System.*

The DVL architecture and design support this requirement completely. The demonstration application does not support this requirement, as we do not have the appropriate technical information to support Dallas County's current Elections' Voter Registration System.

- 1.24. *A system that will be compatible with an assortment of commercial off the-shelf ("COTS") equipment and software operating system variables (i.e. Printer, scanner, signature pad).*

The DVL architecture and design support this requirement completely. The demonstration application supports a barcode scanner.

- 1.25. *A system that is well documented and will enable Elections to assume in house set-up, operations and maintenance, subject to applicable license agreements (i.e. User's Guide, Standard Operation Procedures, and Training Manuals).*

The DVL architecture and design support this requirement completely. The demonstrator application includes a basic user's manual, built-in help, and technical documentation.

- 1.26. *A method of providing poll workers with general information regarding voting and election day procedures so that they may appropriately address and resolve, without outside intervention, common problems and questions occurring in the polling place (i.e. a "help desk" of FAQ and training videos solution that can operate online or offline).*

The DVL architecture and design support this requirement completely. The demonstrator application includes a basic user's manual, built-in help, and technical documentation.

- 1.27. *A method of providing poll workers with the ability to account for all ballots delivered, all ballots cast, all spoiled ballots and all ballot applications, total check-ins on voter roster and poll books; and to create an end-of-the-day reconciliation statement (i.e. Ballot and Seal Certificate).*

The DVL architecture and design support this requirement completely. The demonstrator application includes basic support for this requirement.

- 1.28. *A method to provide poll workers the ability to track their time and attendance for payroll purposes.*

The DVL architecture and design do not include support for this requirement, so they must be trivially evolved to accommodate this requirement. The demonstrator application does not support this requirement.

- 1.29. *A method to and generate poll workers payroll statements.*

The DVL architecture and design do not include support for this requirement, so they must be trivially evolved to accommodate this requirement. The demonstrator application does not support this requirement.

- 1.30. *A method to track searches and edits to the system, including who performed the operation (i.e. Audit trail).*

The DVL architecture and design support this requirement completely. The demonstrator application includes basic support for this requirement.

In addition, it is highly desirable that any system or solutions provide:

- 1.31. *A method to communicate a voter's correct ballot style information to Personal Electronic Ballot (PEB) so that the voter will be able to vote using a touchscreen voting device; if the voter elects to use such a device.*

The DVL architecture and design support this requirement completely. The demonstration application does not support this requirement, as we do not have the appropriate technical information to support Dallas County's PEB system.

2. Hardware and Network Requirements

Provide a detailed description of hardware and network product(s), including:

2.1. All relevant information, including physical descriptions, model numbers, and part numbers, concerning components such as, but not limited to, laptops, tablet computers, printers, cables, connectors, servers, internet connectivity, etc.

These requirements are described in the earlier “TECHNICAL REQUIREMENTS” section.

2.2. Whether a component is proprietary to the Vendor or whether the component is a commercial off-the-shelf (COTS) product.

This requirement is described in the earlier “TECHNICAL REQUIREMENTS” section. The system uses only COTS hardware and software.

2.3. A description of any additional equipment that Vendor recommends, but which is not required as part of the system, including, but not limited to signature pads, barcode scanners, additional printers, carrying case, etc.

The system fulfills this requirement and supports arbitrary input devices that can be added to the COTS hardware. For example, we have used the system with COTS barcode scanners, card strip readers, and arbitrary printers.

2.4. Whether components are available for purchase, for lease, or with an option for lease-purchase.

It is in the county’s best interest to either purchase or lease low-cost Android tablets or Chrome notebooks, or to reuse existing equipment owned or leased by the county. If the county chooses to purchase equipment specifically and used only for election use, and furthermore wishes for Galois to purchase, manage, and configure said equipment, Galois is happy to provide a passthrough cost on such hardware. The cost to the county for storing, configuring, and managing said equipment would be negotiated with Galois in a simple, cost-effective fashion.

2.5. Information regarding financing and/or leasing.

See the answer to the previous requirement.

2.6. The system must have ADA capabilities (i.e. Font size)

The proposed system is ADA-compliant.

2.7. The device must have Bluetooth or wireless capabilities to connect to air-cards or hotspots.

Since the electronic poll book software will run on a COTS desktop/laptop/tablet, any Bluetooth or wireless capabilities that come as part of standard machine capabilities will extend to the electronic poll book software.

In addition, it is highly desirable that any system or solutions provide:

2.8. The system must have, at a minimum 10 hour battery life, with a low battery indicator.

Since the electronic poll book software will run on a COTS desktop/laptop/tablet, the battery life of the base hardware device, including any ability for the device to use backup or extra batteries, will be extended to the electronic poll book application.

2.9. The device must have at least 32G of internal memory.

The available storage of the device is immaterial to our particular product.

3. Software and Database Requirements

Vendor must describe:

3.1. Whether the voter registration database will reside on the electronic poll book, be accessed remotely or be available through a combination of sources.

3.1.1. County voter registration database.

3.1.2. Statewide voter registration database.

The electronic poll book application will not maintain a separate voter registration database but will, in fact, display the data that is imported into it from the county/statewide voter registration database, as part of the data interface established for the application. The electronic poll book contains a database that securely houses the information imported into it and the temporary updates made to it; however, it will not be the system of record with respect to the voter registration information. This will ensure the integrity of data that is derived from a single unified database of voter records.

3.2. Whether the voter registration data will be limited to those voters residing in the precinct or whether poll workers will be able to access voter registration information for voters in the entire County of Dallas, including what information fields will be available to poll workers.

The system has the flexibility to allow access based on the county's needs. The DVL architecture and design support this requirement completely. The demonstrator application includes basic support for this requirement.

3.3. If the voter registration database is to be loaded and reside on the electronic poll book,

3.3.1. How the data will initially be loaded;

3.3.2. When will the data be loaded; and

3.3.3. How long will it take to load?

This requirement is described earlier in this document. Data import is trivial and supports a basic CSV format in the demonstrator, and import is instantaneous.

3.4. If the Ballot and Seal database is to be loaded and reside on the electronic poll book,

3.4.1. How the data will initially be loaded;

3.4.2. When will the data be loaded; and

3.4.3. How long will it take to load?

This requirement is described earlier in this document. Data import is trivial and supports a basic CSV format in the demonstrator, and import is instantaneous.

3.5. How updated voter registration information will be made accessible to poll workers on days when voting will be conducted, including

3.5.1. Whether such access will be done remotely through the internet or locally using a USB or storage device;

- 3.5.2. How long it will take to update the data; and*
- 3.5.3. How often the data will be updated.*
- 3.5.4. How the electronic poll book will synchronize data with the Elections voter registration management system.*
- 3.5.5. How the electronic poll book system will prevent duplicate voting if the voter has already voted by absentee ballot, Provisional, Limited Ballot, by early voting, by Emergency Ballot or by voting in person on Election Day.*
- 3.5.6. How the network architecture will be configured, where the system would be hosted, whether Election staff would maintain the network and equipment, and any other relevant facts concerning the hosting environment.*
- 3.5.7. Application Architecture layout of proposed solution and requirements needed by Dallas County if recommendation is to host solution on Dallas County technology environment.*

This requirement is described earlier in this document. The DVL architecture and design support this requirement completely. The demonstrator application includes basic support for this requirement. Updates happen automatically, and all systems are synchronized to ensure that all systems eventually have a consistent data set.

4. System Security

Vendor must describe:

4.1. Encryption and other security measures in place to protect data if the proposed system involves Internet or cloud based transmission of data to and from local electronic poll book components.

This requirement is described earlier in this document. The DVL architecture and design support this requirement completely. The demonstrator application includes basic support for this requirement.

4.2. Access control methods, password protection and login access levels.

This requirement is described earlier in this document. The DVL architecture and design support this requirement completely. The demonstrator application includes basic support for this requirement.

4.3. Internet intrusion detection and control protocols if any part of the system uses any network connections. If third party testing is done, include dates, name and contact information for such third party and at least one sample test results report from that third party.

This requirement is described earlier in this document. The DVL architecture and design support this requirement completely. The demonstrator application includes basic support for this requirement. Galois performs security analysis, penetration testing, and security audits for the highest-end defense and intelligence customers in the government space.

4.4. How any portable components in proposed system (laptops, tablets, printers, etc.) can be tracked, recovered or disabled if stolen or removed.

As discussed in Section 1.12, the DVL architecture and design accommodate these requirements, but in a security-based fashion, rather than an after-the-fact system tracking and data wipe mechanism.

4.5. If any component in the proposed system will accept USB or SD card input, how will system identify and prevent foreign self-executing code and how components can be limited to accepting only pre-approved USB or SD card devices.

The DVL architecture and design support this requirement completely. The DVL system permits input from external devices such as USB keys and SD cards if the COTS hardware device and operating system support such, and such input can be disabled as the hardware device and operating system allow. The security architecture of the DVL system is such that it cannot be compromised by foreign self-executing code.

4.6. How the proposed system will detect and prevent any suspicious software behavior in any part of the system.

The DVL architecture and design support this requirement completely. The DVL's security architecture and verified implementation is capable of securely and correctly computing even in the presence of malware or other suspicious software on the underlying system.

5. Operational Requirements

Vendor must describe:

5.1. How the proposed system will capture and export data, changes, updates and signatures from the polling locations to the current Voter Registration System.

Galois has insufficient information about the current Voter Registration System to promise to fulfill this requirement at this time. That being said, the DVL architecture and design are complete with regards to various kinds of standard data capture, import, and export to standardized data interfaces. We intend to fulfill this requirement in the final DVL product so long as the interface to the current Voter Registration System is sensible and effective.

5.2. Detailed processes (including system steps, configuration settings, login and verification steps) for setting up and activating proposed system on morning of Election Day, both in polling places and at central office location.

This requirement is completely fulfilled by the existing architecture and design and is described earlier in this proposal in the “DESKTOP SUPPORT SOFTWARE” section.

5.3. Procedures to follow when voter name is not found in the system, including alternate search methods and troubleshooting steps.

In general, the procedure to follow when voter names are not found is defined as part of standard county business procedures; the system will be able to provide common search capabilities as part of those procedures. This can be discussed in more detail during the initial project phase of requirements confirmation, and any gap requirements will be addressed accordingly.

5.4. Procedures for identifying where a voter should be voting if in the incorrect precinct, including solutions for directing the voter to the correct polling place location.

In general, the procedures for voting are defined as part of standard county business procedures; the system will be able to provide adequate support needed as part of those procedures. This can be discussed in more detail during the initial project phase of requirements confirmation, and any gap requirements will be addressed accordingly.

5.5. How the system captures a voter's signature in the Elections' voter registration database, how such signatures are made accessible to poll workers, what access limitations exist, how signature comparisons are conducted, and options for how the system can capture a voter's signature electronically in the polling place using tablets or signature pads. Include procedures if no signature is found in voter registration database.

The system's architecture and design supports the capture and processing of voter signatures. The demonstration version does not support digital signature matching; matching is manually performed by the election officer. We stipulate no specific device for signature input, generally supporting devices that can be connected to the COTS hardware used; if tablets are used, signatures can be recorded directly on the poll book devices.

5.6. How the system treats voters whose registration status is listed as "inactive."

The system can be configured in line with standard county business procedures; this can be discussed in detail during requirements confirmation, and the system will be configured accordingly.

5.7. How the system identifies and tracks voters who cast a provisional ballot, limited ballot or ballot by mail.

The system can be configured in line with standard county business procedures; this can be discussed in detail during requirements confirmation, and the system will be configured accordingly.

5.8. How the system treats same name or other erroneous issues.

The system can be configured in line with standard county business procedures; this can be discussed in detail during requirements confirmation, and the system will be configured accordingly.

5.9. How the systems treats legal or mandated affidavits.

The system can be configured in line with standard county business procedures; this can be discussed in detail during requirements confirmation, and the system will be configured accordingly.

5.10. How the system will support other management functions in the polling place, including but not limited to:

5.10.1. Time sheets for recording poll workers' time and attendance;

The system can be configured in line with standard county business procedures; this can be discussed in detail during requirements confirmation, and the system will be configured accordingly.

5.10.2. Operational checklist for poll workers to assist them in following all proper steps for opening, operating and closing the polls on Election Day;

The system will guide poll workers through poll opening, operation, and poll closing. As previously described, the system will use the Tozny authentication client to provide secure authentication to devices and software without the use of passwords. The election supervisor authenticates to the poll book manager system on election day morning by pointing a cell phone's camera at the manager's screen; they provision each electronic poll book by simply pointing their camera first at the DVL

manager's screen, then at the DVL electronic poll book's screen; and they close the election in a similar way. This is a completely hands-off, trivial authentication procedure usable by even the computer averse or the disabled.

5.10.3. Reconciliation and printing of ballots and ballot applications after the closing of the polls.

5.10.3.1. Ballot and Seals Certificate

5.10.3.2. Official/Regular

5.10.3.3. Provisional

5.10.3.4. ADA

5.10.3.5. Limited Ballot

At the closing of the polls, the system will provide reconciliation information that allows Elections to check the actual numbers of used ballots of all types (official, provisional, ADA, limited) against the expected numbers of ballots based on polling place check-ins of those types recorded by the electronic poll books. In addition, the system will provide other audit and reporting information, as further discussed in the "REPORTING" section.

5.11. How the system will guide the user through simple technical problems.

The system's built-in help facility can be used to address simple technical problems. Help "wizards" and walkthrough functionality can be added to the system as required.

5.12. How the system would guide a voter who is not in the system to the correct precinct if that voter was registered.

If a registered voter attempts to check-in at an incorrect polling place, the system will provide the voter with the address of the correct polling place, as well as a map and directions if requested.

5.13. In addition, it is highly desirable that any system or solutions provide:

Additional functionality not specified in the request for proposals can be added to the electronic poll book system, as negotiated with the county's project team.

5.14. The system must provide a customizable Administrative Command Center/Dashboard that includes, but is not limited to:

5.14.1. Up to the second voter information, polling location, wait time, poll worker, equipment, and etc.

5.14.2. Statistics

5.14.3. Light indicators

5.14.4. Graphical presentation

The DVL architecture and design supports such an Administrative Command Center/Dashboard, which can be arbitrarily customized to client requirements. The

demonstrator application will have a basic version of the dashboard that shows the operating status of all the electronic poll book units.

6. Reporting

Vendor must describe for Polling and Administrative Command Center:

6.1. All standard reports that the system can generate (provide sample copies of such reports).

The DVL architecture and design supports the generation of arbitrary reports from the electronic poll book data, based on client requirements. The demonstrator application will include support for a voter roster report and an election statistics report.

6.2. How custom reports can be designed. Reports including, but not limited to:

6.2.1. Voter Roster

6.2.2. Ballot and Seal

6.2.3. Official/Regular

6.2.4. Provisional

6.2.5. ADA

6.2.6. Limited Ballots

6.2.7. Election Statistics

6.2.8. Early Voting Ballot Cast per Ballot Style and Polling Locations

6.2.9. Similar Name Check-In

6.2.10. NO ID

6.2.11. Judge Oath/Certificate at the Polling Locations

6.2.12. Omissions/Corrections Lists

6.2.13. State Mandated Affidavits

6.2.14. Historical Data for a minimum of three (3) Presidential Elections Cycles

The DVL architecture and design support all of these reports and can generate additional reports based on client requirements. Design of custom reports is straightforward and can be done on demand.

6.3. How the system can be audited, both locally and at the central office location, and what audit reports can be generated.

The DVL architecture and design includes logging of all relevant activity in the system, and these logs are available both locally and at the central office location. Audit reports can be generated based on these logs as required by the client. As with the standard reports above, the generation of audit reports is straightforward and can be done on demand.

6.4. Any post-election tools and reports that can assist Elections in conducting post-election discovery recount and/or election contest proceedings.

All the aforementioned reports and audit data will be available from the system within minutes of concluding an election and can be used in conducting post-election discovery recount and election contest proceedings.

6.5. Whether reports are searchable and amenable to queries.

6.5.1. All reports generated must have the ability to be searchable by Ballot Style, Polling Location, Voter's Name, Voter's Check-In date and time, type of Check-In (i.e. provisional, regular, mail, etc.)

The reports are searchable and amenable to queries and will be searchable by all of the listed attributes.

6.6. Web pages or 'internet reports' that are available, as well as an explanation of the process of getting these reports to the net and how long it takes to get the data to the internet.

Any report, as desired by the client, can be formatted by the system as a web page and published automatically, within seconds to minutes of the publication request. A user interface for such publication will be available as part of the provided system.

7. Implementation, Training & Support

Vendor must describe:

7.1. Detailed plan to implement the system, specifying the tasks to be completed, the individual or entity responsible for implementing the system, the estimated time needed to implement the system and a schedule, including milestone dates for completion of specific tasks and of the entire system.

Galois is proposing an aggressive yet feasible schedule for completing the electronic poll book customizations as per Dallas County's needs and for implementing it at the county courthouse. The key milestones and deliverables are summarized below. All deliverables will have a two-week approval period during which the Galois project team will address any deficiencies or concerns. Following deliverable completion and county approval, the county will be invoiced for the corresponding deliverable fee as listed in this table. Galois will be the entity responsible for execution of and delivery of all proposed deliverables.

Milestone	Deliverable Name	Cummulative Schedule Delivery Date	Deliverable Fee
I	Baseline Electronic Poll Book Release 1 Setup and Install	Week 2	in cost proposal
II	Requirements Specification	Week 6	in cost proposal
II	Project Plan	Week 6	in cost proposal
III	Electronic Poll Book Release 2 Demo	Week 17	in cost proposal
IV	Electronic Poll Book Release 3 - Final Release Demo and Install in UAT environment	Week 26	in cost proposal
V	UAT and Mock Election Completion (Conduct of UAT, Mock and Defect Fixing)	Week 30	in cost proposal
V	Training Completed	Week 30	in cost proposal
VI	Implementation of Final Release in a Live Polling Place Environment	Week 32	in cost proposal

VI	One-Time Electronic Pollbook Software License Fee	Week 32	in cost proposal
	Total		in cost proposal

Milestone	Deliverable Name	Cumulative Schedule Delivery Date	Deliverable Fee
VII	First year Software Support	Week 34 of project (Approval of Implementation)	in cost proposal
VIII	Second year Software Support	12 Months after prior support payment	in cost proposal
IX	Third year Software Support	12 Months after prior support payment	in cost proposal
	Total for 3 years		in cost proposal

Support Pricing:

1. Galois, will be able to offer reasonable discount if the county chooses to pay 3 years support fee as advance at week 34. We will be happy to provide more clarity during BAFO discussions.
2. Annual Software Support can be extended for period beyond 3 years at equivalent pricing. However, discounts will also be available if the county wishes to have a support period greater than 3 years at the onset of support.

7.2. Detailed specifications for acceptance testing of the system under full Election Day conditions and for different types of election (i.e. primaries, general, runoff elections).

The system is capable of being used in full-scale mock election scenarios of all types, and at least one full-scale mock election will be performed as part of acceptance testing. Additional acceptance testing requirements will be negotiated with the county's project team during BAFO or at project kick-off.

7.3. Required level of support that Elections must provide, both during the initial implementation of the system and for ongoing maintenance and support.

Elections must provide for basic maintenance and support of the COTS hardware (storage, battery charging, installation of software updates from hardware manufacturers, etc.) and availability of Internet connectivity at polling places—either

via existing hard line connections or via LTE cellular devices—during elections and field trials.

7.4. End-user training provided by Vendor, including content, number of hours training hours offered, number of people trained, and training documentation.

Full documentation including built-in help and a bilingual user's guide will be provided for the system, as previously mentioned. Additional end-user training will be provided as negotiated with the county project team during BAFO or at project kick-off.

7.5. Level of technical support to be provided by Vendor for each election.

Standard support channels (800 number, online chat interface) will be available for each election. We expect to provide on-site support and training only at initial delivery of the system; additional on-site support and training can be negotiated with the county's team during BAFO or at project kick-off.

7.6. Describe to what extent Elections should be able to support the system without Vendor's assistance.

We anticipate most support demands of the system will relate to the COTS hardware and its maintenance (storage, battery charging, installation of software updates from hardware manufacturers, etc.), rather than the software, and that Elections should be able to support these aspects of the system at minimal cost. Any necessary software support will be provided as part of our software warranty, discussed elsewhere in this document.

In addition, it is highly desirable that any system or solutions provide:

7.7. Built-in instructional videos for Poll Workers

As previously mentioned, the system will have built-in help; this can include instructional videos or animated user interface demonstrations at the client's request.

8. Vendor Experience

Vendor must, at a minimum, have:

8.1. Four (4) years' experience including each Election cycle with multiple ballot styles

8.2. County and State installations

8.3. Provide Pilot Elections

As discussed earlier, Galois has not executed a public contract focusing on an electronic poll book. We have extensive experience in working with elections authorities on other election technologies as has been detailed in prior sections of this proposal response.

9. Maintenance & Upgrades

Vendor must describe:

9.1. Vendor's standard maintenance and upgrade schedule for new system releases and patches, including any additional costs associated with maintenance and upgrades.

We do not anticipate that software maintenance or upgrades will be required. If any defect is discovered in the software at any time after delivery, for the life of that particular software version, regardless of whether an extended support agreement is in effect, we will fix the defect and deliver updated software at no cost.

Any required modifications to the software as a result of election law changes or minor County requirement changes after delivery are included for the three year duration of this contract, and also as part of any extended support agreement, and can be performed at a negotiated one-time cost if no extended support agreement is in place.

Hardware maintenance is dependent on the specific COTS systems used to run the software. If the County elects to purchase hardware through us as part of this contract, we will provide hardware support services for the duration of this contract and as part of any extended support agreement.

9.1.1. Day Light Savings Time

The system is designed to automatically handle Daylight Savings Time changes.

9.2. Vendor's level of support if the Elections elect not to sign an extended support agreement.

Regardless of Elections' choice to sign an extended support contract, we will fix any defect discovered in the software, at any time after delivery, at no cost. For the duration of this contract, we will also perform any modifications to the software required as a result of election law changes or minor County requirement changes, and provide hardware support services for any hardware purchased through us.

The primary support not provided if Elections chooses not to sign an extended support contract is the live telephone and chat-based support built in to the product and our answering deep technical questions about the system in an expedited fashion.

9.3. Vendor's standard for maintaining compatibility with third party software (i.e. Internet browsers).

Our particular implementation is independent of third party software, and is unaffected by changes in third party software versions.

10. Configurability

Vendor must describe:

10.1. The ability of the system to be re-configured and customized to fit Elections' evolving needs over time, including changes in the law or mandates.

Reconfiguration and customization to evolving business or legislative needs will be covered under the annual support contract, so long as such changes are reasonably scoped.

10.2. The ability of Elections to re-configure and customize the system without Vendor's assistance.

Reconfiguration and customization to evolving business or legislative needs will be covered under the annual support contract. Additionally, since the product is open source, the customer is quite welcome to reconfigure and customize the system without our assistance.