San Francisco’s Open Source Voting Project

Open Source Summit NA 2019

Tony Wasserman
tonyw@acm.org
@twasserman
San Francisco (2000)

Population ~800k; Registered Voters ~500K; Nov. 2018 Voter Turnout ~345K
City and County of San Francisco

Population ~800k; Registered Voters ~500K; Nov. 2018 Voter Turnout ~345K
San Francisco Elections

• Elections Commission – makes policies and plans
  • Members appointed by various city departments
  • Subcommittee for Budget and Oversight

• Elections Department – runs the election and reports results
  • Precinct voting
  • Ballot printing
  • Ballot scanning
  • Resolution of “problem” ballots and voters
SF Open Source Voting Project

• Goal: Develop the country’s first open source voting system
• Potential broad impact from successful implementation, both locally and nationally
• Justifications
  • Voter transparency
  • Likely cost savings
  • Freedom from the election systems vendors
San Francisco’s History of Open Source Voting (p. 1)

2005: Idea first suggested
2008: Board of Supervisors creates Voting System Task Force (VSTF)
2011: VSTF suggests open source
2014: Unanimous Board of Supervisors resolution
2015: SF Local Agency Formation Committee reports on technical and security claims by OSV proponents
2015: Unanimous Elections Commission resolution
San Francisco’s History of Open Source Voting (p. 2)

2015: Media Coverage (print, radio, TV, web)

SF Examiner, November, 2015
San Francisco’s History of Open Source Voting (p. 3)

2016: Mayor budgets $300K for planning phase
2017: Elections Commission forms Technical Advisory Committee (OSVTAC)
2017: Contract awarded to Slalom for planning
2018: Slalom report delivered
2018: OSVTAC identifies major flaws in Slalom recommendations
2018: Elections Commission passes new resolution

San Francisco’s History of Open Source Voting (p. 4)

2018: Feedback on SF Civil Grand Jury report

2018: Funds approved for ongoing project work ($1.7M over 2 years)

2018: Project Manager position in DT posted and filled

2019: Extensive study by DT of other Open Source Voting efforts

2019: First community meeting (July 31)
Why Has So Little Progress Been Made?

• Complexity of Elections
• Complexity of Voting
• Government Procurement Issues
• Difficulty of Building Community
• Public Concerns about Open Source Software
Elections are Complicated

- A ballot may cover many issues with different geographical boundaries
- Voter eligibility and registration
- Logistics of conducting the election
- Tabulating votes made in different ways
- Reviewing provisional, challenged, and improperly marked ballots
- Possible runoffs
- Verifying the results

https://sfelections.sfgov.org/results-reporting-schedule
City and County of San Francisco: 11 Supervisor Districts
Congressional Districts 12 and 14

San Francisco is split across two districts
State Assembly Districts

San Francisco is split across two districts – but different from Congressional districts
San Francisco has a single State Senator – District 11 extends beyond city limits
And more…. each with unique boundaries

• Bay Area Rapid Transit (BART) Districts
• Air Quality Districts
• School Districts
• Individual voting precincts

Not every voter gets the same ballot
To make matters more complicated...

Candidate names are often randomized to accommodate the “first in list” effect
Voting is complicated

• Ranked Choice Voting
• Early and election day voting
• Mail, City Hall, and precinct options
  https://sfelections.sfgov.org/ways-vote
• Provisions for disabled voters
• Provisions for military stationed remotely
• Support for multiple languages, currently English, Chinese, Spanish, and Filipino in SF, with some materials in Korean and Vietnamese for specific precinct needs
Voting System Problems

- Election hacking – now global target
Voting System Problems (continued)

- Current System not transparent
- Current System expensive with vendor lock-in
- Updates (bug fixes, enhancements) difficult (impossible?)
Government procurement issues

• Competitive bidding
• Transparency – “sunshine law”
• Legislative budget approvals
PESTLE: the Context of System Development

- Political
- Economic
- Social
- Technical
- Legal
- Environmental
Huge Citizen Concerns About Elections and Voting

• Accuracy of tabulation
• Opportunities for vendor fraud
• Possibility of improper registrations
• Need for paper ballot verification
• Cost of running elections
• Candidate signup – petitions, etc.
• Sources of candidate contributions

Poll watchers, Vote Counting observers, Outside election interests
Clean Money Campaign

Secure the Vote!

Join us at the Campaign Kickoff for
The Secure the VOTE Act (AB 1784)
Open-Source Paper Ballot Voting
Saturday, May 11
Doors Open 1:00pm. Rally 1:30pm-3:30pm.
Organizing and trainings 3:30pm-5:00pm.
The Women’s Building Auditorium
3543 18th Street #8, San Francisco, CA 94110

Speakers
- Assemblymember David Chiu, Joint Author of AB 1784 & State Budget Proposal
- Senator Scott Wiener, Principal Coauthor of AB 1784 & State Budget Proposal
- Assemblymember Rob Bonta
- Malia Cohen, Board of Equalization District 2
- Dave Canepa, San Mateo County Supervisor District 5
- Matt Haney, San Francisco County Supervisor District 6
- Trent Lange, President, California Clean Money Campaign
- Christine Pelosi, Chair, Women’s Caucus of CA Democratic Party
- Helen Grieco, Northern California Organizer, California Common Cause
- Pedro Hernandez, Senior Policy Coordinator, FairVote
- Brigitte Stanwy, Chair, Computer and Internet Caucus of CA Democratic Party
- Jill Ryan, San Francisco Elections Commission
- and other invited leaders

We need publicly owned open-source paper ballot voting systems. Join our campaign kickoff to pass the Secure the VOTE Act and get San Francisco and other counties to use publicly owned open-source paper ballot voting systems instead of secret corporate-owned systems!

Sponsor: California Clean Money Campaign

Co-Sponsors (in progress): California Association of Voting Officials • California Common Cause • Contra Costa County Democratic Club of San Pablo • Endangered Habitats League • FairVote California • Harvey Milk LGBT Democratic Club • Money Out! People In Coalition • Money for Teachers • Older Women’s League • Progressive Democrats of America • California • San Francisco Latino Democratic Club • San Mateo County Democracy for America • South Bay District 8 Democratic Club of San Francisco • Voting Rights Task Force • Wellstone Democratic Renewal

Refreshments, inspiring speakers, and a real way to make a difference

RSVP (no cost): www.YesFairElections.org or info@CAclean.org • (310) 390-6063

There is no street parking at The Women’s Building. Easily access-by: BART station at 16th & Mission St; SF Muni bus lines “14 Mission” stops at 16th & Mission St, “33 Ashbury” stops at 18th & Mission, bus line “49 Van Ness” stops at 16th & Mission. If you must drive, there’s a parking garage near the BART station at 16th & Mission St.

Sponsor: California Clean Money Campaign

Co-Sponsors (in progress): California Association of Voting Officials • California Common Cause • Contra Costa County Democratic Club of San Pablo • Endangered Habitats League • FairVote California • Harvey Milk LGBT Democratic Club • Money Out! People In Coalition • Money for Teachers • Older Women’s League • Progressive Democrats of America • California • San Francisco Latino Democratic Club • San Mateo County Democracy for America • South Bay District 8 Democratic Club of San Francisco • Voting Rights Task Force • Wellstone Democratic Renewal

Refreshments, inspiring speakers, and a real way to make a difference

RSVP (no cost): www.YesFairElections.org or info@CAclean.org • (310) 390-6063

There is no street parking at The Women’s Building. Easily access-by: BART station at 16th & Mission St; SF Muni bus lines “14 Mission” stops at 16th & Mission St, “33 Ashbury” stops at 18th & Mission, bus line “49 Van Ness” stops at 16th & Mission. If you must drive, there’s a parking garage near the BART station at 16th & Mission St.
Voting Systems are Frequently Challenged

- Inaccurate ballot scanning
- Problems with ballots
- Vendor access to machines
- Third-party hacking
Few options for voting systems

- Proprietary vendors
- Consolidation among vendors
- Poor reputation of vendors

- Cities, counties, states need a system to manage their elections and must allocate funds for staff, equipment, storage, transportation, and more
Not like “Election”
San Francisco is not the first to try building an open source voting system.
Selected voting system projects

- Free and Fair (Galois spinoff). [https://freeandfair.us/](https://freeandfair.us/)
- OSET Institute Trust the Vote [https://www.osetfoundation.org/](https://www.osetfoundation.org/)
- Los Angeles County Voting System for All People [https://vsap.lavote.net/](https://vsap.lavote.net/)
- Helios Server [https://heliosvoting.org/](https://heliosvoting.org/)
- Condorcet Internet Voting Service [https://civs.cs.cornell.edu/](https://civs.cs.cornell.edu/)
- Ondersteunende Software Verkiezingen (OSV) - Netherlands
Free and Fair (Galois)

• Fully open source software and documents
• Enhanced Berkeley-developed OpenCount ballot scanning system
• Building an open source, secure voting system under contract with DARPA https://bit.ly/2IlURia
• Includes partnering with Microsoft to develop ElectionGuard, an SDK that will enable anyone to build verifiable and secure elections technology https://n.pr/2ZZH20Q
OSET Institute – Trust the Vote

• Building **ElectOS**, an open, adaptable, flexible, full-featured and innovative elections technology platform.  
  [https://www.osetfoundation.org/](https://www.osetfoundation.org/)

• Goal: elections administration and voting including creating, marking, casting, and counting ballots, as well as managing all back-office functions.

• High-powered Strategic Board, but not much happening
Los Angeles Voting System for All People (VSAP)

• Developed by the Registrar-Recorder/County Clerk (RR/CC) in 2009 to address an aging voting system and an increasingly large and complex electorate.
• Certified by California’s Secretary of State for election use
• Makes use of open source technology
• Proprietary to Los Angeles County [https://vsap.lavote.net/](https://vsap.lavote.net/)
Helios Server

- Open Source – Apache 2.0
- Used by OSI for its elections
- No longer under development
- Small scale use
- Founder started Voting Works to build better voting machines
  https://voting.works/
Condorcet Internet Voting System

• Developed and maintained by Cornell CS Dept. over 15 years
  https://civs.cs.cornell.edu/
• Small scale online voting and polling
• Plan to develop Civitas to be more scalable and secure
• Most recent papers published 2008
  http://www.cs.cornell.edu/projects/civitas/
Ondersteunende Software Verkiezingen (OSV)

• Used in Dutch election with many political parties
• Detailed specifications
• Source code
• Enterprise Java application using OASIS Election Markup Language
Recommendation Topics from OSVTAC

- [https://osvtac.github.io/recommendations/](https://osvtac.github.io/recommendations/)
- Hardware and Software Components
- Development Process
- Implementation Order
- Questions to be Addressed in Decision-Making
- Testing and Certification
Hardware Components of voting system

• Accessible voting device
• Precinct ballot scanner
• Central ballot scanner (for vote-by-mail)
• Desktops and laptops
What is a paper-ballot scanner?
Software Components of Voting System

- Voting System Database / Management
- Ballot Batch Management
- EIMS® Integration
- Ballot Layout Creator
- Ballot Layout Encoder
- Accessible Ballot-Marking Device Software
- Ballot Picture Interpreter
- Scanner Device Drivers (one for precinct and one for central)
- Central Ballot Scanner Software
- Precinct Ballot Scanner Software
- Vote Totaler
- Results Reporter
- Ballot Tabulation Audit Support
(Some) supporters of open source voting project
Follow the project

• OSVTAC.github.io – all documents available
  • Chair: Chris Jerdonek
  • chris.jerdonk@sfgov.org  |  @cjerdonek
• SF Elections Commission
  • https://www.sf.gov/ElectionsCommission
  • @SFElectionsComm
• Project status and community
  • https://opensourcevoting.sfgov.org/
SF City Hall

All photos by Tony Wasserman