

Florida Voting System Standards
Comment by Rebecca Mercuri, Ph.D.
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I have reviewed the “Florida Voting System Standards” document issued by Glenda Hood, Florida’s Secretary of State, published by the Florida Division of Elections, Bureau of Voting System Certification as Form DS-DE 101, Eff. 1-12-05, available at <http://election.dos.state.fl.us/laws/proposedrules/pdf/dsde101Form.pdf>. I was not able to ascertain whether this is the most recent version of this document. I will refer to this document as FLVSS through this comment.

The FLVSS provides insight and direction regarding the certification of voting machines that may be deemed acceptable for use in the State of Florida. The FLVSS correctly defines a voting system as consisting “of a configuration of specific hardware and software components, procedures and expendable supplies” and also states that “no single component of a voting system, such as a precinct tabulation device, meets the definition of a voting system.” This is necessary, because the components, collectively and independently, can control and influence various aspects of the election.

The FLVSS speaks of the establishment of “minimum standards for certification or provisional certification” and references the Federal Election Commission’s 1990 and 2002 voting system guidelines as well as the 2005 NIST/HAVA/EAC guidelines (which at the time of publication of the FLVSS had not yet been formally issued, but were subsequently released in December 2005). Certification under these federal programs is conducted with testing performed by Independent Testing Authorities (ITAs) certified by the National Association of State Election Directors (until recently, and now by the U.S. Election Assistance Commission). There are three authorized ITA’s, CIBER, Inc., Systest, and Wyle Laboratories. Wyle and Systest are authorized to perform hardware and firmware compliance tests, and CIBER and Systest are authorized for software testing. The FLVSS cautions that: “ITA qualification will not satisfy requirements for Florida Certification.” This is because additional testing, by the Bureau of Voting System Certification in Florida’s Division of Elections, is required for compliance with the Florida standards. The FLVSS also notes that “some of the work product necessary to establish compliance with the FEC standards can be used to establish compliance with some of the Florida requirements” but remains vague as to what components of the ITA reviews can be used, stating that “the staff of the Division of Elections, Voting Systems Section is available to assist you with any questions on application of the standards.” This vagueness could be problematic if it is unequivocally applied to different manufacturers’ products. As well, since the three federal certifications (1990, 2002 and 2005) demonstrate increasing levels of difficulty in gaining compliance, *components holding ITA acceptance only under the earlier programs will not have been subjected to more rigorous testing, thus resulting in integrated end products that may differ in compliance with critical aspects (such as auditability, security, usability, etc.) and may pose unfair disparities between municipalities that have adopted units accepted under these different programs.*

The FLVSS speaks of “provisional certification” which “is designed to allow for the approval of hardware and software for innovative use as well as new systems for actual election use” but it is unclear what the extent of differentiation is between this and full certification. In particular, the FLVSS notes that provisionally certified voting systems “are not required to have undergone the Hardware Qualification Tests provided in these standards.” This exemption also includes “personal computer, operating system, or other hardware and software products, that are available to the general public, [that] are shown to be compatible with the operational and administrative requirements of the election programming, polling place or central counting environment.” Since the Hardware Qualification Tests (which are specified to be performed to Military Standard 810D) directly impact reliability, including metrics of evaluation of Mean Time Between Failures (MTBF) rates, and since publicly available components (often known as COTS) do not necessarily provide any more assurances than do custom products (and may even be more risky in terms of security aspects) this exemption is, in my opinion, wholly inappropriate, since *the allowance for provisional certification thus provides an opportunity for unequitable application of the standards to different products, and the potential of unfair disparities between municipalities that are using equipment that is provisionally (rather than fully) certified.*

The Hardware Qualification tests are described in great detail, comprising 13 pages of the 67-page FLVSS document. In contrast, *the software qualification descriptions are grossly inadequate*, and only provided in general terms (known as functional or “black box” evaluations) over a couple of pages. Omitted is any description of code review requirements, penetration testing (such as via “red team” and risks analysis), and other common criteria that are standard to the computer industry for secure applications. Indeed, *the FLVSS definitions of security found on page 20 are inadequate to prevent or detect insider manipulations of voting system functions. Of particular concern is the allowance for the use of local or remote data networks in the voting system configuration without adequate assurances for integrity and anonymity of balloting.*

Other inadequacies in the FLVSS qualification tests include:

- The stated *error rate* of one part in a million may be insufficient if the entire set of ballot choices are considered as input. For example, if ballots containing 100 possible choices form the test configuration, the per-ballot error rate drops to one in ten-thousand.
- The *3% rejection rate* in terms of reliability is far too lax.
- *Memory stability* is defined as error-free for only 6 months – this is too low since federal election retention requirements are 22 months. The bit stability rate of 99.5% for internal memory and 99.95% is also too low, since a single error in a high numeric data bit can lead to gross miscalculations.
- The useful *equipment life* (8 years for precinct counting and 12 years for central counting) places undue burden on municipalities that may find it necessary to replace or repair systems, likely without federal or state funding assistance, potentially as soon as 2010.
- The *Mean Time Between Failures* rate of 163 hours, although consistent with the federal guidelines, has been widely criticized in the engineering community as

- grossly inadequate since, over a 15-hour election day, it allows that nearly 10% of the deployed voting units may fail in precinct use. As this inappropriate rate is also used to calculate system availability, excessive voter disenfranchisement due to denial-of-service may be (and indeed has been) experienced at some of Florida's polling places during election day.
- The operating temperature maximum of 100 degrees is too low for Florida's climate conditions, as it assumes that all precincts where voting equipment is deployed will be fully air-conditioned. The non-operational temperature maximum of 130 degrees is also too low, given that equipment in vehicles for transit to polling places could be exposed to temperatures over 200 degrees. Storage facilities affected by power outages may also not be able to maintain the appropriate temperature levels, thus risking damage to the systems.

Further *serious omissions* in the FLVSS are as follows:

- *Accuracy* is defined in terms of "votes cast," leaving open the possibility that ballots may not actually be recorded as cast by the machine, with no way of determining the intention for casting by the voter. This problem has occurred in actual elections (in many states, including Florida), resulting in high undervote rates that are unresolvable.
- *Independent auditability* requirements (such as provided by voter verified paper ballots) have been omitted. All auditing relies on system-generated information, some of which may be in a proprietary format that has been prevented from exposure due to vendor trade secrecy claims.
- There is no provision or process provided for *decertification*. Equipment that has received final Florida certification that is later found to be noncompliant is not required to be withdrawn from use.
- Although it is stated that "equipment to be tested shall be equivalent in *form and function* with production units," there is no process whereby the State assures this to be the case. Nor is there any ongoing process that ensures that later updates or modifications to the deployed election systems have only included certified components.

Because of the aforementioned potential inequities, inadequacies, and omissions, the FLVSS is, in my opinion, seriously flawed. The Florida examination process thus is not sufficiently comprehensive to assure confidence in the deployment and use of the State's election systems.