

Testimony of John Wack for the Election Assistance Commission

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NIST Test suites for VVSG version 1.1

The National Institute of Standards and Technology

Thank you for the opportunity to testify about the National Institute of Standards and Technology (NIST) developed test suites for the proposed Draft Revisions to 2005 Voluntary Voting System Guidelines (VVSG 1.1). I will provide an overview of NIST's role in testing and how these test suites will assist labs and manufactures in reducing costs of testing and improving quality and transparency of the testing process. I will give an overview of the test suites and provide information on next steps.

NIST has extensive experience in developing test suites for a variety of different standards and technologies as diverse as electronic commerce, healthcare and national defense. NIST developed test suites including: XML, the key web standard for enabling electronic commerce, SQL database standard and several graphics standards. NIST is also developing test suites to implement the Nationwide Health Information Network. The test suites address the core functionality of these systems as defined in the applicable standards.

There are many different types of testing and testing programs. The type of testing program used by the election community was established in the 2002 Help America Vote Act (HAVA) and consists of nationally accredited laboratories providing testing services and a national certification performed by the Election Assistance Commission (EAC). The question remains, though, what kind of tests should the accredited laboratories perform? How can the EAC and their customers know that every test lab is testing the best and most efficient way possible in the most transparent way possible?

The primary answer to these questions is the development of public test suites that will be used by all accredited laboratories. The NIST-developed public test suites serve several purposes:

- They establish for manufacturers exactly what it means to meet a given specification. This helps manufacturers develop better products.
- It reduces the cost of testing since each test lab does not need to invent the same work. It reduces the amount of time spent testing systems that do not meet the VVSG specification, since manufacturers can already have run the tests in house before they submit a product for testing.
- It helps ensure consistency between test labs. In some circumstances manufacturers have been able to "shop" for easier labs. Public test suites help prevent this.
- It promotes transparency of the testing process since all interested parties can see and comment on the test suites.

Additionally, the public test suites can be used by NIST's National Voluntary Laboratory Accreditation Program (NVLAP) to assess labs' capability to test voting systems, thus providing a measure of confidence that such laboratories are capable of performing testing to meet the requirements of HAVA. HAVA requires EAC and NIST to develop a national program for accrediting voting system testing laboratories and in June 2005, NIST/NVLAP announced the availability of applications for the voting systems program in the Federal Register. Laboratories that achieve NVLAP accreditation are recommended by NIST to the EAC for accreditation.

The test suites were originally written to address the requirements in the 2007 TGDC (Technical Guidelines Development Committee) VVSG Recommendations to the EAC. The VVSG 1.1 has been updated primarily with requirements taken from the TGDC VVSG Recommendations to the EAC, thus the test suites for VVSG 1.1 correspond directly to those requirements and only those requirements -- the test suites do not address any of the existing requirements in the 2005 VVSG. The test suites address subsets of the new requirements such as usability and accessibility, security, and core requirements and testing. Several new requirements in the area of security were added to the VVSG 1.1, and tests were written for those requirements.

There are four test suites to address the new requirements added to VVSG 1.1: two test suites to address the added core requirements, a test suite for the added human factors requirements, and a test suite for the added security requirements. Why so many test suites? The VVSG encompasses a wide range of technologies, each demanding its own test suite. Each type of test suite has to be uniquely designed. For example, the human factors test suites will require expert analysis. To test some of the requirements in the area of core requirements, a pseudo-election must be run as part of the test.

In order to build the test suites, each requirement was scrutinized and unique tests were developed. Often times, a single requirement results in many tests, or one test can test multiple requirements. Moreover, the tests require an in-depth understanding of the technology being used. Each test needs to be robust, self-contained, and correct and usable, with consistent pass/fail criteria. It is necessary to fully understand both the VVSG and what techniques are available at a reasonable cost.

I will provide a brief description for each of the test suites:

- The Votetest distribution is a package of public domain data, software, and documentation that NIST has developed to address a number of the core requirements added to VVSG 1.1. It defines abstract tests that exercise every phase of the voting process from election definition through report generation. In addition to the abstract tests, Votetest includes the expected results for each test, a means to derive the expected results for newly developed tests, and a test generator. In essence, Votetest runs a pseudo-election to exercise the requirements.
- In the area of hardware core requirements, there is an additional test suite for operating temperature and humidity.

- The human factors test suite addresses the human factors requirements added from the TGDC Recommendations to Section 3 of VVSG 1.1. They address the usability and accessibility requirements with the exception of the usability performance benchmark requirements, which were not added to VVSG 1.1. The requirements require expert analysis and thus must be performed by qualified individuals.
- The security test suite addresses those cryptographic requirements, electronic reports requirements, software setup validation requirements, and voter verified paper audit trail (VVPAT) requirements added to VVSG 1.1. Additionally, several new requirements were added to VVSG 1.1 in the area of setup validation, thus the test suite contains tests for these new requirements.

The test suites were made available for public review in April, 2009. NIST is now working with the election assistance commission to meet directly with test labs to ensure that the test suites can be integrated into lab practices and, eventually, used by the labs when testing voting systems for conformance to requirements in the VVSG 1.1.

Thank you for the opportunity to testify about the NIST-developed test suites for VVSG 1.1 and this concludes my testimony.