

wyle
laboratories

UTILITY
SERVICES

ACOUSTICS

TEST AND
ENGINEERING

LIFE SCIENCES

AEROSPACE

SPECIAL TEST SYSTEMS

EXCEEDING EXPECTATIONS EVERY DAY

Wyle Laboratories is a leading provider of testing and engineering services. We are committed to providing our clients with the highest quality of service and the most accurate results. Our services include testing and engineering, utility services, life sciences, aerospace, and special test systems. We are proud to be a part of the Wyle family and to be committed to exceeding expectations every day.

Wyle Capabilities

- Wyle personnel has 48 years combined experience in voting systems testing and certification. This experience is in both hardware and software aspects of voting systems testing.
- Wyle currently has 12 qualified and trained personal working in the Voting System Test Group.
- Wyle has access to contractors with over 10 years experience testing voting systems.
- Wyle has personal currently in other areas that have experience in voting systems testing.



What we do.

- Wyle tests voting systems to the applicable standards required by the EAC or State or Local governments.
- Wyle does conformance testing to these standards. Wyle's objective is to provide clear evidence that each testable requirement has been met with in the standards.
- Wyle is certified by NIST/NVLAP to test to the EN 17025 and Federal Election Commission (FEC) Voting System Standard of 2002 (VSS-2002), including the Help America Vote Act (HAVA) requirements and the Election Assistance Commission (EAC) Voluntary Voting System Guidelines of 2005 (VVSG-2005), for core test methods.
- Wyle is certified as an EAC VSTL to test voting systems.

Wyle's Approach

Wyle designed the VSTL program using a modular approach. The requirements of the VVSG were broken into the following test areas:

- TDP Review
- Source Code Review
- All Hardware Testing
 - Environmental Testing
 - Electromagnetic Interference
- Physical Configuration Audits
- Functional Configuration Audits
- Usability and Accessibility
- Performance Based Tests
 - Volume
 - Stress
 - Accuracy
- Security Testing
- Telecommunications Testing
- System Integration Tests
- Product Safety, Maintainability
- Witness Build and System Installation Testing

Each test area has a start time, set of procedures, and acceptance criteria for completing the testing for that test area.

Wyle's Approach (cont)

- Wyle used the experience from the A2LA program to design an efficient system for designing and validating test methods and test cases. This allows Wyle to design and validate test methods and test cases in a matter of days instead of weeks or months.
- Wyle based all software test documentation on a published industry standard (IEEE-829 Standard for Software and System Test Documentation). This allows Wyle to clearly communicate all test procedures and test case steps to the EAC and the Technical Reviewers (TR).
- Wyle uses a transparent process throughout an EAC test campaign. All Test Case Procedure Specifications and Test Cases are submitted to the EAC before actual testing starts. This allows the EAC and TR's to have an open discussion about a test before the test is executed.

Wyle's Approach (cont)

- Wyle reports each test area as it is completed. This allows the EAC and the TR's to digest small portions of the test campaign instead of waiting until the end of the test campaign. It also allows Wyle the opportunity to retest an area of concern in an efficient and inexpensive way.
- Wyle used an object oriented approach to develop baseline test cases. The test cases are used like building blocks to construct larger system functions. This approach assists in test case design, test case validation and can accelerate re-testing and regression testing through reuse of test data and test cases.
- Wyle developed a requirements matrix tool that allows the EAC and the TR's to easily trace Wyle's test methods and test cases to the 2005 VVSG.

Wyle's Approach (cont)

- Wyle developed security test approach that goes beyond the 2005 VVSG. A combination of tools and highly qualified personal are used to provide a level of comfort in one of the most scrutinized areas of testing.
- Wyle has an independent Quality Assurance department to insure qualified personnel have the proper test procedures and equipment before a test is started.

Voting System Test Process

Pre-Testing Activities

- **Technical Data Package Review**

A full review of all design, build, and user documentation to Vol II Section 2 requirements of VVSG including traceability and consistency.

- **Source Code Review**

Four different manual reviews of the actual source code. A compliance review to the VVSG, a COTS review, a functional review, and a security review are all performed on the voting systems software package.

- **Physical Configuration Audit**

Audit the hardware models, software versions, and COTS equipment to insure the manufacturer has documented it correctly. This creates a baseline for the system. All changes to the system during the test campaign are re-examined throughout the test campaign.

- **Functional Configuration Audit**

Audit of the voting system to all stated features and functions of the voting system. All user documentation is examined against the actual function of the system. All applicable functional VVSG requirements are validated during this process.

Testing Activities

- **Hardware Tests**
All environmental and electrical test.
- **System Performance Tests**
Volume Test
Stress Test
Accuracy Test
- **Security Tests**
Automated Source Code Analyzer (Fortify)
Penetration Testing
Access and Physical Controls
Roles and Permissions
- **Telecommunication**
Accuracy and Reliability
- **Usability and Accessibility**
- **System Level Integration Testing**

Post-Testing Activities

- **Engineering Data Analysis**
Analysis all data generated during the test campaign for durability, availability, and reliability issues.
- **Functional Requirements Checklist**
Insure every VVSG functional requirement is traceable to a test or a test step during the test campaign.
- **Test Report**
Develop the EAC National Certification Test Report.
- **Data Collection and Storage**
Collect and organize all data generated during the test campaign.
Store in a secure place until the last unit is retired in the field.
- **Disposition Equipment**
Return all equipment back to the manufacturer.

Cost and Time of Testing

- Wyle attempts to provide as much fixed cost pricing as possible. This allow the customer to budget known costs up front. The major three areas that are difficult to gage for fixed price quotes are source code re-review, TDP re-review and anomalies that occur during test.
- Past experience has shown the main factor in the cost of testing is how prepared a manufacturer is to begin a test campaign. This preparation includes the completeness of deliverables and understanding of the EAC program.

Cost and Time

- **Pre-Testing Activities – 3 - 6 months**

The largest amount of time and money is spent during this stage of testing. Issues are discovered with documentation, source code, and functional requirements. These issues must be address by the manufacturer triggering re-examination. These reviews and re-reviews can not be estimated and depend on the manufacturers attitude and promptness.

- **Testing Activities – 3 – 4 months**

One month of hardware testing and two to three months for the software and system testing. Any large costs in the stage are usually trigger in hardware design or software architectural design. If neither of these issues arise costs are lower and can be estimated easily.

- **Post-Testing Activities – 1 – 2 months**

Analysis of data and generating the report are the major activities of this stage. Both are easily estimated and usually do not have large cost over runs associated with them.

Pre-Testing Activities

Testing Activities

**Post-Testing
Activities**



Questions

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