

Exhibit X



"Shawn Southworth"
<ssouthworth@ciber.com>
08/30/2005 12:09 PM

To: "Hancock, Brian" <bhancock@eac.gov>
cc
bcc
Subject: GEMS 1-18-24 Report

Brian,

Here is the 1-18-24 report with the EMP removed.

Thanks,



Shawn 2005-08-03GEMS1-18-24FinalReport.pdf

**Software Functional Test Report
Diebold Election Systems
GEMS 1-18-24**

Original Report Version 1.0 for GEMS 1-18-24 created 08/03/05

Vendor: Diebold Election Systems

Software: GEMS 1-18-24

Prepared By: CIBER, Inc.

1 INTRODUCTION

CIBER is pleased to submit this report summarizing the functional testing, the source code review, and the documentation review of the GEMS 1-18-24 Election Management System software. The following sections of this document identify the software that was tested, summarize the testing approach and present the results of the testing.

1.1 TEST AGENCY TEST AGENCY HISTORY AND CAPABILITY

CIBER Inc. has been providing IT consulting services for over 20 years. Although the Independent Test Authority (ITA) division name has changed due to an aggressive acquisition and merger market, the ITA division of the company has had the same leadership in place since inception. Founded in 1974, the company's consultants now serve client businesses from 35 Ciber, 10 DigiTerra, 4 Solution Partners and 4 Enspherics offices in the U.S., Canada and Europe. With offices in six countries, Ciber's 4,500 IT specialists continuously build, test and upgrade our client's systems to "competitive advantage status." Ciber provides a single source for IT solutions, including:

- Full-solution ASP services
- Applications maintenance and support
- Testing and IQA
- Web and database hosting
- Enterprise solutions, including SAP, Oracle and Peoplesoft
- Application outsourcing
- eBusiness, from architecture through execution
- Knowledge management and training

The company has been involved in numerous QA and IQA testing projects for commercial, state, and federal government customers. Ciber has an interim accreditation as an ITA through the National Association of State Election Directors (NASSED).

1.2 DOCUMENT OVERVIEW

This document consists of five main sections: Introduction, Qualification Test Background, System Identification, System Overview, and Qualification Test Results. The Qualification Background gives general information about the qualification test process. The System Identification Section gives information about the GEMS software and supporting hardware. The System Overview describes the software and the Qualification Test Results Section provides a summary of the results of the testing process.

Detailed information including the Technical Data Package (TDP) Review, Source Code Review, and Functional Test Review are included as appendices to this report. Tables

illustrating the software's adherence to the FEC Software Qualification Requirements are included in each appendix.

2 QUALIFICATION TEST BACKGROUND

The primary purpose of Software Qualification Testing is to demonstrate compliance with levels of design, performance, and quality claimed for them by manufacturers. The tests are also intended to demonstrate that the system meets or exceeds the requirements of the Federal Election Commission (FEC) Voting System Standards.

The scope and detail of the requirements for qualification have been tailored to the design and complexity of the software submitted by Diebold for testing. The qualification test procedure is intended to discover defects in software design and system operation which, should they occur in actual election use, could result in failure to complete election operations in a satisfactory manner.

The tests have been designed to evaluate system compliance with the requirements of the FEC Voting System Standards. The examination included selective in-depth examination of software, the inspection and evaluation of system documentation and tests verifying system performance and function under normal and abnormal conditions.

3 SYSTEM IDENTIFICATION

Diebold submitted Version 1-18-24 of the GEMS Election Management System for qualification under the 2002 Voting System Standards.

The scope of this qualification effort was to test the GEMS software to verify that the system meets the 2002 FEC Standards. The qualification testing consisted of inspecting and reviewing both the source code and documentation, along with performing a system integration test.

Following is a list of the components that were included in the testing

Software

- **Gems.exe** - The GEMS 1-18-24 program dated 5/13/05
- **Express Poll 1.1.5** package created 6/30/05

Test Support Hardware and Software Tools

- **AccuVote-OS Precinct Count (Optical Scan) 1.96.6** Firmware*
- **AccuVote-OS Central Count (Optical Scan) 2.0.12** Firmware**
- **AccuVote-TSx Precinct Count with AVPM (Touch Screen with Printer Module)**
Bootloader BLR7-1.2.1 running Windows CE WCER7-410.2.1 operating system. 4.6.3
Firmware *

- **Election Media Processor 4.6.1.0** program dated 3/30/2005 *–was included in test but is not recommended for qualification at this time*
- **Key Card Tool 4.6.1***
- **VCProgrammer 4.6.1***
- **Voter Card Encoder 1.3.2***
- **Express Poll 4000**

**(Note: These were used to collect votes, create memory and voter cards, and to test the interfaces of the GEMS application software. Actual source, TDP, and functional testing of these devices is performed by the hardware ITA.)*

*** (Note: This was used to collect votes. Hardware testing was performed by the hardware ITA. Source, TDP, and functional testing was performed by CIBER and previously qualified under NASED N-1-06-12-12-004, NASED N-1-06-12-12-005, and NASED N-1-06-12-12-005.*

COTS Support Hardware and Software

A list of COTS products utilized by each software and hardware application in the voting system follows:

- **GEMS 1-18-24:** [REDACTED]
- **Election Media Processor:** [REDACTED]
- **Key Card Tool:** [REDACTED]
- **VCProgrammer:** [REDACTED]
- **Voter Card Encoder:** [REDACTED]
- **Express Poll 4000:** [REDACTED]

Documentation

The following is a list of documents that were reviewed or utilized for this effort:

Component	Document	Revision
GEMS 1.18	2.01 Technical Data Package Introduction	Rev. 3.0
	2.02 System Overview	Rev. 3.0
	2.03 System Functionality Description	Rev. 3.0
	2.05 Software Design and Specifications	Rev. 3.0
	2.06 System Security Specification	Rev. 3.0
	2.07 System Test and Verification Specifications	Rev. 3.0
	2.08 System Operations Procedures	Rev. 3.0
	2.10 Personnel Deployment & Training Requirements	Rev. 3.0
	2.11 Configuration Management Plan	Rev. 3.0
	2.12 Quality Assurance Program	Rev. 3.0

	2.13 System Change Notes	Rev. 3.0
	2.14 Telecommunications	Rev. 3.0
	App A Software Specifications	Rev. 3.0
	App B Program Specifications	Rev. 3.0
	App C Program Structure and Flow	Rev. 3.0
	App D Data Organization and Flow	Rev. 3.0
	App E System and Data Integrity	Rev. 3.0
	App F File Management	Rev. 3.0
	App G Protocols	Rev. 3.0
	App H SSL Protocol Specification	Rev. 3.0
	App I GEMS Reports	Rev. 3.0
	App J Abasic	Rev. 3.0
	App K TSText	Rev. 3.0
	App L Software Build Process	Rev. 3.0
	App M Procurement Certification	Rev. 3.0
	App N Performance Metrics	Rev. 3.0
	App O Configuration Management	Rev. 3.0
	App P Quality Assurance Methodology	Rev. 3.0
	App Q Test Plans: Executed test plans, Test Plans, Testing summary, Verification list	Rev. 3.0
	App R Administrative Test Plans	Rev. 3.0
	App S C++ Coding Style	Rev. 3.0
	App T Bugzilla User's Guide	Rev. 3.0
	App U Documentation Standards	Rev. 3.0
	App V System Acquisition	Rev. 3.0
	App W Training Program Overview	Rev. 3.0
	App X Client Security Policy	Rev. 3.0
	App Z Development Office Backup Guide	Rev. 3.0
	App 1 Windows NT Security	
	FVSS 2002 Vendor Testing and TDP Trace	Rev. 3.0
	Election Administrator's Guide	Rev. 8.0
	Product Overview Guide	Rev. 2.0
	Reference Guide	Rev. 8.0
	Server Administration Guide	Rev. 3.0
	System Administrator's Guide	Rev 6.0
	User's Guide	Rev. 12.0
	*Appendix O Configuration Management: folder Managing Design and Development	Rev. 3.0
	*Appendix P QA Methodology	Rev. 1.0
	*App Y Support: Bridge Track User's Guide March 2004	
	*CTS 1.1 User's Guide	Rev. 3.0
	*Jresult Client 1.1 User's Guide	Rev. 1.0
	*Various DESI documents (document numbers prefaced with "Q")	

*Documents referenced in GEMS 1-18 TDP. A review was not performed on these documents- they were used as references only.

Component	Document	Revision
ExpressPoll 4000 R 1.1.5	2.01 TDP Introduction	Rev. 2.0
	2.02 System Overview	Rev. 2.0
	2.03 System Functionality Description	Rev. 2.0
	2.05 Software Design and Specification	Rev. 2.0
	2.06 System Security Specifications	Rev. 2.0
	2.07 System Test and Verification Specifications	Rev. 2.0
	2.08 System Operations Procedures	Rev. 2.0
	2.10 Personnel Deployment and Training Requirements	Rev. 2.0
	2.11 Configuration Management Plan	Rev. 2.0
	2.12 Quality Assurance Program	Rev. 2.0
	2.13 System Change Notes	Rev. 2.0
	2.14 Telecommunications	
	Appendix A: Software Specifications	Rev. 2.0
	Appendix B: Program Structure and Flow	Rev. 2.0
	Appendix C: Data Organization and Flow	Rev. 2.0
	Appendix D: Software Build Process	Rev. 2.0
	Appendix E: Installation Procedures	Rev. 2.0
	Appendix F: Procurement Certification	Rev. 2.0
	Appendix G: Performance Metrics	Rev. 2.0
	Appendix H: System and Data Integrity	Rev. 2.0
	Appendix I: Hardware Component Specifications	Rev. 2.0
	Appendix J: Configuration Management	Rev. 2.0
	Appendix K: Quality Assurance Methodology	Rev. 2.0
	Appendix L: Test Plans	Rev. 2.0
	Appendix M: Administrative Test Plans	Rev. 2.0
	Appendix N: Bugzilla	Rev. 2.0
	Appendix O: Coding Style	Rev. 2.0
	Appendix P: Documentation Standards	Rev. 2.0
	Appendix Q: Client Security Policy	Rev. 2.0
	Appendix R: Training Programs	Rev. 2.0
	Appendix S: Development Office Backup Guide	Rev. 2.0
Appendix T: System Acquisition	Rev. 2.0	
Appendix U: Support Revision 2.0	Rev. 2.0	
Appendix V: Windows CE Security	Rev. 2.0	
FVSS 2002 Vendor Testing and TDP Trace	Rev. 2.0	
Election Administrator's Guide	Rev. 2.0	
System Administrator's Guide	Rev. 2.0	
User's Guide	Rev. 2.0	

4 SYSTEM OVERVIEW

Software:

Diebold submitted GEMS 1-18-24 to CIBER to be qualified under the FEC standards of 2002. GEMS provides a comprehensive tool for composing an election from the point of defining election configuration parameters, jurisdictional information, race and candidate information, and ballot content. It also supports creating ballot artwork, programming the voting device memory cards with election and ballot information, receiving election results from uploaded memory cards, and issuing election results reports. GEMS may be used to configure both general and primary elections, and is designed to interface with the AccuVote-TS DRE as well as the AccuVote-OS marksense ballot counting device.

GEMS Clients:

The GEMS election management software is used in tandem with the following client products offered by Diebold Election Systems.

AccuVote-OS

The AccuVote-OS is a mark-sense optical scanning device used to read paper ballots.

AccuVote-TS

The AccuVote-TS is a DRE voting unit on which voters vote and cast ballots either by touching the touch screen display, or by entering selections from a numeric keypad in order to vote an audio ballot.

Election Media Processor (EMP)

The Election Media Processor is a bulk device used for downloading and uploading AccuVote-TS memory cards. *The Election Media Processor is not recommended for qualification at this time.*

Key Card Tool

Key Card Tool is a PC based software application designed to enhance the security provided by AccuVote-TS units used in an election. The Key Card Tool application, when used in conjunction with an external smart card reader device, allows the user to create a smart card encoded with user-defined security codes or keys.

VCProgrammer

VCProgrammer is a voter access card encoding application, installed on a PC, used to create voter access cards at the early voting polling locations.

Voter Card Encoder

The Voter Card Encoder is a pocket-sized device used for encoding voter access cards at the polls.

Express Poll 4000

The Express Poll 4000 is an Electronic Roster and voter access card writer. Only the card writer of this system was included in the testing.

5 QUALIFICATION TEST RESULTS

5.1 TECHNICAL DATA PACKAGE (TDP) REVIEW SUMMARY

The TDP contains requirements, design, configuration management, quality assurance, and system operations information. The FEC requirements state that at a minimum, the TDP shall contain the following documentation: system configuration overview; system functionality description; system hardware specifications; software design and specifications; system test and verification specifications; system security specifications; user/system operations procedures; system maintenance procedures; personnel deployment and training requirements; configuration management plan; quality assurance program; and system change notes.

A very complete software TDP was submitted. This included all documentation listed in Section 3. The documents were reviewed for accuracy and completeness as a part of the TDP testing process. The documents from the TDP also served as the basis for verifying the Software Test Plan that was used for functional testing.

Upon final review of the aforementioned documents, CIBER concludes that the TDP submitted by Diebold meets the requirements under the FEC standards of 2002. Appendix A TDP Review provides more detailed information about the reviewed documents.

5.2 SOURCE CODE REVIEW SUMMARY

The source code changes were reviewed in order to evaluate its compliance with the 2002 FEC standards for source code. These standards are intended to ensure that the overall objectives of the logical correctness, system integrity, reliability, and accuracy are being met. It was also reviewed for its adherence to all Diebold coding standards.

Upon final review of GEMS Version 1.18.24 source code and the Express Poll 1.1.5 source code, CIBER concludes that the source code submitted by Diebold meets the requirements under the FEC standards of 2002. Appendix B Source Code Review provides more detailed information about the source code review.

5.3 FUNCTIONAL TEST SUMMARY

The main goal of functional testing was to verify that the GEMS 1-18-24 software application met the 2002 FEC standards. The functional testing performed by CIBER included defining and creating ballots for voting, producing voter cards, accumulating summary data from the touchscreen and optical scan devices, and reporting results for primary and general elections.

The functional testing included testing against the functional, overall system performance, software, security, communication and data transmission, and audit requirements as specified in the FEC Voting System Standards of 2002.

The functional testing and physical configuration audit were performed at the CIBER and at the Wyle Laboratories sites in Huntsville, AL. CIBER performed a witness of the software compile, build, and creation of the GEMS installation package. This installation package was then installed at the CIBER facility and a comprehensive test focusing upon the exercise of all functions and options in any given area. A system level functional test was conducted that exercised both primary and general elections and included contests, candidates and proposals. Votes were generated using both the AccuVote TSx touchscreen voting machines and the AccuVote-OS optical scan paper ballot counting system.

Functional Testing was also performed on the Express Poll 4000 (card writer functions only) running software 1.1.5.

After completing the final functional testing, CIBER concludes that GEMS 1-18-24 meets the 2002 functional requirements provided by the FEC as well as the additional requirements stated or derived from the TDP. Appendix C Functional Test Review provides more information on the functional test process and the test results.

5.4 RECOMMENDATION FOR QUALIFICATION

It has been demonstrated through the TDP review, source code review and functional testing that GEMS 1-18-24 successfully meets the required acceptance criteria of the 2002 FEC Voting System Standards.

It is upon completion of this testing that Ciber recommends to the NASED committee that GEMS 1-18-24 be certified under the 2002 FEC Standards.

APPENDIX A

TECHNICAL DATA PACKAGE (TDP) REVIEW

TDP REVIEW - APPROACH AND FINDINGS

The TDP review is an evaluation for compliance with the 2002 FEC standards for TDP completeness and quality. The FEC standards state that vendor documentation relating to voting system hardware shall be submitted with the system as a precondition of qualification testing. These are the items necessary to define the product and its method of operation; to provide vendor technical and test data supporting the vendor's claims of the system's functional capabilities and performance levels; and to document instructions and procedures governing system operation and field maintenance.

In addition to the aforementioned items, documentation and records for configuration management and quality assurance are also required parts of the TDP. Additional documents were referenced, but were not a part of this TDP review. These documents are listed with an asterisk in Section 3 of this report.

The TDP for GEMS 1-18-24 and for Express Poll 4000 1.1.5 was evaluated and found to meet the FEC 2002 standards. Some anomalies were detected during the review and all were corrected before testing was completed.

APPENDIX B

SOURCE CODE REVIEW

SOURCE CODE REVIEW APPROACH AND FINDINGS FOR GEMS 1-18-24

The source code review is an evaluation for compliance with the 2002 FEC standards and Diebold's C++ Coding Style Version 2.0.

This report details the results of the GEMS 1.18.24 system software evaluation. The evaluation is an assessment of the source code considering the following characteristics:

- Selection of programming languages: High-level programming language shall be used.
- Software integrity: Self-modifying, dynamically loaded, or interpreted code is prohibited.
- Software modularity and programming: Software shall be designed in a modular fashion. Modules shall have a specific function which can be tested and verified independently, shall be uniquely and mnemonically named, shall be small enough to be easily followed and understood, shall have a single entry point, and process flow within the module shall be restricted.
- Control constructs: Software must adhere to acceptable constructs.
- Naming conventions: Names shall be chosen to enhance readability and intelligibility of the program, shall be consistent, and shall be unique within an application.
- Coding conventions: Software shall adhere to basic coding conventions.
- Comment Conventions: All modules must contain headers and provide header comments describing information contained in the header. Descriptive comments shall be provided to identify objects and data types.

Approach

The standards for source code are listing in Volume I Section 4 and Volume II Section 5 of the 2002 FEC Voting System Standards Document, and the Diebold's C++ Coding Style document Version 2.0 (March 24, 2005).

The assessment consisted of comparing the code to each standard listed in the above Referenced sections of the coding standards documents.

Evaluation

GEMS 1.18.24 uses C++ code to construct a sophisticated application for election data processing. The C++ language facilitates and enforces the object oriented design and programming methodology, resulting in an understandable and maintainable code set.

Findings

All source code was reviewed to the 2002 standards. Most of the anomalies found were related to commenting conventions. Source code review began with GEMS pre-release 1-18-23.5 and continued through pre-releases 1-18-23.6, 1-18-23.7, 1-18-23.8, and 1-18-23.10. All the anomalies found in these reviews were corrected in the final submission of GEMS 1.18.23-10 source code. The 1-18-23.10 pre-release was promoted to 1.18.24.

SOURCE CODE REVIEW FOR EXPRESS POLL 1.1.5

CIBER performed a Source Code Review of the Voter Access Card Writer portions of the Express Poll 1.1.5. After changes were completed, a Witness of the Build was performed. The creation date of the final version was 6/30/05.

All source code was reviewed to the 2002 standards. Most of the anomalies found were related to commenting conventions. Source code review began with Express Poll pre-release 1.1.3.0 and continued through pre-releases 1.1.3.1, 1.1.3.2, 1.1.3.6, and 1.1.4.0. All the anomalies found in these reviews were corrected in the final submission of Express Poll source code. The 1.1.4.0 pre-release was promoted to 1.1.5.

APPENDIX C

FUNCTIONAL TEST REVIEW

FUNCTIONAL TEST APPROACH AND FINDINGS

This Appendix describes the functional testing of the GEMS 1-18-24 software application. All the hardware listed in section 3 was utilized for the functional testing unless otherwise noted. Functional testing began with pre-release 1-18-23.7, continued with 1-18-23.10, and concluded with 1-18-24. The functional testing on the final GEMS revision (1-18-24) performed by CIBER included:

Database Type	
Open Primary Election	Design Ballots that demonstrate the following special circumstances: Non-Partisan Candidates Write-In Candidates Shadow Races Multiple Precincts Use Key Card Tool to set security keys Vote Ballots Review each ballot voted on TSx using AVPM Collect on AccuVote-TSx Collect on AccuVote-OS Precinct Count Print Result Tapes Upload Results (via Ethernet) Review Server Logs Produce Reports Election Summary Report, Cards Cast Report, AccuVote-TS Status Report, AccuVote Write-in Summary Report, AccuVote-OS Status Report Compare Reports to Tapes Produced by TSx and OS. Compare Ballots uploaded to GEMS to AVPM tapes.
Closed Primary Election	Modify Open Primary to create Closed Election Design Ballots that demonstrate the following special circumstances: Non-Partisan Candidates Write-In Candidates Shadow Races Multiple Precincts Split Precincts Question Races Create Cards using VCProgrammer Create Cards using Voter Card Encoder Create Cards on TSx Download (via ethernet) Vote Ballots on TSx

	<p>Verify that Cards created on all devices select appropriate ballot Test Write-In Candidates Test Provisional Ballots Upload Results(via ethernet)</p> <p>View Voted Ballots Accept provisional ballots Produce Reports Election Summary Report, SOVC Report, Cards Cast Report, AccuVote-TS Status Report, AccuVote Write-in Summary Report. Compare Reports to Tapes Produced by TSx Tests that overvotes, undervotes, and blank votes were handled properly</p>
<p>General Election</p>	<p>Create General Election with 10 Precincts Include Ballots that demonstrate the following special circumstances: Straight Party Cross Party Endorsement Split Precinct Recall Race Candidate Rotation within Party Vote for N Write-In Candidates View Ballots Print Ballots</p> <p>Create Cards using VCPprogrammer Create Cards using Voter Card Encoder Create Cards on TSx</p> <p>Download (via Ethernet) to TSx and OS Central Count Vote Ballots from 5 Precincts Vote Provisional Ballots Upload Results (via Ethernet)</p> <p>View Voted Ballots View Logs Produce Reports Election Summary Report, Challenge Voter Report Compare Reports to Tapes Produced by TSx.</p>
<p>Additional Testing – General and Primary Elections</p>	<p>Download General and Primary Elections to EMP Create memory cards on EMP Vote on TSx Read memory cards on EMP Upload and review results on GEMS <i>EMP not recommended for qualification at this time</i></p> <p>Create and test various combinations of security keys Test on TSx to ensure incorrect key code is not allowed</p> <p>Create and build 4 new elections from beginning</p> <p>Load and modify elections used in testing previous releases of GEMS</p>

<p>Additional Testing –Express Poll 4000 specific testing</p>	<p>CIBER performed the following tests:</p> <ul style="list-style-type: none">Created a General Election database.Submitted the database to Diebold for creation of a Voter Registration databaseLoaded Voter Registration database on the Express Poll and downloaded election to the AccuVote TSxCreated voter cards on the Express Poll 4000 and voted the election on the AccuVote TSxUploaded the results to GEMSCompared GEMS election result reports to the AccuVote TSx reportsReviewed Audit Logs
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GEMS 1-18-24 and Express Poll 4000 1.1.5 met the functional requirements provided by the 2002 FEC Standards as well as the additional requirements stated or derived from the TDP.

Summary of Report and Addendums

Original Report (2002)

Integration Test Suite	GEMS Clients	Source Code	TDP
GEMS 1-18-24	AccuVote-OS Precinct Count (Optical Scan) 1.96.6 Firmware(2002) AccuVote-OS Central Count (Optical Scan) 2.0.12 Firmware(2002) AccuVote-TSx Precinct Count with AVPM (Touch Screen with Printer Module) Bootloader BLR7-1.2.1 running Windows CE WCER7-410.2.1operating system. 4.6.3 Firmware (2002) Key Card Tool 4.6.1(2002) VCProgrammer 4.6.1(2002) Voter Card Encoder 1.3.2 (2002) Express Poll 4000 1.1.5 (2002)	GEMS 1-18-24(2002) Express Poll Software 1.1.5 (2002)	GEMS TDP 1-18 Revision 3.0 (2002) Express Poll 4000 TDP Version 2.0 (2002)

Original report consisted of full TDP and source code review, along with functional system integration test. CIBER performed qualification on 1-18-24 including end to end testing with client devices in column 2. All components listed above were qualified to the 2002 standards.