



**U. S. ELECTION ASSISTANCE COMMISSION**  
**VOTING SYSTEM TESTING AND CERTIFICATION PROGRAM**  
1225 New York Avenue, NW, Suite 1100  
Washington, DC. 20005

2/3/2009

Carolyn Coggins, QA Director - Voting  
iBeta Quality Assurance  
3131 S Vaughn Way, Suite 650  
Aurora, CO 80014

**Re: Reuse of prior testing conducted by SysTest Laboratories**

Dear Ms. Coggins,

This letter is in response to iBeta Quality Assurance's recommendations (attached) to the Election Assistance Commission (EAC) regarding the reuse of certain portions of testing conducted by SysTest Laboratories as part of the testing campaign for the ES&S Unity 3.2.0.0. EAC has instructed (attached) iBeta, per section 2.10.6 of the EAC's *Testing and Certification Program Manual*, to conduct a review and audit of certain portions of testing conducted by SysTest prior to SysTest's suspension. This review and audit was conducted in an effort to preserve any prior testing that could be relied upon as meeting the EAC's rigorous program requirements.

Based on iBeta's recommendations the EAC approves the following reuse of prior testing:

**PCA Document Review**

In its letter to the EAC dated January 14, 2009 regarding the reuse of the PCA document review iBeta recommends, "Based upon the audit and review documented herein iBeta deems that the results of the SysTest PCA Document Review are adequate for reuse in the Unity v.3.2.0.0 Certification test effort". iBeta additionally recommends further review of the TDP for the Volume, Stress, Error Recover and Security testing still to be conducted on the voting system.

After careful review of iBeta's recommendation as well as the documentation submitted by SysTest for the ES&S Unity 3.2.0.0 voting system, the EAC approves iBeta's recommendation for the reuse of the PCA document review conducted by SysTest. In approving this prior review and testing the EAC expects iBeta to document any further review conducted on the TDP and to clearly identify any discrepancies found during this additional review.

## Source Code Review

In its letter dated January 16, 2009 to the EAC regarding reuse of the source code review conducted by SysTest on the Unity 4.0. voting system for the Unity 3.2.0.0. testing engagement iBeta recommended reuse of the SysTest source code review. Before making this recommendation, and per the EAC's instruction, iBeta conducted a 3% audit of the Unity 3.2.0.0. source code. As a result of this audit and the existence of possible discrepancies that could impact the source code, iBeta conducted two additional analyses of the source code:

1. Confirmed that the results of the iBeta review of the 3% of code are consistent with the previous results (not identical but consistent): This confirmation was reached by reviewing the types of discrepancies generated by SysTest in the 100% review against those generated by iBeta.
2. Reviewed the severity of the discrepancies discovered: The number of discrepancies potentially impacting the source code is considered very low versus the overall number of discrepancies (as is consistent with a 100% review). The severity of the discrepancies and the vendor responses do indicate that the majority of those 21 potential logic discrepancies would be resolved without source code modifications.

In addition to the audit and reviews conducted by iBeta the EAC Technical Reviewers have conducted a review of the recommendation made by iBeta and the audit and reviews conducted. Based on iBeta's audit and reviews and this additional technical review the EAC approves iBeta's recommendation for the reuse of the source code review previously conducted by SysTest.

If you should have any questions regarding this approval or the impact it has on the Unity 3.2.0.0. testing engagement please do not hesitate to contact me. Thank you.

Sincerely,



Brian Hancock  
Director, Testing and Certification  
US Election Assistance Commission



**U. S. ELECTION ASSISTANCE COMMISSION**  
**VOTING SYSTEM TESTING AND CERTIFICATION PROGRAM**  
1225 New York Avenue, NW, Suite 1100  
Washington, DC. 20005

February 3, 2009

Ms. Sue L. Munguia  
Director of Certification  
Election Systems and Software (ES&S)  
11208 John Galt Boulevard  
Omaha, NE 68137

**Sent via e-mail**

Ms. Munguia:

This letter is being sent to address ES&S's questions regarding the reuse of testing by iBeta Quality Assurance (iBeta) that was conducted by SysTest Laboratories (SysTest) on the Unity 3.2.0.0. voting system prior to the suspension of SysTest's accreditation as an EAC Voting System Test Laboratory (VSTL). As you are aware, and as indicated in our letter to all EAC registered manufacturers (attached), section 2.10.6. of the EAC's *Voting System Test Laboratory Program Manual* allows for the reuse of prior testing at the EAC's discretion.

The EAC recognizes the unique circumstances the SysTest suspension has created and the need for the EAC to be diligent in reviewing and deciding on the reuse of this testing. Given these circumstances the EAC has corresponded on several occasions with both iBeta and ES&S to discuss the testing that was conducted by SysTest and its possible reuse. Per an email from Brian Hancock, Director, EAC Testing and Certification Program to Steve Pearson of ES&S dated November 21, 2008 (attached) the following plan is approved for the review of prior testing conducted by SysTest for possible reuse by iBeta in the testing of the Unity 3.2.0.0. voting system:

- The EAC has authorized the reuse of the hardware testing conducted by SysTest sub-contractors. iBeta will review the reports to confirm any failures resulting in engineering changes are documented and the reports document that all hardware ultimately passed.
- iBeta will audit a sample of the Technical Data Package (TDP) submitted to and reviewed by SysTest and provide a recommendation to the EAC regarding the need to conduct a more comprehensive review of the TDP. The EAC shall issue a decision regarding reuse of the PCA Document Review.
- iBeta will conduct a 3% review of the ES&S source code. This review will focus on important functional sections of the code in order to determine the depth and focus of source review conducted by SysTest. iBeta will provide a recommendation to the EAC

- regarding the reuse of the source code review conducted by SysTest. The EAC will then issue a decision regarding the reuse of the source code review conducted by SysTest.
- The EAC Technical Reviewers will review and assess the Functional, Accessibility, Maintainability, Accuracy, and Reliability test summary reports provided by SysTest on the DS-200, M650, AutoMARK VATs, Ballot on Demand printer, and Unity EMS software. The EAC will issue a decision regarding the reuse of this testing.
  - The Volume, Stress, Error Recovery and Security testing was not completed by SysTest; iBeta will perform this testing on the DS-200, M650, AutoMARK VATs, and Unity EMS software.
  - While applicable areas from the Unity v.4.0.0.0 Test Plan may be used, iBeta must issue a Unity v.3.2.0.0 test plan. The EAC will review and approve a full test plan provided by iBeta.
  - SysTest shall provide the appropriate test summaries for all items that are accepted for reuse.

If you should have any questions regarding these decisions or the testing to be conducted at iBeta please do not hesitate to contact me. Thank you for your time in resolving these issues.

Sincerely,



Brian J. Hancock  
Director, Testing and Certification

Attachment: 10.29.08 EAC ltr. to all EAC registered manufactures  
11.21.08 email from Brian Hancock to Steve Pearson

cc: iBeta Quality Assurance  
Steve Pearson, Election Systems and Software



January 14, 2009

Mr. Brian Hancock  
U.S. Election Assistance Commission  
Voting System Testing and Certification Program  
1225 New York Avenue, NW, Suite 110  
Washington, DC 20005

**Sent via E-mail**

Dear Mr. Hancock,

The purpose of this letter is to document the audit of the ES&S Unity v.3.2.0.0 Technical Data Package (TDP) in accordance with your November 21, 2008 email to Steve Pearson of ES&S providing instructions on the reuse of SysTest Labs' Unity v.4.0.0.0 testing for the ES&S Unity v.3.2.0.0 . EAC Certification test effort. iBeta has completed the audit of the Unity v.3.2.0.0 TDP. This letter provides iBeta's findings and opinion to the EAC regarding the reuse of the PCA Document Review conducted by SysTest Labs from the Unity v.4.0.0.0 test effort.

#### **Scope of the Unity v.3.2.0.0 EAC Certification Test Effort**

The scope of Unity v.3.2.0.0 is a subset of Unity v.4.0.0.0 . It is restricted to the applications of the ES&S election management system, the DS200 and M650 optical scanners and the AutoMARK Voter Assistant Terminals (VAT) A100 and A200 ballot markers. It is our understanding that over the course of the Unity v.4.0.0.0 test effort ES&S made changes to the scope of Unity v.4.0.0.0 . These scope changes included the incorporation of the VAT ballot markers and the AIMS application. These had previously been in the Unity 3.0.1.0-3.0.1.1 EAC Certification test effort. Results of the PCA Document Review performed by SysTest Labs, including open discrepancies were delivered in:

- Unity v.4.0.0.0 PCA Document Review results for the ES&S election management system applications, the DS200 and M650; and
- Unity 3.0.1.0-3.0.1.1 PCA Document Review results for the VATs and AIMS.

ES&S delivered Unity v.3.2.0.0 TDP which consisted of:

- The rebranded Unity v.4.0.0.0 TDP incorporating the "*NOTICE OF UNCERTIFIED FUNCTIONALITY*" disclaimer; and
- The AutoMARK VAT and AIMS TDP.

iBeta sampled the ES&S Unity v.3.2.0.0 documents. The sample selection included the documents identified in the SysTest Labs issued discrepancies and documents needed to complete the Unity v.3.2.0.0 trusted builds, a sample 3% source code review, test planning and test execution. Criteria for the review were to confirm that the Unity v.3.2.0.0 documents addressed any document discrepancies within the scope of the Unity v.3.2.0.0 test effort and the content provided sufficient information in order to complete the test tasks list above.

#### **Documentation of the Audit of the TDP**

Due to the change of scope many discrepancies issued by SysTest Labs were outside the scope of Unity v.3.2.0.0 . iBeta reviewed every open discrepancy. Issues which were identified as all or partially relevant to the Unity v.3.2.0.0 scope were transferred to iBeta's *Unity v.3.2.0.0 Discrepancy Report*. Issues or parts of issues, outside this scope were excluded. Scope assessment was recorded in a review disposition document. The transferred discrepancies identified location of the issue, SysTest Labs discrepancy number, and detail of the initial description from the SysTest Labs discrepancy report. iBeta confirmed the issues were valid and traced to an appropriate 2002 VSS requirement. iBeta reviewed the SysTest Labs description history from the original SysTest Labs discrepancy report and the Unity v.3.2.0.0 documents submitted by ES&S to validate

resolution of the issue. In some instances discrepancies are being incorporated into Unity v.3.2.0.0 Functional Configuration Audit (FCA).

The review of documents necessary to complete Unity v.3.2.0.0 trusted builds, sample code review, test planning and test execution was incorporated into these tasks and recorded in the daily status. Missing content or discrepancies were reported in the *Unity v.3.2.0.0 Discrepancy Report*.

### **Review Results**

The Unity v.3.2.0.0 TDP submitted by ES&S was sufficient to close the majority of the document discrepancies deemed inside the scope of Unity v.3.2.0.0.

- One document issue remains open for additional clarification of the ES&S response;
- One document issue remains open for incorporation into the iBeta Security Review; and
- Four issues did not have a response from ES&S. As these were the last items on the list it is possible that they had not been submitted to ES&S by SysTest Labs.

Review of documents necessary to perform Unity v.3.2.0.0 trusted builds, sample 3% code review and test planning has generally found them to contain the information needed to perform these task. Four issues were noted in the review.

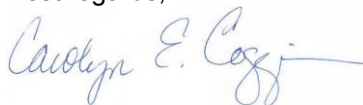
- Document discrepancy #10 identified a gap in the Win650 build procedure;
- Document discrepancy #50 identified the System Overview and System Limitations do not reflect the language scope of Unity v.3.2.0.0;
- Document discrepancy #52 identified System Overview contained a typo with an incorrect hardware version for the DS200; and
- Document discrepancy #53 identified the absence of the VATs and AIMS from the System Limitations.

The attached Tables 1 and 2 provide the results and disposition of all SysTest Labs Unity v.4.0.0.0 issued discrepancies. Note: Functional discrepancies which remain open for validation in the FCA are also listed in Table 1.

### **Recommendation on Reuse of the SysTest Labs PCA Document Review**

Based upon the audit and review documented herein iBeta deems that the results of the SysTest PCA Document Review are adequate for reuse in the Unity v.3.2.0.0 Certification test effort. Use of the TDP in development of the Volume, Stress, Error Recovery and Security testing shall incorporate additional review. Any documentation issues encountered shall be reported in the Unity v.3.2.0.0 discrepancy report. We do not recommend a more comprehensive review of the TDP.

Best regards,



Carolyn Coggins  
QA Director - Voting

Attachments: Table 1 & 2

**Table 1 Unity v.3.2.0.0 Applicable Discrepancies**

SysTest#	DS200	M650	VAT	EMS	Other Doc	iBeta#	Disposition	Part Excluded fm Unity v.3.2.0.0	Out of Scope Disposition
6	X	X				12	Closed	M100	Not reviewed, remains open in Unity v.4.0.0.0
23					X	13	Closed	ABCR, Test Plan	Not reviewed, remains open in Unity v.4.0.0.0
24					X	14	Closed	ABCR, Test Plan	Not reviewed, remains open in Unity v.4.0.0.0
26		X		X		15	Closed	M100, IVIM, IVO, ABCR	Not reviewed, remains open in Unity v.4.0.0.0
27	X	X		X		16	Closed	IVIM, DAM, IVO, M100	Not reviewed, remains open in Unity v.4.0.0.0
43					X	17	Closed	ABCR	Not reviewed, remains open in Unity v.4.0.0.0
284				X	X	18	Closed	PEB Reader/ Writer, DAM, IVIM	Not reviewed, remains open in Unity v.4.0.0.0
297				X		19	Closed		
317					X	20	Closed		
318				X	X	21	Closed	IVIM, M100	Not reviewed, remains open in Unity v.4.0.0.0
339					X	22	Closed		
348		X		X		23	Closed	ABCR, IVIM, DAM, M100	Not reviewed, remains open in Unity v.4.0.0.0
355					X	24	Closed	ABCR , Voyager hand scanner, 4.0 Test Plan	Not reviewed, remains open in Unity v.4.0.0.0
359					X	25	Closed	ABCR , Voyager hand scanner, Test Plan	Not reviewed, remains open in Unity v.4.0.0.0
361					X	26	Closed	Test Plan	Not reviewed, remains open in Unity v.4.0.0.0
372	X	X		X		27	Closed	M100	Not reviewed, remains open in Unity v.4.0.0.0
411		X				28	Open, FCA		
429				X		30	Open		
435					X	31	Open, FCA		
453	X					32	Open, FCA		
454	X					33	Open, FCA		
473				X		34	Closed		
475				X		35	Open, FCA		
479					X	36	Closed		
480					X	37	Closed		
492				X		38	Closed		
493					X	39	Closed		
495				X		40	Closed		
496		X				41	Closed		
497					X	42	Closed		

SysTest#	DS200	M650	VAT	EMS	Other Doc	iBeta#	Disposition	Part Excluded fm Unity v.3.2.0.0	Out of Scope Disposition
549					X	43	Closed		
550					X	44	Closed		
553				X		45	Open		
554				X		46	Open		
555				X		47	Open		
556				X		48	Open		
557				X		49	Closed		

**Table 2 Out of Scope & Non Issues**

SysTest #	Finding	Disposition
190, 191, 196, 198, 235, 238, 245, 369, 382, 388, 390, 401, 428, 434, 437, 441, 442, 445, 446, 450, 451, 452, 458, 461, 463, 464, 466, 467, 468, 469, 474, 478, 483, 485, 486, 487, 488, 490, 491, 494, 498, 503, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 545, 547, 548, 551, 552	<p><b>The following are excluded from Unity v.3.2.0.0 :</b></p> <p><b>System Hardware</b>  Automated Bar Code Reader  iVotronic DRE Precinct Tabulator  Model 100 Precinct Ballot Counter  Voyager Hand Scanner (COTS)</p> <p><b>System Software</b>  Unity Data Acquisition Manager  Unity iVotronic Ballot Image Manager</p> <p><b>Uncertified System Features</b>  Network Data Transmission Including remote transmission of vote data and/or consolidated results data</p>	Not reviewed, remains open in Unity v.4.0.0.0
459, 510, 538	<p><b>Closed or Informational Issues</b>  Comments in the report identified these issues as closed or informational typographic errors</p>	Not reviewed, non- significant issue
499, 500, 501, 502, 504, 505, 506, 507, 508, 509, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 539, 540, 541, 542, 543, 544, 546	<p><b>Issues Written Against System Change Notes</b>  Changes occurring during the Unity v.4.0.0.0 testing were reported in the System Change Notes. The role of the VSTL in the FCA process is to determine if the changes were tested appropriately and determine how they should be incorporated into functional testing. These discrepancies identify test or other documentation as lacking. The VSS instructs the VSTL to test if testing is inadequate. In iBeta's opinion, as written, these are not documentation discrepancies, but findings applicable to the FCA.</p>	As these are findings for functional test scope they remain open in Unity v.4.0.0.0 ; iBeta shall examine the change notes as part of the FCA Document Review for relevance to the Unity v.3.2.0.0 test scope





January 16, 2009

Mr. Brian Hancock  
U.S. Election Assistance Commission  
Voting System Testing and Certification Program  
1225 New York Avenue, NW, Suite 110  
Washington, DC 20005

**Sent via E-mail**

Mr. Hancock,

The purpose of this letter is to document the 3% review of the Unity 3.2.0.0 source code in accordance with your 21 November 2008 email providing instruction on the reuse of testing for the ES&S certification effort. This letter also provides the iBeta recommendation to the EAC regarding the reuse of the source code review conducted by SysTest.

**Documentation of the Review Process**

To conduct the review, iBeta used our PCA Source Code Review Procedure. The source code was delivered from SysTest Labs and configuration managed in the iBeta Source Code Repository. With the exception of Cobol, the coding languages submitted for review had been previously reviewed on other certification test efforts therefore the previously used interpretation of the generic VSS requirements to the language specific review criteria were utilized unmodified. For the Cobol review, iBeta provided the interpretation of each VSS requirement to ES&S prior to initiating the source code review task. The language specific review criteria for each of the five languages is not attached to this letter and will be provided if deemed necessary for the EAC review. The VSS requirements applicable to the source code review task are:

VSS	
Vol. #	Section(s) #
1	4.2.2
1	4.2.3
1	4.2.4
1	4.2.5
1	4.2.6
1	4.2.7
1	6.2
1	6.4.2
2	2.5.4d
2	5.4.2

To select the 3% for review, iBeta conducted an analysis by first using a library of static analysis tools to parse each application source code base and provide a list of the files and functions as well as the Lines of Code (LOC) count. iBeta uses executable LOCs only and does not include comment, blank, or continued lines in our metrics. An exception to this process was the Cobol applications as our library of static analysis tools do not address Cobol source code. For those two applications, the number of files and files sizes were used to determine the volume of code in order to select 3%.

Once the spreadsheets were populated for each application, a selection of files/functions was made based on the file header information documenting the file purpose. iBeta focused the review by selecting source code files and functions that process vote data, audit logs, and reporting.

The ES&S AutoMARK source code submitted was compared against the source code submitted with the Premier certification effort as the code is similar. The differences between those two source code bases were then reviewed as part of the ES&S 3% source code review. The unique as well as the shared application discrepancies are reported herein.

The peer review of each Source Code Review was conducted by experienced reviewers who had reviewed source code to the VSS requirements on a minimum of two VSTL test efforts. Based on the instruction in your 21 November 2008 email "*This review will focus on important functional sections of the code in order to determine the depth and focus of source review conducted by SysTest*", the peer review analyzed each instance of non-compliance with the VSS requirements and assessed if the issue impacted source code logic. Discrepancies that dealt with comments, headers, formatting, and style were accepted as non-logic issues and color coded as green. Potential logic issues were flagged as needing an EAC decision and color coded as yellow. Confirmed logic issues were to be flagged as red (no confirmed logic issues were identified).

The matrix of the source code reviewed is provided as Attachment 1 and each individual discrepancy spreadsheet is provided as a separate confidential compressed file delivered on CD subsequent to the email delivery of this letter.

#### Summary of 3% Source Code Review Results

A total of 330 discrepancies were identified with the majority, 307 or 93%, categorized as non-logic issues. The summary of discrepancies categorized as EAC Decision Discrepancies as well as the vendor responses are provided as Attachment 2 to this letter.

Of the 21 of 23 potential logic discrepancies, ES&S has provided in their response their justification for non complying with the requirement or their disagreement of the iBeta interpretation of the VSS requirements. Precedence for the iBeta interpretation has been established with testing for other clients and these established interpretations must be applied consistently to all manufacturers under test with iBeta. We do acknowledge that in some instances another interpretation may be possible and that alternative interpretation may be acceptable to the EAC reviewers.

The remaining 2 potential logic discrepancies remain under investigation by both Premier and ES&S and are expected to be addressed within the Premier source code review letter.

*Recommendation Regarding the Reuse of the SysTest Source Code Review*

In order to provide a recommendation, iBeta evaluated the results of the 3% source code review whereas the results would be recommended as accepted if no significant discrepancies were found, this includes the less critical requirement which were not addressed, not recorded or interpretations are inconsistent with documenting industry accepted practices. As there were discrepancies written that potentially impact the source code, two other analyses were conducted:

1. Confirmed that the results of the iBeta review of the 3% of code are consistent with the previous results (not identical but consistent): This confirmation was reached by reviewing the types of discrepancies generated by SysTest in the 100% review against those generated by iBeta.
2. Reviewed the severity of the discrepancies discovered: The number of discrepancies potentially impacting the source code is considered very low versus the overall number of discrepancies (as is consistent with a 100% review). The severity of the discrepancies and the vendor responses do indicate that the majority of those 21 potential logic discrepancies would be resolved without source code modifications.

Based on the limited impact (or perhaps no impact) on the source code as a result of these discrepancies, iBeta recommends reuse of the results of the SysTest source code.

Sincerely,



Gail Audette  
iBeta Quality Manager

Attachment 1: Matrix of Source Code Reviewed

Attachment 2: Summary of Discrepancies

Enclosure: CONFIDENTIAL CD Source Code Review Discrepancies 1-16-09.zip

cc: Steve Pearson, ES&S  
Sue Munguia, ES&S