THE AUTOMATED ELECTION SYSTEM COMPLIANCE ISSUE: TEC Certification

Sixteen facts enumerated below indicate failure of the AES to operate properly, securely, and accurately. While the TEC had issued the mandated certification, it was contingent on the implementation of procedural and technical compensating controls.

Republic Act 9369[1] (RA9369), mandates the creation of the Technical Evaluation Committee (TEC)[2] which in turn is mandated to certify categorically that the automated election system (AES) is operating properly, securely, and accurately no later than three months before the date of the electoral exercise.[3]

On February 10, 2010 or exactly three (3) months before the May 10, 2010 National and Local Elections, in its Resolution No 2010-001, the TEC resolved:

> **"NOW THEREFORE**, the Technical Evaluation Committee, properly convened, **RESOLVED** as it hereby **RESOLVES,** to recommend that Comelec continue with the preparations for the conduct of automated May 10, 2010 National and Local Elections.

> **"FURTHER RESOLVED** as it hereby **RESOLVES,** to issue the certification that the AES is operating properly, securely, and accurately, as mandated by Section 11 of RA 9369, <u>upon successful completion of the outstanding certification requirements</u>."[4] *(underscoring supplied)*

Then on March 9, 2010, in its Resolution No. 2010-002 the TEC resolved:

> "NOW THEREFORE, the Technical Evaluation Committee, RESOLVED as it hereby RESOLVES, to certify, in accordance with RA 9369, that the AES, as submitted, <u>with full adoption of the recommended compensating controls, can securely, accurately, and properly be used by voters, boards of election inspectors, local and national boards of canvassers, and Comelec in the May 10, 2010 National and Local Elections</u>.

> "FURTHER RESOLVED, as it hereby RESOLVES, to state that this certification excludes the public website, KBP server, central server, back-up central server, election system DNS server, PCOS modem firmware, and ballot production tool, which were not submitted for full certification testing."[5] *(underscoring supplied)*

On March 16, 2010, the Commission on Elections promulgated Resolution No. 8800[6], enumerating therein the compensating controls deemed necessary to ensure that the AES can operate properly, securely, and accurately.

In a hearing of the Joint Committee to Canvass the Votes for President and Vice President (Joint Committee), the Chairman of the TEC, Director Denis F. Villorente, testified that the TEC had relied solely on the report of SysTest Lab[7], an international certification entity with offices in Colorado, USA.

CERTIFICATION REQUIREMENTS[8]

"1. The successful conduct of a field testing process followed by a mock election event in one or more cities/municipalities;"

In all field tests and mock election events the Comelec and Smartmatic encountered several problems, in particular, ballot rejections and transmission at all levels of canvassing.[9]

"2. The successful completion of audit on the accuracy, functionally and security controls of the AES software;"

Nothing has been disclosed by the Comelec with regard to an independent conduct of audit on the accuracy, functionally and security controls of the AES software by the TEC or any local entity. The TEC had relied solely on the SysTest Labs report.

"3. The successful completion of a source code review;"

There was no review conducted by any political party or interested groups as provided in RA9369.[10] The TEC had relied solely on the SysTest Labs report.

"4. A certification that the source code is kept in escrow with the Bangko Sentral ng Pilipinas;"

A copy of the source code including the hash codes had indeed been deposited with the Bangko Sentral ng Pilipinas.

"5. A certification that the source code reviewed is one and the same as that used by the equipment; and"

No procedure was provided in the operations of the PCOS machine and CCS laptops to show to the public that the software installed in the PCOS machine and CCS laptops is one and the same as the one that was reviewed, certified, and deposited in escrow at the Bangko Sentral ng Pilipinas. The procedure could have been included prior to the generation of initialization reports for both the PCOS machines and CCS laptops.

"6. The development, provisioning, and operationalization of a continuity plan to cover risks to the AES at all points in the process such that a failure of elections, whether at voting, counting or consolidation, may be avoided."

The Comelec promulgated Resolution No. 8839 on April 30, 2010 detailing therein the contingency actions for specific incidents or problems that may be encountered with the PCOS, the CCS, and the overall operations of the AES. However, no report has been disclosed detailing the training conducted for the members of the Board of Election Inspectors, members of the Board of Canvassers, the technicians, and other election workers. There is also no evidence that drill exercises had been conducted in order to test the execution of the contingency actions.

Did the AES operate properly, securely, and accurately?

Unless otherwise indicated, the facts enumerated hereunder were admitted at the hearing conducted by the House of Representatives Committee on Suffrage and Electoral Reforms.

On the proper of operations of the AES:

Fact 1: Election Returns generated during the Final Testing and Sealing of the PCOS Machines were transmitted to the canvassing laptops at the city/municipal level, the central server, and the server located at the Pope Pius Center.

The AES did not distinguish between the Election Returns generated during the Final Testing and Sealing of the PCOS machines and the Election Returns generated during the election day itself. It was admitted that Smartmatic discovered the said erroneous transmissions. In an attempt to correct the error, the Comelec issued Resolution No. 8914 "In the matter of correcting files uploaded to the consolidation and canvassing servers using the final testing and sealing results in connection with the May 10, 2010 Synchronized National and Local Elections" and Resolution No. 8919 "In the matter of the implementation of Comelec Resolutions numbered 8912 and 8914 in connection with the May 10, 2010 National and Local Elections." The fact that the errors occurred and the reactive nature of the issuance of the resolutions aforementioned are indications that such incidents were never anticipated and that the necessary safeguards against such erroneous transmissions were never considered in the preparation of the AES.

Further, the integrity of the database has been compromised with Comelec by allowing the corrections to be made.

Fact 2: Some Canvassing and Consolidation System (CCS) laptops failed to print the Statement of Votes (SoV) in some areas and for some contests.

Complainants raised the issue during the hearing of the HOR CSER. Underscored during the hearing was the importance of the SoV as it served as a supporting document to the Certificate of Canvass (CoC) which is the basis for proclaiming the winners of the contests. While no technical reason was provided by Smartmatic or Comelec, Comelec Executive Director Jose Tolentino suggested that the CCS laptops be recalled and brought to the Comelec main office so that the programs may be modified to generate the said SoV. Dir. Tolentino's response appeared so cavalier as to dismiss the importance of the SoV and the determination of the cause of the CCS laptop's failure to print the SoV.

Further, the integrity of the software in the CCS laptops that failed to print the SOVs will be compromised if Dir. Tolentino's suggestion was implemented. And, if so implemented, the resulting software will no longer be the same as the one for which a hash code has been generated and which has been deposited in escrow with the Bangko Sentral ng Pilipinas.

Fact 3: Clustered Precincts

A common experience by voters on election day was having to fall in line for hours under the heat of the summer sun, waiting their turn to vote. While the issue of long queues is not a technical matter relating to the performance of the AES, it nevertheless is part of the whole system. Various groups had warned the Comelec of problems relating to the clustering of precincts resulting in increasing the number of voters per precinct to as much as one thousand voters. The warnings were unheeded, with the long queues resulting in disenfranchisement as some voters simply left the line and never came back.

Fact 4: Transmission Problems

Incident reports indicate that an undetermined number of election returns were conveyed manually rather than through the telecommunications infrastructure.

Field reports from volunteers of the Center for People Empowerment in Governance (CenPEG) show that there were voting centers that had only one modem shared by a number of clustered precincts. The same reports indicate that modem antennas easily get detached from the modem.

On the secure operations of the AES:

Fact 5: The PCOS machine ultraviolet (UV) mark detection was disabled

Detection of the UV mark on the ballot was a feature proposed by the vendor to ensure that the ballot issued to the voter was genuine. Smartmatic and Comelec proffered two reasons that led to the decision to disable the UV mark detection feature:

1. The late printing of the ballots as a result of the changing design of the ballot. Mr. Cesar Flores of Smartmatic reasoned that the printing of the ballot had to be speeded up which resulted in the lower density of the UV ink being printed on the ballot such that the UV mark detection in the PCOS failed to detect the UV mark on some ballots. Yet, when asked if the printing speed resulted in the lower density ink use in the printing the names of the candidates, Mr. Flores responded in the negative.

2. The National Printing Office (NPO) had insisted on the printing of its own UV mark. The NPO wanted its own security mark on the ballots so that in the event they are called upon to testify in case of an electoral protest, it will be able to authenticate the ballot it had printed.

According to Dir. Tolentino, Comelec had started to talk to the NPO February 7, 2010, less than 100 days to elections! By this time it was already too late to make adjustments on the ballot design, the UV security marks included.

The reason given by Mr. Flores is implausible. The printing density of the ink used to print the UV mark could not have much differed with the ink used to print the names of the candidates and other marks on the ballot, including the bar code.

The NPO security mark that it insisted be included could have been printed in other areas of the ballot. The ballot was about 25 inches long! It was not necessary for the PCOS machine to detect the NPO security mark.

The Comelec had resorted to the use of a handheld UV mark reader. Handheld UV mark readers were purchased and deployed. Yet on election day, many BEIs did not use the handheld UV mark readers to determine genuineness of the ballots being issued to the voters. There were reports that there were some that were used, but generally the BEIs thought the lamps to be flashlights. Further, Comelec Resolution No. 8786 "Revised General Instructions for the Board of Election Inspectors (BEI) on the voting, counting, and transmission of results in connection with the 10 May 2010 National and Local Elections" was never amended to include instructions on the use of the handheld UV mark readers and what figure was to be detected in order to establish genuineness of the ballot.

Fact 6: There was no review of the source code of the AES by interested political parties and groups.

The Comelec argued, and continues to argue, that it had made the source code **available** to interested political parties and groups but no one had taken the offer.

On February 5, 2010, the Comelec invited political parties and groups interested in reviewing the source code of the AES to a meeting during which time it issued a set of guidelines. The political parties and groups found the guidelines to be too restrictive, including making available a copy of the source code in read only format. The interested political parties and groups proposed that (a) the copy of the source code be made available in editable format to allow marking and insertion of comments and/or compilation of the same to the binary/executable equivalent for purposes of testing; (b) the use of automated tools be allowed; and (c) the interested political parties and groups be accorded the same degree of freedom and latitude, if not greater, in the conduct of the source code review as was given to SysTest Labs.

As of March 24, 2010, the last meeting called by the Comelec on the same subject, the Comelec had not revised its guidelines although it was willing to make available the source code in editable format and that automated tools may be used by the interested political parties and groups for the conduct of the review. It was then only 49 days to elections and the Liberal Party and the Center for People Empowerment in Governance (CenPEG) along with other political parties informed the Comelec that they were withdrawing from the review due to lack of time.

Fact 7: Absence of the Digital Signature

Comelec and Smartmatic assert that a "machine digital signature" is used. Research, however, shows that "machine digital signature" does not exist in the technical or legal environments, international or local. RA 8792 or the E-Commerce Act, incorporated in RA9369 by reference, defines a digital signature as a mark that is adopted by a person, tied to that person's identity, and that a system may be used to verify the same.

Comelec Resolution No. 8786 promulgated on March 4, 2010 clearly instructs the Chairman and members of the Board of Elections inspectors to skip the execution of the digital signature.

Likewise, nothing in Comelec Resolution No. 8809 promulgated on March 30, 2010 refers to the execution of the digital signature.

An examination of the PCOS audit log (file SLOG.TXT) reveals an entry "No BEI keys with which to sign results".

When the Forensic Team[11] that conducted an examination of the PCOS machines found in Antipolo requested a Smartmatic representative to extract the digital certificate[12] from a particular PCOS machine, the Smartmatic representative declined saying that they did not have the necessary tools to extract the digital certificate.

Fact 8: The Hash Code extracted from the PCOS Machine is not the same as the one published in Comelec's website.

The Forensic Team found that while the hash codes extracted from the six PCOS machines matched each other, the same did not match the one published in Comelec's website. A Comelec representative present during the examination admitted that the hash codes published in the Comelec's website were erroneous and that the hash codes extracted were the correct ones.

The hash codes were generated on February 5, 2010. Shortly thereafter, CenPEG found the same hash codes for two pieces of software and the matter was raised. Comelec had reported that the error resulted from a simple copy-and-paste error committed by a Smartmatic representative in preparing the document. Comelec had corrected the error but published a document with the same date, February 5, 2010. Such action raised the issue of document control. IT Best Practice dictates the use of document control mechanisms to indicate document changes, explaining therein the reason for the document change. Apparently, this best practice has not been adopted by either Comelec or Smartmatic.

Fact 9: A Console Port is present in the PCOS Machine and the internal mechanisms, including the software, are accessible by connecting another computer to it.

The Console Port was noted during the visit to Smartmatic's Cabuyao Plant in Laguna. CenPEG noted in its statement at the HOR CSER hearing:

> "The May 3 CF Card issue, central password (used for digital signing) management by Comelec, **the console port on the PCOS**, are security holes that have to be thoroughly reviewed. Could these security holes have been exploited in order to breach the system and perpetrate fraud?"

The Forensic Team reported that internal mechanisms, including the operating system, are accessible through the console port.

Fact 10: The CF Card Problem

The CF card problem hogged the news headlines following the discovery of glaring discrepancies of the machine count and the hand count for the local contests after the Final Testing and Sealing activities conducted on May 3, 2010. The problem caused public worry with regard to the integrity of the system. It was reported that the configuration data was in error resulting from the redesign of the ballot. The CF cards, all 76,347 had to be recalled, reconfigured, and redeployed. Some reconfigured or replacement CF cards did reach the Clustered Precincts. The CF cards changed through many hands during the redeployment process, exposing the data stored in the CF cards to threats of manipulation.

The CF card problem highlighted the failure of processes in the preparation of the system. IT best practice dictates that changes to a system, in the case of the AES – the change in ballot design - necessitate review of all other system components that may be affected by the change in design. It appears that the ballot configuration file stored in the CF card was not regenerated following the change in the ballot design.

The problem also highlighted the process failures within the Comelec with the reactive issuances of memoranda on the handling of the CF card problems in the field. It appears that Dir. Tolentino had issued memos without the prior knowledge of the Commissioners although the Commissioners had reportedly ratified the memos. On June 1, 2010, CenPEG found one particular memo posted on the Comelec website. The following day, June 2, 2010, said memo could no longer be found.

None of the CF cards containing the incorrect configuration data has been subjected to forensic examination.

On the accurate operations of the AES:

Fact 11: The voter verifiability feature was disabled or not made available.

This is a feature that various groups had been asking the Comelec to make available. Comelec had reasoned that the printing of vote verification reports would take time and slow down the process. Without the vote verification reports, voters are deprived of knowing if the PCOS machines had correctly and accurately interpreted their votes.

Fact 12: The Election Returns generated and printed from various PCOS machines reflected varying date and time stamps.

Smartmatic reasoned that the internal clock settings might have been inadvertently reset during transport from the manufacturing plant to their final destinations. To validate the reasoning, CenPEG suggested that some PCOS machines be subjected to vibration and drop tests to be done by a local testing lab accredited by the Department of Trade and Industry. Smartmatic then informed the body that the PCOS machines were subjected to such tests at the production plant in Shanghai, China.

Another reason proffered by Smartmatic was that the technicians at its Cabuyao Plant might have set the internal clocks to different dates.

IT Experts present at the HOR CSER hearing found the explanation unacceptable. (1) If the bios battery had somehow become loose or dislodged from its receptacle during transport, then the internal clocks would have reset to a common default date. (2) How is it that the technicians could have set the internal clocks differently? Dates of December 2009, January 2010, and April 2010 appeared on the printout of the Election Returns. This was simply indicative of the lack of quality control standards and practices at the Cabuyao Plant.

Perhaps absent in the internal workings of the PCOS machine and the application program is the date/time checking each time that the PCOS machines were started prior to any testing, demonstration, or on election day. Absent, too, is the instruction to the BEI conducting the Final Testing and Sealing activity to check the PCOS machine date/time.

Fact 13: There were reports of inaccurate counts of the ballot such that the machine count differed from the hand count done by the BEI.

In Random Manual Audit (RMA) activities witnessed by the National Citizens' Movement for Free Elections (Namfrel) volunteers noted discrepancies in the machine count of the ballots and hand count[13]:

Clustered Precinct	Voting Center	Machine Count	Hand Count
8	San Perfecto Elementary School, San Juan City	616	614
1223	Krus na Ligas Elementary School, Quezon City	743	742
1211	UP Integrated School, Quezon City	699	698
13	Barangay Calgdaan, Cantilan, Surigao del Sur	507	506

The requirement of accurate ballot counters in the PCOS machine is simply not met.

Fact 14: The number of registered voters in the canvassing system was wrong.

The registered voters is estimated at 51 million (a bloated number considering that the voters list have not been cleansed). Yet:

• The display of the number of registered voters at the Philippine International Convention Center where the Commission on Elections was monitoring the elections and conducting the canvass of votes for Senators and Party List showed a figure of at least 153 million.

• The display of the number of registered voters at the Batasan Pambansa where the Senate and House of Representatives Canvassing Panel was assembled for the canvass of votes for President and Vice President showed a figure of at least 256 million.

In the May 26, 2010 hearing of the Joint Committee to Canvass the Votes for President and Vice President, Senate President Juan Ponce Enrile, Chairman (on the part of the Senate) raised the question on the display of the number of registered voters. It appears that immediately after the initialization of the Canvassing Servers at the Batasan Pambansa, the figure of 256,733,195 following the label "number of registered voters" was already displayed. Comelec was asked to explain this figure. Mr. Cesar Flores of Smartmatic explained:

> "Mr. President, Mr. Speaker, as you stated before when you initialized the server, you verified that all the positions are zero. However, there was a big number of registered voters. The main reason for this is this, **there was an error in the application** that was adding the number of registered voters on the PCOS level, on the precinct level, it was adding the votes – not the votes, sorry — the number of registered voters on the municipal level, and then the ones in the province, and the ones in the central server, therefore, multiplying the number of registered voters. x x x"[14] *(emphasis supplied)*

Mr. Flores further explained:

> "Mr. President, this error is affecting the national server that we have here and it did affect the one that COMELEC was using for the senatorial and party-list canvassing."[15]

Mr. Flores simply explained the error:

> "x x x basically, it was multiplying by five the number of registered voters plus the number of registered voters for Hong Kong and Singapore. x x x"

The multiplier five (5) has never been thoroughly explained except that by coincidence, 51 million x 5 = 255 million, close enough to 256 million. Would it then follow that for the senatorial canvass the multiplier is three (3) because by coincidence 51 million x 3 = 153 million? No documentary proof showing that the error has been scientifically analyzed and the cause of the error determined has ever been disclosed.

The canvassing and consolidation servers deployed for the national canvass were not tested prior to deployment as Director Villorente testified:

> "x x x Unfortunately for the national canvassing and consolidation servers which were deployed to Comelec and to Congress, the configured CCS machine that was tested was not the one that was deployed, x x x."[16]

Fact 15: 99.995% accuracy was not met

In its Request for Proposal the Comelec specified that "10. The system shall count the voter's vote as marked on the ballot with an accuracy rating of at least 99.995 %." or an error rate of 0.005% (1 mark out of 20,000).

On July 29, 2010, the Random Manual Audit Team reported a finding of 99.6% accuracy or an error rate of 0.4% (4 marks out of 1,000).

Fact 16: Compensating Controls not implemented.

There is no evidence that the proposed Compensating Controls were implemented. For instance, in the press briefing conducted by the Comelec on the results of the Random Manual Audit, on July 29, 2010, Mr. Atom Araullo of ABS-CBN asked if the proposed compensating control for the RMA was resorted to, Ms. Tita De Villa of PPCRV responded in the negative.

Management and Procedural Issues

It appears that the TEC did not have enough latitude in the performance of its function or that the recommended compensating controls were not fully implemented.

The Comelec project time table or calendar of activities was too tight. The TEC missed its deadline to issue the mandated certification. It had issued its certification two months prior to the May 10, 2010 National and Local Elections. It has to be noted though that failure to issue the mandated certification by the TEC, the Comelec only had to advise the Joint Congressional Oversight Committee (JCOC) on the AES that "If the Commission decides to proceed with the use of the AES without the Committee's certification, it must submit its reason in writing, to the Oversight Committee, no less than thirty (30) days prior to the electoral exercise where the AES will be used."[17] This option should not be availed of. No less than the sacred right of suffrage is at the very core of the any election, automated or otherwise, a right that the Comelec is constitutionally mandated to protect. If the AES is not certified that it will operate properly, securely, and accurately, the public cannot be assured that the Comelec can protect the people's sacred right.

The engagement of the international certification entity, SysTest Labs, did not go through the proper process as there was no public bidding and evaluation. There was no due diligence study with regard to the background of SysTest Labs. The hurried engagement of SysTest Labs stems from the tight calendar of activities of Comelec. It appears that SysTest Labs was engaged in October, 2009 as it started its review of the AES in November, 2009. The engagement coincided with the customization of the programs for the AES.

CAC Chairman Ray Anthony Roxas-Chua revealed during one of the JCOC meetings that the programs were being submitted to SysTest Labs modularly, as customization of each module is completed, a practice which is inconsistent with best industry practice or internationally-recognized standards on software quality assurance.

The Continuity Plan was not properly operationalized as evidenced by the absence of any training and drill exercise.

Conclusion

The 16 facts enumerated above indicate failure of the AES to operate properly, securely, and accurately.

While the TEC had issued the mandated certification, it was contingent on the implementation of procedural and technical compensating controls. There is no proof that such procedural and technical compensating controls had been implemented or adopted. Further, the TEC certified the AES which failed to operate properly, securely, and accurately.

SysTest Labs Certification on which TEC certification was based checks for conformity with EAC 2005 VVSG and not for conformity to RA 9369, which should have been the sole basis for certification

End Notes

1 Republic Act No. 9369, "AN ACT AUTHORIZING THE COMMISSION ON ELECTIONS TO USE AN AUTOMATED ELECTION SYSTEM IN THE MAY 11, 1998 NATIONAL OR LOCAL ELECTIONS AND IN SUBSEQUENT NATIONAL AND LOCAL ELECTORAL EXERCISES, TO ENCOURAGE TRANSPARENCY, CREDIBILITY, FAIRNESS AND ACCURACY OF ELECTIONS, AMENDING FOR THE PURPOSE BATAS PAMPANSA BLG. 881, AS AMEMDED, REPUBLIC ACT NO. 7166 AND OTHER RELATED ELECTIONS LAWS, PROVIDING FUNDS THEREFOR AND FOR OTHER PURPOSES"

2 See Section 9 of RA9369 which amended RA8436 by creating a new Section 10 mandating the creation of the Technical Evaluation Committee

3 See Section 9 of RA9369 which amended RA8436 by creating a new Section 11 which defines the functions of the Technical Evaluation Committee

4 See Technical Evaluation Committee Resolution No. 2010-001

5 See Technical Evaluation Committee Resolution No. 2010-002

6 See Annex C of ComelecComelec Resolution No. 8800

7 See Transcript of Stenographic Notes of the Joint Committee to Canvass the Votes for President and Vice President dated May 26, 2010

8   See Section 9 of RA9369 which amended RA8436 by creating a new Section 11 – Functions of the Technical
     Evaluation Committee

9   See separate report on Field Test and Mock Elections

10   See separate report on Source Code Review

11   A Forensic Team was organized by the Joint Congressional Canvassing Panel to examine the controversial PCOS
     machines found in Antipolo City, Rizal.

12   Digital Certificate – proof of validity of a digital signature and allows verification of the owner of the digital
     signature

13   Terminal Report, National Citizens' Movement for Free Elections

14   Transcript of Stenographic Notes, Hearing of the Joint Committee to Canvass the Votes for President and Vice
     President, May 26, 2010

15   Ibid

16   Transcript of Stenographic Notes, Hearing of the Joint Committee to Canvass the Votes for President and Vice
     President, May 26, 2010

17   See Section 9 of RA9369, new Section 11 – Functions of the Technical Evaluation Committee