Elections ACT

Upgrade of eVACS® for the 2020 ACT Legislative Assembly Election

System Specification - Part 2

Scenario Analyses

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eVACS®

eVACS® is a registered Trademark of Software Improvements Pty Ltd.

Where used in this System Specification - Part 2 Scenario Analyses, eVACS is the same as eVACS®

eVACS® upgraded document tree

Contract with Upgrade requirements
Project Management Plan
Operational Concept Description
System Specification - Part 1 eVACS requirements including upgrade requirements
System Specification - Part 2 Scenario Analyses
System Design and Software Specification
Interface Specification - Setup election
Interface Specification - Voting
Interface Specification - IVR (Telephone voting)
Installation Manual
User Manual - Election server
User Manual - Voting server



Document Control Information

The controlled version of this document is in electronic form. All hardcopy versions are uncontrolled.

Modifications

Date of this Revision	Version	Comment	Author	Reviewer Release
2019-08-05	0.1	Initial Draft of System Specification	CJB	RB
2019-09-27	0.2	Split of System Specification into two Parts - Expanded draft of Part 2 Scenario analyses	CJB	AS, MC, JZ
2019-09-04	0.3			

Distribution

Name and Appointment	Document Name	Date of Issue	Version
Ro Spence, deputy Commissioner, EACT	System Specification Part 2		
Jiv Sekhon, Project Manager, EACT			



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The System Specification (SSS) specifies the system structure and requirements for eVACS® Upgraded and the methods to be used to ensure each requirement has been met.

The SSS has been derived from the Operational Concept Description (OCD)[3]; in turn it is to be used as the basis for modelling, design, and quality testing of the system.

There are two parts to the SSS:

- Part 1 Requirements, including election nomenclature definitions as used in eVACS® Upgraded, and
- Part 2 Scenario Analyses (this document), in the form of Event-Action lists reflecting the requirements for the upgraded eVACS®.

1.1 Identification

This document applies to the upgraded version of eVACS® to be used by Elections ACT (EACT) in the 2020 ACT Legislative Assembly Election. It will be referred to as SSS-2-SA.

The purpose of the SSS is to provide the Project Team with a specification of the requirements of eVACS® upgraded. The two parts of the SSS will form the basis for developing a set of Software Specification (SS) and Interface Specification (IS) documents.

1.2 Document overview

The upgraded eVACS® is based on eVACS® version 7.0 used by EACT in 2016 together with a number of changed or additional requirements to be incorporated for the 2020 Election. The list of combined requirements is provided at Appendix C. A list of defined terms used in association with the requirements and scenarios is provided as Appendix B, with detailed descriptions of the definitions available in Section 3 of Part 1 of the SSS [6].

The specific requirements (Appendix C) are in many cases further expanded via the scenarios described in Appendix A.

The requirements captured by each event-action in Appendix A each have a unique identifier defined as follows:

Identifier label	Definition of identifier elements
SSS-R-C.X-Y	SSS = System Specification,
	R = Requirement,
	C = Major Section within the SSS – Part 2, i.e. Appendix A,
	C.X = a number being a subsection of section A, where X is the subsection identifier, and
	Y = a sequential number, commencing with 1, within C.X

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1.3 Reference Documents

In this SSS-2-SA, a citation of the form [1] is a reference to document 1 in the following list.:

- 1. Business Requirements Specification ICT Business system upgrade eVACS®, version 1.0;
- Statement of Requirements at Schedule 2 of the Contract Electronic Voting and Counting System (eVACS®) Enhancements, Services and Support: ACTGS reference 636238 Final Version 23 July 2019, being a simplified version of [1];
- 3. Software Improvements Pty Ltd. eVACS® Operational Concept Description, 2019;
- 4. The Unicode Consortium. Unicode Home Page available at <u>https://unicode.org/main.html;</u>
- 5. The Unicode Consortium. The Unicode Standard, Version 12.1 available at http://www.unicode.org/versions/Unicode12.1.0/;
- 6. Software Improvements Pty Ltd, eVACS® System Specification Part 1 Requirements, 2019



2 Acronyms

Abbreviation or Term	Meaning
ACT	Australian Electoral Commission
ACT EC	ACT Electoral Commission
CJB	Carol Boughton
CRS	Counting and Reporting Server
CSV	Comma-separated values
CVB	Clive Boughton
DEC	Data Entry Client
DEO	Data Entry Operator
DES	Data Entry Server
DESuper	Data Entry Supervisor
EACT	Elections ACT
eVACS / eVACS®	electronic Voting and Counting System
I-ESS-EC	Interface for Election Setup Server
I-VC-VS	Interface between Voting Client and Voting Server
IRS	Interface Requirements Specification
IVR	Interactive Voice Response
OCD	Operational Concept Description
PPO	Polling Place Official
RAM	Random-Access Memory
RB	Russell Baird
SIPL	Software Improvements Pty Ltd
SRS	Software requirements Specification
SSS	System Specification
SSS-1-R	System Specification – Part 1 Requirements
SSS-2-SA	System Specification – Part 2 Scenario Analyses
TSV	Tab-Separated Values
TVS	Telephone Voting Server
UI	User Interface
USB	Universal Serial Bus
USB-FD	USB Flash Drive



3 Scenario Analyses

3.1 Coverage

The detailed scenario analyses provided in Appendix A address four modules within eVACS® in the following order:

Identifier	Scenario
A1	Election setup
A2	Electronic voting
A3	Data entry
A4	Counting

A number of server related functions are not detailed in scenarios due to the relative simplicity of the event-action; however, these are detailed in the associated software specifications and user manuals. They include:



Appendix A represents possible scenarios for various users of eVACS®. These scenarios are not confined to software alone, mainly because it is important to also determine the system context of the upgraded software. This is despite the fact that the context of the eVACS® software is reasonably obvious. However, sometimes the boundary between the software, people and hardware is not completely apparent, or the boundary can change as a result of extra information that is collected from scenario construction.

For brevity, the voting-related scenario analyses do not list events that have no voter-discernible effect, such as reading the barcode when an error screen is displayed. However, such events must be reflected in the associated test plans.

The move from keypads to touch screens for non-BV&I voters introduces a constraint that results in significant change to the way in which an elector will interact with their on-screen ballot. Detailed consideration is required of the scenario describing how a voter will be guided to complete their electronic ballot via a touch screen. For example, there is no need to have 'keys' to move to Previous Group (4), Next Group (6) or \uparrow (up - 2), \downarrow (down - 4) between candidates, Volume up (9), Volume down (7), and SELECT (5), but there are equivalents for FINISH (#), UNDO (*), and START AGAIN (1). However, as the use of a keypad by BV&I voters is to continue, this is retained as a scenario.







3.3 How to read the scenarios

The scenario analyses for eVACS® upgraded, presented as tables in Appendix A, are captured in the form of event-action lists that reflect the requirements from 2016 and the new requirements being implemented for 2020 (Appendix C).

Each of the tables contain columns with headings, from left to right, of Label, Event, Action, Condition, Required data and References. These headings are defined as follows:

Label	The <i>label</i> uniquely identifies the requirement determined by this row of the list. These labels may appear in other documents, for cross-referencing and requirement tracking purposes.
Event	An <i>event</i> is any stimulus to eVACS® that requires some <i>action</i> to be carried out. <i>Events</i> can be generated by a process operating on a part of the system (for example, scanning a barcode), between two components of the system (for example, a voting server receiving a request from a voting client), or inside on a component of the system (for example, an internal state transition).
Action	An action is a response to an event that requires some software/system function to be performed.
Condition	A <i>condition</i> is a statement of the state/status of the system/software under which the specified <i>event</i> occurs. Unless explicitly specified to the contrary, a list of <i>conditions</i> is to be interpreted as the conjunction of the <i>conditions</i> . Often the same (apparent) <i>event</i> can occur for different <i>conditions</i> of the system/software and lead to different corresponding <i>actions</i> to the event.
Required data	<i>Required data</i> represents the information that is essential for the event/action combination to be realised.
References	A <i>reference</i> will usually be to a definition or a requirement but could also be to a label in another scenario.



Each row of each list is to be interpreted as a requirement as follows:

Whenever a component of eVACS® is in a state satisfying the *condition*, if the component receives the *event*, the component shall evoke the *action*.









































































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Appendix B - List of Definitions

Definition identifier *	Defined item	Page in [6]
SSS-D-3-1	Election	16
SSS-D-3-2	Contest	16
SSS-D-3-3	Contest choice	16
SSS-D-3-4	Candidate choice	16
SSS-D-3-5	Voter	17
SSS-D-3-6	Ballot	17
SSS-D-3-7	Paper ballot	17
SSS-D-3-8	Electronic ballot	17
SSS-D-3-9	Vote	17
SSS-D-3-10	Paper vote	17
SSS-D-3-11	Electronic vote	17
SSS-D-3-12	Ballot type	17
SSS-D-3-13	Ballot rotation	18
SSS-D-3-14	Polling place	18
SSS-D-3-15	Vote normalisation	18
SSS-D-3-16	Unnormalised and normalised vote	18
SSS-D-3-17	Normalisation process	18
SSS-D-3-18	Counting system	19
SSS-D-3-19	Audit log	20
SSS-D-3-20	Error	20
SSS-D-3-21	Error message	20
SSS-D-3-22	Multiple languages	21
SSS-D-3-23	States of the voting client	25
SSS-D-3-24	Vote keystroke store	28
SSS-D-3-25	Vote touch screen store	28
SSS-D-3-26	Vote-in-progress store	28
SSS-D-3-27	Paper version number	31
SSS-D-3-28	Entry	31
SSS-D-3-29	Active Entry	31
SSS-D-3-30	Archived Entry	31
SSS-D-3-31	Data entry screen	31
SSS-D-3-32	Data control session	32
SSS-D-3-33	Data entry correction screens	32
SSS-D-3-34	Data control current contest	32
SSS-D-3-35	Data control current output device	32



*Definition identifier

The definition identifier is of the form SSS-D-C-N, where:

SSS = System specification

D = Definition

C = Section; in the following all definitions can be found in Section 3 of Part 1 of the SSS, so C = 3

N = a sequential number commencing with 1

The description of each definition is provided in SSS-1-R [6] on the page indicated.



Appendix C – 2020 List of Requirements

Requirement identifier *	Defined item	Page in [6]
SSS-R-3.2-1	Ballots with rotation by permutation sequence	19
SSS-R-3.2-2	Voting server to manage use of sequences	19
SSS-R-3.2-3	Permutation used in sequence	19
SSS-R-3.2-4	Permuted display of control choices	19
SSS-R-3.2-5	Displaying a contest choice within a group	19
SSS-R-3.2-6	Electronic audit logs	20
SSS-R-3.2-7	Audit log entries timestamped	20
SSS-R-3.2-8	Audit log entries indicate origin	20
SSS-R-3.2-9	Access to audit log	20
SSS-R-3.2-10	Display error message on error	20
SSS-R-3.2-11	Display error message only on error	20
SSS-R-3.2-12	Errors logged to audit log	20
SSS-R-3.2-13	Error messages with recovery instructions	21
SSS-R-3.2-14	Error messages for voters and officials	21
SSS-R-3.2-15	Use of localised translation for display and printing	21
SSS-R-3.2-16	Installation erases disk contents	21
SSS-R-3.2-17	Election setup server initial menu	21
SSS-R-3.2-18	Loading from USB Flash Drive	22
SSS-R-3.2-19	Supported resolutions	22
SSS-R-3.2-20	Backup election data	22
SSS-R-3.2-21	Restore election data	22
SSS-R-3.2-22	One vote per barcode per contest	22
SSS-R-3.2-23	One vote per PIN/Voting Token pair per contest	22
SSS-R-3.2-24	Arrangement of candidates on an electronic ballot	22
SSS-R-3.2-25	Ballot legibility	22
SSS-R-3.2-26	Voting data stored twice	22
SSS-R-3.2-27	Voting data not to be stored with timestamp	23
SSS-R-3.2-28	Pre-polling backup	23
SSS-R-3.2-29	Spoken instructions	23
SSS-R-3.2-30	All formal votes accepted	23
SSS-R-3.2-31	Informal votes	23
SSS-R-3.2-32	Voting client response time	23
SSS-R-3.2-33	Barcodes to be QR codes	23



SSS-R-3.2-34	Avoid confusion between characters	24
SSS-R-3.2-35	Ability to vary font size within candidate name	24
SSS-R-3.2-36	Provide flexibility in how text is programmed and displayed on screen	24
SSS-R-3.2-37	Provide for touch screen functionality	24
SSS-R-3.2-38	Screen display colours	24
SSS-R-3.2-39	Opening screen properties: select language	25
SSS-R-3.2-40	Welcome screen properties: messages	25
SSS-R-3.2-41	Welcome screen properties: e-voting card instruction	25
SSS-R-3.2-42	Main voting screen	25
SSS-R-3.2-43	Main voting screen properties: language	26
SSS-R-3.2-44	Main voting screen properties: groups	26
SSS-R-3.2-45	Main voting screen properties: candidates	26
SSS-R-3.2-46	Main voting screen properties: display	26
SSS-R-3.2-47	Main voting screen properties: Zoom and scroll	26
SSS-R-3.2-48	Main voting screen properties: Robson Rotation	26
SSS-R-3.2-49	Main voting screen properties: none	26
SSS-R-3.2-50	Main voting screen properties: preferences	26
SSS-R-3.2-51	Main voting screen properties: review preferences	26
SSS-R-3.2-52	Confirmation screen	26
SSS-R-3.2-53	Confirmation screen properties: language	26
SSS-R-3.2-54	Confirmation screen properties: current voter	26
SSS-R-3.2-55	Confirmation screen properties: order	26
SSS-R-3.2-56	Confirmation screen properties: instruction	27
SSS-R-3.2-57	Confirmation screen properties: HIDE MY VOTE	27
SSS-R-3.2-58	Confirmation screen properties: empty	27
SSS-R-3.2-59	Reconfirm & scan screen	27
SSS-R-3.2-60	Hidden vote screen	27
SSS-R-3.2-61	Hidden vote screen properties: language	27
SSS-R-3.2-62	Hidden vote screen properties: message	27
SSS-R-3.2-63	Start again screen	27
SSS-R-3.2-64	Start again screen properties: language	28
SSS-R-3.2-65	Start again screen properties: message	28
SSS-R-3.2-66	Acknowledgement screen	28
SSS-R-3.2-67	Acknowledgement screen properties: language	28
SSS-R-3.2-68	Acknowledgement screen properties: message	28
SSS-R-3.2-69	Acknowledgement screen properties: colour	28
SSS-R-3.2-70	Reset	28



SSS-R-3.2-71	Voting server initial menu	28
SSS-R-3.2-72	Voting server menu during voting	29
SSS-R-3.2-73	Make two backups of voting server	29
SSS-R-3.2-74	Verifying voting server backups	29
SSS-R-3.2-75	Errors during writing backup of voting server	29
SSS-R-3.2-76	Telephone voting server initial menu	29
SSS-R-3.2-77	Telephone voting server menu during voting	30
SSS-R-3.2-78	Make two backups of telephone voting server	30
SSS-R-3.2-79	Verifying telephone voting server backups	30
SSS-R-3.2-80	Errors during writing backup of telephone voting server	30
SSS-R-3.2-81	Data entry and counting servers installed	30
SSS-R-3.2-82	Data entry login screen	31
SSS-R-3.2-83	Vote entry screen	31
SSS-R-3.2-84	End vote screen	32
SSS-R-3.2-85	Cancel vote screen	32
SSS-R-3.2-86	Log data entry	32
SSS-R-3.2-87	Paper ballot entry client response time	32
SSS-R-3.2-88	Data entry correction and batch control menu	32
SSS-R-3.2-89	Vote control screen	33
SSS-R-3.2-90	End vote control screen	33
SSS-R-3.2-91	Cancel vote control screen	33
SSS-R-3.2-92	Integrate polling place votes	33
SSS-R-3.2-93	Integrate data entry votes	33
SSS-R-3.2-94	Export votes from data entry and counting server	33
SSS-R-3.2-95	Tag exported votes	33
SSS-R-3.2-96	Counting data backups	33
SSS-R-3.2-97	Counting audit	33
SSS-R-3.2-98	Intermediate results	34
SSS-R-3.2-99	Hare-Clark algorithm	34
SSS-R-3.2-100	Hare-Clark counting to provide for two counting options	34
SSS-R-3.2-101	Count by count scrutiny sheets	34
SSS-R-3.2-102	Counting of the choices	34
SSS-R-3.2-103	Distribution of effective votes	34
SSS-R-3.2-104	Tracking preferences	34
SSS-R-3.4-1	Unicode	36
SSS-R-3.6-1	Voter anonymity	37



SSS-R-3.6-2	No public network	37
SSS-R-3.6-3	Vote data integrity and security	37
SSS-R-3.6-4	Access passwords to conform to Government requirements	37
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SSS-R-3.6-6	Limit availability of ports on hardware	38
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SSS-R-3.7-1	Hardware supported by operating system	39
SSS-R-3.7-2	Election setup hardware	39
SSS-R-3.7-3	Electronic voting client hardware	40
SSS-R-3.7-4	Voter data media finalised	40
SSS-R-3.7-5	Operating system	40
SSS-R-3.7-6	Language of software shall be Ada	40
SSS-R-3.8-1	Independent code audit	42
SSS-R-3.8-2	Enhancements and legislative changes	42
SSS-R-3.9-1	Use of non-volatile storage on clients	42

*Requirement identifier

The requirement identifier is of the form SSS-R-C.X-Y, where:

SSS = System specification

R = Requirement

C = Major Section; in the following all requirements can be found in Section 3 of Part 1 of the SSS, so C = 3

C.X = a number being a subsection of section 3, where X is a the subsection identifier, and

Y = a sequential number, commencing with 1, within subsection C.X

The description of each requirement is provided in SSS-1-R [6] on the page indicated.



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