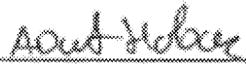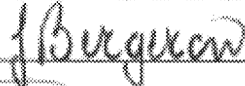# RTGE Joint Venture

OTTAWA LIGHT RAIL TRANSIT PROJECT

SYSTEM INTEGRATION TEST PROCEDURE

SCADA/HSDR/VEHICLE COMMS SIT - BLA

Prepared by:	Novak Aplc	
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	Name Title	Signature
Document No.	RES-16-5-BLST-SIT-4P3188	Rev: 0
RTGE Joint Venture		July 12, 2018
This document may contain confidential and commercially sensitive information.		DATE

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Document Revision

Revision	Date yyyy-mm-dd	Description of changes
0	2018-07-12	First official release

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1. INTRODUCTION

1.1. Objective And Scope

The purpose of this document is to describe communication through High Speed data radio with the Passenger Information Display System on the vehicle. The High Speed data radio system must be able to transfer data from the Passenger Information System located in the MSF and controlled in TSCC to the Passenger Information Display System (PIDS) located on the train.

The test will confirm that specific pre-recorded audio files and video messages can be properly transferred from control centre to one train, group of trains or all trains at the BLA station.
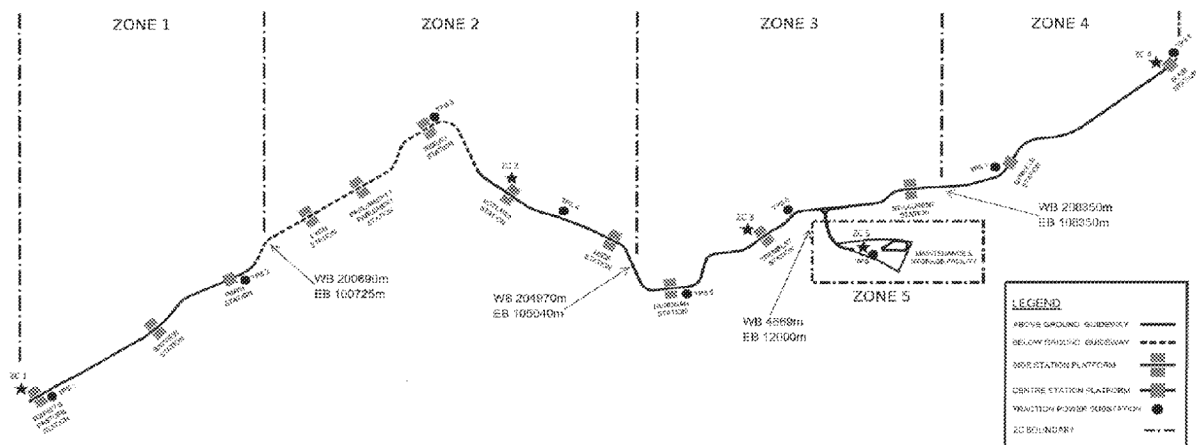
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1.2. Definitions and Abbreviations

MSF	Maintenance and Storage Facility
OCS	Overhead Catenary System
TPSS	Traction Power Substation
PICO	Post Installation Check Out
SAT	Site Acceptance Test
SIT	System Integration Test
EB	East Bound
WB	West Bound
TBD	To Be Determined
TRU	Transformer Rectifier Unit
SCADA	Supervisory Control And Data Acquisition

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2. TEST REQUIREMENTS

2.1. Test Instruments

The tests outlined in this procedure does not require any specialized test instruments.

2.2. Test Equipment

Handheld radios will be required for communication between individuals involved in the testing.

2.3. Test Personnel

The following test personnel are necessary to perform this SIT procedure:

- Test supervisor / Subject Matter Expert (1)

- Vehicle driver (3)

- Test technician position on the platform (1)

- Signalling Control Room Operator (1)

- Comms Control Room Operator (1)

2.4. Vehicles Required

This SIT requires 3 OLRT LRV trains (1-car train).

2.5. Supporting Documentation

- Vehicle Interface High Speed Radio System Functional Design RES-53-0-0000-0218
- SIT Traceability Matrix Report RES-03-0-0000-REP-0352 (This document addresses PA requirements)

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3. PRE-REQUISITES

Before commencing the test, the following conditions must be met:

Item	Description	Responsible	Verified
1.	The equipment turn over from the construction subcontractor is complete.	Test Supervisor	
2.	The T&C Zone 4 is handed over to T&C	Test Supervisor	
3.	The SCADA equipment is installed and SAT tested at TSCC or BCC/YCC	Test Supervisor	
4.	Three trains involved in test are handed over to ORLTC	Test Supervisor	
5.	All necessary personnel, test instruments, drawings and equipment are available.	Test Supervisor	

Before commencing the test, ensure that the Zone 4 related TPSSs, and OCS equipment is configured as follows:

Item	Description	Verified
1.	The Zone 4 TPSSs are fully operational and is providing traction power to all sections of the Zone 4 OCS	
2.	All disconnect switches in the Zone 4 are in their normal operating positions.	

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4. **SAFETY PRECAUTIONS AND PROCEDURES**

Safety of personnel and equipment shall be considered paramount. To ensure safety during the testing all activities must be regulated in accordance with the Test and Commissioning Site Safety Plan (OLR-15-0-0000-MPL-0004). In addition all testing shall be coordinated with the site Testing and Commissioning Manager and OLRT-C Safety, QA and testing representatives. No testing of other subsystems in the testing area will take place at the same time.

Personnel involved in the tests must adhere to the Test & Commissioning Rules and Test & Commissioning Standard Operating Procedures.

5. **SPECIAL ENVIRONMENT REQUIREMENTS**

The tests shall be ideally performed on a day free from rain, snow or sleet.

6. **PASS/FAIL CRITERIA:**

During the test runs, the test will be considered Pass if all steps in the check sheets are indicated as "Pass".

7. **TEST PROCEDURE**

This test has 3 test cases:

Test Case 1 – sending pre-recorded visual file to trains

Test Case 2 – sending pre-recorded audio files to trains

Test Case 3 – synchronization between train and the station

For Test Cases 1 & 2, three single car trains will be parked at BLA station with the train driver on board. Make sure that, at least one train is in manual mode and at least one train is in ATO mode.

Either from TSCC or BCC/YCC at MSF, select one, two and three trains in sequence and issue pre-recorded visual file or audio messages. Tester in charge will confirm via the radio that:

- Proper message was delivered to targeted train.
- Message transfer did not affect the transmission of platform edge camera video from a station to the train

For Test Case 3, send the same audio message to both train under test and BLA station. Observe time delay for messages being broadcasted at the station and onboard the train. There should be 2 s time delay between broadcasting message at station and train.

8. **TEST RESULTS**

Record the test results in the attached check sheets and on the drawings.

Deficiencies will be raised for all failures and logged on Unifier.

APPENDIX A-TEST SHEETS

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Test Case 1 – Visual Message Transmittal

Pre-conditions

1. There trains are parked at BLA station with the doors closed
2. All train drivers confirmed that platform edge camera images are clearly shown on their displays.
3. Test Zone 4 is powered up
4. There are no other trains on the Mainline

Note trains designation (eg. LRV1, LRV2…), locations and train mode in the table below.

Test Train	Train Designation	Train Location	Train Mode
1			
2			
3			

Test flow:

From SCADA workstation send pre-recorded video message to the trains. Confirm that proper message was sent to the train under test and that platform edge camera images at the drivers display were not disturbed.

Execute test steps from the test sheet. This test has 8 steps.

Note any deviations:

Overall test status: Pass / Fail

If fail, list the defects raised in unifier:

Tested by:	_____	_____	Date:	_____
	(print name)	(signature)		(yyyy-mm-dd)
Witnessed by:	_____	_____	Date:	_____
	(print name)	(signature)		(yyyy-mm-dd)

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Test Case 1 – Visual Message Transmittal

Step	Action	Expected results
1	From a SCADA workstation: • select train 1 • send one pre-recorded visual message	☐ Train 1 selected. ☐ Pre-recorded visual message sent Note message id: _____ Pass ( )/Fail ( )
2	Confirm with the train driver at the train 1 that: • Pre-recorded message sent in step 1 is displayed at PIDS onboard the train • Platform edge camera images were not disturbed	☐ Pre-recorded visual message displayed ☐ Platform edge camera images were not disturbed Pass ( )/Fail ( )
3	Confirm with the train drivers at trains 2 & 3 that message sent in step 1 was not received.	☐ Train 2 confirms that message was not received ☐ Train 3 confirms that message was not received Pass ( )/Fail ( )
4	From a SCADA workstation: • select train 1 & 2 • send one pre-recorded visual message (different than one sent in step 1	☐ Train 1 selected ☐ Train 2 selected ☐ Pre-recorded visual message sent Note message id: _____ Pass ( )/Fail ( )
5	Confirm with the train drivers at the trains 1 & 2 that: • Pre-recorded message sent in step 4 is displayed at PIDS onboard the trains • Platform edge camera images were not disturbed	☐ Pre-recorded visual message displayed on Train 1 ☐ Platform edge camera images were not disturbed on Train 1 ☐ Pre-recorded visual message displayed on Train 2 ☐ Platform edge camera images were not disturbed on Train 2 Pass ( )/Fail ( )

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Test Case 1 – Visual Message Transmittal

Step	Action	Expected results
6	Confirm with the train driver at train 3 that message from step 4 was not received	☐ Train 3 confirms that message was not received Pass ( )/Fail ( )
7	From a SCADA workstation: • select train "All Trains" • send one pre-recorded visual message (different than one sent in steps 1 & 4)	☐ All Trains selected ☐ Pre-recorded visual message sent Note message id: _____ Pass ( )/Fail ( )
8	Confirm with the train drivers at the trains 1, 2 & 3 that: • Pre-recorded message sent in step 7 is displayed at PIDS onboard the trains • Platform edge camera images were not disturbed	☐ Pre-recorded visual message displayed on Train 1 ☐ Platform edge camera images were not disturbed on Train 1 ☐ Pre-recorded visual message displayed on Train 2 ☐ Platform edge camera images were not disturbed on Train 2 ☐ Pre-recorded visual message displayed on Train 3 ☐ Platform edge camera images were not disturbed on Train 3 Pass ( )/Fail ( )

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Test Case 2 – Audio Message Transmittal

Pre-conditions

1. There trains are parked at BLA station with the doors closed
2. All train drivers confirmed that platform edge camera images are clearly shown on their displays.
3. Test Zone 4 is powered up
4. There are no other trains on the Mainline

Note trains designation (eg. LRV1, LRV2…), locations and train mode in the table below.

Test Train	Train Designation	Train Location	Train Mode
1			
2			
3			

Test flow:

From SCADA workstation send pre-recorded audio message to the trains. Confirm that proper message was sent to the train under test and that platform edge camera images at the drivers display were not disturbed.

Execute test steps from the test sheet. This test has 8 steps.

Note any deviations:

Overall test status: Pass / Fail

If fail, list the defects raised in unifier:

Tested by:	_____ (print name)	_____ (signature)	Date: _____ (yyyy-mm-dd)
Witnessed by:	_____ (print name)	_____ (signature)	Date: _____ (yyyy-mm-dd)

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Test Case 2 – Audio Message Transmittal

Step	Action	Expected results
1	From a SCADA workstation: • select train 1 • send one pre-recorded audio message	☐ Train 1 selected. ☐ Pre-recorded audio message sent Note message id: _____ Pass ( )/Fail ( )
2	Confirm with the train driver at the train 1 that: • Pre-recorded message sent in step 1 is announced onboard the train • Platform edge camera images were not disturbed	☐ Pre-recorded audio message is announced ☐ Platform edge camera images were not disturbed Pass ( )/Fail ( )
3	Confirm with the train drivers at trains 2 & 3 that message sent in step 1 was not received.	☐ Train 2 confirms that message was not received ☐ Train 3 confirms that message was not received Pass ( )/Fail ( )
4	From a SCADA workstation: • select train 1 & 2 • send one pre-recorded audio message (different than one sent in step 1)	☐ Train 1 selected ☐ Train 2 selected ☐ Pre-recorded audio message sent Note message id: _____ Pass ( )/Fail ( )
5	Confirm with the train drivers at the trains 1 & 2 that: • Pre-recorded message sent in step 4 is announced onboard the trains • Platform edge camera images were not disturbed	☐ Pre-recorded audio message is announced on Train 1 ☐ Platform edge camera images were not disturbed on Train 1 ☐ Pre-recorded audio message is announced on Train 2 ☐ Platform edge camera images were not disturbed on Train 2 Pass ( )/Fail ( )

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Test Case 2 – Audio Message Transmittal

Step	Action	Expected results
6	Confirm with the train driver at train 3 that message from step 4 was not received	☐ Train 3 confirms that message was not received Pass ( )/Fail ( )
7	From a SCADA workstation: • select train "All Trains" • send one pre-recorded audio message (different than one sent in steps 1 & 4)	☐ All Trains selected ☐ Pre-recorded audio message sent Note message id: _____ Pass ( )/Fail ( )
8	Confirm with the train drivers at the trains 1, 2 & 3 that: • Pre-recorded message sent in step 7 is announced onboard the trains • Platform edge camera images were not disturbed	☐ Pre-recorded visual message is announced on Train 1 ☐ Platform edge camera images were not disturbed on Train 1 ☐ Pre-recorded audio message is announced on Train 2 ☐ Platform edge camera images were not disturbed on Train 2 ☐ Pre-recorded visual message is announced on Train 3 ☐ Platform edge camera images were not disturbed on Train 3 Pass ( )/Fail ( )

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Test Case 3 – Synchronization Between Train and the Station

Pre-conditions

1. One Train is parked at BLA station
2. Test Zone 4 is powered up
3. Test technician is positioned on the BLA station platform
4. Clocks at station PIDS and at the train driver console are synchronized

Note train designation (eg. LRV1, LRV2…), locations and train mode in the table below.

Test Train	Train Designation	Train Location	Train Mode
1			

Test flow:

From SCADA workstation send pre-recorded audio message to the train and station. Confirm that there is 2 s delay between playing the message onboard the train and at the station.

Execute test steps from the test sheet. This test has 3 steps.

Note any deviations:

Overall test status: Pass / Fail

If fail, list the defects raised in unifier:

Tested by:	_____	_____	Date:	_____
	(print name)	(signature)		(yyyy-mm-dd)
Witnessed by:	_____	_____	Date:	_____
	(print name)	(signature)		(yyyy-mm-dd)

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Test Case 3 – Synchronization Between Train and the Station

Step	Action	Expected results
1	From a SCADA workstation: • select train at BLA station • select BLA station • send pre-recorded audio message to both train and the station	☐ Train 1 selected. ☐ BLA station selected. ☐ Pre-recorded audio message sent Note message id: _____ Pass ( )/Fail ( )
2	Observe the clocks at: • Train TOD • Station PIDS Note time when the message starts playing	Start time for message at: ☐ Train TOD ___/___/___ (HH/MM/SS) ☐ Station PIDS ___/___/___ (HH/MM/SS) Pass ( )/Fail ( )
3	Calculate delay between start times from previous step. Calculated delay time should be 2 s	Calculated delay time: _____ Pass ( )/Fail ( )

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SYSTEM INTEGRATION TEST REPORT

SCADA/HSDR/VEHICLE COMMS SIT - BLA

Test Report Status:	☐ Pass	☐ Fail	☐ Incomplete	☐ Retest	If not PASS, Defect #: _____ Revision: _____ Page _____ of _____

Test Commencement: _____
                    Date & Time

Test Completion: _____
                 Date &Time

I certify that this procedure has been performed according to the procedures detailed herein except as noted, and that the results recorded are accurate and complete.

Tested by:	_____ Name, Title	_____ Signature	_____ Date &Time
T&C Manager:	_____ Name, Title	_____ Signature	_____ Date &Time

I certify that the results recorded against the test procedure with the noted deviations are correct.

Review by:	_____ Name, Title	_____ Signature	_____ Date
Approved by Engineer of Record:	_____ Name, Title	_____ Signature	_____ Date

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