Rolling Stock PPP
Double Deck Trains

Exhibit 9

RailCorp Simulator Specification

Change Log

Issue	Date	Author	Change
v9	CONTRACT	-	-
v10	18/11/2008	CJEH	Addition of text changes from RFTA Group 2 listed below: 00016 00018
v11	11/02/2009	ARJS	Addition of text changes from RFTA Group 6 listed below: 00264 00265 00266 00269 00270 00271 00275 00276
v12	17/03/2009	ARJS	Addition of text changes from RFTA Group 8 listed below: 00261 00263 00267 00268 00273
v13	29/06/2009	ARJS	Addition of text changes from RFTA Group 14 listed below: 00336 Note: RFTA 00336 from group 14 also amends the Simulator Design Book, Section 4.2 paragraph 1.
v14	31/08/2010	ARJS	Addition of text changes from RFTA: 00375
v15	17/01/2011	ARJS	Addition of text changes from RFTAs: 00383 00384 00392 Note: RFTA 00382 amends the Simulator Design Book, Section 2.8 paragraph 2.

Contents

1   INTRODUCTION AND OVERVIEW

1.1   General Description of the Works

1.1.1   This RailCorp Simulator Specification describes the functional requirements for the provision of two Simulator training facilities for the Sets, each comprising the following elements:

(a)   a fully featured Driver's Simulator;

(b)   a fully featured Guard's Simulator;

(c)   a Simulator Control Station; and

(d)   a software-based Part-Task Simulator with three Operator options (Driver, Guard or Maintenance Staff).

1.1.2   One Simulator facility shall be fixed and incorporate a motion system for the Driver's Simulator and shall be installed and commissioned by PPP Co at a site to be nominated by RailCorp. The other Simulator facility shall not incorporate a motion System for the Driver's Simulator and shall be a mobile version capable of being transported.

1.2   System Overview

1.2.1   Driver's Simulator

RFTA 00016

RFTA 00261

PPP Co must provide a Driver's Simulator (DS) installed in a space to be provided at a location nominated by RailCorp. ~~The Driver's Simulator shall be identical in appearance and dimensions to the actual Crew Cab and shall be~~ designed in such a manner provided with a HVAC System so as to maintain a comfortable environment at all times. ~~The simulated functionality shall be identical to that found on the Sets and must include simulation of all Fault and Defect conditions as if the Trainee Driver was driving an actual Set.~~

The Driver's Simulator will use CGI images displayed on a screen to give the Trainee Driver an accurate impression of travelling along the simulated railway route. The fixed site Driver's Simulator shall be fitted with a motion base to accurately simulate the full range of train dynamic movement in Normal, Degraded and Emergency operating scenarios.

The Driver's Simulator will be controlled from the Simulator Control Station. By using the Simulator Control Station an Instructor will be able to control the simulated behaviour of the Set by acting as an alternate Driver, as well as by providing real-time interactive input to a Training Session such as by introducing faults and changing signals. Any saved Training Session will be able to be replayed in the Driver's Simulator environment and at the Simulator Control Station.

It shall be possible to operate the Driver's Simulator in an interactive Training Session with the Guard's Simulator.

1.2.2   Guard's Simulator

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PPP Co must provide a Guard's Simulator (GS) installed in a space to be provided at a location nominated by RailCorp. ~~The Guard's Simulator shall be identical in appearance and dimensions to the actual Crew Cab and shall be~~ designed in such a manner provided with a HVAC System so as to maintain a comfortable environment at ~~all times. The simulated functionality shall be identical to that found on the Sets and must include simulation of all Normal operation, Fault and Defect conditions as if the Trainee Guard was operating an actual Set.~~

The Guard's Simulator must be a static simulator and must have a GS Vision System with CGI capability to support training of Guards in their duties with regard to the safety of Passengers when boarding and alighting from Sets and when working Sets through platforms. This GS Vision System must cover platforms on both sides of the train, doors and Passengers and must be consistent with the DS Vision System with regard to Rail Network location, Passenger density and station staff/hand signallers.

The Guard's Simulator must be controlled from the Simulator Control Station. By using the Simulator Control Station an Instructor must be able to control the behaviour of the Set as perceived by the Guard, as well as by providing real-time interactive input to the Training Session such as by introducing Faults or incidents on the train or on the platform. Any saved Training Session must be able to be replayed at the Simulator Control Station.

It shall be possible to operate the Guard's Simulator in an interactive Training Session with the Driver's Simulator.

1.2.3 Simulator Control Station

The Simulator Control Station (SCS) will provide space for two Instructor's positions and will provide all facilities necessary for the configuration, control, supervision, management, recording and replay of Training Sessions in the DS and GS. The SCS shall be able to operate the DS or GS independently or together in an integrated simulation. It shall also be possible for one Instructor to control and monitor an interactive session from one Instructor's position if required.

1.2.4 Part-Task Simulator

PPP Co must provide a Part-Task Simulator. The Part-Task Simulator shall be delivered in a form such that it can be installed on any standard PC, subject to minimum system operating requirements. The Part-Task Simulator shall be capable of operation in three Operator options (Driver; Guard; Maintainer) and shall simulate Set operating systems and fault conditions to permit a range of part-task training requirements in Normal, Degraded and Emergency operating scenarios.

The Part-Task Simulator shall permit self-paced learning by the Trainee. For each Operator option the Part-Task Simulator shall feature four learning modes: demonstration; tutorial; practice and assessment.

1.3   Standards

1.3.1   RailCorp has identified the following standards as appropriate to the development and introduction of ICT equipment. PPP Co must demonstrate to the satisfaction of RailCorp that its ICT systems approach is compliant with the following standards (except to the extent that RailCorp agrees otherwise):

ICT Area	Standard
Architecture Methodology	DoDAF
Service Management Infrastructure	ITIL
System Life Cycle Process	EIA 632
Systems Engineering Practice	CMMI
Risk Management	AS 4360
Security Management	ISO/IEC 27001
Systems Integration	EIA 632 EN 50126 and EN50129,
Software Safety	EN 50128
Software Requirements Specification	MIL-STD-498
Business Continuity Management	HB 221:2004

1.4   Avoidance of Proprietary Technologies

1.4.1   All systems, subsystems, equipment and components of the Simulators shall exhibit the following characteristics:

(a)   have public and readily available specifications for all aspects related to interoperability in multi-vendor ICT environments;

(b)   are in current active maintenance and are generally regarded as good practice for the relevant purpose;

(c)   are founded on underlying technology that is in widespread use and for which development/support/maintenance skills and training are broadly available in the Australian ICT market place; and

(d)   have more than one commercial source, so that reasonable competition exists in the market place for supply.

(e)   shall be based on equipment and software built to open, non-proprietary standards that will remain supportable during the Contract Term; and,

(f)   shall remain certified, supported and maintained on the Upgrade Path during the Contract Term, regardless of enhancements that may be required

1.4.2   Access to embedded source code for ICT systems, subsystems, equipment and components of the Simulators shall be maintained in accordance with clause 37 (Intellectual Property Rights) of the Conditions of Contract.

1.5   Connectivity to Public Systems

1.5.1   All ICT systems, subsystems, equipment and components of the Simulators shall not interfere with or otherwise impact on the use of public mobile communication systems.

1.6   System Integration with RailCorp ICT Systems

1.6.1   All systems, subsystems, equipment and components of the Simulators shall be capable of being safely, successfully and sustainably integrated into RailCorp systems where they must inter-operate.

1.6.2   Any requirements for components, environments or resources to be supplied by RailCorp to achieve the required level of system integration shall be stated clearly. This shall include proposed data schemas, expected data volumes to be handled across interfaces with RailCorp, requirements for connectivity approaches, bandwidth of communications links and any other relevant content details and related topics which may impact RailCorp's ICT infrastructure capacity.

1.6.3   All interfaces with RailCorp ICT systems, subsystems, equipment and components shall be capable of supporting bi-directional standards, protocols and data.

1.6.4   Interfaces shall be compliant with the standards of the IEEE Rail Transit Vehicle Interface Standards Committee or accepted non-proprietary equivalent international, national or industry standards.

1.7   Safety Systems

1.7.1   All ICT systems, subsystems, equipment and components that have safety attributes, or have interfaces to RailCorp ICT systems (whether explicitly related to safety or not), shall be identified and shall comply with EN 50128, or an accepted non-proprietary equivalent international, national or industry standard. Any safety related data transferred from any ICT systems, subsystems, equipment and components to any RailCorp ICT system, by any means, shall also be clearly identified.

2 DRIVER'S SIMULATOR (DS)

2.1 DS Purpose

2.1.1 The purpose of the Driver's Simulator (DS) is to provide training for the role of the Driver. The scope of this training includes the following training objectives:

(a) identification and operation of controls, instrumentation alarms and communications equipment;

(b) start-up and shutdown procedures;

(c) fault detection analysis and corrective actions, including operation in Normal, Degraded and Emergency scenarios;

(d) Driver's techniques, including:

(i) braking and acceleration;

(ii) reaction to signals; and

(iii) reaction to traffic impediments;

(e) signal training, routes, and collision avoidance;

(f) communication procedures with the Guard, the Rail Management Centre, signaller, train controller, Authorities, and passengers;

(g) operation in varying weather conditions, including reduced visibility (darkness, rain, fog etc.);

(h) operation in varying track conditions, including low adhesion etc.;

(i) optimum Driver's practice for safety, energy efficiency and passenger comfort; and

(j) operation under a range of safeworking conditions.

2.2 DS Appearance and Functionality

RFTA 00264

2.2.1 Unless otherwise agreed by RailCorp, the ~~The~~ DS shall be identical in appearance and dimensions to the actual Crew Cab.

RFTA 00265

2.2.2 Unless agreed otherwise by RailCorp, the ~~The~~ DS functionality shall be identical to that found on the Sets and shall simulate Normal, Degraded and Emergency operation conditions as if the Trainee Driver was driving an actual Set. ~~and~~ The DS must include simulation of all Normal operating conditions and all ~~operation,~~ Fault and Defect conditions that PPP Co determines can or needs to be investigated by the Driver ~~as if the Trainee Driver was driving an actual Set under Normal, Degraded or Emergency operation scenarios~~. This includes the operation of the CCTV system consistent with the need of the training scenario and using images consistent with the DS Vision System for the simulated location of the train.

RFTA 00016

2.2.3 The DS shall be designed in such a manner ~~provided with a HVAC System~~ so as to maintain a comfortable environment at all times.

2.2.4 The DS will use CGI images displayed on a screen to give the Trainee Driver an accurate impression of travelling along the simulated railway route.

2.3 DS Vision System

2.3.1 DS Vision System graphics shall be displayed with a resolution of no less than 1280 x 1024 and a refresh rate of no less than 30 Hz.

2.3.2 CGI shall be generated using ~~photo texture~~ <u>photo/texture</u> mapping technology to allow the display of photo-realistic images.

2.3.3 Both the projector and the display shall operate simultaneously and correctly when the generic track database is run at all simulated speeds up to 130 km/h.

2.3.4 The projection system used shall provide an alignment and focusing facility to allow for easy adjustment to display correct depth of field.

2.3.5 The DS Vision System shall be capable of displaying all static features that are required to provide a realistic and representative simulation of the Sydney metropolitan rail network, including:

   (a) rail track, ballast, signals, speed restriction boards, work boards, whistle boards, trackside structures and signs;

   (b) man-made structures such as stations, platforms, bridges, buildings, houses and high rise buildings;

   (c) landscape objects including trees, bushes, embankments, hills, other natural landforms, cuttings, fields and other rural land and bush land;

   (d) standing trains and stalled vehicles on crossings; and

   (e) miscellaneous features such as advertising panels, telephone lines, level crossing and obstructions.

2.3.6 The DS Vision System shall be capable of displaying all multi-state features that are required to provide a realistic and representative simulation of the Sydney metropolitan rail network, including:

   (a) signals;

   (b) points;

   (c) signs; and

   (d) lights.

2.3.7 The DS Vision System shall be capable of displaying all dynamic features that are required to provide a realistic and representative simulation of the Sydney metropolitan rail network, including:

   (a) moving trains;

   (b) work crews on or near the track;

   (c) children playing on or near the track;

   (d) passengers moving on platforms and entering or leaving the Set;

   (e) passengers falling or jumping on the tracks; and

   (f) passengers or staff walking, running, bending, falling or lying down.

2.3.8 The DS Vision System shall be capable of displaying the following lights:

    (a) headlight beams which illuminate the track and surrounding features;

    (b) tail lights from vehicles; and

    (c) illuminated signs.

2.3.9 Light points and illuminated signs shall be suitably attenuated and scaled to give a real world distance viewing effect.

2.3.10 The DS Vision System shall be capable of displaying the following effects:

    (a) fog;

    (b) general smoke haze;

    (c) sun glare and sun washout;

    (d) any time of day, with ambient light levels varying from full darkness (with and without moonlight), through to full sunlight. Note dynamic shadows are not required; and

    (e) rain.

2.3.11 The Instructor may select the time of day and date of year to position the sun accurately.

2.3.12 The DS Vision System software shall not display the following distracting visual effects:

    (a) visible stair-casing (aliasing);

    (b) noticeable time delay between human input and visual feedback (that is not inherent in the real system which is being simulated);

    (c) peel-back, rollback or disappearing surface content; nor

    (d) level of detail change exhibiting popping or aliasing.

2.4 DS Train Performance Display

2.4.1 The DS shall be fitted with a Train Performance Display (TPD). The TPD shall be mounted in the DS in a manner unobtrusive to the Trainee Driver.

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2.4.2 The TPD shall allow the Trainee Driver to simultaneously ~~select and~~ view ~~from~~ the following display sections:

    (a) Train Profile Display;

    (b) Graphical Output Display; and

    (c) Digital Output Display.

2.4.3 The Train Profile Display shall include:

    (a) change in curvature of the current track;

    (b) elevation of the current track;

    (c) track features alongside the current track (e.g. stations etc.); and

(d)   the current simulated position of the Set along the track.

2.4.4   The optimum position of the Set for the simulation shall be overlaid on the TPD. This overlay is a recording of a previous session on this scenario which RailCorp select as being optimum.

2.4.5   The TPD shall be provided with a facility to zoom in on the display.

2.4.6   The TPD shall display data such that the rear Car is located to the ~~to the leftmost edge~~ on the left side of the display. <u>The Train Profile Display shall show track and features in front of the train and a small amount of track and features behind the train, when on the default zoom level.</u>

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2.4.7   The Graphical Output Display shall graphically display the Set configuration with the distance travelled along the horizontal axis.

2.4.8   The Graphical Output Display shall display the following values plotted over time for the duration of the simulation:

(a)   longitudinal acceleration;

(b)   lateral acceleration;

(c)   longitudinal acceleration rate; and

(d)   lateral acceleration rate.

2.4.9   The Digital Output Display shall display:

(a)   current longitudinal acceleration rate;

(b)   current longitudinal acceleration;

(c)   current lateral acceleration rate;

(d)   current lateral acceleration;

(e)   odometer; and

(f)   elapsed time for the current Driver Training Session.

2.5   DS Audio System

General

2.5.1   The DS Audio System shall simulate three-dimensional spatial effects within the Crew Cab to indicate the direction and apparent distance of a sound source as perceived from the Driver's position.

2.5.2   The DS Audio System shall produce accurate simulated audio whenever any section of the installed track database is being traversed.

2.5.3   The DS Audio System shall be capable of a realistic composite sound consisting of all relevant individual sound sources played simultaneously as appropriate to the simulated location.

2.5.4   Sounds emanating from sources external to the Crew Cab shall be simulated so as to be consistent with track location and synchronised with the DS Vision System.

2.5.5   The maximum delay between the DS Vision System and DS Audio System shall be 100ms.

2.5.6   Environmental Sounds

The DS Audio System shall simulate the following sounds emanating from outside the Set:

(a)   cuttings;

(b)   bridges;

(c)   aerodynamic noise;

(d)   track clatter from rail joints, frogs and points;

(e)   warning detonators;

(f)   wheel squeal on curves;

(g)   wheel flats;

(h)   level crossing bells.

(i)   brake blocks against wheels where relevant; and

(j)   passing vehicles.

2.5.7   External sounds shall be modified for the following environmental conditions:

(a)   track curvature;

(b)   bridges;

(c)   platforms;

(d)   tunnels;

(e)   cuttings;

(f)   crossovers and points;

(g)   wind;

(h)   speed; and

(i)   Set systems status.

2.5.8   External sounds shall be modified by Doppler effects dependent on the simulated speed of the Set.

2.5.9   The DS Audio System shall produce the following sounds emanating from the Set when it is in use:

(a)   traction motor noise consistent with speed and trainload;

(b)   electric braking;

(c)   air brake;

(d)   brake pads;

(e)   air horn;

(f)   vigilance system warnings;

(g)   power contactors;

(h)   emergency air brake release in the Crew Cab;

(i)   air release from the compressor unloader; and

(j)   compressor start and stop.

2.5.10   The sounds produced by the DS Audio System shall as far as possible be identical to the noise produced by the real Set.

2.6   DS Radio/Intercom System

2.6.1   The DS shall be fitted with a DS Radio/Intercom System. The radio shall be a simulated version of the actual Train Radio system(s) fitted to the Set.

2.6.2   The DS Radio/Intercom System shall provide the following communications links as a minimum:

(a)   Trainee Driver's position to and from the SCS;

(b)   Trainee Driver's position to Trainee Guard's position; and

(c)   Broadcast from the SCS.

2.6.3   The DS radio channels shall be able to be remapped by an Instructor using the SCS so as to replicate the Set moving between different radio zones in the network.

2.6.4   The DS radio shall not simulate radio interference effects.

2.6.5   The active DS radio channel shall be displayed to the Instructor at the SCS.

2.6.6   Independent volume controls shall be provided for the DS Radio/Intercom System at the SCS.

2.6.7   The DS Radio/Intercom System shall allow the Driver to simulate Driver to Guard communication (Crew Intercom) and Public Address functions.

2.6.8   The DS Radio/Intercom System interface for the Instructor shall be via the SCS headsets and microphones.

2.6.9   The DS Radio/Intercom System signal shall be mixed with the output from the DS Audio System at the SCS.

2.7   DS CCTV

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2.7.1   The DS shall be fitted with sufficient colour CCTV cameras to enable the Instructor to view the Trainee Driver and the Trainee Driver's use of all of the DS equipment. Where the operational state of equipment cannot be determined through the use of the CCTV system, that state shall be indicated to the instructor by an alternative means to be agreed by RailCorp.

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2.7.2　A colour monitor for each of the <u>The</u> DS CCTVs <u>system</u> shall be provided <u>viewable</u> at the SCS. Each screen shall be configurable to display either:

(a)   ~~one image;~~

(b)   ~~two images (split screen); or~~

(c)   ~~four images (split screen).~~

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2.7.3　The DS CCTV images shall be recorded during each Driver Training Session and shall be capable of being replayed. All sessions will be stored on a Hard Disk and will be capable of being saved or exported as required. The CCTV image as described in clause 2.7, export format must be compatible with MPEG4. A CD ROM or DVD Burner will also be provided to facilitate the storage and transfer of data.

2.8　DS Procedural Trainer

2.8.1　A DS Procedural Trainer must be provided as part of the DS to allow Trainee Drivers to simulate interaction with areas of the Set that exist outside of the Crew Cab in the real environment.

2.8.2　The DS Procedural Trainer shall be available via a touch-screen.

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2.8.3　The DS Procedural Trainer shall be mounted immediately outside the DS on the mobile simulator. <u>On the fixed DS Simulator the DS Procedural Trainer shall be mounted inside the DS in a location to be agreed by RailCorp.</u>

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2.8.4　The DS Procedural Trainer screen shall mimic the status of each Car of a Set.

2.8.5　The DS Procedural Trainer screen shall allow the Trainee Driver to interrogate and control the status of the various Set systems by interaction with the simulated controls and instruments using a collection of linked hierarchical images and technical drawings through which the Trainee Driver can navigate.

2.8.6　The DS Procedural Trainer shall allow the Trainee Driver to investigate and clear Faults introduced by the Instructor.

2.8.7　The DS Procedural Trainer shall allow the Trainee Driver to:

(a)   select any tools required to perform the task;

(b)   locate the position in the Set at which the Fault requires correction; and

(c)   remedy the Fault,

for all train Faults that PPP Co determines can or need to be investigated by the Driver during Normal, Degraded and Emergency operating conditions.

2.8.8　A loudspeaker with separate volume control shall be provided to simulate the sound that would be made by the real equipment when operated (e.g. the sound of leaking air or alternator whine). It shall be possible to control whether the loudspeaker is operative and to vary the master volume level when in use from the SCS.

2.8.9   The volume of the audio shall increase or decrease as the Trainee Driver
           progressively selects Cars closer to or further away respectively from the source of the
           cause of the audio.

2.8.10   The DS Procedural Trainer shall provide graphical images on the touch-screen to
           allow the Trainee Driver to 'drill down' to more detailed sections of the Set to
           investigate a problem.

2.8.11   The DS Procedural Trainer shall provide navigational buttons to allow movement
           throughout the Set via simple selections.

2.8.12   The DS Procedural Trainer must provide a facility via the DS Procedural Trainer
           interface that shall allow the Instructor to drive the Set independently from the Trainee
           Driver. This facility shall allow the Instructor to simulate driving the Set as might be
           performed by the Guard under special conditions.

2.9   DS Demonstration Mode

2.9.1   The DS shall have a demonstration mode that will allow the demonstration of the full
           range of DS performance. This functionality may be achieved by default through the
           use of a replay function within the Simulators. The demonstration mode shall operate
           on all generic RailCorp metropolitan network track including both the existing generic
           track and additional track to be provided as per clause 4.3.16.

3 GUARD'S SIMULATOR (GS)

3.1 GS Purpose

3.1.1 The purpose of the Guard's Simulator (GS) is to provide training for the role of Guard. The scope of this training includes the following training objectives:

(a) identification and operation of controls, instrumentation alarms and communications equipment;

(b) start-up and shutdown procedures;

(c) fault detection analysis and corrective actions, including emergency handling;

(d) communication procedures with the Driver, operations staff, Authorities, and passengers; and

(e) ensuring the safety of Passengers when boarding and alighting from Sets and while working Sets through platforms.

3.2 GS Appearance and Functionality

| RFTA 00270 | 3.2.1 | <u>Unless otherwise agreed by RailCorp, the</u> ~~The~~ GS shall be identical in appearance and dimensions to the actual Crew Cab. |

| RFTA 00271 | 3.2.2 | Unless agreed otherwise by RailCorp, the ~~The~~ GS functionality shall be identical to that found on the Sets and shall simulate Normal, Degraded and Emergency operation conditions as if the Trainee Guard was operating an actual Set. ~~and~~ The GS must include simulation of all Normal operating conditions and all ~~operation,~~ Fault and Defect conditions that PPP Co determines can or needs to be investigated by the Guard ~~as if the Trainee Guard was operating an actual Set under Normal, Degraded or Emergency operation scenarios~~. This includes the operation of the CCTV system consistent with the needs of the training scenario and using images consistent with the GS Vision System referred to in clauses 1.2.2 and 3.2.4 of this RailCorp Simulator Specification for the simulated location of the Set. |

| RFTA 00018 | 3.2.3 | The GS shall be <u>designed in such a manner</u> ~~provided with a HVAC~~ so as to maintain a comfortable environment at all times. |

3.2.4 The Guard's Simulator will have a GS Vision System with CGI vision capability to support training of Guards in their duties with regard to the safety of Passengers when boarding and alighting from Sets and when working Sets through platforms. This GS Vision System will cover platforms, doors and Passengers and will be consistent with the DS Vision System with regard to Rail Network location, Passenger density and station staff/hand signallers. The technical features of the GS Vision System shall be consistent with those for the DS Vision System described in clause 2.3 of this RailCorp Simulator Specification. To facilitate platform operations the Guard shall be able to stand in the doorway and look up and down the external view of the train by the use of suitable visual displays.

3.3 GS Audio System

General

3.3.1 The GS Audio System shall simulate three-dimensional spatial effects within the GS to indicate the direction and apparent distance of a sound source as perceived from the Guard's position.

3.3.2 The GS Audio System shall produce accurate simulated audio consistent with the settings for the Guard Training Session being undertaken.

3.3.3 The GS Audio System shall be capable of a realistic composite sound consisting of all relevant individual sound sources played simultaneously as appropriate to the simulated location.

3.3.4 Environmental Sounds

The GS Audio System shall simulate the following sounds emanating from outside the Set:

(a) cuttings;

(b) bridges;

(c) aerodynamic noise;

(d) track clatter from rail joints, frogs and points;

(e) warning detonators;

(f) wheel squeal on curves;

(g) wheel flats;

(h) level crossing bells.

(i) brake blocks against wheels where relevant; and

(j) passing vehicles.

3.3.5 External sounds shall be modified for the following environmental conditions:

(a) track curvature;

(b) bridges;

(c) platforms;

(d) tunnels;

(e) cuttings;

(f) crossovers and points;

(g) wind;

(h) speed; and

(i) Set systems status.

3.3.6 External sounds shall be modified by Doppler effects dependent on the simulated speed of the Set.

3.3.7 The GS Audio System shall produce the following sounds emanating from the Set when it is in use:

(a) traction motor noise consistent with speed and trainload;

(b)   electric braking;

(c)   air brake;

(d)   brake pads;

(e)   air horn;

(f)   power contactors;

(g)   emergency air brake release in the Crew Cab;

(h)   air release from the compressor unloader; and

(i)   compressor start and stop.

3.3.8   The sounds produced by the GS Audio System shall as far as possible be identical to the noise produced by the real Set.

3.4   GS Radio/Intercom System

3.4.1   The GS shall be fitted with a GS Radio/Intercom System. The radio shall be a simulated version of the actual Train Radio system(s) fitted to the Set.

3.4.2   The GS Radio/Intercom System shall provide the following communications links as a minimum:

(a)   Trainee Guard's position to and from the SCS;

(b)   Trainee Guard's position to Trainee Driver's position; and

(c)   Broadcast from the SCS.

3.4.3   The GS radio channels shall be able to be remapped by an Instructor using the SCS so as to replicate the Set moving between different radio zones in the network.

3.4.4   The GS radio shall not simulate radio interference effects.

3.4.5   The active GS radio channel shall be displayed to the Instructor at the SCS.

3.4.6   Independent volume controls shall be provided for the GS Radio/Intercom System at the SCS.

3.4.7   The GS Radio/Intercom System shall allow the Guard to simulate Driver to Guard communication (Crew Intercom) and Public Address functions.

3.4.8   The GS Radio/Intercom System interface for the Instructor shall be via the SCS headsets and microphones.

3.4.9   The GS Radio/Intercom System signal shall be mixed with the output from the GS Audio System at the Simulator Control Station.

3.5   GS CCTV

3.5.1   The GS shall be fitted with sufficient colour CCTV cameras to enable the Instructor to view the Trainee Guard and the Trainee Guard's use of all of the Crew Cab equipment.

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3.5.2   A colour monitor for each of the ~~The~~ GS CCTVs system shall be provided viewable at the SCS. Each screen shall be configurable to display either:

(a)   ~~one image;~~

(b)   ~~two images (split screen); or~~

(c)   ~~four images (split screen).~~

3.5.3   The GS CCTV images shall be recorded during each Guard Training Session and shall be capable of being replayed. All sessions will be stored on a Hard Disk and will be capable of being saved or exported as required. The CCTV image export as described in clause 3.5, format must be compatible with MPEG4. A CD ROM or DVD Burner is also to be provided to facilitate the storage and transfer of data.

3.6   GS Procedural Trainer

3.6.1   A GS Procedural Trainer must be provided as part of the GS to allow Trainees to simulate interaction with areas of the Set that exist outside of the Crew Cab in the real environment.

3.6.2   The GS Procedural Trainer shall be available via a touch-screen.

3.6.3   The GS Procedural Trainer shall be mounted immediately outside the GS.

3.6.4   The GS Procedural Trainer screen shall mimic the status of each Car of a Set.

3.6.5   The GS Procedural Trainer screen shall allow the Trainee Guard to interrogate and control the status of the various Set systems by interaction with the simulated controls and instruments using a collection of linked hierarchical images and technical drawings through which the Trainee Guard can navigate.

3.6.6   The GS Procedural Trainer shall allow the Trainee Guard to investigate and clear Faults introduced by the Instructor.

3.6.7   The GS Procedural Trainer shall allow the Trainee Guard to:

(a)   select any tools required to perform the task;

(b)   locate the position in the Set at which the Fault requires correction; and

(c)   remedy the Fault,

for all train Faults that PPP Co determines can or need to be investigated by the Guard during Normal, Degraded and Emergency operating conditions.

3.6.8   A loudspeaker with separate volume control shall be provided to simulate the sound that would be made by the real equipment when operated (e.g. the sound of leaking

air or alternator whine). It shall be possible to control whether the loudspeaker is operative and to vary the master volume level when in use from the SCS.

3.6.9   The volume of the audio shall increase or decrease as the Trainee Guard progressively selects Cars closer to or further away respectively from the source of the cause of the audio.

3.6.10   The GS Procedural Trainer shall provide graphical images on the touch-screen to allow the Trainee Guard to 'drill down' to more detailed sections of the Set to investigate a problem.

3.6.11   The GS Procedural Trainer shall provide navigational buttons to allow movement throughout the Set via simple selections.

4 SIMULATOR CONTROL STATION (SCS)

4.1 SCS Purpose

4.1.1 The purpose of the Simulator Control Station (SCS) is to allow the Instructor(s) to control and supervise Training Sessions in the DS and GS.

4.1.2 It shall be possible to operate the DS and GS independently of one another or in an integrated Training Session during which a Trainee Driver in the DS and a Trainee Guard in the GS can interact under the control and supervision of an Instructor(s).

4.2 SCS Appearance and Functionality

4.2.1 The SCS desk shall have space for two Instructor's positions.

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4.2.2 Each Instructor positions shall be able to be configured to operate either <u>as follows</u>

   (a) one Instructor position configured to operate the DS ~~alone~~;

   (b) one Instructor position configured to operate the GS ~~alone; or~~ and

   (c) both Instructor positions capable of operating together ~~the DS and the GS~~ in an interactive Training Session, each controlling their respective simulator.

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4.2.3 Each Instructor position shall have sufficient monitors and other controls so as to:

   (a) observe the ~~outputs~~ <u>colour image</u> from each of the DS or GS CCTV cameras <u>as follows:</u>

   (i) any individual camera from the DS or GS;

   (ii) all cameras from either the DS or GS (split screen);

   (iii) all cameras from both the DS and GS (split screen).

   (b) observe a mimic of the DS or GS controls;

   (c) view the vision being displayed to the Trainee in the DS or GS (when configured to operate a DS Training Session or GS Training Session respectively);

   (d) listen to the audio signal being provided to the Trainee and use the radio and intercom systems; and

   (e) control and supervise all aspects of the Training Session or integrated scenarios.

4.2.4 A telephone connection shall be provided at each Instructor position.

4.2.5 The SCS shall be fitted with a HVAC system so as to maintain a comfortable environment at all times.

4.2.6 The SCS shall be capable of storing, retrieving and replaying a minimum of 100 Training Sessions for each of the DS, GS and integrated scenarios.

4.3 SCS Training Session Control

General

4.3.1   The SCS shall allow the Instructor to perform all activities necessary to control a Training Session, including:

(a)   controlling Faults;

(b)   controlling signals, track features and animated objects;

(c)   controlling environmental conditions;

(d)   controlling Training Sessions;

(e)   viewing the DS or GS console mimics;

(f)   viewing the DS or GS status and diagnostics; and

(g)   controlling the recording of a Training Session and subsequent replay.

4.3.2   The Instructor shall be able to customise and influence a Training Session by:

(a)   manually using the SCS controls to make real-time adjustments to conditions during a Training Session; or

(b)   pre-programming (scripting) commands for a Training Session using the full range of available simulation parameters.

Fault Controller

4.3.3   PPP Co must provide a Fault Controller on the SCS that shall allow the Instructor to control the introduction or removal of Faults for the DS or the GS.

4.3.4   The Fault Controller shall provide the Instructor with a list of Faults that can be controlled from the SCS.

4.3.5   For ease of access, the Faults shall be divided into categories appropriate to the design of the real Sets.

4.3.6   The Instructor shall be able to set or clear the Faults.

4.3.7   The Fault Controller shall provide the Instructor with the current status of each Fault.

Signal and Track Controller

4.3.8   PPP Co must provide a Signal and Track Controller on the SCS that shall allow the Instructor to control the state of multi-state features.

4.3.9   The Signal and Track Controller shall also provide a graphical representation of the Set's position on the track map to the Instructor.

4.3.10   The Instructor shall be able to select a feature and alter the state of the feature using the SCS.

Environment Controller

4.3.11   PPP Co must provide an Environment Controller on the SCS. The Environment Controller shall provide the Instructor with the capability to modify the following environmental conditions:

(a)   atmospheric condition; and

(b)   wind intensity level (0-100 km/h).

4.3.12   The atmospheric conditions available for selection shall be:

(a)   rain - at a range of 0 - 100% in intensity;

(b)   fog - at a range of 0 - 100% in intensity;

(c)   smoke haze - at a range of 0 - 100% in intensity; and

(d)   overcast level (brightness of sun) - at a range of 0 - 100% in intensity.

4.3.13   The fog and haze environmental conditions shall be mutually exclusive. When the intensity of fog is set to greater than 0%, the intensity of haze shall be reduced to 0%. Likewise, setting the intensity of haze greater than 0% shall reduce the intensity of fog to 0%.

Track Builder Tool

4.3.14   A Track Builder Tool shall be provided on the SCS. The Track Builder Tool shall allow creation and modification of the 2-D and 3-D aspects of train tracks, the trackside features and the nearby terrain features.

4.3.15   Resultant track files shall be capable of being readily stored and selected for use in the DS and GS via the SCS.

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4.3.16   PPP Co shall supply a visual database of track for use in the DS covering at least the track which is in use on RailCorps' existing Simulators including the ~~Parramatta~~Epping to Chatswood Rail Link plus an additional 30 Km of generic Sydney Metropolitan track populated with generic scenery. The 30km of generic Sydney track to be provided should effectively represent the Up and Down lines between Central and Chatswood, including the gradient profile and track heights in accordance with actual track, sidings and dynamic switches, the platforms on that route and a number of key features that lie outside of the Rail Corridor.

Session Controller

4.3.17   PPP Co must provide a Session Controller. The Session Controller on the SCS shall provide the Instructor with buttons for overall Simulator control.

4.3.18   The Instructor shall be able to use the Session Controller to:

(a)   play, pause and stop a Training Session;

(b)   save a Training Session;

(c)   replay a Training Session;

(d)   select the scenario for a Training Session;

(e)   alter the initial conditions of a scenario for a particular Training Session;

(f)   add, delete or modify dynamic events throughout the Driver's Training Session (such as Railway Fog Signals); and

(g)   record the Instructor and Trainee names for future reporting data.

4.4 SCS Training Session Management

General

4.4.1 The SCS shall allow the Instructor to perform Training Session management activities including:

(a) report generating;

(b) scenario building;

(c) user management; and

(d) performance parameter editing.

User Management Interface

4.4.2 A User Management Interface shall be provided at the SCS to:

(a) allow the identification of each Trainee by first and last name;

(b) allow the identification of each Instructor by first and last name;

(c) provide storage and retrieval of Trainee details:

    (i) Trainee profile;

        A   employee number;

        B   RailCorp classification;

        C   RailCorp work location; and

        D   six (6) text fields for profile data;

    (ii) Training Sessions completed by a Trainee; and

    (iii) Training Sessions saved for a Trainee with indications of which Simulator (DS or GS) the Training Session was executed on when recorded;

(d) provide a Trainee Performance Report on both quantitative and qualitative measures; and

(e) provide a text area for comments to be entered by Instructors in free text or selected from a pre-defined list.

User Management Report Generator

4.4.3 The User Management Report Generator on the SCS shall include quantitative reports that shall provide details including:

(a) Trainee reaction to events:

    (i) event;

    (ii) time of the event; and

    (iii) Trainee reaction time;

(b) Trainee performance after a particular event or Fault occurred:

    (i) event;

(ii)   time of the event; and

(iii)   Trainee resolution steps;

(c)   charts indicating actions taken (e.g. application of power and braking in the case of the DS) with respect to the optimum values determined for the Training Session;

(d)   braking performance (DS only);

(e)   use of Set whistle relative to related track features such as sign boards, crossings (DS only);

(f)   Passenger comfort measure (lateral and longitudinal acceleration and acceleration rate) (DS only); and

(g)   it shall be possible to generate a report containing the same information as will be provided by the real Set's Event Recorder.

4.4.4   The User Management Report Generator on the SCS shall include qualitative reports that shall provide a report covering a range of performance categories utilising the ranges of the quantitative scores for a particular Trainee.

4.4.5   A filtering facility shall be provided within the User Management Report Generator to allow the Instructor to select the type and amount of information provided in any report.

4.4.6   The report scoring, weighting, assessment criteria, qualitative report generation and format of the reports shall be able to be customised by suitably trained personnel of RailCorp.

4.4.7   Capability shall be provided for printing:

(a)   Training Session details; and

(b)   User Management Report Generator reports.

Scenario Builder

4.4.8   The Scenario Builder shall allow selection of the initial conditions for either a DS, GS or integrated (DS and GS simultaneously) Training Session, including:

(a)   Set configuration and operating status (Normal, Degraded, Emergency etc.);

(b)   track;

(c)   initial speed of the Set;

(d)   time of day and date (to allow for position-of-sun calculations); and

(e)   a selection of scripting capabilities as described below.

4.4.9   Scripting via the Scenario Builder provided on the SCS shall include:

(a)   alterations to the modifiable environmental conditions;

(b)   setting or clearing of Faults;

(c)   alteration of the state of multi-state objects (such as a signal, track switch, flag-man waving);

(d)   addition or deletion of a dynamic event (such as a warning detonator);

(e)   modifications to model parameters; and

(f)   allowing the programming or scripting required to define the state changes for an entity based upon factors including:

(i)   Set position along a track segment;

(ii)   elapsed time of Training Session; or

(iii)   any of the following events occurring:

A.   a selected Set speed;

B.   a selected Set acceleration;

C.   a selected traction level;

D.   a selected braking level; or

E.   the reverser handle being put into a selected position.

4.4.10   The SCS shall be able to store and select the settings for a minimum of 100 DS Training Sessions plus 100 GS Training Sessions plus 100 integrated DS and GS Training Sessions.

4.4.11   PPP Co will pre-program the SCS Scenario Builder with the settings for a minimum of 20 DS Training Sessions plus 20 GS Training Sessions plus 20 integrated DS and GS Training Sessions. PPP Co will present the content for each of these Training Sessions to RailCorp for its agreement.

Track Importer/Exporter

4.4.12   PPP Co must provide a Track Importer/Exporter Facility on the SCS.

4.4.13   The Track Importer/Exporter Facility shall allow the Instructor to select the appropriate track files created with the Track Builder Tool to be imported into the Simulator Configuration Database.

4.4.14   Similarly, the Track Importer/Exporter Facility shall allow the Instructor to export a selected track from the Simulator Configuration Database to a suite of files.

Performance parameter editing

4.4.15   PPP Co must provide a performance parameter editing facility on the SCS to allow modification of the following report and analysis features:

(a)   scoring parameters;

(b)   rule weighting;

(c)   assessment criteria status (include or exclude);

(d)   qualitative report generation defaults; and

(e)   format of the reports.

4.4.16   PPP Co shall provide training to nominated RailCorp staff in the modification of performance parameters.

Train Configuration Builder

4.4.17   PPP Co must provide a Train Configuration Builder.

4.4.18   The Train Configuration Builder shall allow the Instructor to nominate either:

(a)   the number of people to be included in a Car; or

(b)   the total Passenger weight for a Car,

as the initial loading value for each Car in the Set.

4.5   SCS Recording and Replay System

4.5.1   All Trainee and Instructor control actions (including data, voice and aural) shall be recorded for any Training Session in order to replay the Training Session.

4.5.2   Each saved DS Training Session shall be able to be replayed in the DS as well as at the SCS.

4.5.3   Using the SCS, the Instructor shall be able to:

(a)   begin a replay of a Training Session from an entered session time;

(b)   produce a time-stamp with an automatically allocated time-stamp sequence number;

(c)   begin a replay of a Training Session from a selected time stamp;

(d)   pause the replay of a Training Session;

(e)   resume the replay of a Training Session;

(f)   fast forward a Training Session until the end of the Training Session is reached or fast forward is halted;

(g)   rewind a Training Session until the start of the Training Session is reached or rewind is halted;

(h)   rewind a Training Session to a selected time stamp;

(i)   rewind a Training Session to an entered time;

(j)   fast forward a Training Session to a selected time stamp;

(k)   fast forward a Training Session to an entered time; and

(l)   intervene in the fast-forwarding or rewinding of a Training Session and halt the advance or rewind.

4.5.4   Throughout the fast-forwarding or rewinding of a Training Session, the "out of the window" vision shall be displayed both in the DS, GS and on the SCS monitor.

4.5.5   Initiation of a replay shall result in the same dynamic behaviour as that experienced when the Training Session was recorded.

4.5.6   Replay shall be able to be initiated simultaneously for both the DS and GS from one Instructor position on the SCS for Training Sessions recorded during an interactive Training Session.

4.5.7   External events to each Simulator that have been recognised throughout an interactive
         Training Session shall be recorded for that Simulator with the interactive Training
         Session data.

5 PART-TASK SIMULATOR (PTS)

5.1 PTS Overview

5.1.1 The Part-Task Simulator (PTS) must be a synthetic trainer tool that allows Trainees to interact with a virtual Set and to isolate and rectify a series of pre-defined Faults in a PTS Training Session.

5.1.2 The PTS shall provide a self-paced learning environment and must include:

(a) a built-in Trainee help system;

(b) self-assessment capabilities for Trainees; and

(c) Trainee activity and performance logging.

5.1.3 The PTS must be provided in a portable format capable of installation and operation on any computer with a suitable specification. The PTS shall be capable of networked operation with Instructor control, or in stand-alone mode.

5.1.4 The PTS must allow Trainees to interact with a virtual Set presented on their computer screen. The PTS must display a simulation model of a Set to a sufficient level of detail to accurately simulate the state of the Set's equipment and relate the state of that equipment to the images seen and sounds heard by the Trainee as they examine the equipment. The PTS must allow Trainees to navigate to the Set equipment of interest and select actions to change the state of the Set equipment as required.

5.2 PTS Fault Tasks

5.2.1 The Faults to be incorporated in the PTS shall cover all types of Fault that affect one or more of the Operator types during Normal, Degraded or Emergency operation.

5.2.2 The PTS must be capable of simulating Faults at their root cause and any consequential effects from a Fault. As a PTS Training Session proceeds, the PTS must simulate the Set state as derived from the Faults, any consequential effects from a Fault and the subsequent Trainee actions.

5.2.3 In each PTS Training Session the PTS must present the Trainee with a series of Fault Tasks. Each Fault Task shall comprise a number of steps the Trainee must execute with the correct procedure, and where required in the correct sequence, to isolate and rectify the nominated Fault.

5.2.4 The PTS must be capable of incorporating any number of discrete Faults into a Fault Task but the particular Faults in any given Fault Task shall not be user configurable.

5.2.5 The PTS shall require that certain steps in a Fault Task be completed by a Trainee in a defined mandatory order, while other steps in a Fault Task can be undertaken in an order determined by the Trainee.

5.2.6 The PTS shall allow a Trainee to undertake unnecessary steps whilst isolating and attempting to remedy a Fault.

5.2.7   At each step in a Fault Task the PTS must allow the Trainee to navigate to a specific image in the simulated Set model and select the correct hotspot to locate a Set component. The Trainee shall then be prompted to make a selection from a randomised list of potential actions for that component based on a presented component state.

5.2.8   The PTS shall be capable of simulating Fault Tasks which start with the Set moving and Fault Tasks which start with the Set stationary. The PTS must always provide that the Set comes to rest before the Trainee begins Fault isolation.

5.2.9   When a Fault is initiated and during a Fault Task the PTS must simulate the consequential responses of the Set.

5.2.10 During a Fault Task the Trainee shall not have control over the Set's movement.

5.2.11 The PTS views of Set controls must represent the appropriate position of all controls with regard to the start conditions for the Fault being simulated.

5.3   PTS Training Sessions

5.3.1   The PTS shall allow the Trainee to:

(a)   log on to the PTS with their name and/or unique identifier;

(b)   select which type of training they wish to undertake by selecting an operator type;

(c)   enter the lesson currently allocated by the Instructor;

(d)   select the learning mode they wish to execute and interact with the PTS accordingly; and

(e)   save their partially completed lessons and return to them at any later time by re-entering their logon identifier.

5.3.2   At the completion of each Fault Task the PTS shall present the Trainee with the option to start the next Fault Task or to go back to the selection menus to save or exit the current PTS Training Session or select a new PTS Training Session.

5.3.3   A PTS Training Session shall only be completed when the Trainee has completed the isolation and rectification procedure for each Fault Task in the PTS Training Session.

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5.3.4   If the Trainee undertakes any action which introduces an additional Fault into the Set during a Fault Task the PTS must simulate the additional Fault and a PTS Training Session shall only be completed when the additional Fault is corrected. The incorrect steps which introduced the additional Fault shall be recorded as incorrect steps and will result in the trainee receiving a "Fail" result for the original Fault Task.

5.3.5   The PTS must allow the Instructor to:

(a)   create and allocate PTS Training Sessions to individual Trainees;

(b)   select the Faults to be included in a PTS Training Session as a list of Fault Tasks to be completed sequentially; and

(c)   assess the Trainee's performance by reviewing their PTS Training Session.

5.3.6   PPP Co. shall provide a maximum of 70 individual Fault Tasks for use in the Training Sessions. Any number of individual Fault Tasks shall be able to be included in a PTS Session.

5.3.7   PTS Training Sessions shall be able to be created and stored in a directory for future access and use. It shall then be possible for PTS Training Sessions to be allocated to each individual Trainee's PTS for completion.

5.4   PTS Learning Modes

The PTS must have four learning modes:

(a)   demonstration mode;

(b)   tutorial mode;

(c)   practice mode; and

(d)   assessment mode.

Demonstration mode

5.4.1   The purpose of the demonstration mode shall be to show the Trainee how to operate the PTS.

5.4.2   In demonstration mode the PTS shall present an animated demonstration which automatically executes a number of typical Fault Tasks, with visual and aural commentary to explain the operation of the PTS and the actions being undertaken.

Tutorial mode

5.4.3   The purpose of the tutorial mode shall be to assist the Trainee to understand the required Fault rectification actions.

5.4.4   In tutorial mode the PTS must present the required steps in the Fault isolation and rectification procedure to the Trainee in the correct order.

5.4.5   In tutorial mode the PTS must allow the Trainee to access:

(a)   help screens for each Fault Task step at any time to view information to assist them in making the correct selections to work through the Fault rectification sequence; and

(b)   a labels function that labels each critical component in the images simulated by the PTS to assist the Trainee in identifying the correct Car component for attention. The labels must reflect the correct naming of each component as it is referred to in the help system.

5.4.6   In Tutorial Mode the PTS shall also provide a demonstration option. When the demonstration option is selected, the PTS must automatically demonstrate the entire procedure for the isolation and rectification of the current Fault with visual and aural commentary to explain the actions being undertaken.

5.4.7   If the Trainee makes an error in tutorial mode the PTS must prompt the Trainee to try again.

5.4.8   No scoring of the Trainee's performance shall be included in tutorial mode other than a log of the time taken if desired by the Instructor.

Practice mode

5.4.9   In practice mode the Trainee shall control their actions and attempt to isolate and repair Faults without the PTS providing any of the assistance accessible by a Trainee in the tutorial mode.

5.4.10   In practice mode the PTS must:

(a)   provide the Trainee with feedback when they make an incorrect choice of action during a Fault Task through the use of colour coding;

(b)   enable the Trainee on making a mistake (at their option) to step back to the previous step; and

(c)   show the Trainee's completion time and scoring for the purpose of self-assessment.

Assessment mode

5.4.11   In assessment mode the PTS must provide no assistance to the Trainee in completing the Fault isolation and rectification procedure.

5.4.12   In assessment mode the PTS must:

(a)   record the time taken by the Trainee to complete each Fault Task;

(b)   monitor the execution and order of each step in the Fault Task;

(c)   be capable of confirming that all actions were executed in the correct order; and

(d)   note the occurrence of any departure from the recommended steps.

5.4.13   On completion of a PTS Training Session in Assessment Mode the PTS must automatically generate a report for the Trainee and allocate a pass or fail for the lesson based on the successful execution of each Fault Task, and the time taken to undertake each Fault Task.

5.4.14   The production and viewing of the assessment report shall be optional. Consequently the formal assessment can be ignored and the PTS shall provide the Trainee with a "free play" mode which shall be manually monitored by the Instructor to provide an alternative assessment mechanism.

5.5   PTS Operator Options

5.5.1   The PTS shall allow Trainees to select from one of the following three Operator options:

(a)   Driver;

(b)   Guard; or

(c)   Maintainer.

5.5.2   Each Operator option shall be able to be allocated with a sub-set of the total available Fault Tasks by the Instructor. The Instructor shall be able to vary the Fault Task allocation when they construct the PTS Training Sessions.

5.5.3   The PTS must provide the Instructor with tools to control the nature of PTS Training Sessions and to perform activities such as:

(a)   allocation of Fault Tasks to a particular PTS Training Session for each class of Operator;

(b)   determination that the Fault Tasks in a PTS Training Session are presented to the Trainee either in the order they are defined in the Training Session configuration or in a random sequence;

(c)   allocation of PTS Training Sessions from the library to be current for each type of Operator. Current lessons are presented to the Trainee according to the type of Operator they nominate during login; and

(d)   viewing each Trainee's assessment when they execute assessment mode.

5.5.4   The PTS must also give the Instructor the ability to edit the content of the Fault Tasks in the PTS including:

(a)   the ability to edit labels, help text and help screen images as well as the names of each step in a Fault Task; and

(b)   to define the assessment parameters associated with each Fault Task and PTS Training Session to define a Trainee's pass/fail criteria.

6 SYSTEM SUPPORT

6.1 On-Line User Manual and Help Facility

6.1.1 PPP Co must provide an online User Manual at each Instructor position at the SCS.

6.1.2 The User Manual shall contain a linked index to allow location of relevant sections of the User Manual. The Manual will be designed to assist the end user to understand how to perform tasks and will make use of process maps to describe in summary terms the requirements.

6.2 Simulator Configuration and Calibration

6.2.1 PPP Co must ensure, at its own cost, that all Simulator systems and components supplied to meet the requirements of this RailCorp Simulator Specification are updated so that they accurately reflect the visual, physical and operating characteristics of the real Sets throughout the operating life of the Sets.

6.2.2 Within 3 months of Set 1 entering passenger service the Simulator models shall be validated against actual measured performance data from Set 1. This includes, but is not limited to, validation of the traction and braking dynamic models and of any motion systems that are provided.

6.2.3 Any changes in the configuration of the real Sets must be reflected in an equivalent updating of the affected Simulator's component(s) no later than two calendar months after the initial configuration change on the real Sets, unless agreed otherwise in writing with RailCorp.

6.3 Provision of Information to RailCorp for RailCorp Enabling Works

6.3.1 PPP Co will be responsible for providing all necessary details of the Simulators and training terminals necessary to allow RailCorp to design and construct the Simulator Building and its services. These details include dimensioned layout drawings and services requirements including electric power, ventilation, and air conditioning loads.

6.3.2 PPP Co will also be responsible for installing and commissioning the Simulators and training terminals in the Simulator Building.

7   SIMULATOR VERSIONS

7.1   Mobile Version Simulator

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PPP Co must provide the Driver's Simulator (DS), Guard's Simulator (GS) and Simulator Control Station (SCS) in a mobile configuration, such that they are ~~installed in a standard ISO container or otherwise~~ installed in a suitable road vehicle trailer ~~unit~~ so as to be able to be transported<u>, during daylight hours without requiring either a Specific Permit (as defined in *Road Transport (Mass, Loading and Access) Regulation 2005*) or a pilot vehicle,</u> ~~(without special traffic arrangements or police escort)~~ to any ~~suitable~~ <u>nominated</u> location (e.g. <u>Auburn Maintenance Facility, the Petersham Rail Training Centre, and specific RailCorp Depots</u> ~~Crew depots etc.~~). The functional requirements for the Simulators shall otherwise be as set out in this Specification.

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7.2   Motion System Version Simulator

7.2.1   General

PPP Co must provide a DS with a motion system that is capable of accurately simulating the dynamic motion of a Set consistent with its simulated speed, track condition and Driver's mode/characteristics appropriate to the section of the installed track database being traversed. The Motion System Version Simulator is mutually exclusive to the Mobile Version Simulator.

7.2.2   Simulated Dynamic Movements

The Motion System Version Simulator shall accurately simulate the full range of train dynamic movement in Normal, Degraded and Emergency operating scenarios, consistent with the following inputs:

(a)   behaviour of the Set suspension in negotiating the simulated track;

(b)   operation of traction and braking controls;

(c)   pressure waves, such as resulting from passing other trains or entering and exiting tunnels;

(d)   passing over items on the line (including planned (e.g. detonators) and unplanned obstructions (e.g. shopping trolleys etc.);

(e)   derailment;

(f)   wheel flats; and

(g)   jerks consistent with real Set behaviour in low adhesion and other Degraded and Emergency operating conditions.

7.2.3   Motion System Defects

Where the motion base develops a defect in operation, it shall:

(a)   Return to its starting position to enable egress of staff in the normal manner; and

(b)   Allow the Simulator to continue to be used in a non motion manner.