



दिल्ली मेट्रो रेल कॉरपोरेशन लिमिटेड
DELHI METRO RAIL CORPORATION LTD.

CONTRACT NO.: ORM-2253

"Hardware CAMC of RS-10 Simulators (05 No. Driving Simulator, 12 No. Maintenance Simulator and 06 No. General Maintenance Simulator)"

EMPLOYERS REQUIREMENTS/SCOPE OF WORK

TENDER DOCUMENTS

DELHI METRO RAIL CORPORATION LTD.

**5th FLOOR, C-WING, METRO BHAWAN,
FIRE BRIGADE LANE, BARAKHAMBA ROAD,
NEW DELHI 110001**

SCOPE-OF-WORK FOR CAMC OF RS10 DRIVING SIMULATOR

- 1. General:** The DMRC Academy is an ISO 9001:2015 and ISO 14001:2015 certified institution, internationally recognized for its quality and environmental management standards. It is equipped with state-of-the-art training infrastructure and advanced simulators to provide comprehensive training in the fields of operations and maintenance.

DMRC Academy shall transfer the "RS10 Simulators" to the contractor on "as is where is basis" for CAMC period of 5 Years. DMRC Academy has a complete set of the simulators system for the RS10 type Rolling Stock which includes the following:

- a) 4 nos. of RS10 Rolling Stock Driving Simulator workstations (which includes 4 nos. of Observer Stations and 2 nos. of Instructor Workstations along with associated electronics, electrical and mechanical hardware with computing system).
- b) 1 no. of Independent Driving Simulator Workstation along with associated electronics, electrical and mechanical hardware with computing system.
- c) 12 nos. of the Sub-System Maintenance Simulators along with associated electronics, electrical and mechanical hardware with computing system.
- d) 06 nos. of the General Maintenance Simulator modules along with associated electronics, electrical and mechanical hardware with computing system.
- e) 01 no. Learning management system along with associated electronics, electrical and mechanical hardware with computing system.
- f) 01 no. track builder tool for driving simulator along with associated electronics, electrical and mechanical hardware with computing system.

The Driving simulator was developed by M/s HENSOLDT and Maintenance Simulators was developed by M/s Inno simulation, which are installed at the A-Block, DMRC Academy of DMRC in 2021.

- 2. Scope-of-Work:** Aim of this work is to ensure the smooth system operation through timely maintenance, rectification, and replacement of faulty components. The contractor shall provide 05 years of hardware Comprehensive Annual Maintenance Contract (CAMC) for the RS10 Driving Simulators, Maintenance Simulator and General Maintenance Simulator, Tack builder tool and learning management system along with associated electronics, electrical, hardware and computing system with the following-

- 2.1** The CAMC shall be for comprehensive maintenance servicing i.e. contractor shall provide minimum one service engineer available at Delhi/NCR region all the times in working hours and shall report to DMRC as and when required. This CAMC includes all labour, Spare (Hardware), consumables material, transport and accommodation charges, which are to be borne by the contractor for upkeeping the system healthy and operational. The contractor shall supply all types of skilled and unskilled manpower for carrying out corrective, as well as preventive, maintenance of all RS10 simulator systems and sub-systems. Also, the contractor shall provide immediate support and rectify failure within 03 working days of any failure reporting by DMRC. For Complex failures, where arranging of spare parts is taking time, for maximum once in a year, contractor can request for exemption of period for arranging spares for penalty calculations (Penalty Clause 4 of this scope of work). However, consideration of such request will be the sole discretion of Engineer's In- charge. In addition, it will be the responsibility of the

contractor to rectify all the pending faults (i.e. Blocking / Non-Blocking) before the closure of CAMC contract.

2.2 This AMC is of comprehensive nature, i.e. the contractor shall provide complete labour service and spare parts of all hardware in the scope of this work. The repairing/ replacement cost of all spares, materials etc. shall be borne by the contractor. Also, cost of hardware installation, or need of providing upgraded hardware (including re-installation of software in the replaced or upgraded hardware) for replacement of faulty parts (if the original item has become obsolete) etc. shall be borne by the contractor. The procurement and renewal of any licenses required for servers or any other components of the Simulator system shall be the sole responsibility of the contractor, and all costs associated with such licenses shall be borne by the contractor throughout the CAMC period.

2.3 It will be contractor's responsibility to maintain recommended spare parts for smooth operation and quick recovery of the system, in case of breakdown failures. Audit of the pool of spare suggested and maintained by the contractor at the DMRC Academy shall be done by the DMRC once in every six months.

2.4 This CAMC includes the entire RS10 Driving Simulator system, Maintenance Simulator and General Maintenance Simulator with all of its supporting equipments. The important sub-systems of the simulator are as follows:

2.4.1 Driving Simulator

- 2.4.1.1 4 nos. Driving Simulator Workstation, 2 nos. Instructor Workstation, 4 nos. Observer Workstation, 1 no. Independent Driving Simulator Workstation and 1 no. RSC GUI screen.
- 2.4.1.2 All equipments of each simulated cab.
- 2.4.1.3 2 nos. Instructor Workstations, including all the associated computers, printer, communication console and other associated accessories/ equipments.
- 2.4.1.4 4 nos. Observer Workstation monitors, associated speaker, student marker button and other associated accessories/ equipments.
- 2.4.1.5 1 no. Independent Workstation, with all of its cab equipments, exercise loading
- 2.4.1.6 Screen and other associated accessories/ equipments.
- 2.4.1.7 RSC GUI computer.
- 2.4.1.8 All simulator computers in technical room cabinet and all other equipments in the cabinets, e.g. sound matrix, screen multiplexer, networking and MCBs etc.
- 2.4.1.9 The entire UPS system, including battery.
- 2.4.1.10 Track Building Tool (TBT).
- 2.4.1.11 All wiring of the simulator power and networking, and associated systems.
- 2.4.1.12 Internet connection with router and firewall installed inside technical room.
- 2.4.1.13 Some train OEM equipments such as Master Controller, Operating Panels, Train Radio are used in the Simulator. In case of failure of such equipments, DMRC Academy will provide new parts for replacement to contractor and contractor has to replace the same.

2.4.2 Maintenance Simulator

- 2.4.2.1 12 Nos. Maintenance Simulator Work Stations.
- 2.4.2.2 Computing equipments for the 12 nos. Maintenance Simulators.
- 2.4.2.3 OEM/Replica model for the Maintenance Simulator.

2.4.2.4 UPS for the Maintenance Simulator.

2.4.2.5 Learning management system workstation with its associated hardware and computing arrangements.

2.4.2.6 All wiring of the simulator power and networking, and associated systems.

2.4.2.7 Internet connection with router and firewall installed inside technical room.

2.4.3 General Maintenance Simulator Modules

2.4.3.1 06 nos. Workstation for the General Maintenance Simulator Modules

2.4.3.2 Computing equipment for the General Maintenance Simulator Modules.

2.4.3.3 UPS for the Maintenance Simulator.

2.4.3.4 All wiring of the simulator power and networking, and associated systems.

2.4.3.5 Internet connection with router and firewall installed inside technical room.

2.5 During the CAMC period, Contractor is to ensure that no upgradation to the current system's hardware and software are needed. The system configuration will only be altered by the contractor in the event that the installed parts become obsolete and must be replaced with new ones owing to malfunctions.

2.6 At end of CAMC 5 years period, contractor will submit an assessment to evaluate the performance of system and requirement of upgrade/refurbishment.

2.7 The items under CAMC shall be restricted to RS10 Driving Simulator, Maintenance Simulator and General Maintenance Simulator equipments, peripherals, cabling/ wiring, networking and all sub- systems available in the RS10 Simulator System installed at DMRC Academy. Contractor shall make himself/herself aware about the RS10 Simulator System (Driving, Maintenance and General Maintenance) and associated equipments before commencing the work.

2.8 The contractor shall create the mirror image of the all-available existing software files. In case of the error in the software, contractor shall reinstall the software using the mirror image files. If the system is corrupt on the account of software issue, then contractor shall make every best possible effort to make the system healthy. However, Engineer's decision shall be final in this case. If any hardware needs to be replaced which requires installation of the software same shall be done by contractor using the mirror image files.

2.9 This CAMC shall include providing support and failure rectification (interim or permanent) in case of blocking failures, which results in non-functionality of the system within 3 working days of intimation from DMRC, definition of the working hours is mentioned in the clause 3.2.1 In case an interim solution is provided, then the permanent solution must be provided by the contractor within 5 days of the occurrence of the failure. Train related spare (Master Controller Components, Operating. Panels Components and Train Radio Components) will be provided by DMRC. Time required for arrangement of train related spares shall be exempted from penalty clause 4.

2.10 This CAMC shall include providing support and failure rectification in case of non-blocking failures, which do not prevent the training objective of the system, within 05 days of intimation from DMRC.

- 2.11** This CAMC shall include the preventive maintenance serving to be done once in every quarter. Details of preventive maintenance is mentioned in the clause no. 2.15.1.
- 2.12** The contractor shall submit the Failure investigation report to DMRC for both Blocking and Non-Blocking failures, within 5 days of the rectification of failure.
- 2.13** If the contractor fails to attend the complaint, or repair/ servicing, or submit the failure investigation report, within specified time then penalty as per Section 4 (below) for delay/ loss/ damage shall be charged from the contractor, and the same may be deducted from the gross amount of the bill.
- 2.14** Contractor shall conduct quarterly preventive maintenance visit covering all activities as per Section 2.15.1 (below). For every site visit, for servicing/repair, Service Engineer will prepare a service report, which shall be signed by contractor's service engineer and DMRC engineer. First copy of it will be handed over to the DMRC engineer and second would be retained by the Contractor's service engineer. Contractor shall propose the activities to be performed during the preventive maintenance check and format of Preventive Maintenance sheet shall be approved by DMRC. Date of preventive maintenance shall be decided after consultation with DMRC.
- 2.15 Simulators Preventive Maintenance Activity Plan**
The contractor will submit the preventive and corrective maintenance checklist for DMRC/DMRA review and the checklist finalized jointly shall be followed during entire 5 years of the CAMC. If any further correction and modification is felt during the CAMC period same shall be finalized jointly.
- 2.15.1 Preventive Maintenance Activity Plan**
The Contractor shall execute the work "Service / Cleaning / Repair of Hardware" on quarterly basis and interval between two subsequent preventive checks shall not be less than 75 days or more than 100 days. The contractor will execute the work "Service/ Procurement of CGI Licenses etc./ Hardware" as per the following Simulator CAMC activity plan.
- a) Examine of all hardware at system & sub-system level and rectification of deficiencies, if any.
 - b) Examine functioning of software applications at system & sub-system level and rectification of deficiencies, with the help of existing software image files.
 - c) Basic cleaning of subsystems of RS10 Simulator like Workstation, replica models, computing units, cabinets along with other electrical and communication accessories.
 - d) Examine of simulator wiring under trench covers, Network cable & connection checking.
 - e) Examining UPS operating screen display.
 - f) Checking battery health as per OEM recommendations if any.
 - g) Testing/tuning the functioning of various touch screens
 - h) Testing of different circuit breakers.
 - i) Checking available space in different drives of all connected computers.
 - j) Check for loose connection between the contactors/subsystems
 - k) Check for Power cable connectivity and replacement of faulty/damaged cables with new one provided by DMRC.

S. No.	Task Description	Quarterly	Remarks
1	Cab Examine and rectification of deficiencies	Contractor	-
2	Cleaning of PC/ computers/filters/ displays of Driver station, Instructor station, observer station, RSC screen and CCTV cameras.	Contractor	-
3	Cleaning of key boards and computer accessories/connection	Contractor	-
4	Checking - Network cable and connections	Contractor	Replacement of faulty networking cables
5	Cleaning and checking of marker button at observer station	Contractor	Cleaning and wiring setup
6	Examine UPS operating screen display	Contractor	-
7	Checking Battery voltage state before discharge	Contractor	Testing battery performance
8	Checking Battery voltage state – after 20 minutes of discharge	Contractor	To be done by contractor on any of the frequencies as per OEM recommendations (Monthly / Quarterly / 6 Monthly / Yearly)
9	Cleaning of all components of the Technical room cabinet	Contractor	-
10	Checking available space in different drives of all connected computers	Contractor	-
11	Testing/ Tuning of Touchscreens, i.e. DMI, AD, MOU, TCMS screen, IWS GUI and CCP (Communication Control Panel) including screen	Contractor	-
12	Checking TBT Computers (Cleaning, connection and performance)	Contractor	Cleaning and performance testing
13	Backup of CGI & Host computers	Contractor	Before up gradation of new software version
14	Test of different circuit breakers computer cabinet and other equipments present in the cabinet	Contractor	Cleaning, testing (for thermal) and replacement of faulty MCB
15	Heavy cleaning of Printer - Simulator	Contractor	-
16	Heavy Cleaning - UPS Units	Contractor	-
17	Heavy Cleaning of Camera	Contractor	Heavy cleaning
18	Examine of Simulator wiring under trench cover	Contractor	Heavy cleaning

2.16 The payment towards comprehensive CAMC charges would be made at the end of each quarter, on production of reports. The maintenance and servicing report shall be submitted by contractor.

2.17 Within one month of award of this contract, the contractor will submit a CAMC organization memo covering all roles and responsibilities of the persons involved in CAMC organization, with names, phone numbers and

Email ID details, corrective and preventive visits formats and reports and quarterly maintenance activity report format. This CAMC organization memo will be jointly agreed and signed by DMRC.

- 2.18** The contractor shall maintain sufficient spares as per list attached as Annexure-A and B at site for achieving the failures rectification. Any spare/item if required but not included in the Annexure-A and B by the tenderer will be deemed to have been included and shall be supplied as per the provisions of this contract without any extra financial implication to the Employer. Contractor shall ensure that once consumed, or becoming defective, the local holding of DMRA spare part must be replenished within a month and maintained in a good working condition. DMRC shall perform quarterly audit for the inspection of the spares for their availability at DMRA. During the audit/depending on failure trend if it is found that there is a need to increase the quantity of any spare/item then contractor shall increase the quantity of that spare/item without any extra financial implication to the Employer. After the end of the CAMC period, the spares shall be handed over to DMRC in good working condition. It is explicitly clarified that all types of servers and all types of monitors across the Driving, Maintenance, and General Maintenance Simulators shall be part of Annexure-A and B(spare) under this contract.

3 Fault Categorization

The failures occurring in the simulator system shall be divided in to two categories i.e. blocking and non-blocking faults. This section defines Blocking and Non-Blocking faults and downtime calculation.

3.1 Definition of Blocking and Non-Blocking failures:

- 3.1.1 Blocking Fault** shall mean a fault recognized as obstructing the achievement of the training objective with the simulator including sound. The following faults will be treated as blocking faults:

3.1.1.1 Blocking faults for the Driving Simulator

- a) Simulator cannot be started.
- b) Failure of sound or communication system.
- c) Failure of simulator PA/PIS system.
- d) Any one of the simulator PC does not boot.
- e) Normal driving operation from cab not possible.
- f) Normal operation of Instructor Station not possible.
- g) Any one monitor of Instructor Station not operational.
- h) Any one monitor of Observer Station not operational.
- i) Train can be operated from cab but any cab item of any kind (gauge, switches, push button, circuit breakers, etc.) is not operational.
- j) Fault finding screen (FFS) is not operational.
- k) DMI/HMI screen not operational.
- l) TCMS screen not operational.
- m) RCH screen not operational.
- n) MOU screen not operational.
- o) CCP screen available at the Instructor Station is not operational.
- p) RSC GUI screen is not operational.
- q) UPS failure
- r) Random and non-systematic failures that hamper training on Driving Simulator for more than 60 minutes will be treated as a Blocking fault.

3.1.1.2 Blocking faults for the Maintenance Simulator

- a) Simulator cannot be started.
- b) Normal training not possible on the Maintenance Simulators.
- c) Workstation's any one screen is not operational.
- d) Sound system not operational.

- e) Screen is blank.

3.1.1.3 Blocking faults for the General Maintenance Simulator

- a) System cannot be started.
- b) Screen is blank.
- c) Sound system is not working.

Note: The above list for the blocking failure is based on simulators failure prediction/knowledge as on date. This list may be modified/updated during execution of AMC after mutual agreement of both parties. Job card shall be taken by contractor staff for doing service / investigation / rectification / testing activity.

3.1.2 Non-Blocking Fault shall mean any fault, which is not blocking training on the system. It is a Fault, the consequences of which can be avoided as it is not obstructing the training objective with the simulator. All failures not listed in clause 3.1.1.1, 3.1.1.2, 3.1.1.3 shall be considered as Non-blocking failure.

3.2 Down Time calculation for Blocking Faults

3.2.1 Simulator working time is to be considered as 8 x 6 availability (08 hours working for 6 days every week) for training at DMRA. Grace period of 03 working days will be given to contractor from the time of intimation of fault by phone, or email, or fax, or any other mutually agreed mean for approaching the site and rectifying the fault.

3.2.2 03 working days of Grace Period, and subsequent Down Time, will be calculated based on the example and formula as given below:

Example: Blocking fault occurrence and intimated to the contractor's concerned person by phone, email or fax or any other mutually agreed means on Sunday at 17.00 hrs. The failure is removed on the following Friday at 12.00 hrs.

(To avoid imposition of any penalty failure shall be rectified within the grace period i.e. by Wednesday)

Calculation of Grace Period:

Monday (First working Day)
Tuesday (Second working Day)
Wednesday (Third working Day)
Total Grace Period – 03 Working Days
Penalty of 02 Working Days shall be imposed on the contractor for rectifying the fault beyond the grace period (Fault rectified on Friday).

Down Time calculation: For the penalty imposition, after Wednesday downtime starts till the system is restored, i.e. Friday 12:00 hrs. Now downtime is from Thursday to Friday i.e. Down Time will be 2 working days.

3.3 Down Time calculation for Non-blocking Faults

Non-blocking Failures Grace period of 5 days (excluding holidays if any) shall give to the contractor from the time of intimation of failure by email, text message or phone or any other mutually agreed mean. After expiry of the grace period, the Down Time for the Non-blocking Failure shall be calculated in Working days in similar lines as explained in para 3.2, (excluding holidays if any).

4 Penalty Clause

Penalty will be imposed on the contractor if any one, or more, of the following, events happens, and penalties will be added {cumulative} if the contractor fails to deliver on one or more than one aspect of the CAMC contract:

4.1 Contractor fails to provide uninterrupted service of simulators even after grace period for both blocking/non-blocking faults,

Or

Contractor fails to submit Failure Investigation Report within 05 days of Failure rectification,

Or

Contractor fails to perform the preventive maintenance as specified in clause no. 2.15.1 beyond the permitted range (75-100).

4.2 The penalty shall be divided into three parts i.e. penalty for non-attending of blocking/non-blocking fault for Driving simulator and penalty for non-attending of blocking/non-blocking fault for maintenance simulator and Delay in the preventive maintenance beyond applicable range and delay in submission of investigation report.

S. No	Description	Amount (INR)
1.	Blocking/non-blocking failure of the Driving simulator after expiry of the grace period.	2000 /per system/day
2.	Blocking/non-blocking failure of the maintenance simulator expiry of the grace period.	600 /per system/day
3.	Delay in the preventive maintenance beyond the applicable range (75-100) days	2000/day
4.	Delay in the submission of the investigation reports beyond 05 days	1000/day

The total penalty amount cannot be more than the bill submitted by the contractor.

Note:

- There are 5 systems in the RS10 Driving Simulator, i.e. 4 nos. of Driving Simulator Workstations (DSWs) and 1 no. Independent Driving Simulator (IDSW). Training is imparted on them simultaneously, or independently.
- There are 12 nos. systems in the RS10 Maintenance Simulator, training is imparted on them simultaneously, or independently.
- Blocking and Non-Blocking failures shall be considered system-wise, and their downtime and penalty calculation shall also be done system wise.
- If any of the DSW or IDSW, or its corresponding Observer Station, or both fail, it shall be considered as 1 system, and penalty shall be imposed as defined in clause 4.2 above.
- If one Instructor station fails in a manner that it leads to disruption of training on 2 DSWs, then it shall be considered as a failure of 2 systems i.e. 2 DSWs.
- Any failure in Independent Driving Simulator (IDSW) shall be treated as failure of the standalone IDSW system only.
- If any of the Maintenance simulator workstation or its corresponding replica module, or both fail, it shall be considered as 1 system, and penalty shall be imposed as defined in clause no. 4.2 above.
- For any failure in UPS or Technical rack or any other sub-system, leading to failure of multiple systems (DSWs and IDSW), Down Time hours shall be calculated based on the number of systems getting impacted, and penalty will be imposed as per Section 4.2 above.

4.3 If the contractor fails to submit detailed Failure Investigation report within 05 days of rectification of the failure, penalty will be imposed INR 1000/day over and above 05 days, till the submission of the report.

4.4 If contractor fails to provide preventive maintenance as per the scope of work (refer to clause 2.15.1 above), a penalty will be imposed/ levied/ deducted from contractor dues. The daily penalty shall be INR 2000/day of days the preventive maintenance is overdue beyond the specified range.

4.5 If any of the Blocking faults and/ or the Non-Blocking faults are not rectified by the contractor in 15 days' time from informing of the fault to the contractor's

concerned person, then double penalty as mentioned in para 4.2 shall be levied on the contractor submitted bills.

- 4.6** If any Blocking fault and/ or Non-Blocking fault is not rectified within 45 days from informing of the fault to the contractor's concerned person, then the contract may be terminated by DMRC, along with forfeiting of the security deposit of the contractor, deposited for the CAMC contract.

5 Other Contractual Provisions

- 5.1** Contractor shall provide services for corrective as well as preventive maintenance of the Driving Simulator, Maintenance Simulator and General Maintenance Simulator System, as per the scope-of-work of CAMC.
- 5.2** The contractor shall raise the invoice quarterly (3-monthly), for the payments towards comprehensive CAMC charges, which would be made after the end of each quarter of year, on production of satisfactory maintenance activity report, covering each and every activity performed in the last quarter, which will have to be duly verified by DMRC representative.
- 5.3** The repairing/ replacement cost of all spares, materials including all consumables, machines needed for repairing and manpower shall be borne by the contractor.
- 5.4** In case of any matter relating to terms and conditions not specified, the same shall be decided by mutual agreement between DMRC and the contractor.
- 5.5** At the time of finalization of the CAMC contract, the standard terms and conditions of DMRC contracts shall be given to contractor, which will have to be complied.
- 5.6** Within one month of award of this contract, the contractor shall submit a CAMC memo covering all roles and responsibilities of the persons involved in AMC with their details like names, phone numbers, Email ID etc. contractor shall also submit the corrective and preventive maintenance activity report format. This CAMC memo shall be jointly agreed and signed between contractor and DMRC.
- 5.7** Contractor shall submit bank guarantee to DMRC as per standard rates applicable after issuance of LOA/PO to contractor before starting of CAMC work.
- 5.8** **This is a fixed contract and price variation clause is not applicable in this contract.**
- 5.9** Exclusion
- 5.9.1** Hardware-The maintenance contract does not cover the actual cab hardware parts and the damage caused by misuse, unauthorized modifications, or external factors such as accidents, power surges, or environmental conditions. In all such cases joint meeting shall be conducted between DMRC and Contractor and shall be decided mutually.
- 5.9.2** Software-The maintenance contract does not cover the defects in the software of the simulators and issues caused by third-party software, unauthorized modifications, or improper use of training features. It does not cover user error or additional software integrations. In all such cases joint meeting shall be conducted between DMRC and Contractor and shall be decided mutually.

Annexure-A

SN	Module	Manufacturer	Item / Part (Intern)	PN (Manufakturer)	Serienummer	Illustration / Image	No. in use	Spare required
1	TR1	Dell	Computer (RS10-DSW-SIM)	Precision Rack 7910	13,21,55,20,982		5	1
	TR1	Dell	Computer (RS10-DSW-CGI)	Precision Rack 7910			5	1
	TR1	Dell	Computer (RS10-DSW-VID)	Precision Rack 7910			5	1
2	TR1	Dell	Computer (RS10-IWSD1)	Precision Rack 7910	13,21,54,74,326		2	1
	TR1/TR3	Dell	Computer (RS10-IWS)	Precision Rack 7910	13,21,54,74,326		2	1
3	TR2	Dell	Computer (RS10-SERVER)	Precision Rack 7910	12,81,06,86,870		1	1
4	TR	NVIDIA	Graphic Card (Type 1, NVIDIA PNY GeForce GTX 980 - 4GB GDDR5) CGI (DSW and IDSW)					1
5	TR	NVIDIA	Graphic Card (Type 2, NVIDIA Quadro K620 2GB (DP, DL-DVI-I) (1 DP to SL-DVI Adapter)) all other					1
6	TR	Western Digital/S eagate or similar	HDD 1TB SATA , 7,2K 1/min 2.5"					5
7	TR	Kingston	RAM Typ 1	16GB (4x4GB) 2133MHz RDIMM ECC				8
8	TR	Kingston	RAM Typ 2	16GB Registered ECC DDR4 SDRAM (2x 8GB DIMM)				2
9	TR3	TP-LINK	Switch 24 Port DSW	TL-SG1024	2157488002879		5	1

10	DWS1	TP-Link	8-Port Gigabit Ethernet Switch (located in DSW 1 - 4, IDSW)	1730502048 (TSLG108)	2157165000841			1
11	TR2	Audio Pro	Soundweb London DSP	BLU-160	11030033774			1
12	TR3	Audio Pro	Soundweb London BIB (#4)	BLU-BIB	11030046989			1
13	IWS	Audio Pro	Soundweb London BOB6	BLU-BOB	11030049614			1
14	IWS	Logitech	Multimedia Speaker - Z150 or alternative Z-130	S-00134	1545GG023908			1 pair
15	OBS 1-4	Ecarke	Marker Buttons Observer (MBO) Ecarke 2-Key Gaming Keyboard	MOP189	001 002 003 004			1
16	TR2	PureLink	HDMI Matrix Switch - IWS1 Top	HX-8400-U	15024OSHPO - 022			1

								
17	DSW 1 - 4 IDSW	PureLink	HDMI 2.0 Repeater	PT-R-HD20	?			1
18	TR3	BlackBo x	KVM Extender (DVI-D and USB) - DSW3-AUX	ACU5501A-R4	1512B0053165			1
19	DSW 1-4, IDSW: Aux Display Pole & TCMS Display	BlackBo x	VG-DVI	DVI-D Ghost	16070608 16121994 16070353 16070540 16070537 16070534 16070538 16070597			1
20	TR2	PureToo ls	HDMI Splitter 1x4	PT-SP-HD14-4K	PTSPHD144KPC005 5			1

21	TR1	2direct GmbH	Sound card USB	Logilink UA0053				2
22	IWS-1	CRE Rösler Electronic GmbH	CCP	CPF070PC / G00-10358	1502216			1
23	IWS-1	Monacor GmbH	Microphone Preamplifier (Gooseneck Mic)	MPR-1	C06/001203-02			2
24	ISW 1-2	Logitech	IWS Camera (alternative)	C270 or C505				1
25	DSW1-4, IDSW	TP-Link	PoE Injector Adapter	TL PoE150S				1

26	OBS	Sony	Headphone (alternative to 28)	MDR-ZX110AP				1
27	OBS 1-4	Monaco r GmbH	Microphone	ECM-306B/SW				2
28	DSW 1-4 IDSW	Visaton	Amplifier	AMP 2.2LN				1
29	DSW 1-4 Front View	Samsun g	Display 121cm	(5200CLASS) UN48J5200AFXK R	00H13NFH500434 00H13NFH500237			2

30	IWS 1/2	Dell	TouchDisplay (Alternative)	P2418HT				1
31	IWS 1/2 (Monitor)	LG	Monitor	24M47VQ	606NTTQAG433 606NTBKAG757 606NTFAAG755 606NTWGAG753			2
32	DSW 1-4 IDSW	Innosimulation	Pressure Gauge	MR/BC gauge				1
33	DSW 1-4 IDSW	Innosimulation	Pressure Gauge	BP gauge				1
34	DSW 1-4 IDSW	Robotis	USB Converter (USB to Dynamixel Adapter)	91659				1
35	DSW 1-4 IDSW	Anders Systems	TCMS Display	AS-RT-10BE				1
36	DSW 1-4 IDSW	Anders Systems	DMI Display	AS-RT-10BE				1
37	DSW 1-4 IDSW	Anders Systems	MOU Display unit	Q-I9047X				1
38	DSW 1-4 IDSW	CRE/Kussauer	Train Radio Control Head	provided by: Hyundai Rotem Company		modified for simulation purposes		1
39	DSW 1-4 IDSW	Kussauer	Fist Microphone	1177-A- 71223A00				1
40	DSW 1-4 IDSW	AKG	Gooseneck Microphone	GN30				1
41	DSW 1-4 IDSW	Anders Systems	AS-Box	7260 / QBOX2060				1
42	DSW 1-4	Phoenix	Ethernet/Inline Bus	2703981				1

Contract: ORM-2253: "Hardware CAMC of RS-10 Simulators (05 No. Driving Simulator, 12 No. Maintenance Simulator and 06 No. General Maintenance Simulator)".

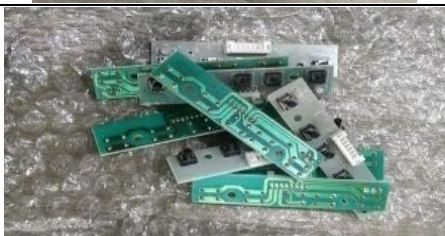
	IDSW	Contact	Coupler					
43	DSW 1-4 IDSW	Phoenix Contact	16 Digital Inputs	2861250				1
44	DSW 1-4 IDSW	Phoenix Contact	16 Digital Outputs	2861292				1
45	DSW 1-4 IDSW	Phoenix Contact	2 Analog Input Channels	2861302				1
46	DSW 1-4 IDSW	Phoenix Contact	Power supply 24 V DC/4 A	2938837				1
47	UPS	Legrand	UPS	TRIMOD HE				1
48	TR	TP-Link	LTE Router					1
49	TR	Fortinet	Fortigate F40	SKU:FG-40F				1
50	ALL	Various	Plug-in power Supplies (2 pin plug of 08 numbers)					5
51	ALL	Various	Power Adapter					1
52	MCB	ABB	DS201 C16 0.03 A / Part no CSR255140R1164					8
53	Coin Battery (wireless)		CR2032					30
54	48" monitor	Samsung					13	6
55	Keyboard with wire	HP	HPK500F wired				2	1
56	Mouse with wire	HP	M160 USB wired				2	1

Annexure-B

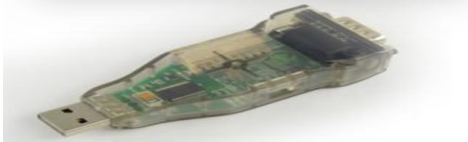
S no.	Name & Product description	Illustration / Image	Population used in MSM	OEM / Supplier NAME	OEM Part no.	Reqd Spare Qty
1	MCB's		18	ZHEJIENG YONGIL ELECTRICAL CO., LTD.	BK63H	4
	MCB,EBS 32Fb 15A,		18	MEC		2
	Contactor, HJ02004-7007, 220V ,10A		18	GMC 10P2		2
2	PC (New), 13th Generation Intel Core i7-6700(Quad core, 3.40GHz, 4.0GHz, Turbo), RAM 16 GB, DDR 4 -DDR5A, AMD file pro W4100 2GB (4 mDP) 1 TB hard drive		22	DELL		
3	Speaker, Model-BR 1000A plus Frequency response- 100Hz - 10 KHz Impedance-80 ohm		12	Plus Britz		2

4	Pressure gauge		2	innosimulation		01 - MR/B P 01-SR /BC
5	Back door Clip		106			30
6	ipTIME U1G USB3.0 (LAN cable to USB connector)		2	ipTIME U1G Gigabit LanCard		2
7	Hanting hvac connector		2	Unknown		1
8	M12 screw In 4 Pin D code male cable with connector (Shielded)		8	Unknown	Q-L9036 X LCD CONTROLLER	2
9	Terminal Block		145	Unknown		4

10	Relay		4	OMRON	LY2N 8-pin	2
11	Power cable & Ac DC Adapter		34	MachLink	ML- PWB0 50 5M	5
12	USB type-A (A/M to B/M 3m)(Touch Cable)		26	MIDITREE	AM to BM 3m	5
13	220V Ac LED power button with protection cover		18	EAO	704.0 06.21 8	5
14	Power button LED		18	EAO	10- 2H25. 2042	40
15	U2D2 USB communication converter		1	ROBOTIS		1

16	USB 2.0 AM-AF(female) For mouse/keyboard (USB to USB cable (male to female) for bluetooth)		22	NEXI	USB2.0 AM-AF (3M)	10
17	Keyboard+ mouse combo (Bluetooth type), 2.4GHz, USB dongle		22	DELL	KM636	20
18	CMOS(coin) batteries		22	Bexel	CR2032	30
19	DP to DVI adaptor (White)		47	SAPPHIRE	CA00112-R0	5
20	Wheel set		68	WOO-IL INDUSTRY CO.,LTD.	WI-60S	4 (1 set)
21	Router with adapter		1	3COM	3CGS U08A	0
22	PCB button		46	COMPLIMENTARY (CORISH) COMING WITH CORISH		0

				MONITOR		
23	PCB wires 5 pack		46	COMPLIMENTARY (CORISH) COMING WITH CORISH MONITOR		0
24	Batteries (AA type) Batteries (AAA type)		66			AA-20 AAA-40
25	23" monitor B type		6	CORIS	COR-230B	2
26	23" monitor A type, LED Full HD, Resolution-1920*1080		28	CORIS	COR-230A	5
27	23" touch pannel		34	CORIS	Unkown	10
28	46" monitor, LED Full HD, Resolution-1920*1080		18	CORIS	COR-460A	12
29	43" Monitor		6	SAMSUNG		2
30	Graphic card		22	AMD Radeon Pro WX3200		6

31	headphone , Frequency response: 20Hz- 30kHz impedance- 32k ohms@1khz		6	CORSAIR	VOID RGA ELITE WIREL ESS	2
32	USB Converter (USB to Dynamixel Adapter)		1	Robotis		1
33	Ethernet Hub, Model-A1004NS WAN Interface- : 1*10/100/1000 Mbps WAN LAN interface- 4*10/100/1000Mbps PC port PC Interface- 802.11 aa/b/g/n/ac		1	IPTIME		1
34	HSL , (USB-7250), 8-CH relay output, 8- ch isolated DI & 2counter USB module		2	ADLINK		1
35	HDMI to mini DP for GMSM, 2mtr		30			10

* Some spare parts are not mentioned in the list as not frequently used. May be needed in future as per requirement.