

CC ENGINEERS PVT. LTD.

Complex Systems Simplified; Through Simulation.



DRIVING SIMULATION SYSTEMS

Driving Simulators

From Design To Reality

A complete design & development solution for driving simulation equipment, across railways, defence, aerospace and specialised applications.



RAIL



NAVAL



SPECIALISED SIMULATORS



AEROSPACE



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INTRODUCTION

What is a Driving Simulator?

Driving Simulators are computer-based systems that replicate the experience of operating a vehicle in a realistic and controlled environment.

They give operators, loco pilots, defence vehicle crews and specialised-platform operators alike, a safe and effective training tool to practise their skills without risk of injury or damage to equipment.

Simulation technology enables safe and cost-effective testing of real-world scenarios, improving the efficiency and reliability of vehicle and transport systems across every sector.



OVERVIEW

One platform, engineered around the training problem

CC Engineers designs, builds and delivers driving simulators as complete training environments - hardware, software, motion, visuals, instructor tooling and the facility around them. Each system is built on validated mathematical models and geo-specific visual simulation, and configured to the vehicle, the sector and the operational profile it must train for.

Sectors served



Railways

Loco pilot & metro operator training, route familiarisation, emergency & fault-recovery drills, energy-efficient driving



Defence

Combat & tactical vehicle operator familiarisation and mission rehearsal



Aerospace

Flight and rotary-wing training device integration



Specialised Simulators

Purpose-built simulators for cranes, plant, and mission-specific platforms

Value

- Safe, repeatable practice with zero risk to crew or equipment
- Real-world scenario testing that is impractical or unsafe on the live vehicle
- Reduced dependency on operational assets for training
- Turnkey delivery, from cockpit build to the training building itself
- Instructor-controlled fault injection, scenario control and objective assessment
- LMS-ready: SCORM-compliant logging of sessions, scores and competency



UNDER THE HOOD

Engineering detail

01

Validated vehicle model

Traction effort, braking ratios, adhesion, gradient effects and consist behaviour modelled in real time.

02

Route learning

Best-in-class route learning built from photo-realistic CGI imagery; dynamic CGI route rendering up to 4K.

03

SOVAC visual technology

Visual simulation using SOVAC technology for all-weather and time-of-day conditions.

04

Rake / consist configuration

Design goods or passenger rakes with multiple loco operations; configurable train consist formations.

05

Instructor Operating Station (IOS)

Fault injection, weather & visibility control, route-parameter changes, live performance monitoring and post-session reports.

06

Multi-channel spatial audio

Traction-motor whine, track-joint clatter, brake squeal, station and system announcements.

07

Driver Auxiliary Display (DAD)

Replicates real vehicle instrument panels.

08

Scenario library

Route learning, emergency response, fault recovery and G&SR (General & Subsidiary Rules) compliance training.

09

AR / VR module integration

Immersive training extensions layered onto the physical system.

10

DOF availability

7 DOF / 6 DOF / 5 DOF / 3 DOF motion for Full Cockpit or Driver-Desk configurations.

8K

dynamic CGI route rendering resolution.



THREE CONFIGURATIONS

Simulator Configurations

Simulators can be developed for all types of vehicles across three main configurations.

DRIVING SIMULATOR WITH MOTION PLATFORM

In-Motion Driving Simulator

Full Motion Simulator - driver cockpit mounted on a 6 DOF motion platform, with Instructor Station, Observer Station and Part Task Trainers.



MAIN COMPONENTS

- Full replica driver cockpit
- 6 DOF motion platform
- Instructor Station
- Observer Station
- Part Task Trainers
- Visual simulation
- Training infrastructure

DESK-TOP COCKPIT SIMULATOR

Desktop Simulator

Full replica of cockpit with full instrumentation, conducting all exercises for driving and troubleshooting.



MAIN CHARACTERISTICS

- Compact simulator configuration
- Replica locomotive cockpit
- Full instrumentation
- Driving exercises
- Troubleshooting exercises
- Front-view visual simulation

PART TASK SIMULATOR

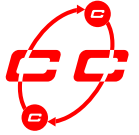
Part Task Trainer

Computer-based training setup on a replica cockpit desk for specific training in driving and troubleshooting.



MAIN CHARACTERISTICS

- Computer-based training setup
- Replica driver desk
- Operational controls and instruments
- Driving training
- Troubleshooting exercises
- Can be networked
- Available with or without motion chair



ALSO AVAILABLE

Extended configurations



AR-Enhanced Simulator

Augmented-reality overlays on physical cockpit controls for interactive system identification, fault-diagnosis guidance and procedure training.



VR Simulator

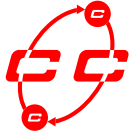
Software-based simulation on VR headsets, computers and tablets for flexible, anywhere training.



Mobile Simulator

Containerised or vehicle-mounted simulator for field deployment across distributed training locations.

- Configuration availability depends on vehicle type and training objective.



SYSTEM

In-Motion Driving Simulator

MAIN SYSTEM ELEMENTS

Driving Simulator with Motion Platform

Complete physical driver cockpit mounted on a motion platform.

Inside View of Driver Cockpit

Actual or replicated driver controls, instrumentation and visual environment.

Instructor Station

Dedicated instructor control and monitoring setup.

Observer Station

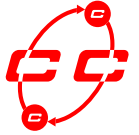
Separate observer and training-review environment.

CC Engineers delivers In-Motion Driving Simulators as a turnkey solution - the complete training environment, not only the simulator hardware. Deployed at scale for Indian Railways.

TURNKEY SCOPE MAY INCLUDE

- Simulator building
- Furniture
- Twelve Part Task Trainers
- Other training infrastructure





COMPACT

Desktop Simulator

MAIN SYSTEM ELEMENTS



A compact physical replica of the locomotive cockpit, intended for driving and troubleshooting exercises without requiring the full in-motion simulator infrastructure.

INSIDE VIEW INCLUDES

- Driver instruments
- Driver controls
- Visual display
- Driver desk
- Simulated operational interfaces





CAPABILITY

Simulation Software

Geo-specific simulation software supporting high-fidelity visual and audio reproduction, troubleshooting in a 3D environment, operating procedures, trainee evaluation, and configuration of operating environments, tracks and train consists.



High-Fidelity Electronics & Computer Interfaces

Recreates electronic systems and operator-facing computer interfaces used during operations.



Troubleshooting in a 3D Environment

Fault troubleshooting through an interactive three-dimensional environment.



Exercise Monitoring

Instructor / exercise monitoring interface to observe and evaluate training exercises.



Photo-Realistic CGI

Visual simulation recreates routes and operating environments with photo-realistic CGI imagery for route learning.



Visual & Environmental Simulation

Different weather conditions, times of day, and route-specific and track environments.



Sound Simulation

Normal operations, fault conditions and operational events.



Trainee Evaluation

Built-in trainee-evaluation capabilities.



Exercise Generation

Instructor / exercise-generation modules to design exercises for developing specific trainee skill sets.



SPECIFICATION

Technical Comparison

PARAMETERS	IN-MOTION SIMULATOR	DESKTOP SIMULATOR	PART TASK TRAINER
Cockpit	Aluminium replica	20 km/h	30 km/h
Motion	6 DOF Stewart platform	<130 m*	<150 m*
Driver Desk	Real components to scale (redeveloped replicas for Part Task Trainer)	Redeveloped replicas of instruments and operational components	Redeveloped replicas of instruments and operational components
Simulator Building	550 sq.m with furnishing	Not Included	Not Included
Track CGI	300 km*	100 km*	50 km per exercise*
Track Builder Tool	Included	Not Included	Not Included
Visual Simulation	Front and side views	Front views	Front views

* Figures are configuration-specific; confirm scope at enquiry.

Part Task Trainer: a minimum of 6 units networked.

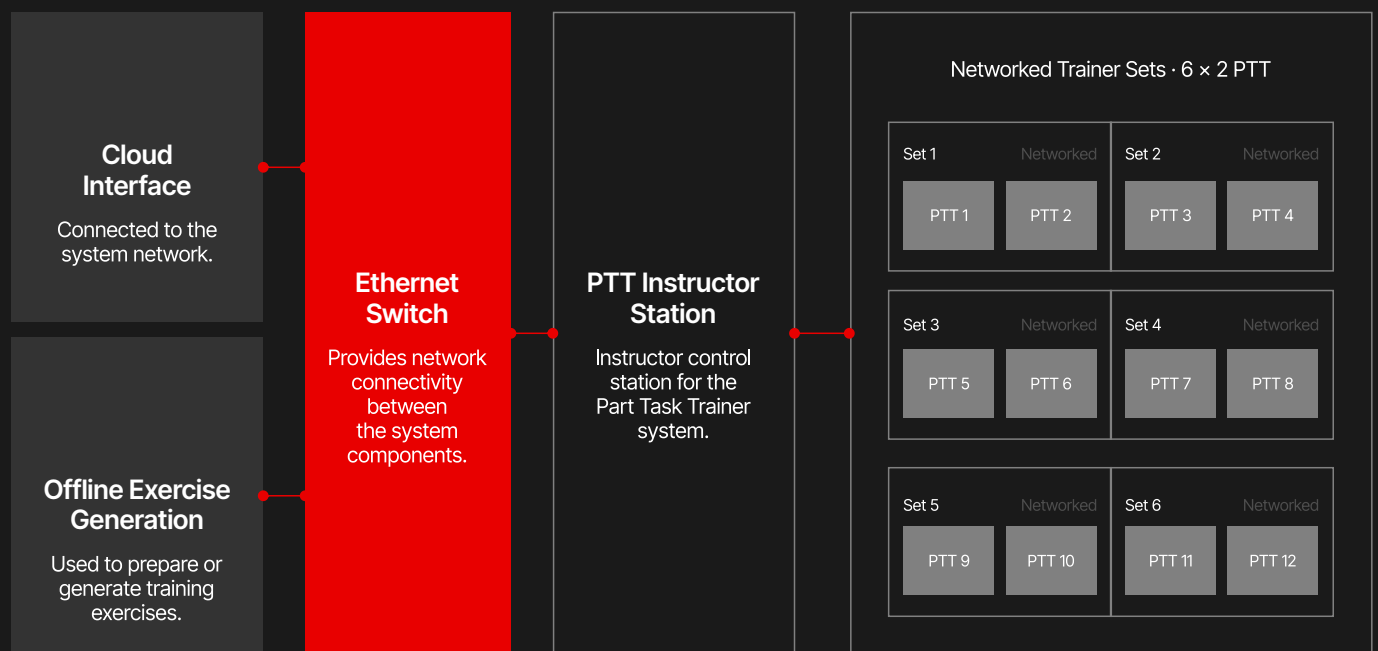
Part Task Trainer available with and without motion chair.



ARCHITECTURE

Part Task Trainer System Architecture

A networked configuration of Part Task Trainer stations, centrally controlled and monitored. Minimum of 6 units networked; architecture includes provision for an optional upgrade.



OPTIONAL UPGRADE PROVISION | AVAILABLE WITH OR WITHOUT MOTION CHAIR





COMPATIBILITY

Vehicle & platform types

Simulators can be developed for a wide range of vehicles and platforms. Railway examples are shown below; the same engineering applies to defence, aerospace and specialised platforms.



Diesel Locomotive



DEMU, MEMU, EMU



Electric Locomotive



Metro Train / Vande Bharat
Trainset

Locomotive coverage includes WAP, WAG, WDP and WDG series, plus EMU / MEMU / DEMU trainsets and metro rolling stock. Custom vehicle models can be developed to specification.

- Initial operator / loco-pilot training for diesel and electric traction
- Route familiarisation before line commissioning
- G&SR compliance and energy-efficient driving training
- Metro operator certification and recurrent training
- Emergency response and fault-recovery drills
- Defence vehicle operator familiarisation

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CREDIBILITY

Why CC Engineers

Founded in 1987 and headquartered in Pune, Maharashtra, CC Engineers Pvt. Ltd. designs, manufactures and delivers dynamic simulators and technology-intensive customised projects for the transport and defence industries.



In-house engineering

- Civil
- Mechanical
- Electrical
- Electronics
- Computer engineering
- Software
- Manufacturing
- Turnkey project execution



Services

- Software Development
- Modeling for Simulations
- Turnkey Project Execution
- Design, Development & Innovation
- Manufacturing
- Civil Engineering



Certifications

- ISO 9001:2015
- MSME registered
- NSIC registered

Clients



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FAQ

Which locomotives are supported?

WAP, WAG, WDP and WDG series locomotives, EMU / MEMU / DEMU trainsets and metro rolling stock; custom models to specification.

What is the Instructor Operating Station?

It lets instructors inject faults, control weather and visibility, modify route parameters, monitor trainee performance in real time and generate post-session reports.

Can the simulator integrate with an LMS?

Yes - SCORM-compliant LMS / AS integration for automatic logging of sessions, assessment scores and competency tracking.

Engineer your driving simulator with CC Engineers.

From cockpit build to the training building - one turnkey partner.



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