Guiding Lights Technology Inc (GLT)

provides the North American Market with World Class Driver Training Rail Simulator Technology, from SYDAC

SYDAC

is a leader in the application of simulation technologies to the Rail Industry. For both Freight and Passenger industries our team of scientific modellers, engineers and visualisation experts provide a range of skills and products to improve the efficiency and safety of railways.

TRAIN DRIVING SIMULATORS

Sydac offers a family of simulators that are intuitive and easy to use. Sydac constantly focuses on the ability of the trainer and the trainee to achieve the greatest results from our simulators. They include a comprehensive range of features and capabilities that are designed to ensure high quality, effective training is delivered in a flexible and intuitive environment.

Our simulators lead the market for their realism, high fidelity modelling, construction and ease of operation.

Listening closely to our customers we develop simulators that bring together the best in:

- Applied technology and engineering quality
- Rail operations knowledge
- Learning methodologies
- Flexible and modular designs on a PC platform

to deliver real benefits in improved driver performance and safety levels whilst minimising training and operating costs.

Sydac provides simulators that include:

- Full cab simulators
- Driver desk level simulators
- Mobile simulator facilities
- Desktop simulators
- Single or multiple vision channels
- Full replay and third party viewing facilities

The physical accuracy of the cab and train models combined with the visual and environmental fidelity of the Computer Generated Images (CGI) ensures the trainees are completely immersed and absorbed in the training task at hand.

The CGI vision covers a comprehensive range of situations and experiences that arise during train driving;

- Environmental interactions such as fog, snow, rain and sun glare
- Animations such as track side workers, vehicles, boom-gates and passengers
- Railway features such as complex stations, bridges, tunnels and signals

Incorporating the RealityManager tool-set, our simulators provide superior flexibility to: create, train, record, report and measure the effectiveness of training.

With a high degree of configuration control, artificial intelligence capabilities and sophisticated scripting techniques the instructor is free to instruct rather than run the simulator

ITRAIN COMPUTER BASED TRAINING

The iTrain series of Computer Based Trainers (CBT) are designed for self-paced learning of complex apparatus or procedures, enhanced by utilising real time simulation.

Reality Centres

Reality centre's are unique group training facilities, used not only for training drivers but to provide collaborative, state-of-the art hazard perception and situational awareness training for all rail employees.
Reality centre's are theatre style environments, enabling high levels of flexibility in implementing learning methodologies, experimentation and training.

The reality centre provides a higher degree of immersion, due to its larger screen depth and field of view combined with surround sound. It is ideal for training groups in collaborative learning and as a forum environment to share ideas.

As modern railway organisations continue to optimise their equipment, systems and processes to increase system reliability, operational employees are becoming less exposed to abnormal situations. It is often the employee's response to these uncommon, and often critical situations that determine the safety of the railway itself.

A modern development being adopted by rail operators is hazard perception and situational awareness training (HAPSAT). HAPSAT centres comprise a powerful computer generated vision system that surrounds the trainee's complete field of view.

When coupled to a spatial audio system, the centre provides a complete visual and aural environment that typically trains ten to twenty trainees simultaneously. This environment is used to create elements of a virtual railway in which critical situations are portrayed.

Typical scenarios include evacuation of underground stations, emergency procedures for signal failures, interaction with members of the public and manual operation of normally automatic systems.

Trainees can interact and influence the outcomes of scenarios by adopting the role of more or more characters, controlling their actions. The interaction mimics the complex interaction of individuals that contribute to successful operations.

These centres can be fully integrated with driver training simulators and other local or geographically remote HAPSAT centres so that complex multi-role scenarios can be developed. These include; signallers, controllers, station staff and drivers, all interacting in their own environment to deal with a network problem.

An add on option of the reality centre is a roll-in, roll-out driver's desk, allowing HAPSAT centres to be converted into a multi seat, driver training simulator.

This is ideal for teaching trainee drivers, driving techniques, whilst non-driving employees can be shown rail events from a drivers perspective, increasing understanding between employee groups.

Virtual training is now an option for all rail employees. It provides a cost effective way and indeed in many cases the only way, to provide high quality practical training in critical and hazardous situations.

SUBWAY SIMULATORS

Simulation technology has long been used for training Astronauts, the Military, and in safety critical fields like Aviation, Super Tanker Shipping and Nuclear Power. Now through SYDAC and Guiding Lights Technology, the same Best-of-Breed Simulation Technology is available to enhance all Ground Vehicle Driver Training, to Airline Pilot standards of certification, to optimize Passenger Safety and Public Security.

Crush load' simulation for London Underground

Winter Scenario

Autumn Scenario

The mobile driving simulator is a full driver's cab simulator built into a semi-trailer or container, enabling easy relocation to any rail depot or training site.

Inside the trailer is a fully operational training facility. Comprising a simple start up and automated system checks, enabling instructors to control the training experience or scenario. Trainees to simply swipe their own unique card to operate, providing a choice of lessons, allocated to the individual users.

Equipped with pre-programmed training sessions, text and voice help messages, trainees can use the simulator independently or train with an instructor. If required, instructors can control training by inserting faults and making changes to driving conditions.

Modem or wide area network connections allow for training sessions to be remotely controlled and results monitored from the main training facility.

Results are logged to the training session database and can be reviewed and replayed by the instructor and driver. Customised training reports are also available.

The simulator is a fully immersive rail simulator. The driver's cab, driver controls and instrumentation is an exact replication of the train. The simulator accurately predicts vehicle performance in terms of vehicle speed, fuel consumption, braking performance and in train forces.

The instructor console is fully fitted out as a training room and a radio communications system and intercom is provided between the driver's cab and instructor station. A 3D spatial audio system is built into the driver's cab that allows replication of vehicle, track and environment noise.

Simulator Motion Bases:

Sydac always works closely with customers to provide solutions that are precisely matched to their unique requirements and motion bases are no exception.

All of the benefits and technology of a full cab simulator but with the cab mounted on a motion base, providing the driver with a full movement experience and a real feel for the track and its environment.

The advancement of visual systems today and the increasing complexity of railway rolling stock means that the majority of customers/operators now require an increased level of realism in their training simulators.

Working with the world's leading suppliers of motion systems, Sydac's high performance solutions are designed to offer an unprecedented level of fidelity that matches the new sophisticated simulators and the needs of the customer.

Motion bases add flexibility to training systems that assist in reducing personnel development time, resulting in increased productivity and producing trainees that are efficient in their specific tasks.

With payloads ranging from 1,000 kg to 14,500 kg; electric or hydraulic actuation and varying degrees of motion (typically around 6 degrees), any railway rolling stock environment can be replicated for use within the training environment

World Leading Simulation Technology

Simulator features and Options

Superior construction and replication of train cab and desk.

Accurate models of traction, braking, pneumatic and operating systems.

Train communication systems, radio and intercom.

Using VirTrain students can “walk the train” fault finding and performing procedures.

The very latest in Computer Generated Imagery (CGI).

Train CCTV for passenger management training.

Simulation of environmental effects and track adhesion.

High fidelity spatial audio simulation.

Training performance display and comprehensive train fault simulation.

Start up and shut down procedure simulation.

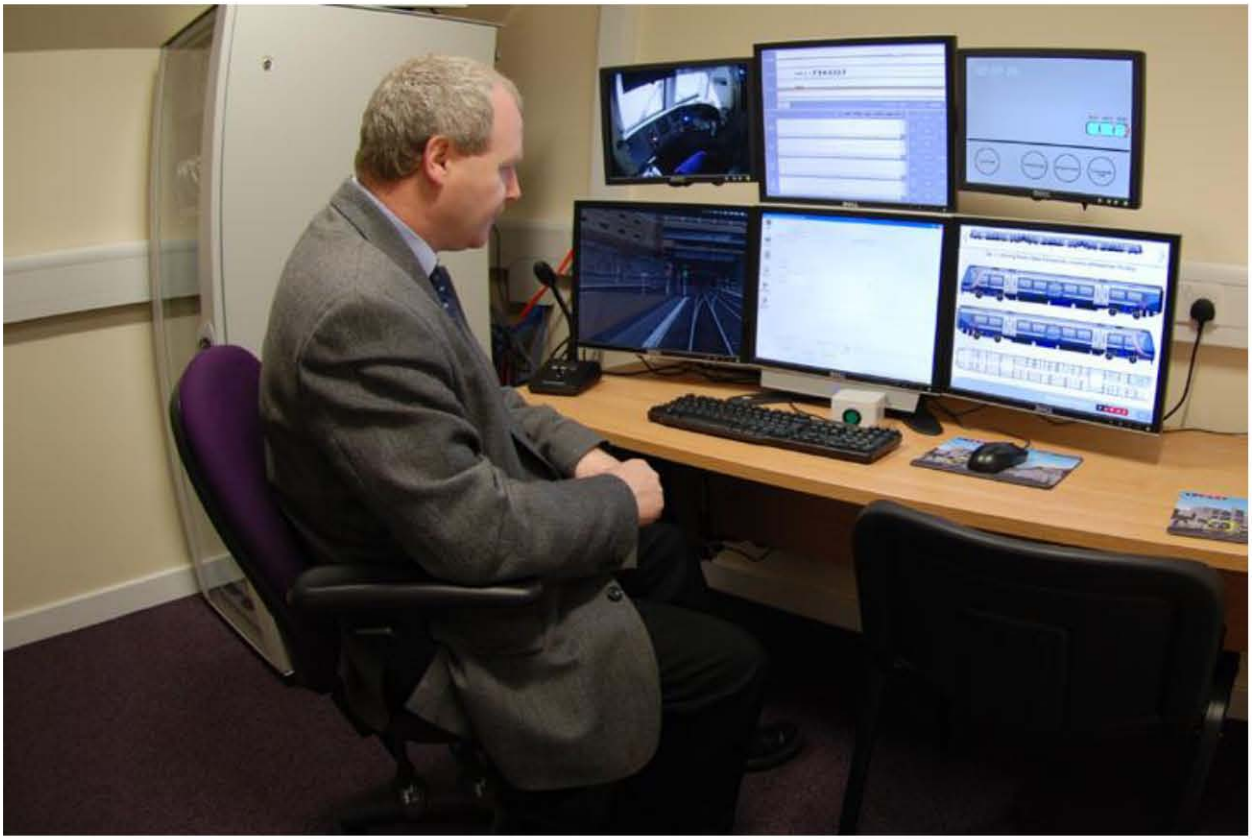
Multiple simulator integration operating in the same 3D world.

Mobile simulators in container and trailer forms.

Motion base.

Single switch power up of the simulator.

Trainees self run operation.



Instructor Facilities

Instructors are provided with the tools to deliver an almost endless array of scenarios and experiences to trainee drivers. Instructors are able to create scenarios, record training, produce reports and measure training effectiveness.

Portable training in remote locations.

Optional Instructor Station Portable Training Simulator

Benefits:

Same functionality and operability as a full cab simulator.

Exact same user interface as a full cab simulator, with a real brake handle and ergonomic output displays on the screens.

Based on the same accurate engineering model as a full cab simulator and the applicable vehicle.

Easy to upgrade both the memory and the system.

Packaged robust and portable, allowing a single instructor to transport the entire simulator to a remote customer or training site.

Easily maintained and provides in-built hardware diagnostics.

Extremely cost effective as an add on to a full cab simulator or as a stand-alone training tool.

iTrain CBT's minimise training time with highly effective learning outcomes. They are adaptable to changing processes and operating conditions and allow the practice of safety regulations in real world scenarios.

iTrain CBT's feature:

- High definition 3D models of real equipment with various depth of view
- Tutorial, practice and assessment modes
- Highly interactive and engaging Navigation window
- Simple point and click operation
- Audio delivery of realistic sounds
- Communications and forms

Accurate ATP simulation and representation

iTrain is primarily used where

- Access to real apparatus is limited
- New practices are implemented
- Training of dispersed staff
- Hands-on approach preferred
- Simulation enhances learning

Train Controller CBT

Track machine CBT

CURRENT iTRAIN PRODUCTS

ATP

Provides training in the set up, isolation and restarting of the train after a Penalty Brake Application. Includes all radio communication procedures, compulsory documentation and simulations of all ATP in-cab equipment and braking.

Air Brake Simulator

Train Controller

Develop skills in problem solving,

Decision-making, operation of signalling equipment, communication procedures and compulsory documentation.

Track Machine

Tutors maintenance and operational staff in set to work, daily service, start up, shut down and driving the various machines

Virtual Train CBT

Air Brake Simulator

Provides understanding of how air brakes operate so students can practice and see the simulated effects of their actions and test the brake system

Virtrain

Trainees can "walk the train" listening for noises and looking for faults then carry out reset procedures such as closing air cocks and resetting electrical breakers and compressor system equipment.

Sydac can provide an iTrain module to meet your needs for efficient and effective training of any apparatus, complex procedures and/or simulation.

RAIL TRACK VISUALISATION

Track visualisation for new track or proposed changes minmises the risk and allows drivers to be trained prior to completion.

Using our experience in simulation and modelling, Sydac can create visualisation for track that is yet to be completed. This can be used to

- Minimise the hight cost of changes post completion

- Signal sighting
- Trial train performance through the various gradients and curves, including changes to track adhesion characteristics
- Examine the impact of environmental effects and changes to driver visibility
- Identify potential issues with obstructions to the driver's field of view
- Expedite regulatory approvals
- Familiarise emergency services and other personnel with the layout and features of the tunnel in a format that is readily understood
- Minimise the cost and time for drivers training
- Get early stakeholder and public acceptance by providing a web based preview
- Assists in the consultations process so all can easily understand the various elements and complexities of the rail link.

Mandurah line in Western Australia

Sydac has an extensive library of trackside objects (click to enlarge image (1200x800))

The vision is created from geo-spatial data, which is then transformed into a 3D world by our digital artists. This vision can be imported into one of our simulators where it can be driven, or displayed as an animated movie using generally available viewing packages.

ACCIDENT INVESTIGATION & RECREATION

Sydac's simulators have been used in the investigation of rail accidents, where the models are fine t
train involved and an accurate track vision is produced.

Due to the high level of physics based modelling of the train system, Sydac models are particularly accurate in the dynamic calculation of train performance including acceleration, braking and in train forces and behaviours.

Our suite of models includes a full range of train systems and subsystems as well as variable environmental models such as wheel-rail friction.

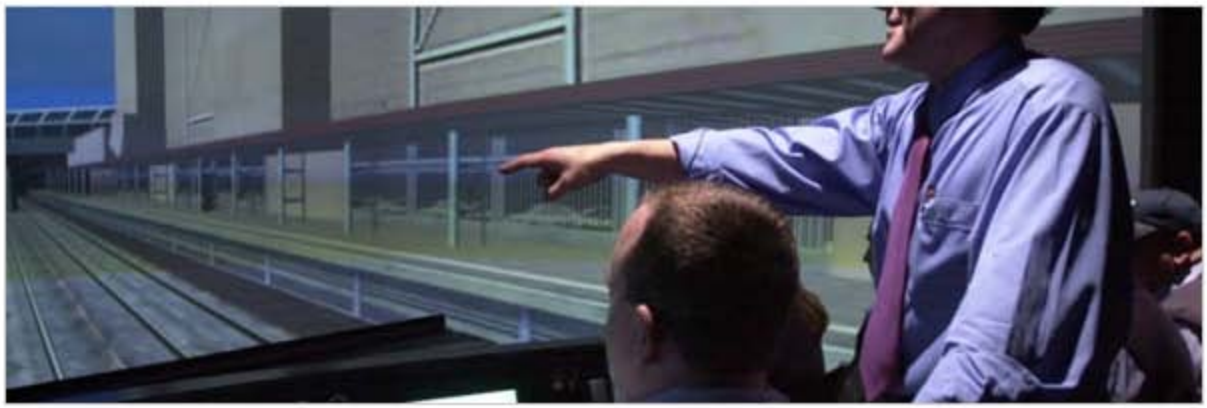
Sydac simulators are not only able to calculate gross train performance but also to provide the level of detail necessary to understand in-train behaviours such as buff and draft forces at couplers as well as individual braking component performance and interactions.

Example track

We can accurately recreate the situation and test theories on the simulator as to the cause of the accident.

Waterfall track

HAZARD PERCEPTION & AWARENESS



Hazard awareness training provides a cost effective, and in many cases, the only way to give high quality practical training in critical and hazardous situations. As part of a well-constructed training program, it prepares your operational workforce for any expected hazard situations.

Using a reality theatre, trainees are immersed into an animated scenario where they assess actions of the characters to understand how a chain of events can combine to create catastrophic failures.

The Hazard Perception Centre can facilitate large class sizes

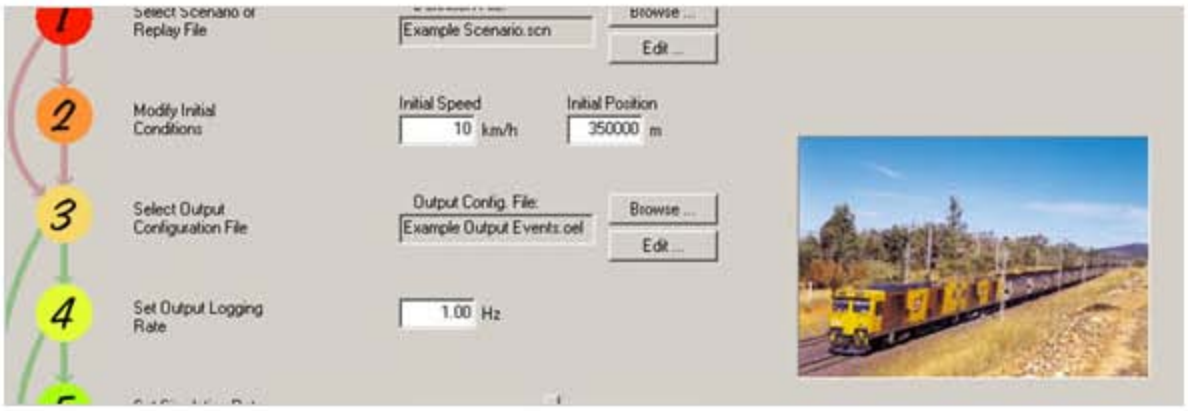
This exposure allows staff to improve their situational awareness skills and to learn and rehearse their response to hazardous events that, whilst rarely encountered, are critical to the safe operation of the railway. The outcome of this simulation-based training is a better-trained and safer driver workforce.

Sydac can provide a hazard scenario for any situation, such as:

- Train derailments
- SPAD's
- Passenger issues
- Communication problems
- Fire or explosions
- Evacuations from trains, stations or tunnels
- Track or signal faults
- Trespassers
- Track obstructions

Aerial perspective of a train pulling into a platform with people standing near the edge.

ENGINEERING MODELLING & SIMULATION



Sydac has developed the Engineering Simulator for calculating operational performance parameters and in-train dynamics. Performance parameters include running speed, trip time, fuel consumption and brake wear. Train dynamics include coupler forces and extensions, brake pipe pressure, brake cylinder pressure and other dynamic characteristics.

The Engineering Simulator calculates operational and train dynamics for specific consist configurations running on specific tracks to assists users to evaluate on-track performance and understand the behaviour of trains. The analysis is performed by a real time simulation engine using high fidelity behavioural models.

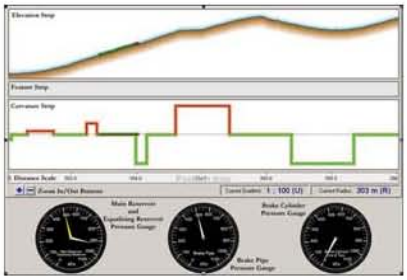
A screen-shot of the Simulator

Drivers inputs provided in a variety of ways:

- Direct control

- Pre-recorded driver inputs (control action files) or
- Sydac's autopilot algorithms.

Use of the autopilot or control action files allows the simulation to be run unattended up to 10 times faster than real-time depending on the PC used.



A second screen-shot of the Simulator

Related Rail Projects

The following projects and cases allow you to see how we apply our capabilities to the unique needs of every project

CGI TRAINING WITH REALITYMANAGER

The use of computer-generated imagery to enhance vocational training is exploding. Applications range from simple desktop computer packages to fully immersive virtual reality systems. These technologies enable trainees to experience a wide variety of situations that they cannot safely or economically do using conventional training techniques

PORTABLE AIR BRAKE SIMULATOR

Sydac supplied a Train Air Brake Simulator to Queensland Rail (QR) for use in its engine driver training program. The system has been in service at the Rockhampton Driver Training School since 1991. As well as training its own drivers, QR sells training services to customers around Australia and in South East Asia. It asked Sydac to supply a portable version of the Train Air Brake Simulator so that it can include hands on training in course modules for remote customers.

MOBILE TRAIN DRIVING TRAINING SIMULATOR

Sydac has developed a mobile 4000 Class Diesel Electric Locomotive Simulator for Queensland Rail. The simulator is a full driver's cab simulator that is built into a semi-trailer, enabling it to be easily moved to any rail depots or training sites. The trailer provides a fully operational automated training facility that can be used unattended by the trainee only or in conjunction with an instructor.

CHILTERN RAIL DRIVING SIMULATORS

Chiltern Railways were recently awarded a 20-year franchise to operate commuter trains on the London to Birmingham route. Part of the franchise agreement was a requirement to adopt simulator-based training for their drivers.

Sydac proposed a solution to Chiltern that would meet all their requirements and was delivered within a tight 7-month schedule.

DESKTOP DRIVER TRAINING SIMULATOR

Sydac's Desktop Driver Training Simulator is a PC based train driving simulator that is capable of accurately simulating the performance of a selected train configuration operating on a selected route in response to the driver's actions and any pre-programmed fault or emergency conditions.