SimWorld Software Suite
www.autosim.no

AS 1600

AutoSim
Overview

- A set of software modules covering all aspects of driving simulation
- Full simulator package or just a part of it?
- Easily adapted to specific needs

AutoSim AS
The **Simulator Platform** that all SimWorld software is built on

Focus on scalability and distributed systems

Provides
- control mechanisms
- real-time data distribution
- message passing system
- license control
- time synchronization

API available for custom simulator development
SW 510 SimWorld Visual

- Based on OpenGL and OpenSceneGraph
- No limitation in number of visual processes in a system
- Up to 32 individual visual channels from a single process/computer, depending only on hardware limitations
- Supports “image in image” channels
- Supports mirrored views
Supported features:
- Weather conditions like fog, rain, snow
- Lighting based on time of day
- Vehicles with turning and rotating wheels
- Vehicles with suspensions
- Animated pedestrians and bikes
- Lights equipped with halos
- Support for text and bitmap images
- Night driving with headlights
- Static fire and smoke\(^1\)
- Advanced reflections\(^1\)

\(^1\) Depends on the graphic database used
SW 520 SimWorld Autonomous Traffic

- Built on autonomous agents technology (intelligent robots)
- Number of simultaneous traffic objects only limited by hardware performance
- An autonomous traffic object (cars, trucks, etc.) reads the traffic, and makes his own choice based on the current situation
- Vehicles are accelerating, braking, and steering while following the road network, respecting traffic lights, road signs, road markings, as well as other traffic.
- The traffic behaviour (what to do in what situations) is defined in a human readable file, and can be edited in a text editor
- The behaviour can at any time be overridden by control commands from the scenario or from an instructor interface
SW 530 SimWorld Physical Model

- A shared module with an open API; can be interfaced to a customer’s proprietary solution
- Calculates the dynamics of a motor vehicle
  - Reads input from the driver interface and the road
  - Calculates position, speed, heading pitch and roll by simulating the dynamics of body motion, engine, transmission, wheels, suspensions, and brakes.
  - Includes influence from external forces, like wind, gravity, road friction, etc.
  - True 3D support
- Includes keyboard interface as driver interface
SW 540/541 SimWorld HW Interfaces

- Shared modules with an open API; can be interfaced to a customer’s proprietary solution
- SW 540 Game Wheel Steering Interface
  - Provides real-time data from the game wheel
  - Provides real-time data for force feedback to the game wheel
- SW 541 Real Cabin Interface
  - Interface to AutoSim’s hardware
  - Provides real-time data from the cabin I/O
  - Provides real-time data to the cabin I/O
Built on the OpenAL API
Generates 3D sound from the interactive vehicle and the other vehicles in the traffic
Mixes sound samples from the engine, the tires/road, and wind to provide a natural mix of these depending on engine RPM and load, road surface material and speed (only interactive vehicle)
Tyre sounds include lateral and longitudinal slip sounds
From autonomous vehicles their engine sound is reproduced in 3D, with Doppler effect
Support for pre-recorded voice messages
SW 560 SimWorld Operator Panel

- Graphical User’s Interface (GUI) for controlling the driving session
- Buttons to load, start, pause, resume and stop a scenario, and to start, pause, resume and stop replay
- Map of the chosen road network with all traffic objects displayed in real-time
- Simulation objects can be moved at runtime by dragging in the map
- The driving environment (weather and light conditions) can be modified on-the-fly
- List of all created simulation objects
- Monitoring of real-time data from the simulation object selected in the map or the object list
SW 570 SimWorld Scenario Builder

- Graphical User Interface for construction of scenarios (exercises)
- Selection of terrain, weather and light conditions
- Configuration of simulation objects (vehicles, bikes, pedestrians, etc.) and their initial position and swarm dependencies
- Definition (programming) of conditional events that shall occur during the scenario.
- Uses Lisp as scripting language, providing full support for the power of Lisp
**SW 580 SimWorld Record/Replay**

- Stores real-time data from all simulation objects to disk
- Stores all control commands needed to re-establish the desired traffic situation
- Recording can be started/stopped at any time during a scenario by instructor or from the scenario
- Bookmarks can be added any time during record, by instructor or from the scenario
- Bookmarks are identified by custom defined names
- The Replay Control GUI provides support for –
  - Loading a recorded session
  - Jump to a bookmark
  - Run fast forward and fast rewind
  - Jump a number of seconds forth or back
The system contains the following modules:

- **Exercise Editor** used to add exercises from the general exercise base into the special course environment
- **Course Editor** where you can build courses from course related scenarios
- **Student Editor**, where the student progress is recorded and reported
- **Student Exec**, enabling the student to log in and partly administrate the training depending on training mode chosen
- **Course Driving** where the system automatically provides the scenarios and assessments and do not let the student precede to next scenario until the present has been successfully completed
- **Free Driving** where the student or the teacher is allowed to freely chose between scenarios
- **Reporting System** for progress of the training and how the student has performed during the different scenarios
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