

geneCARS

Car Sound Simulator



geneCARS features

- Interactivity and 3D sounds for unrivalled realistic sound rendering
- geneCARS generates the following sounds:
 - Powertrain partials and noise
 - Aerodynamic and rolling noise
 - Traffic noise with Doppler effects
 - Screeching tyres
 - Starter
- geneCARS takes into account various factors that affect engine, aerodynamic and rolling noise, such as:
 - Engine RPM
 - Car speed
 - Load
- Each synthesized source can be controlled separately
- An additional wav player is supplied to play additional sampled sounds: hazard lights, indicators, etc
- Customized sounds or effects can be added:
 - Shocks, impacts
 - Air conditioning
 - Tunnel effect
 - Noise generated by different road surfaces
- An open sound data set: geneCARS is able to use your own models to run synthesis parameters separately
- 3D audio rendering is available with 4 loudspeakers and 1 subwoofer
- SCANer II compatible

Applications

- Car simulators
- Virtual reality platforms
- Sound quality studies

geneCARS is an advanced real-time audio synthesis tool for the generation of car-related sounds: powertrain, aerodynamic and rolling noises, screeching wheels, traffic and starter. 3D real-time processing allows 3D audio rendering of each sound source.

geneCARS is specially designed to receive data through a network and to be integrated within driving simulators and virtual reality platforms. Its sound database is open, meaning that customized car-related sounds can be created.

Two key technologies

Real-time audio synthesis

The real-time synthesis technique consists in separating sound sources and generating them in real-time with algorithms. When the driving conditions are changing, the algorithm for each sound source perfectly follows the new conditions and each sound source can be controlled separately. The powertrain source is controlled by the rpm and a percentage of charge linked to the couple, while aerodynamic and rolling noise is controlled by the speed of the car.

3D Sound

A set of techniques is processed to give sounds a 3-dimensional perception around the listener. Each fixed or moving source can be processed separately according to spatialization requirements such as localization, immersion or externalisation.

the **best SOUND** for **car simulators** by



GENESIS audio simulators

GENESIS is a high-technology company whose core business is high-performance 3D audio simulators and sound quality tools & expertise.

GENESIS real-time audio simulators are used for industrial or military applications that require a realistic and interactive soundscape, with an accurate sound reproduction.

Examples include:

- Training simulators: helicopter flight simulators, car simulators, training facilities for sonar operators, etc.
- Simulators for research and study purposes : car simulators for multisensory analysis tests, virtual aeroplane cockpit to study ergonomics, train coach simulation tool for studying passenger sound comfort, etc.
- Virtual reality platforms

The GENESIS' know-how is based on 10 years experience with major simulators built for Industry and Defence: RENAULT, PSA, DCNS, AIRBUS, EUROCOPTER, SNCF, etc.



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geneCARS architecture

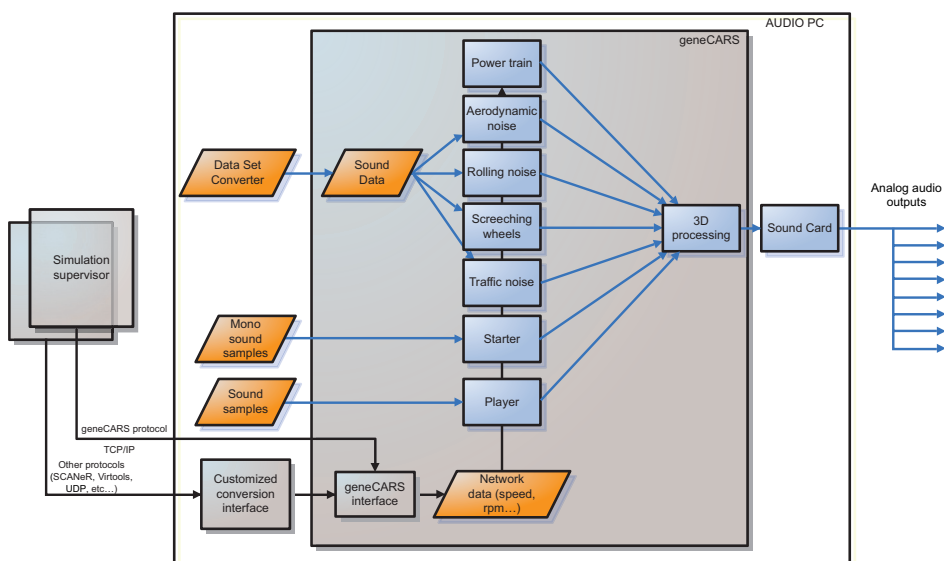
geneCARS software is installed in an audio PC that is equipped with an 8-channel professional sound card and is connected to the simulation supervisor via an Ethernet link. It can also be implemented on an independent PC integrating a dynamic car model and driver controls (steering wheel and pedals).

Synthesis data is loaded at the start-up of the geneCARS program from information included in a configuration file.

geneCARS shares the simulation parameters (RPM, car speed, load, key/starter position, traffic information, etc.) transmitted through a dedicated network. These parameters are sent to real-time generators in order to synthesize the sound sources.

geneCARS then generates car sounds according to the received data, applies 3D processing and mixes the sounds to send them to the sound card output.

For any specific simulation supervisor protocol, GENESIS can supply a specifically designed compatible conversion interface.



Synthesis data

geneCARS is delivered with one car data package. Synthesis data is made up of the following parameters:

- Engine partials:**
- Level of partials as a function of engine speed
 - Frequency of partials as a function of engine speed

- Engine noise:**
- Bark band levels

Function for the variation in the level of engine partials:

- Partial gain as a function of speed pedal load

- Aerodynamic Noise:**
- Bark band level as a function of car speed

- Rolling noise:**
- Bark band level as a function of car speed

- Starter noise:**
- WAV-format file of starter noise
 - Cross-fade between the different starting phases

If needed, GENESIS can supply customized synthesis data from sound recordings or data sets. You can also convert your own synthesis data into geneCARS format with the optional Data Set Converter.

Product information

geneCARS is a standalone application (.exe) that runs under Windows XP.

geneCARS is usable with any audio professional sound card that is ASIO format compatible. The current system manages playback on up to 7 loudspeakers with an additional subwoofer.