

Audio Simulator Sherpa

GENESIS created in 2004 for **PSA Peugeot Citroën** the audio part of their real-time driving simulator SHERPA, featuring:

- **3D spatialized** sound generation in the passenger compartment,
- **Engine, rolling and aerodynamic sounds synthesis** realized by PSA Peugeot Citroën (Sound synthesis platform: HARTIS),
- **Sound synthesis** of additional noises,
- **Management of communications** between simulator's main server and audio PC
- **Intercom** system between passenger compartment and monitoring room,
- Supervision and **advanced modification of synthesis parameters** by experimenter

SHERPA (*Simulateur Hybride d'Etudes et Recherches de PSA Peugeot Citroën pour l'Automobile*) is a simulator allowing to immerse a driver in realistic driving conditions and aiming at:

- *Developing and testing innovations (avoiding built prototypes)*
- *Collecting information on experienced feelings towards tested innovation*
- *Estimating global performance of the driver-car system.*

In order for the driver to feel the simulated movements better, the vehicle – of which driving controls are interfaced with the simulator-, is placed on a hexa-axis electric platform.

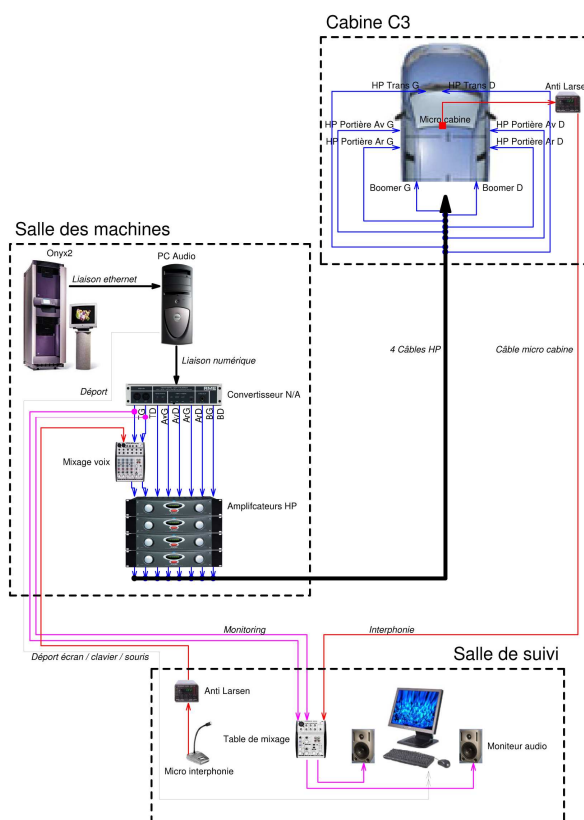
The external visual environment is displayed on three flat screens, offering a 170° horizontal field of vision and a 40° vertical one.

GENESIS also dealt with:

- The full conception of **hardware sound system** inside the vehicle,
- The development of specific modules and **graphic interfaces**, allowing supervision and advanced modification of **synthesis parameters and engine noise signal** (graphical modification of partials' evolution law, filtering...)
- The integration of sound system, spatialization processing, algorithms and synthesis interfaces



Example of graphic interfaces



Block diagram of the installation

The audio system was implemented on a **standard PC** running under **Linux** and using **jMax** software developed by IRCAM; and associated to **professional audio equipments**.

GENESIS dealt with **all** specifications, conception, realization and installation **stages**, based on PSA Peugeot Citroën needs and the integration to HARTIS synthesis platform specifications.