ODAS Soundscape Design Tool for SNCF Simulator

GENESIS realized in 2003, for the Research and Technology Department of **SNCF** (national railway company), a prototype of a Soundscape Design Tool (called ODAS), including:

- **Ambient sound generation** of a TGV using real-time sound synthesis,
- Real-time **soundscape sculpture**,
- **3D spatialization** of sound sources with headphones,
- **Scenario recording and playback**.

*ODAS is an original **sound design** tool because it uses **3D sound simulation** to immerse the listener in a **realistic acoustical environment**. Thanks to a **real-time audio** engine, the user can **instantly hear** the acoustical field modification.*

*This was realized on a **Windows** based **standard portable computer** with a **professional audio equipment**. The expertise of GENESIS in signal processing, physical acoustics, psychoacoustics, sound systems and software development enabled the implementation of a comprehensive integrated system.*

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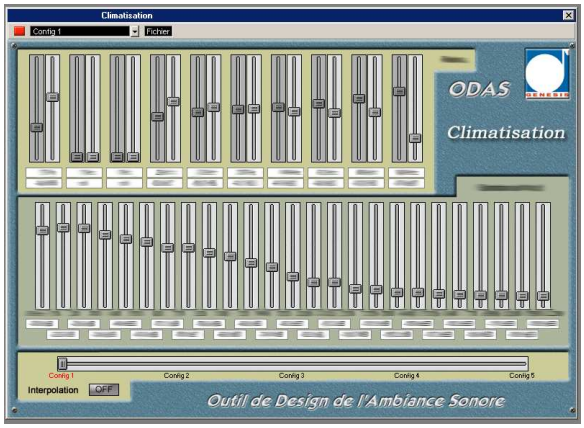
TECHNICAL SPECIFICATIONS

Ambient sound generation

Sound sources are separated into different modules:

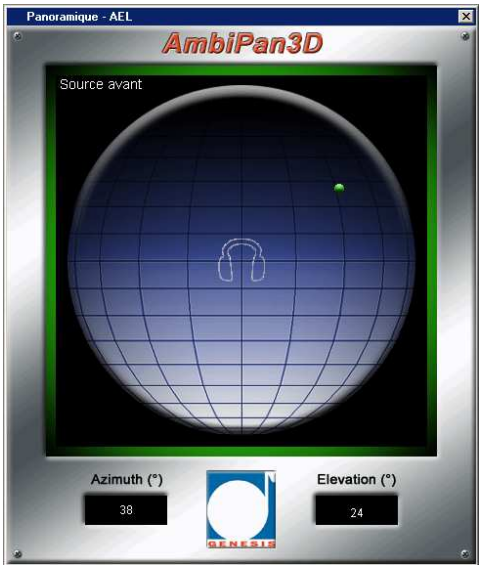
- **sounds linked to train running**, generated by **real-time sound synthesis** algorithms,

- sound sources due to **passengers** (talks, doors, GSM,…), generated from recordings.



Sound sculpture

The real-time tool offers the possibility to **modify the synthesis parameters** and to **hear instantly the acoustical result**.



3D spatialisation

The 3D spatialisation enables to immerse the listener in a soundscape in which sources arrive from any direction (front/rear, left/right, top…).

A **SoundField** microphone was used to reproduce the 3D field with the **localization** and **room effect indicators**.

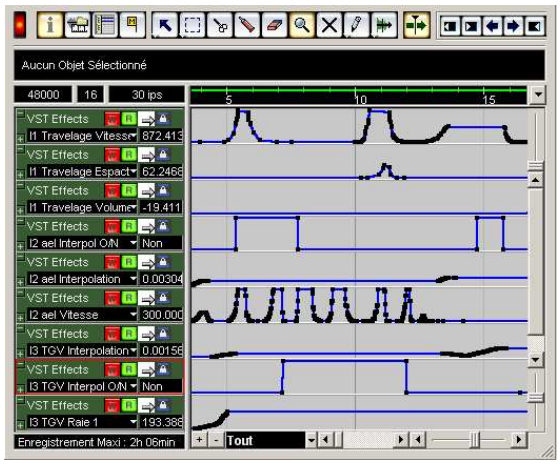
Each sound source can be processed as a **monophonic signal** and moved in 3D space around the listener in order to reproduce the different positions of the train passengers

The 3D sound field encoded in **B-Format** is transcoded in **binaural** in real-time to be reproduced with **headphones.**

Scenario recording and playback

A **scenario module** enables the reproduction of a complete TGV soundscape by recording successive sound events and modifying the synthesis parameters. It can be accurately edited with **specific tools** in real-time or off-line.

This function allows the construction of sound environment required for **psychoacoustic tests**.



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all dimensions of Sound
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