

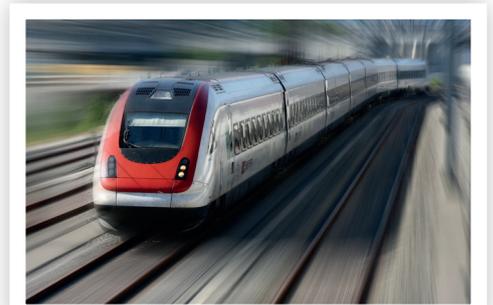
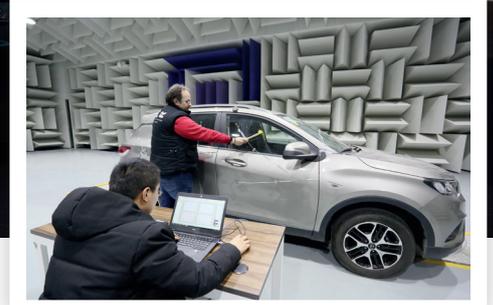
# TPA

## TRANSFER PATH ANALYSIS

LOOKING FOR  
A COMPREHENSIVE SOLUTION  
FOR YOUR ACOUSTIC COMFORT  
CHALLENGES?

**Cars, trains, planes, ships... all means of transport are affected by acoustic comfort challenges. Although the R&D departments of manufacturers deal with these issues directly during the design phase, it is often necessary to take further action once the first prototype has been released. To improve comfort, NVH experts need to identify the main contributing sources and their transfer paths to the target, such as passengers' ears, and then implement the necessary mechanical modifications accordingly.**

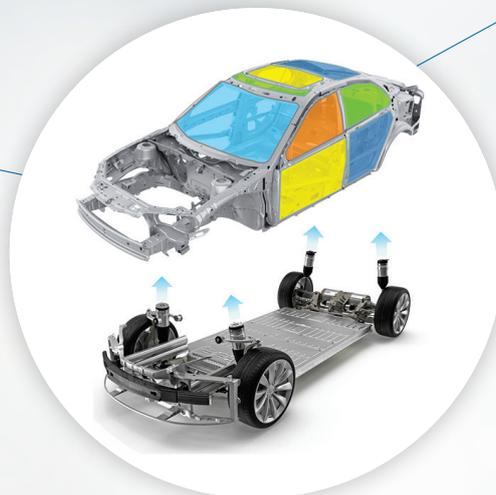
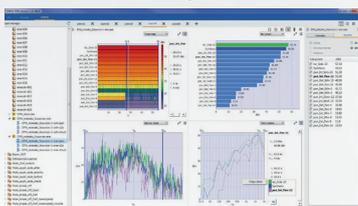
To address these issues, OROS proposes an innovative and comprehensive solution dedicated to Transfer Path Analysis (TPA): testing software, services, and instrumentation. This solution makes it possible to determine and rank contributions and the complete transmission path. It was developed in cooperation with the ICR company, a specialist in Transfer Path Analysis.



## A COMPREHENSIVE TPA TESTING SOLUTION

### Software

Contribution ranking



### Instrumentation

Acquisition focused on your needs



### Services

From training to consulting



## SOFTWARE

In NVH, one of the key objectives is to characterize how noise and vibrations reach the target, for example the driver's ear, under different operating conditions. This can be achieved experimentally by applying OROS's Advanced TPA Solution, powered by ICR unique ATPA algorithm, which offers the following main advantages:



**No mechanical isolation** of various sources is required, resulting in much simpler testing procedure and shorter testing time.

Synthesis calculation allows for a full **test validity check**.

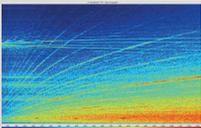
Allows contributions from **panels, structural paths** and **sources** to be ranked.

Separates **air-borne contributions** from **structure-borne contributions**.

Extends the analysis to a **wider frequency range** by using coherent and energetic analysis methods.



Complemented by a powerful and flexible range of applications including the comprehensive OROS software suite:



**EV/HV** (electric motor noise)  
To characterize e-NVH signature of electric motors.

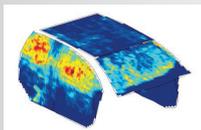
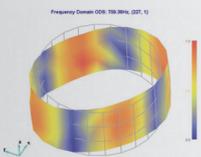
**ODS** (Operating Deflection Shapes)  
To display the deflection shapes at chosen frequencies.

**OMA, EMA** (Operational and Experimental Modal Analysis)  
Using an impact hammer, shaker(s) or operational excitation.

**Sound Power**  
Based on the sound pressure levels measured at defined microphone positions.

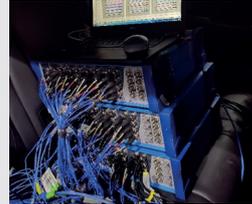
**Sound Quality**  
Psychoacoustics & sound design.

**Source Localization and Sound Mapping**  
Using sound intensity, Nearfield Acoustic Holography (NAH) and beamforming.



## INSTRUMENTATION

The solution goes all the way to provide a full range of high-end acquisition and analysis instrumentation.



### Teamwork instruments

Ideal for multichannel impact testing acquisition and in-vehicle data recording. From 2 to 32 channels. Can be cascaded and distributed to measure up to 1000 channels.

### DataCare

Embedded dedicated processing (DSPs). High-end metrology. Retrievable SSD hard-drives.

### Flexibility

Handles any transducer. Office and on-instrument licensing. Synchronous multi-tasking (live and post).

### Multi-environment

Robust & portable design: in-vehicle tests Standalone recording mode. Easy integration in test benches.



## SERVICES

Solving NVH issues at the design stage or after manufacturing requires complementary skills in vibroacoustics and NVH:



### Consultancy services

Including NVH measurements, test data analysis and problem solving.

### NVH technical training

For NVH engineers, including application with OROS NVH testing system.

### Customized training

Focusing on your application.

OROS has been designing and manufacturing noise and vibration testing systems (instruments and software) for more than 35 years, meeting the requirements and expectations of the automotive industry in the area of NVH testing in particular. OROS systems are used to obtain an effective evaluation of vibroacoustic phenomena. The final aim is to improve the comfort of vehicles as well as their durability and performance.

OROS's solutions are dedicated to NVH for conventional vehicles, engines, components and EV/HV in different test environments: laboratory, in-vehicle or production. OROS proposes a wide range of analysis solutions covering data acquisition, structural dynamics, acoustics and rotating applications along with the related services.

