

EV/HEV

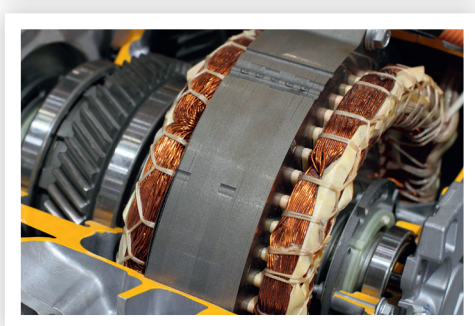
NVH TESTING SOLUTION

by  **OROS**
MEASURING NOISE & VIBRATION

LOOKING FOR
A COMPREHENSIVE
SOLUTION
FOR YOUR E-NVH
CHALLENGES?

NVH (Noise, Vibration and Harshness) of Electric Vehicles and Hybrid Electric Vehicles (EV/HEV) requires a wide range of dedicated applied skills and high-end technology.

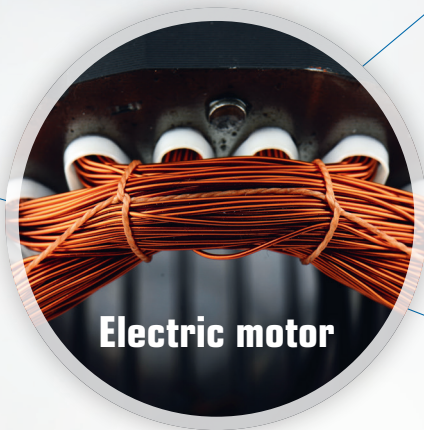
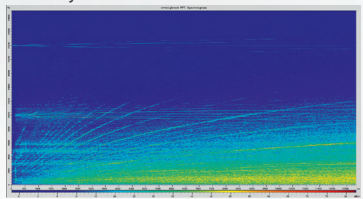
OROS proposes the most advanced and comprehensive solution to the challenges of e-NVH: Testing Software, Services and Instrumentation. This solution has been developed in cooperation with EOMYS, who is a specialist of electromagnetic noise and vibration.



A COMPREHENSIVE E-NVH TESTING SOLUTION

Software

e-NVH measurements
& analysis



Electric motor

Instrumentation

Acquisition focused on your needs



Services

From training to consulting



SOFTWARE

e-NVH signature of electric motors highly depends on motor topology, converter strategy, and structure-borne vs air-borne path contributions. Some specific tools are therefore required to quickly identify and solve e-NVH issues during testing.

e-NVH Software module:

e-NVH environment

- Management of your EV motor topologies (PMSM, SCIM...).
- Pre analysis of the main excitations (frequencies, wavenumbers).

Electric Markers

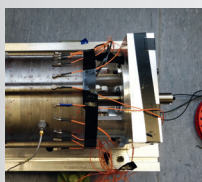
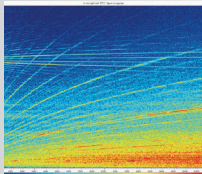
Based on motor and converter electric characteristics, e-NVH excitations can be spot right away (PWM, slotting...) in terms of electrical frequencies.

Spatioigram

A unique tool to quickly quantify the contribution of e-NVH excitation wavenumbers to vibrations.

Sound Design

Playback and listen to the motor noise separating and designing the various sources (mechanical, aerodynamic, electric).



Completed by a powerful and flexible range of applications with the comprehensive OROS software suite:



TPA (Transfer Path Analysis)

Acoustic comfort optimization based on an innovative TPA method.

ODS (Operating Deflection Shapes)

Display the deflection shapes at chosen frequencies.

OMA, EMA (Operational and Experimental Modal Analysis)

Using an impact hammer, shaker(s) or operational excitations.

Sound Power

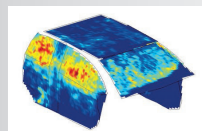
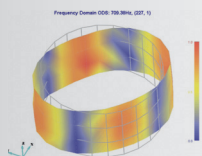
Based on the sound pressure levels measured at defined microphone positions.

Sound Quality

Psychoacoustics & sound design.

Source Localization and Sound Mapping

Using sound intensity, Nearfield Acoustic Holography (NAH) and TPA analysis.



INSTRUMENTATION

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



MoDS (Mobile DAQ System)

4 to 8 channels ultraportable DAQ dedicated to in-vehicle acquisition.



Teamwork instruments

The portable and modular range from 4 to high channel count systems. The Teamwork technology enables to cascade or distribute the instruments.

SERVICES

Solving NVH issues at design stage or after manufacturing requires complementary skills:



Consulting services

Including e-NVH measurements, test data analysis and problem solving.

NVH technical trainings

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

Customized trainings

Focusing on your application.

OROS designs and manufactures noise and vibration testing systems (instruments and software) for more than 30 years, meeting the requirements and expectations of automotive industry, especially NVH testing. OROS systems are used to obtain an effective evaluation of vibro-acoustic phenomena. The final aim is to improve the comfort of vehicles as well as their durability and performance.

The OROS Solutions are dedicated for vehicles, engines, components and EV/HEV NVH, 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 and related services.

