
OROS
Modal 2


OROS Modal Analyzer : comprehensive and portable
Modal analysis is a powerful technique for understanding structures behavior and for validating mechanical design and simulation results. Listening to customers expecting easy and powerful tools for modal tests, OROS offers the OROS Modal Analyzer, the comprehensive package for modal experts as well as novice engineers.
Instrument + Software
High quality acquisition is a must.
Chaining systems


3 methods for 3 types of excitation
Natural excitation :
OMA : Operational Modal Analysis
Shaker excitation :
EMA : Experimental Modal Analysis,
MIMO (Multiple Inputs Multiple Outputs)
Ranmer excitation :
ODS : Operating Deflection Shape),
EMA : Experimental Modal Analysis,
SIMO (Single Input Multiple Outputs)
It makes me saving a precious time when testing a new component.


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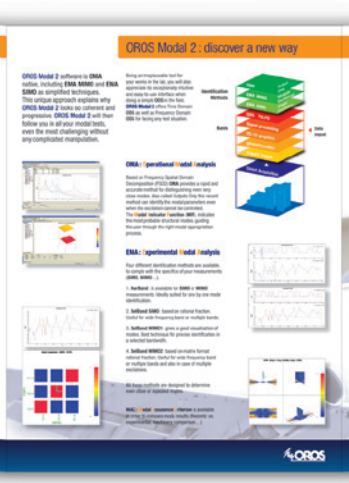
OROS Modal 2 : discover a new way
OMA : Operational Modal Analysis
EMA : Experimental Modal Analysis


for effective modal analysis!
Time to Results
Intuitive
Self-learning
ODS : Operating Deflection Shape


Ordering information
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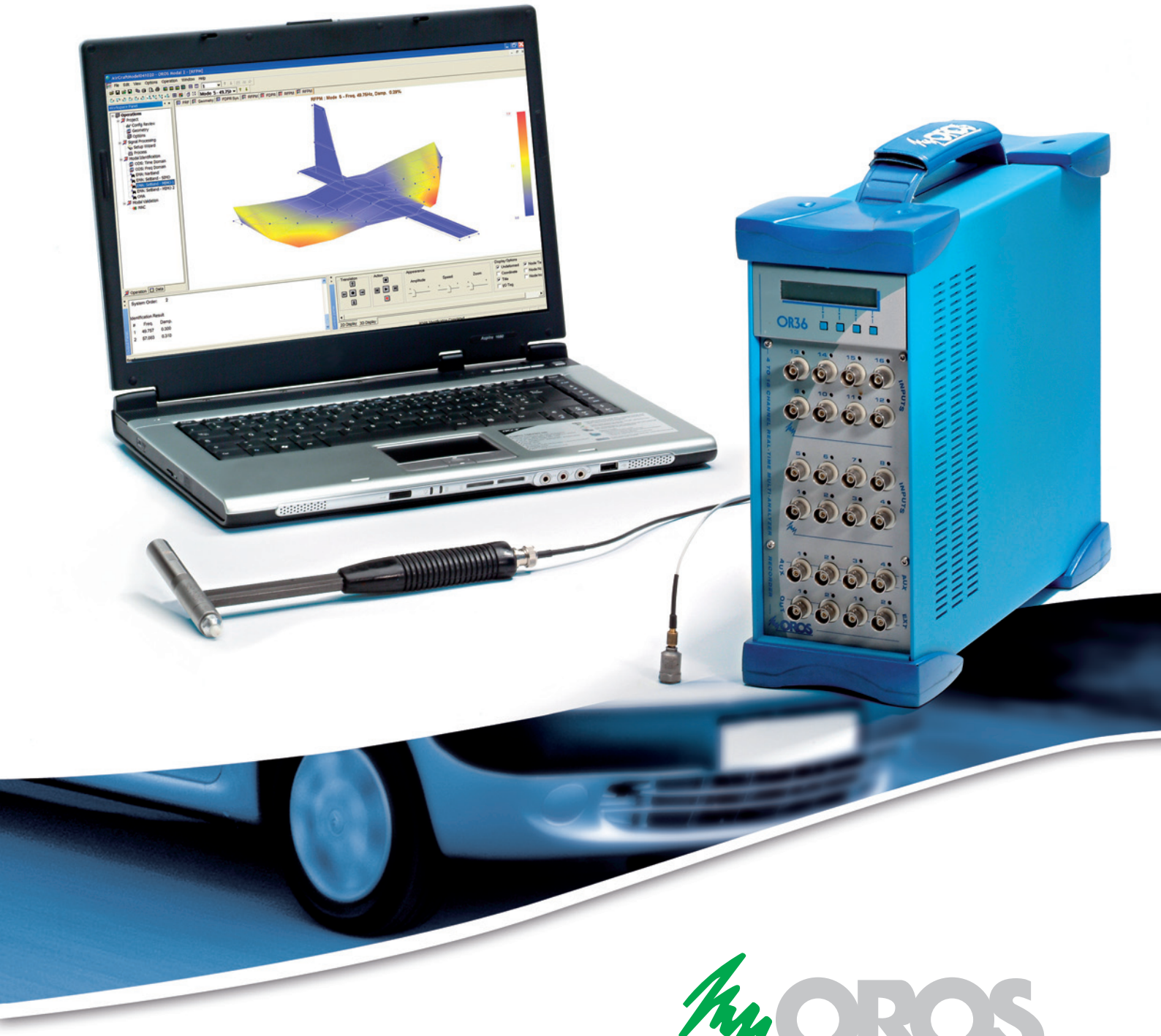

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OROS Modal Analyzer : comprehensive and portable

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Instrument + Software

OROS Modal Analyzer is a fully integrated solution combining the measurement instrument OROS 3-Series and the analysis software **OROS Modal 2**. This architecture guarantees the quality of the acquisitions and the consistency of the user interface for test efficiency and a short learning period.

High quality acquisition is a must.

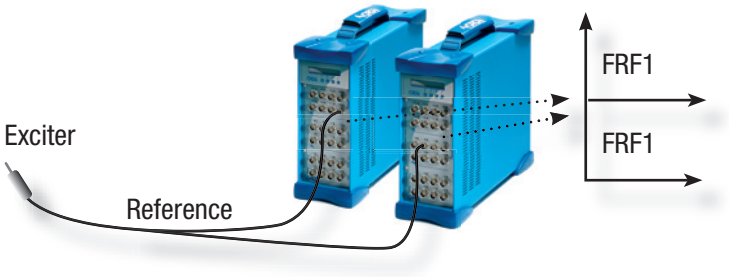
For your modal test you need quality FRF acquisition and an efficient and interactive way for getting and processing your data.
OROS 3-Series analyzers are already renowned for their measurement quality. Their specifications and functions match easily the most demanding applications. Some specific functions like FRF/coherence preview and remote control for accept/reject give comfort and save time. The integration of **OROS Modal 2** software with the analyzer makes the system totally coherent.

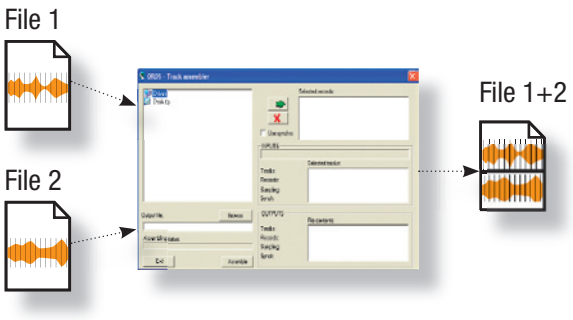
The unique Mobi-Disk™ technology enables long term as well as transient acquisitions on high channel counts with direct uploading to a PC.

Throughout its 20 + year history, OROS is known to be expert for portable, multichannel and real-time analyzers.

Chaining systems

Moreover, handling ultrahigh channel count is also possible by chaining several OROS-3 Series analyzers together and precisely synchronizing excitations and responses.

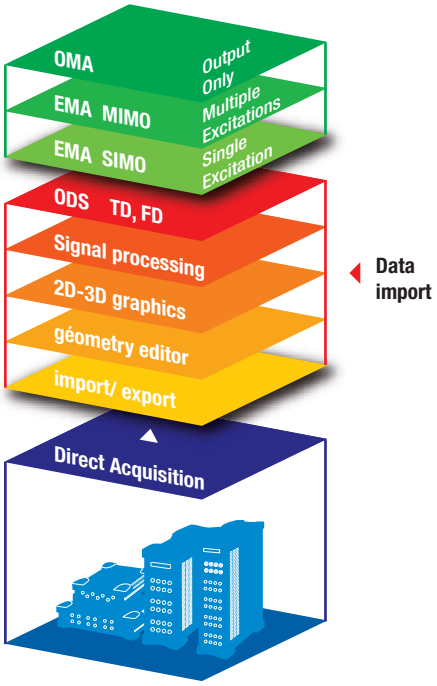


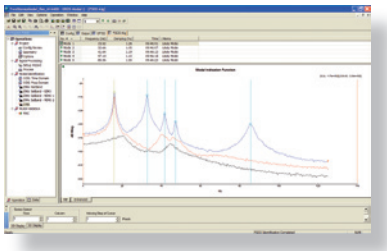


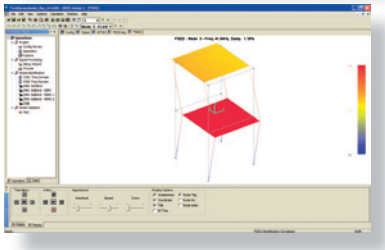
OROS Modal 2 : discover a new way

OROS Modal 2 software is **OMA** native, including **EMA MIMO** and **EMA SIMO** as simplified techniques. This unique approach explains why OROS Modal 2 looks so coherent and progressive. OROS Modal 2 will then follow you in all your modal tests, even the most challenging without any complicated manipulation.

Being an irreplaceable tool for your works in the lab, you will also appreciate its exceptionally intuitive and easy-to-use interface when doing a simple **ODS** in the field. **OROS Modal 2** offers Time Domain **ODS** as well as Frequency Domain **ODS** for facing any test situation.

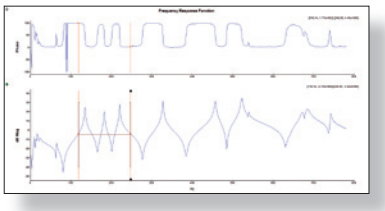


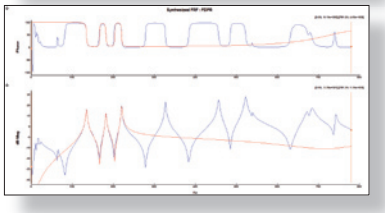




OMA : Operational Modal Analysis

Based on Frequency Spatial Domain Decomposition (FSDD) **OMA** provides a rapid and accurate method for distinguishing even very close modes. Also called Outputs Only this recent method can identify the modal parameters even when the excitation cannot be controlled.
The **Modal Indicator Function** (**MIF**), indicates the most probable structural modes, guiding the user through the right modal appropriation process.





EMA : Experimental Modal Analysis

Four different identification methods are available, to comply with the specifics of your measurements (**SIMO**, **MIMO**…).

1. **NarBand** : is available for **SIMO** or **MIMO** measurements. Ideally suited for one by one mode identification.

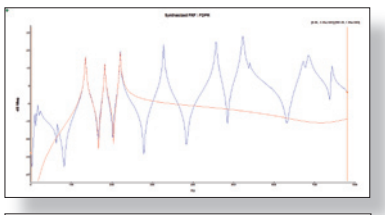
2. **SelBand SIMO** : based on rational fraction. Useful for wide frequency band or multiple bands.

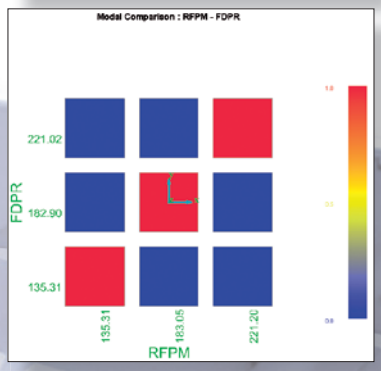
3. **SelBand MIMO1** : gives a good visualization of modes. Best technique for precise identification in a selected bandwidth.

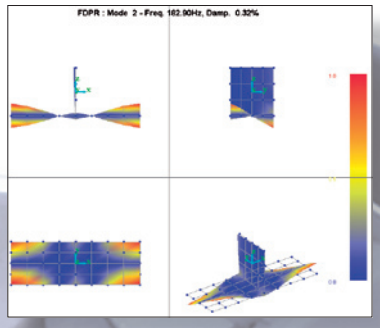
4. **SelBand MIMO2** : based on matrix format rational fraction. Useful for wide frequency band or multiple bands and also in case of multiple excitations.

All these methods are designed to determine even close or repeated modes.

MAC : Modal Assurance Criterion is available in order to compare mode results (theoretic vs. experimental, machinery comparison…)







for effective modal analysis!

Time to Results

Intuitive

A clear function tree organized as a wizard makes the progress through the various steps of a modal test easy :
- geometry (import or edit)
- FRF (acquire directly or import)
- signal processing
- method and parameters selection
- MIF
- modal parameters determination
- animation
- export, report, save

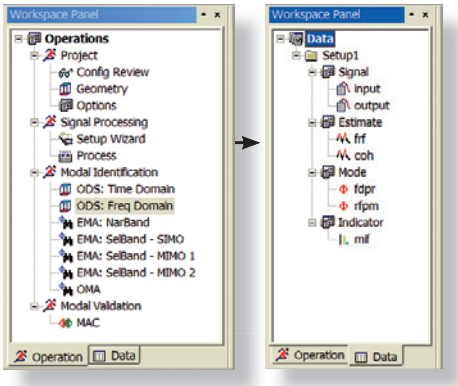
You are guided through all steps of your measurements and analysis from the geometry edition to the visualisation of the results.

Self-learning

You are not an expert in modal ? Then **OROS Modal 2** will accompany you and guide you through the various modal testing methods.
The clear tutorial set and the on-line help provide all the necessary elements.
The only prerequisite is the mechanical knowledge of the structure and a clear idea of the information you are looking for.

5 min
1 min
few secondes
1 min

< 8 min to get accurate results

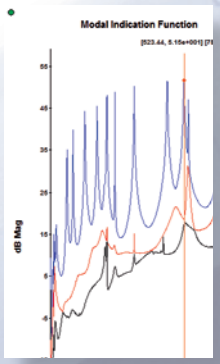


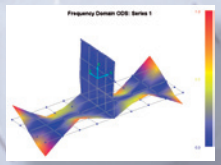
ODS : Operating Deflection Shape

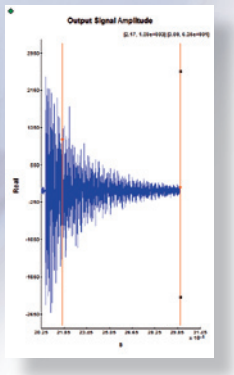
ODS is the preferred tool for solving problems in the field especially when investigating the interactions between a vibration source like a rotating machinery and the mounting structure.

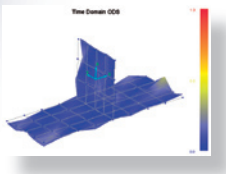
With a simplified geometry and a couple of hammer impacts, the **ODS** gives a clear view of the system's behaviour and helps you find a correction for an unwanted vibration mode.

In one click **OROS Modal 2** gives you access to **ODS** in both frequency domain and time domain to visualize the deformation of your structure at a specific frequency (frequency domain) or at a specific moment in time (time domain).









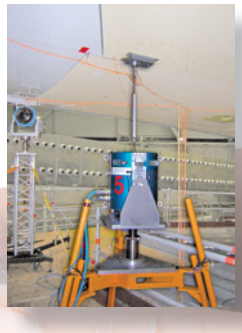
3 methods for 3 types of excitation

Natural excitation :
OMA (Operational Modal Analysis)

This identification method is ideally suited for large civil engineering structures (e.g., bridges…), machines in operation or other structures which are not easily excited artificially like in flight aircrafts.
No need to have excitation equipment ! You can get the dynamic characteristics of the structure in real operating conditions.
To perform those measurements the Mobi-disk™, coupled with the high dynamic inputs will be of unprecedented efficiency. **OROS Modal 2** is **OMA** native, and gives particularly easy access to this remarkable technique, using the latest algorithms published by the scientific community.

Shaker excitation :
EMA (Experimental Modal Analysis),
MIMO (Multiple Inputs Multiple Outputs)

For large structures, 1 to 6 shakers can receive a large series of excitation signals (swept sine, chirp or random…) from the analyzers generators. **OROS Modal 2** includes **MIMO** identification methods corresponding to the use of multiple shakers.
Note the exceptional features of the signal generators of OROS 3-Series : total control of transients and excitation levels for security, precise phase control, uncorrelated noise generators, Advanced Swept Sine option for closed-loop control, high resolution FRF measurement.



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Hammer excitation :
ODS (Operating Deflection Shape),
EMA (Experimental Modal Analysis),
SIMO (Single Input Multiple Outputs)

Hammer excitation being the most usual technique for common structures, **OROS Modal 2** offers convenient and efficient tools for quickly getting **ODS** as well as determining modal parameters. OROS 3-Series offer great features for impact excitation : high dynamic inputs making the auto-ranging even unnecessary, node path sequencer, double-impact rejection and preview of averaged coherence dramatically speeds up acquisition.
For large structures, you can even chain a couple of OROS 3-Series analyzers to perform data acquisition on 64, 128 or 256 channels.

«From acquisition to mode shapes, I can quickly process all the steps with the OROS Modal Solution. »

Rajan, 31 years Vehicle Dynamics, NVH Engineer

It makes me saving a precious time when testing a new component.

OROS

Ordering information

The basis of the software includes geometry editor, geometry import, data import, data export, signal processing, 2D and 3D graphics.

- **ORNVS-MOD300 : ODS** (frequency domain **ODS**, time domain **ODS**)
- **ORNVS-MOD330 : ODS + EMA SIMO** (ORNVS-MOD300 + **M**odal **I**dentification **F**unction, **SIMO** modal identification)
- **ORNVS-MOD350 : ODS + EMA SIMO + EMA MIMO** (ORNVS-MOD330 + Multi-reference curve fitting, **MIMO** modal identification)
- **ORNVS-MOD380 : ODS + EMA SIMO + EMA MIMO + OMA** (ORNVS-MOD350 + **OMA** identification)

Upgrades :
- **ORNVS-MOD330u :** ORNVS-MOD300 to ORNVS-MOD330
- **ORNVS-MOD350u :** ORNVS-MOD330 to ORNVS-MOD350

Options :
- **ORNVS-MOD200 :** Acquisition available on all OROS 3-Series analyzers
- **ORNVS-MOD180 :** OMA (Option to ORNVS-MOD300 or ORNVS-MOD330)

Specifications :

- Unlimited number of nodes and data (depending on capacity of the computer)
- Unlimited number of identified modes
- FFT resolution : from 64 to 8192 points
- Weighting windows : Boxcar, Hanning, Hamming, Force&Exp, Exponential, Flattop.
- FRF estimation (H1, H2, Hc), PSD estimation (for **MIMO**), normal and multiple coherences
- **M**odal **I**ndicator **F**unction **(MIF)**, **M**odal **A**ssurance **C**riterion **(MAC)**
- Modal identification techniques for **EMA** : Rational Fraction Orthogonal Polynomial (**SIMO** or **MIMO**), or Frequency Domain Poly-Reference, or Complex Mode Indication Function
- Modal identification technique for **OMA** : Frequency Spatial Domain Decomposition

PC requirements:
- Operating systems : Windows2000/XP/2003 server
- Pentium III class CPU, Intel Pentium4, AMD Athlon XP or higher
- 256MB RAM, 512MB or higher
- 1 GB of free Hard disk space
- 1 USB interface
- SVGA monitor, 1024x768 minimum resolution

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Belgium	+ 33.1.6991.4300
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	+ 86.21.6225.6334
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