What's New in Actran 2024.1

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Article Number

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Summary

Description

Hexagon is proud to announce the release of Actran 2024.1. This new version includes new acoustic, vibro-acoustic and aero-acoustic technologies with a focus on creating better models faster..

Release Highlights

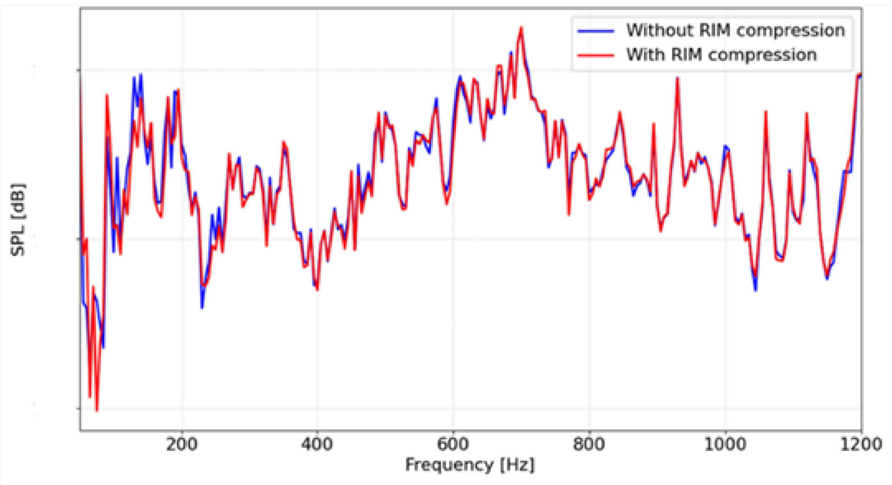
Some main highlights of this release include the following:

- **Compressed Reduced Impedance Matrices (CRIM) for Nastran PEM and Actran for Trimmed Body analyses (2024.1)**

  We introduce a new compressed way to store reduced impedance matrices (RIM) for 3D acoustic trim analysis. The uncompressed matrices, stored in modal coordinates, can be very large for models with lots of modes, requiring a large amount of disk space and I/O operations. Starting from Actran 2024.1, users can specify a CRIM_MODE datablock in the trim model, defining if they want to compress structure and/or fluid modes, and the compression tolerance. Activating this option, the RIM won't be projected and stored on all modes, but only on a subset of modes, the ones that are contributing the most to the trim coupling.
  With this new capability, engineers will be able to:
  - Drastically reduce the size of those matrices and reduce then the computational time (thank to less I/O operations),
  - The accuracy can be tuned with the CRIM_TOLERANCE keyword. A higher tolerance will select more modes, leading to more accuracy but less compression.

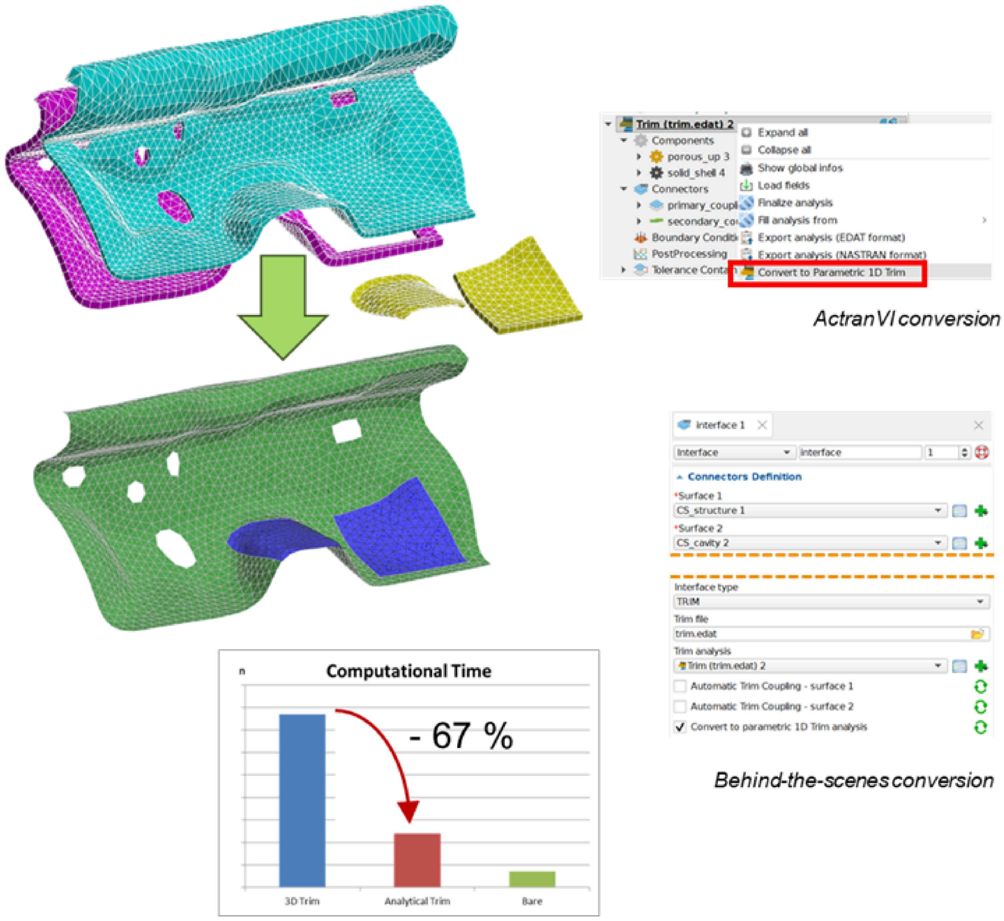
Industrial Trimmed Body Model	
DOFs	28M
Structure modes	19 027
Cavity modes	9 000

Actran for Trimmed Body Performance
Runtime -57%
Memory -97%



- **Automatic Conversion of 3D Meshed Trims into 1D Analytical Trims (2024.1)**

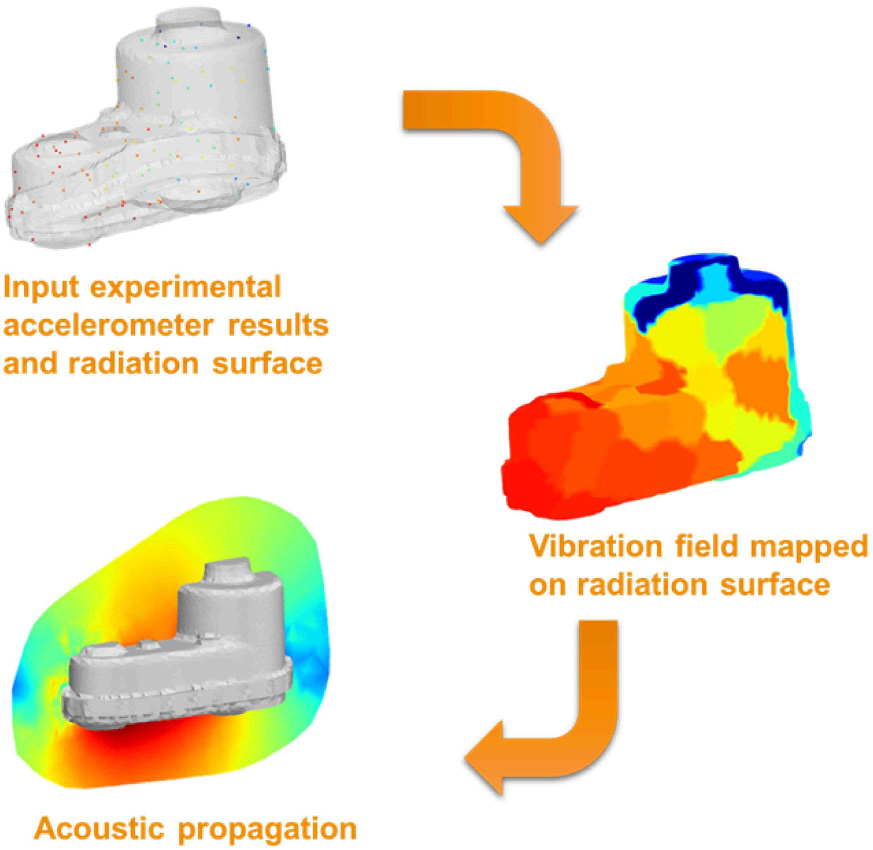
  With this release, 3D meshed trims can be easily converted to 1D analytical trims. This conversion can be done either inside ActranVI by right-clicking on the trim analysis, or behind-the-scenes using the new CONVERT_TO_PARAMETRIC_1D keyword inside the trimmed interface.
  With this new capability, engineers will be able to:
  - Reach higher frequencies at lower cost in terms of runtime and memory consumption,
  - Quickly access to trims performance indicators like transmission loss,
  - Reuse the existing 3D trims for building up a SEA model (only supporting 1D trim definitions)



- **Enhanced Vibration Mapping Method Based on Experimental Data (2024.1)**

  A new method has been added to the BC_MESH datablock, which maps experimental vibration results measured on a set of accelerometers on the acoustic coupling surface for acoustic radiation. This method is activated by specifying METHOD_SAMPLED_POINTS in the BC_MESH boundary condition. Each point of the acoustic coupling surface will be considered as vibrating with the amplitude and phase of the closest measurement point. With these new capabilities, engineers will be able to:

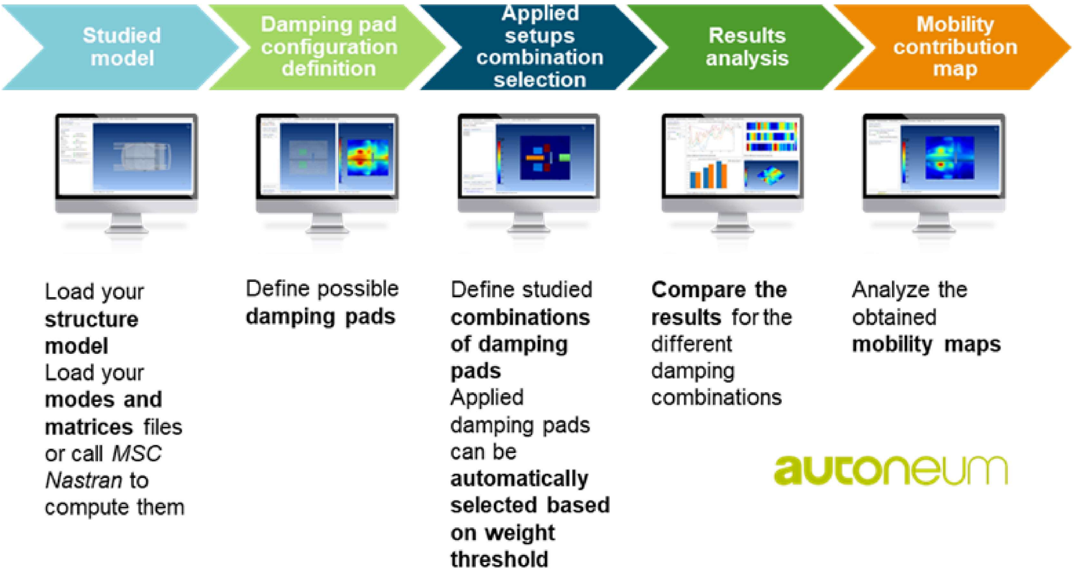
  - Easily set up an acoustic radiation model starting from experimental vibration data (surface acceleration, velocities or displacements),
  - Avoid complex structural dynamics modelling and rely on experimental data to assess the noise emission,
  - Conduct structure borne transfer path analysis with a hybrid approach mixing experimental and computational results.

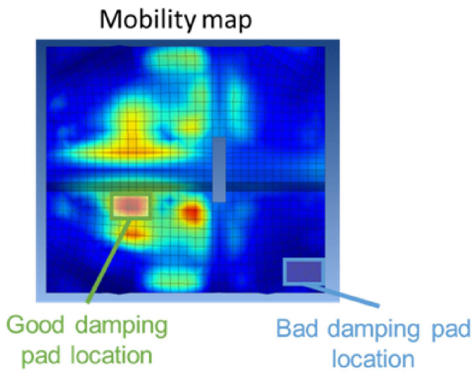


- **Enhanced User Experience for Damping Pad Positioning Workflow (2024.1)**

  The damping pads positioning workflow has been reworked for a smoother and easier experience. The untreated bare configuration (the original model without any pad) is solved in the first tab, allowing to directly work on the positioning of the damping pads and assess their effect.
  With these new capabilities, engineers will be able to:

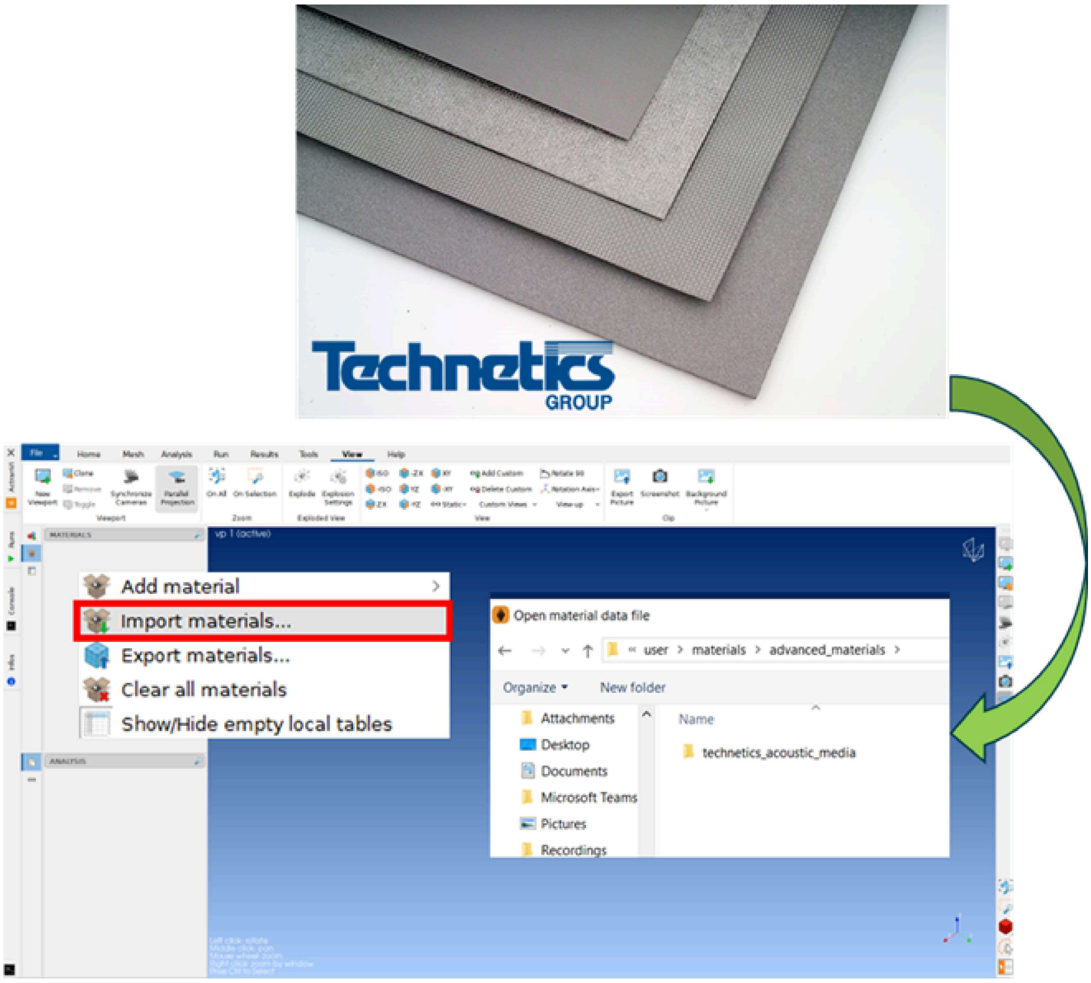
  - Directly have access to the different selected and computed pad combinations without restating any new model set-up,
  - Compare in a single step all the defined pad combinations,
  - Apply a weight constraint and let the workflow suggest the best damping pad combination.





- **Technetics Materials Data Available in the Actran Database (2024.1)**

  We have integrated the Technetics FELTMETAL™ materials family (wiremesh) in the Actran database. Technetics FELTMETAL™ Acoustic Media provides enhanced noise control for applications such as inlet and exhaust for both APU and propulsion engines. These media are engineered, porous material made of sintered metal fibers. The Biot materials properties of these materials are now available in Actran.
  With this new capability, engineers will be able to:
  - Easily explore which Technetics materials provide the best noise attenuation for their design by conducting acoustic simulation,
  - Improve noise reduction performance of APU inlet/exhaust and ECS Ducting,
  - Better control the noise in space crew compartments as well as for Manufacturing Machinery and Heavy-duty HVAC Systems



- **Many more new features**

  Besides these key features, several other new features are included in this version including:

  - Blade modes for turbomachinery applications with pellicular analysis: Pellicular analysis now supports pressure boundary conditions. This allows to decompose a pressure pattern (on a fan blade for example) into acoustic pellicular modes, to understand better which part of the complex pressure pattern is radiating the most. It can also be used to filter the acoustic pressure contribution from the hydrodynamic one.
  - Support of overset meshes from scFlow: Results produced by scFlow using the overset meshes methodology are now supported in ICFD CAASOURCES and MEAN_FLOW datablocks. This can be activated with OVERSET_MESH 1 in the PARAMETER datablock.
  - Acoustic trim support in Nastran SE SEA workflow: The Nastran SE SEA workflow now supports analytical (1D) trim definition. Those analytical acoustic trims will be considered in the created SEA analysis, modifying the Damping Loss Factor (DLF) of the neighbouring structure and cavity subsystems, and the fluid-structure Coupling Loss Factor (CLF) to account for added insulation.
  - Easier subsystems creation and modification thanks to Element Sets. The concept of "Groups" in ActranVI used mainly to define subsystems in Virtual SEA from the partition manager, has been replaced by "Element Sets". Element sets are visible directly from the datatree and can be easily selected. This makes it much easier to create or modify subsystems.
  - Performance improvement for Green solution sequence for modes and panels contribution.
  - Mixed precision added by default when using Block Low Rank (BLR) decomposition in MUMPS solver, decreasing timings by up to 5% and RAM consumption by 10%.