Release 2022 R1 Highlights
Ansys Sound

2022 R1 – What's New

Ansys / SOUND

Order analysis - Display

- Display order in dB SPL, dBA and Pa (log and linear amplitude scales)

Order analysis – tonality indicators

- Calculate TNR and PR for orders

FRF estimation

- Beta > Release

Sound quality

- Display loudness ISO 532-1 as a colormap

Spectrum import (beta)

- Import spectrum from Mechanical txt files

ASD Designer for decreasing RPM

- Decreasing RPM profiles now supported in ASD Designer

ASD for EV enhancements

- Combine several CAN parameters to create new control parameters
- Generate ASD sound (ESE) into ASDforEV

Reminder

2020 R1
- Pro - Improvements of ergonomics
- Premium - New Jury testing method
- All - ANSYS Common Licensing

2020 R2
- Sound Composer for E-motor
- Spectra and Waterfall compatibility formats
- DLL for Fluent
- ASDforEV – 1st release

2021 R1
- Fluent: FRF filtering, Sound quality indicators, sound length extension
- Mixer in Sound Composer
- Switch curve abscissae to any profile
- SAF Sound improvement and CAN bus connector

2021 R2
- Import data with non regular time
- Sound Composer broadband noise
- FRF calculation
- Use several harmonic source in Driving Simulator
- Optimized ASD for EV
- Psychoacoustic indicators update

Order Analysis

Enhance tools for the study of harmonic noises

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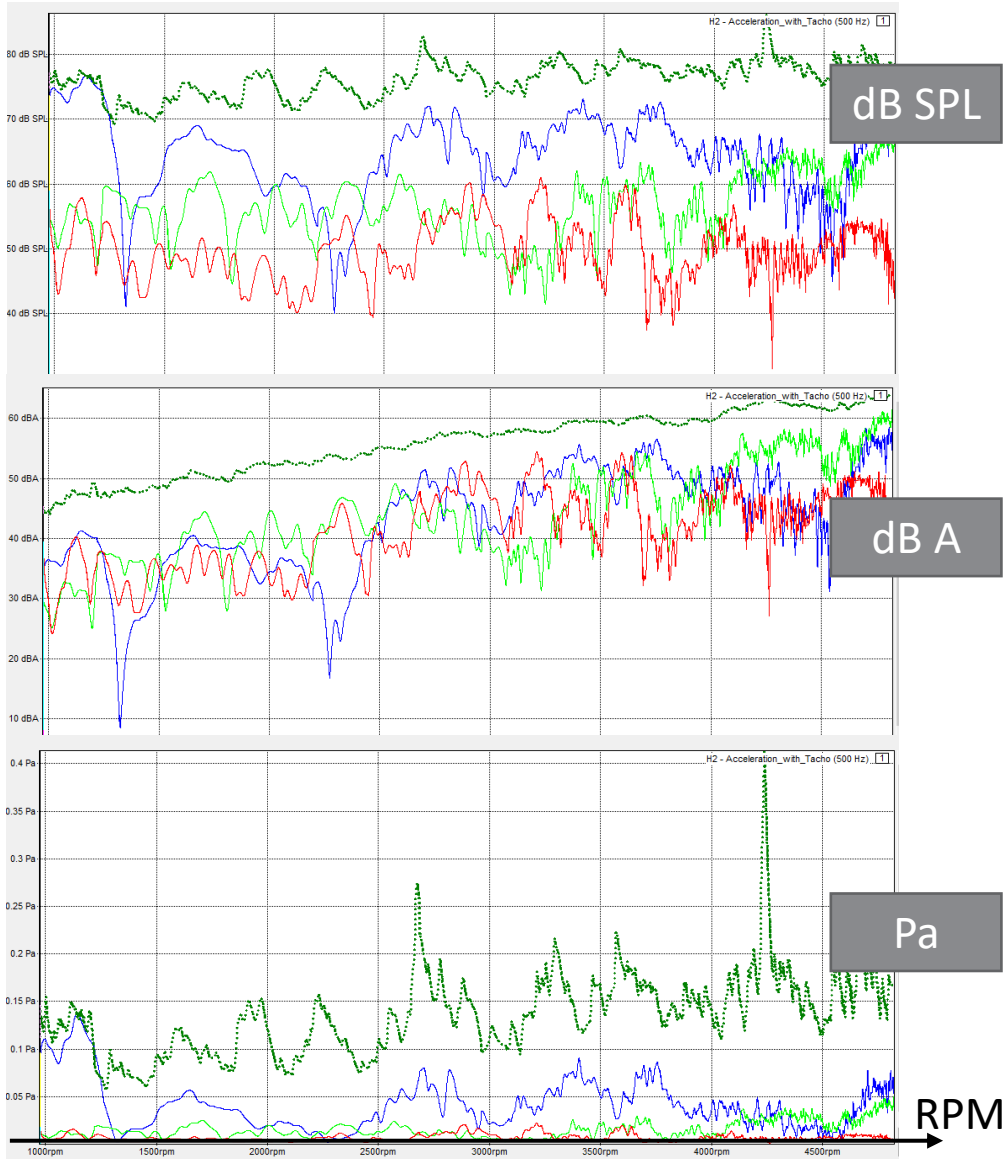
Display Order Level in dB SPL, dBA and Pa

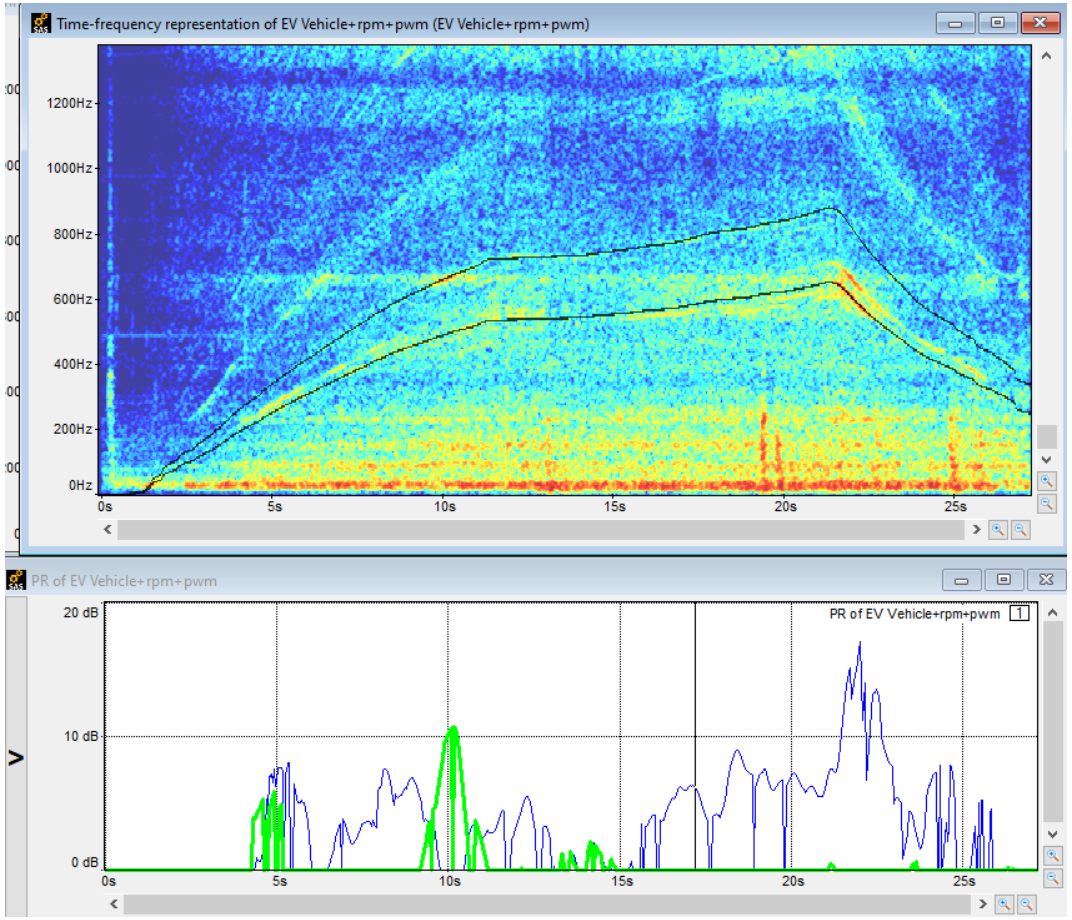
- Purpose
  - Order analysis is a widely used feature of Ansys Sound for any user interested in rotating machines
  - Users have different habits, and many are used to deal with dBA or Pa units for analysis, comparison and requirements
- Feature
  - Enhance the order analysis by allowing the display in several units, and still vs RPM as abscissa
- Additional Information
  - Switch order level between dB SPL, dBA and Pa
  - Data export is made according to the currently used abscissa and ordinate



Calculate TNR and PR for Orders

Tone to Noise Ratio, Prominence Ratio

- Purpose
  - Tonality indicators (TNR, PR) are widely used to assess tones audibility
  - Knowing at which time or RPM values the tonalities are audible is of great interest for electric engine manufacturers and integrators (objective assessment of sound quality, requirements)
- Feature
  - Calculate the TNR and the PR for any order as a function of time or RPM
- Additional information
  - Available only if signal unit is Pa



Frequency Response Function

Estimate the FRF comparing the signal at reception with the source signal

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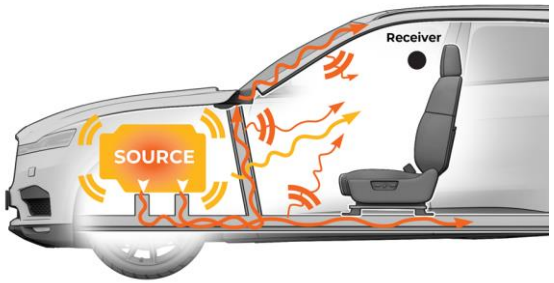
FRF Estimation

- Purpose

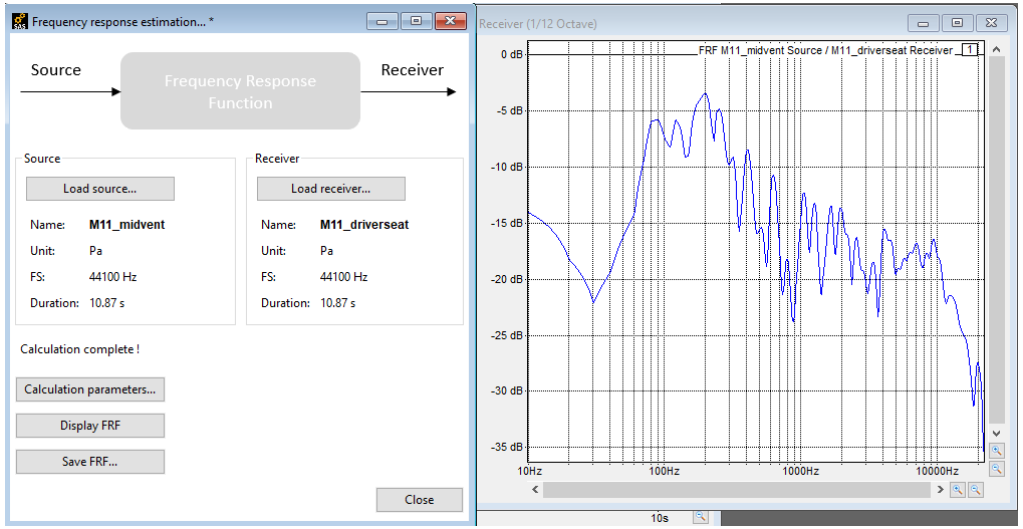
  Characterize the transfer function of a system, by estimating its FRF (Frequency Response Function)

- Feature
  - Method used: “H1 estimator” to minimize the effect of the noise at the receiver
  - Display and save FRF, can then be used in Fluent
- Additional information
  - Default smoothing is set to 1/12th octave



The relationship between the source X and the receiver Y is modeled by the ***linear, time-invariant transfer function*** **H**

FRF is the ***frequency response*** of the transfer function H



Sound Quality

Better understand how is perceived the sound

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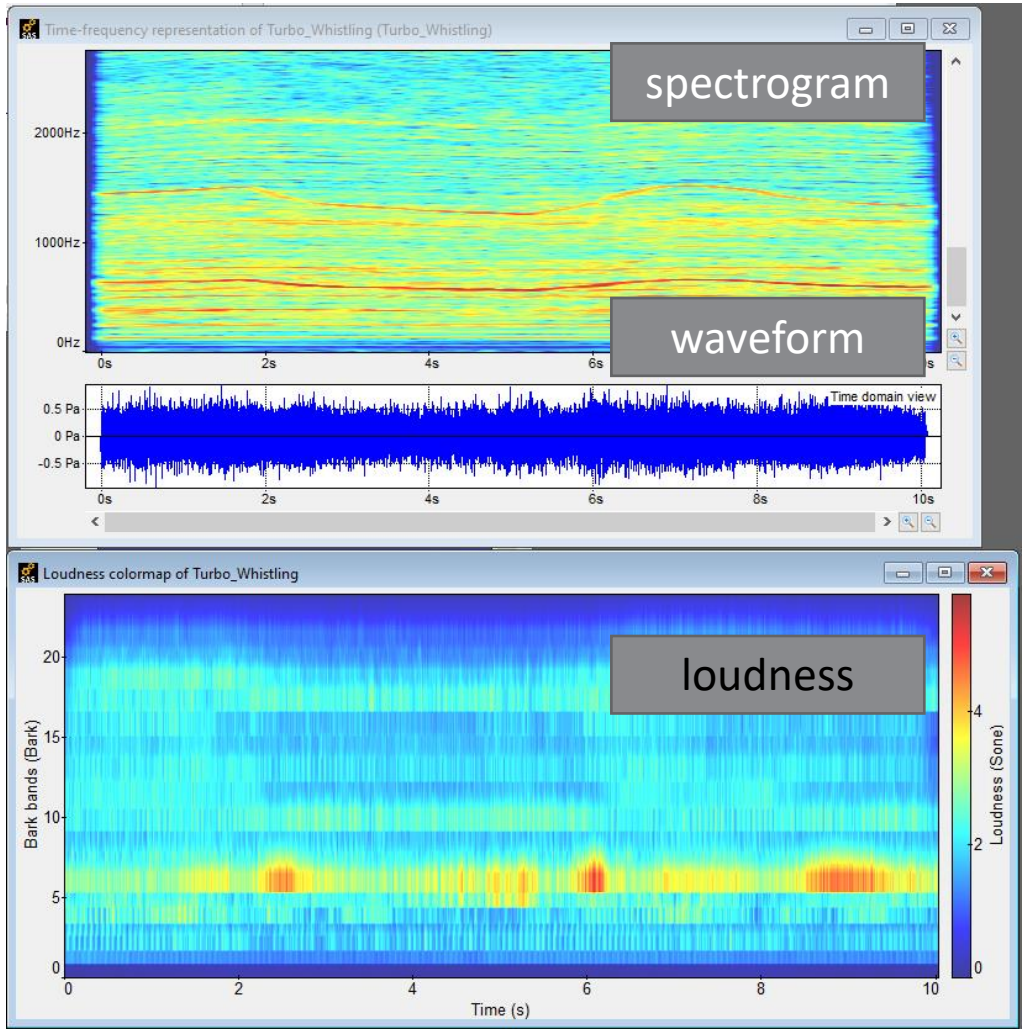
Display Loudness ISO 532-1 as a Colormap

- Purpose
  - Loudness is one of the mostly used sound quality indicators, its display as a colormap enhances the analysis capabilities
- Feature
  - Display loudness ISO532-1 as a colormap:
    - Loudness vs time vs frequency
    - Select unit: Sone or Phone
- Additional Information
  - Can be calculated from the waveform window



Ansys Connection

Toward seamless data exchanges

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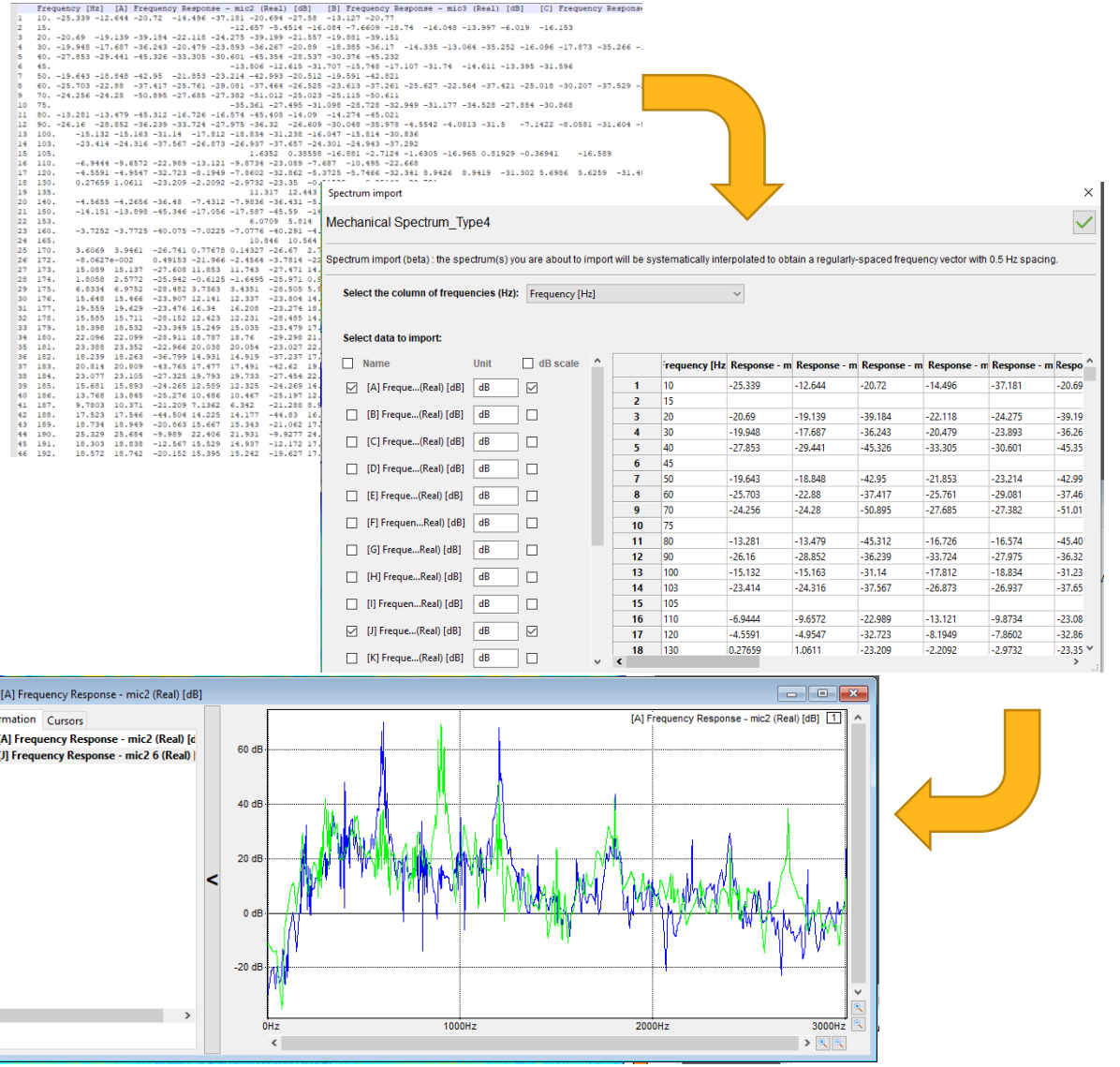
Import Spectrum from Mechanical txt files (beta)

- Purpose
  - Mechanical can simulate spectra at several points, in several conditions and types (Acoustics, Vibration, ERP, …) and it would make sense to open these spectra for visualization in Ansys Sound
- Feature (beta)
  - Import spectrum from a text file generated by Mechanical
- Additional Information
  - Four different types of spectra exported by Mechanical are supported as input
  - All imported spectra are automatically interpolated over a frequency scale spaced evenly at 0.5 Hz spacing



Generate Sound in Vehicles

Better control the sound delivered inside any kind of vehicle

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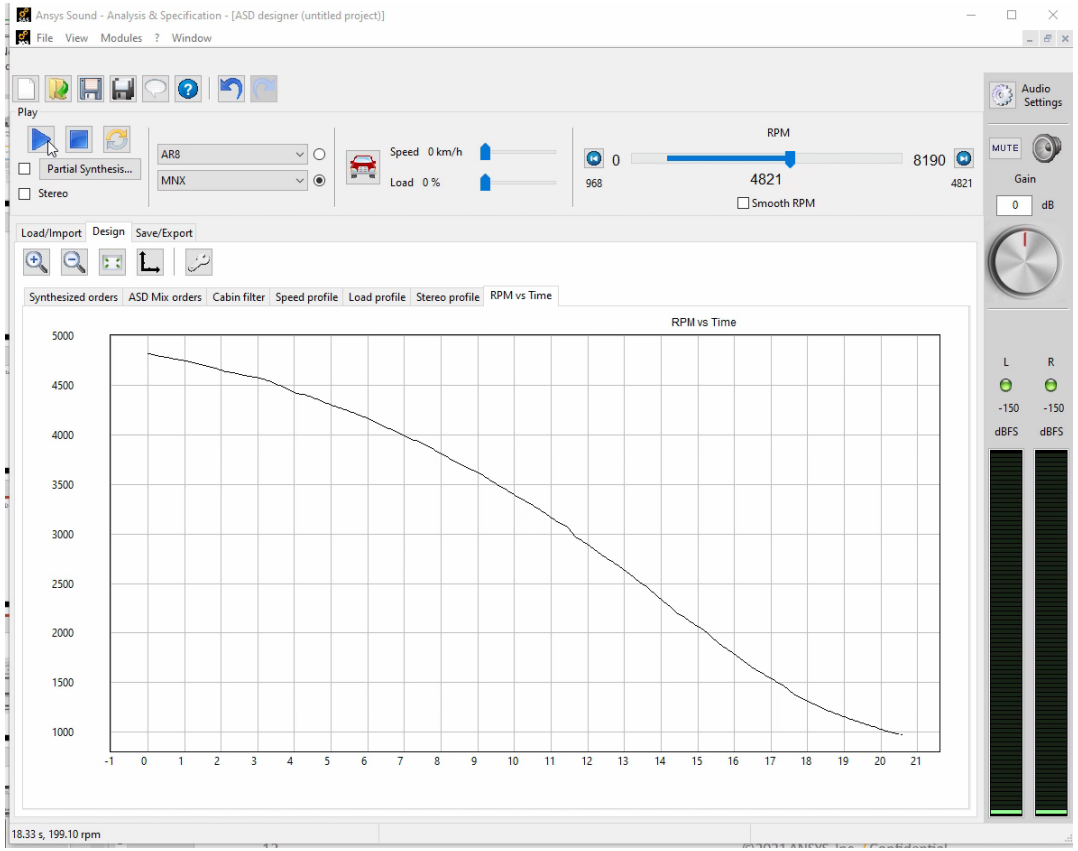
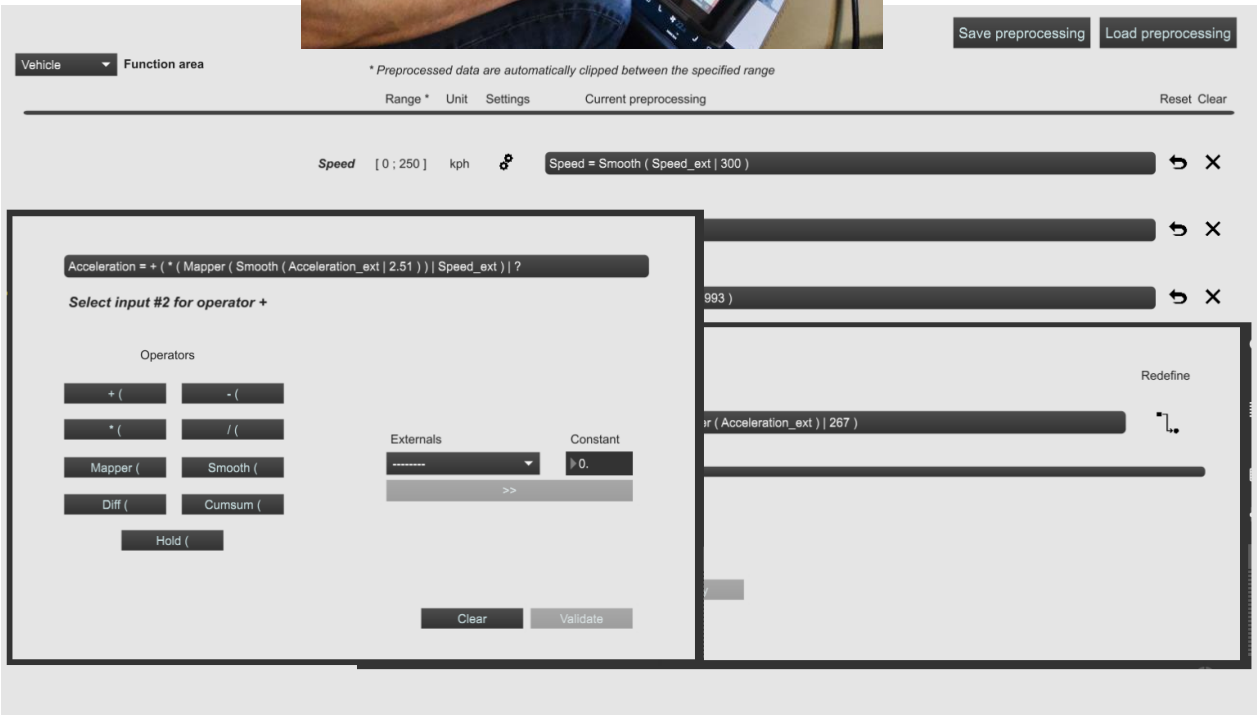
Decreasing RPM Profiles Now Supported in ASD Designer

- Purpose
  - ASD designer is used to create ESE sounds for ICE vehicles from real recordings, but is limited to strictly increasing RPM profiles
    - Several customers interested in designing sound for decreasing RPM (deceleration)
- Feature
  - Overcome limitation and allow decreasing RPM profiles in ASD designer
- Additional Information
  - No specific visual change for the user, just adding more compatibility



Combine Several CAN Parameters into ASDforEV

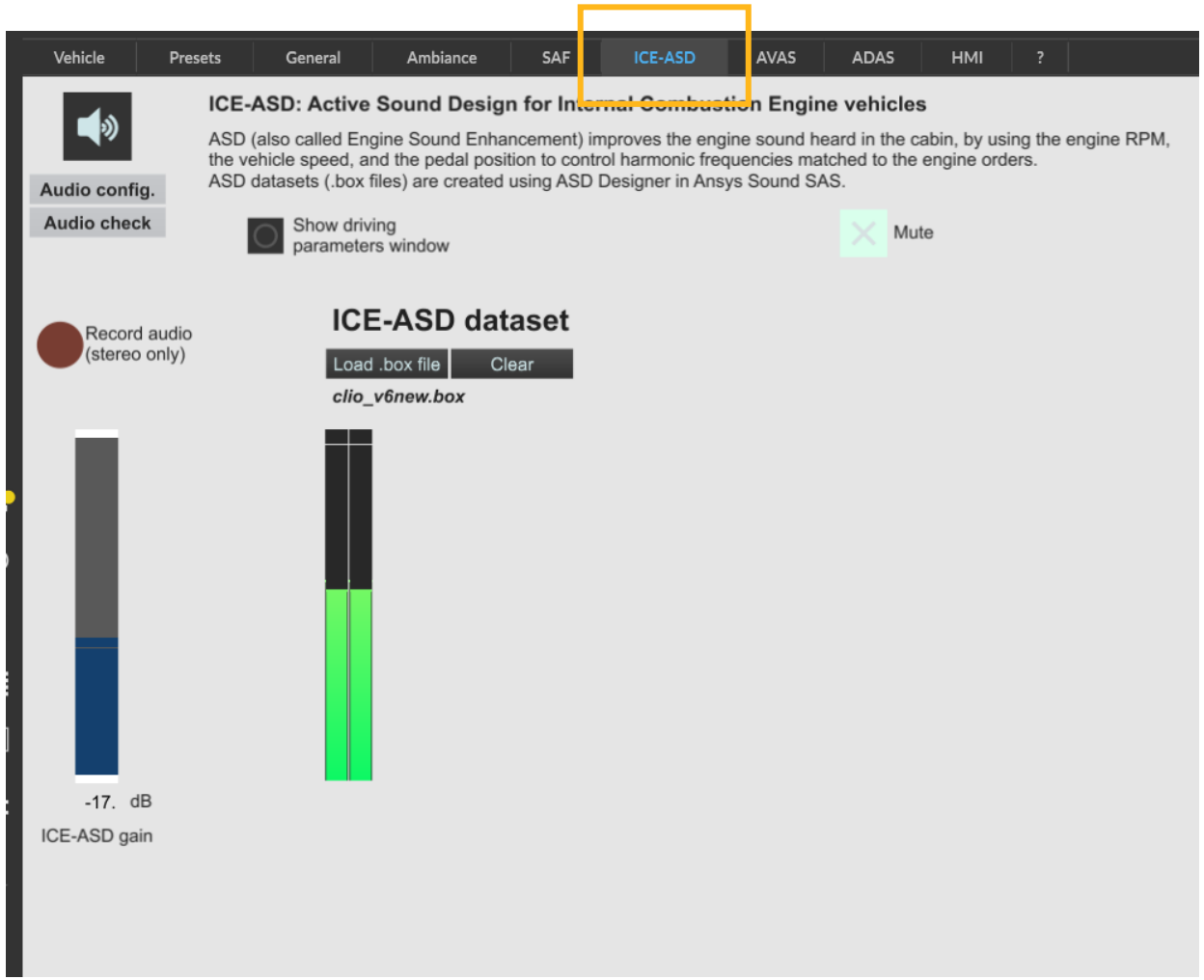
- Purpose
  - ASDforEV sounds are controlled by external parameters, usually coming from the vehicle through the CAN bus
  - Some sounds cannot be controlled directly by linking to a single parameter from the CAN
  - Need to define new control parameters based on the available ones. It gives the user:
    - More accuracy in the control
    - More freedom in the design purpose
- Feature
  - For each ASDforEV sound the user can define the control parameter as a combination of any external parameter
- Additional Information
  - Several operators can be applied to any external parameter



Generate ASD Sound (ESE) into ASDforEV

- Purpose
  - Thermal engine vehicles can use Engine Sound Enhancement (ESE)
  - Electric Vehicles sound can use Speed & Acceleration Feedback sounds (SAF)

  > Hybrid vehicles should benefit from both!
- Feature
  - Generate ESE sound from ASD in ASDforEV
  - Choose when SAF sound and ESE sound should be produced
- Additional Information
  - ASD sound is made from a .box file
  - Three control parameters to set:
    - RPM, Speed, Pedal load

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