HEAD acoustics

ArtemiS SUITE
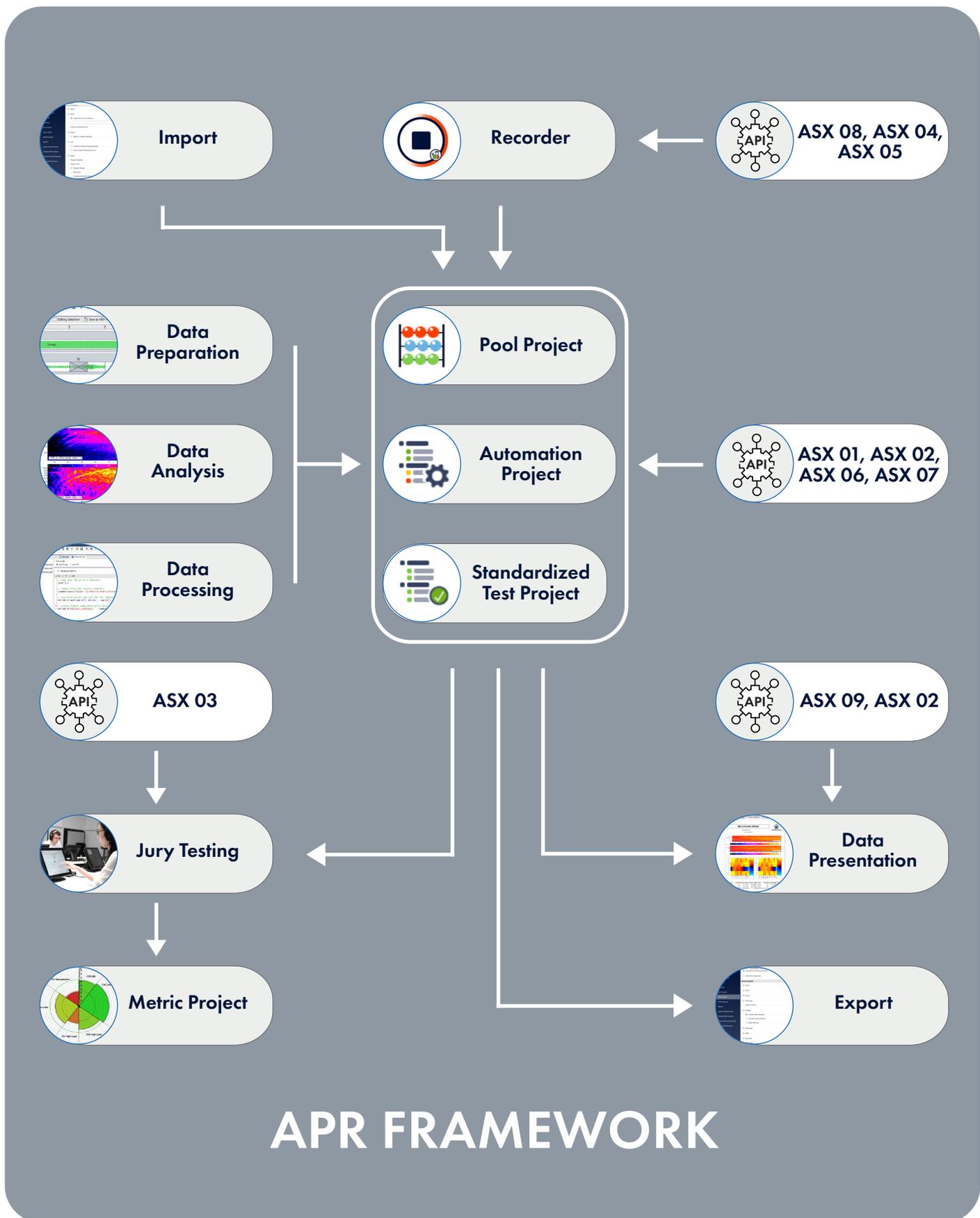Overview

Codes 50000–51801

ArtemiS SUITE – Overview

ArtemiS SUITE is a universal software environment for sound and vibration analysis. The modular design of ArtemiS SUITE enables customizable configurations consisting of projects (APRs) and signal processing tools (ASPs). In addition, the ASX programming interfaces provide customizable extensions and remote-control functionality.

OVERVIEW

APR/ASP	CODE	NAME	FUNCTION	ASX (API)
APR 000	50000	APR Framework	Basis of ArtemiS SUITE	ASX 05
APR 040	50040	Recorder	Data acquisition	ASX 04, ASX 08
APR 080	50080	RPM Generator		
APR 210	50210	Signal Generator Project		
ASP 301	51301	Offline Filters		
ASP 302	51302	Data Preparation	Data preparation	
ASP 304	51304	Batch RPM Generator		
ASP 702	51702	MDM Recording		
ASP 801	51801	Basic Decoder		
APR 010	50010	Pool Project		ASX 01, ASX 02, ASX 06, ASX 07
APR 050	50050	Automation Project	Central projects	
APR 220	50220	Standardized Test Project		
ASP 303	51303	Statistics		
ASP 305	51305	Channel Calculation		
APR 190	50190	Sound Engineering Project	Data processing	
APR 200	50200	HDF Tools		
ASP 001	51001	Basic Analysis		
ASP 002	51002	Basic Analysis vs. Control Channel		
ASP 003	51003	Advanced Analysis		
ASP 004	51004	Advanced Analysis vs. Control Channel		
ASP 005	51005	Modulation Analysis		
ASP 006	51006	Order Analysis		
ASP 007	51007	Octave Analysis		
ASP 101	51101	Psychoacoustics - Basic Analysis	Data analysis	
ASP 102	51102	Psychoacoustics - Basic Analysis vs. Control Channel		
ASP 103	51103	Psychoacoustics - Advanced Analysis		
ASP 104	51104	Psychoacoustics - Advanced Analysis vs. Control Channel		
ASP 106	51106	Speech Intelligibility Analysis		
ASP 201	51201	System Analysis		
ASP 202	51202	System Analysis vs. Control Channel		
ASP 203	51203	Sound Power Analysis		
APR 020	50020	Report	Data presentation	ASX 02, ASX 09
APR 021	50021	Comparison Report Project		
ASP 707	51707	MDF4 Import		
ASP 703	51703	MDF4 Export	Extended import/export	
ASP 704	51704	MTS-RPC Conversion		
ASP 705	51705	UFF Conversion		
APR 500	50500	Jury Testing - SQala Basic		
APR 501	50501	Jury Testing - SQala Lite		
ASP 501	51501	Jury Testing - SQala Net	Listening tests / Sound evaluation	ASX 03
ASP 502	51502	Jury Testing - SQala Server		
APR 570	50570	Metric Project		
APR 430	50430	Impact Measurement		
APR 440	50440	Reference+		
APR 420	50420	Modal Analysis Project	Structural analysis	
APR 400	50400	ODS Project		
APR 410	50410	Shape Comparison Project		
APR 600	50600	TPA Project		
APR 610	50610	TPA - Data Acquisition		
ASP 601	51601	TPA - Virtual Point Transformation	Transfer path analysis	
ASP 602	51602	TPA - Structure-Borne Analysis		
ASP 603	51603	TPA - Airborne Analysis		
APR 030	50030	Database		
APR 100	50100	Compact Analysis Project		
APR 110	50110	Playback Filters	Further tasks	
APR 300	50300	Sound Intensity Measurement		

FUNDAMENTAL TASKS

Import

Recorder ← ASX 08, ASX 04, ASX 05

Data Preparation

Data Analysis

Data Processing

Pool Project

Automation Project ← ASX 01, ASX 02, ASX 06, ASX 07

Standardized Test Project

ASX 03

Jury Testing

Metric Project

ASX 09, ASX 02

Data Presentation

Export

APR FRAMEWORK

BASIS OF ARTEMIS SUITE

APR Framework is the basis of ArtemiS SUITE and is required for each individual configuration of projects (APRs) and signal processing tools (ASPs).

In addition, APR Framework contains a range of central functions, for example:

› Navigator, Player, Data Viewer, User Documentation, System Documentation, and Sensor Library

› Measurement Point Library for recording measured quantities and integrating 2D or 3D grid models (CAD models can be imported)

› Channel Editor for editing channel properties and signals

› Tolerance Schemes

› Import and export options
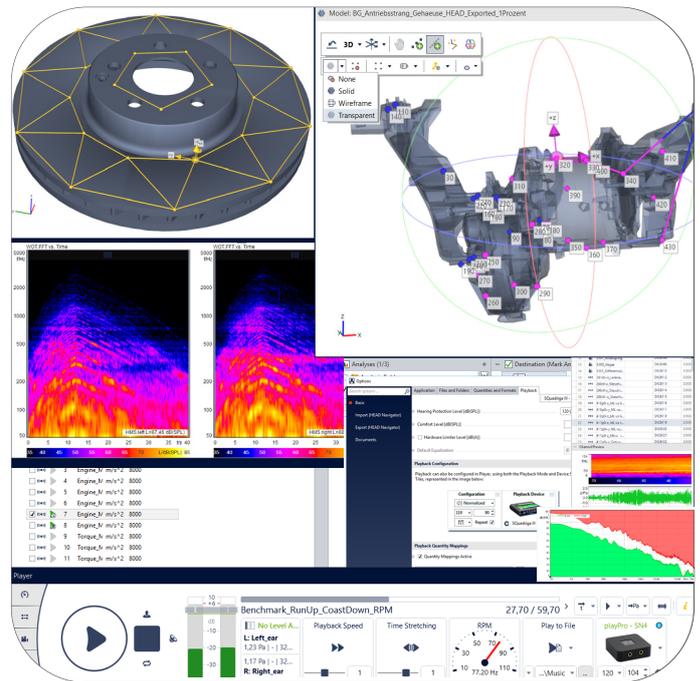
DATA ACQUISITION

APR 040   Recorder

› Universal Recorder

› Structured planning and execution of measurements using the Measurement Point Library and 3D models

› Automatic recognition of the supported frontends

› Online Monitoring

› Individually adjustable triggers

› Flow Control for automatic execution of recurring tasks

› Wizard for calibrating sensors, reading out TEDS information, leveling, ...

› Shaker excitations

DATA PREPARATION

|	
APR 080	RPM Generator
APR 210	Signal Generator Project
ASP 301	Offline Filters
ASP 302	Data Preparation
ASP 304	Batch RPM Generator
ASP 702	MDM Recording
ASP 801	Basic Decoder

› Extraction of signals: CAN, OBD-2, FlexRay, Pulse, Resolver, Ethernet, ...

› Generation of RPM curves and artificial signals

› Filtering (IIR, FIR, ...) of input signals

› Differentiation, integration, sampling rate conversion, ...

› Editing marks and channels, Point Map, ...
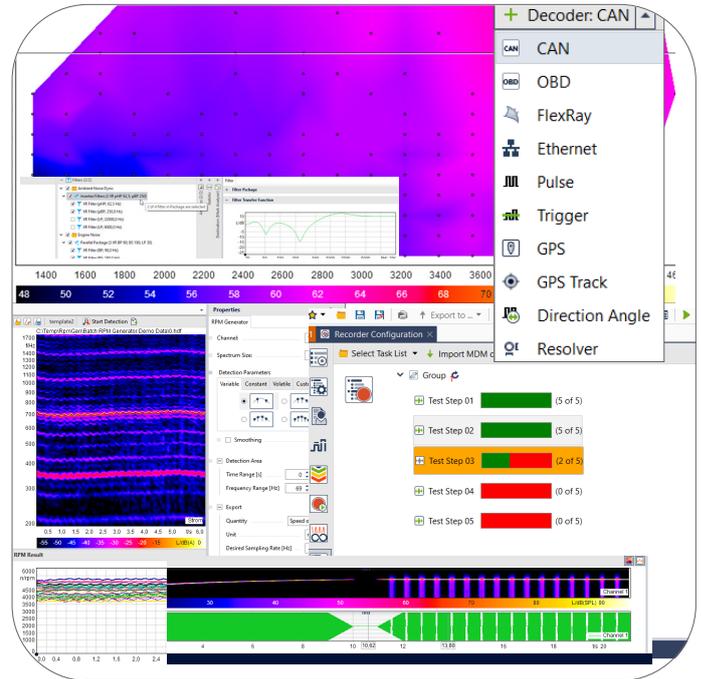
CENTRAL PROJECTS

|	
APR 010	Pool Project
APR 050	Automation Project
APR 220	Standardized Test Project

› The Pool Project enables an interactive mode of operation, offers straightforward usability, and computes the data based on cross-product logic principles

› In the Automation Project, processing steps are defined a single time, executed automatically, and reused for all subsequent data

› In the Standardized Test Project, various operating conditions of objects are measured using the Recorder and examined through multiple analysis methods

› The central projects can be combined with various projects (APRs) and signal processing tools (ASPs) of ArtemiS SUITE
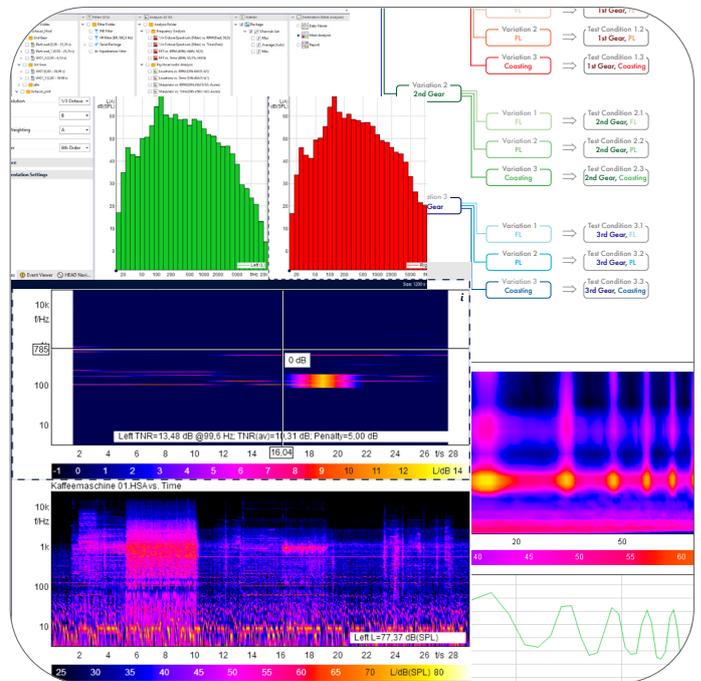
DATA PROCESSING

ASP 303	Statistics
ASP 305	Channel Calculation
APR 190	Sound Engineering Project
APR 200	HDF Tools

› Adjustment of HDF files including Channel Sort, File Concatenation, and File Merge

› Calculation of statistical functions, including minimum, maximum, mean, sum, median, ...

› Interactive optimization of data using a graphical user interface

› Individual processing of individual channels and execution of cross-channel operations using scripts
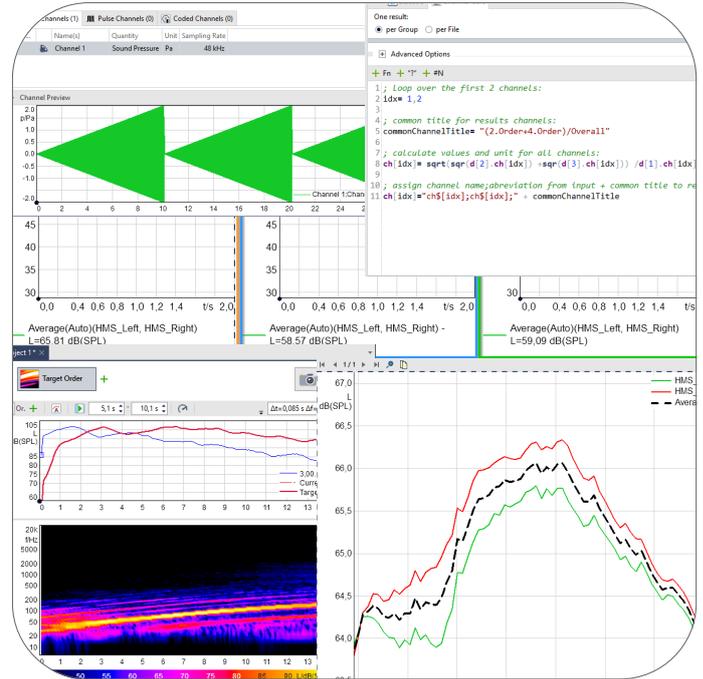
DATA ANALYSIS

|	
ASP 001	Basic Analysis
ASP 002	Basic Analysis vs. Control Channel
ASP 003	Advanced Analysis
ASP 004	Advanced Analysis vs. Control Channel
ASP 005	Modulation Analysis
ASP 006	Order Analysis
ASP 007	Octave Analysis
ASP 101	Psychoacoustics - Basic Analysis
ASP 102	Psychoacoustics - Basic Analysis vs. Control Channel
ASP 103	Psychoacoustics - Advanced Analysis
ASP 104	Psychoacoustics - Advanced Analysis vs. Control Channel
ASP 106	Speech Intelligibility Analysis
ASP 201	System Analysis
ASP 202	System Analysis vs. Control Channel
ASP 203	Sound Power Analysis
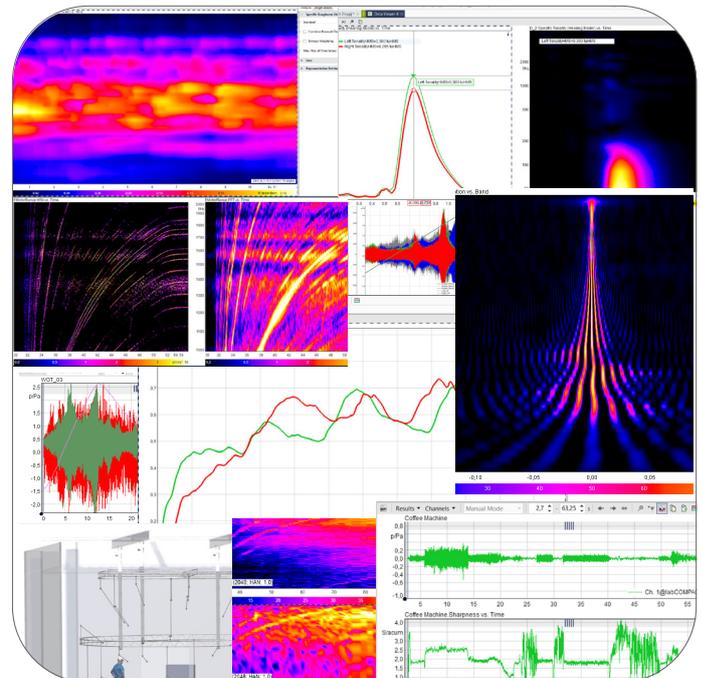
Data Analysis offers more than 150 analyses, ranging from basic analyses to psychoacoustic analyses based on the Sottek Hearing Model.

Basic Analysis (ASP 001)
› FFT vs. Time, ...
› 1/n Octave Spectrum (FFT), ...
› Level vs. Time, ...
› Power Spectral Density, ...
› Single value: Level
› ...

Basic Analysis vs. Control Ch. (ASP 002)
› Analyses from ASP 001 vs. Control Ch.

Advanced Analysis (ASP 003)
› VFR, ...
› HSA, ...
› GFT, ...
› Wavelet
› ...

Advanced Analysis vs. Control Ch. (ASP 004)
› Analyses from ASP 003 vs. Control Ch.

Modulation Analysis (ASP 005)
› Modulation Analyses vs. Time, vs. RPM, vs. Band

Order Analysis (ASP 006)
› Order Spectrum vs. Time, vs. RPM, ...
› Time Signal vs. Rotation

Octave Analysis (ASP 007)
› 1/n Octave Spectrum (Filter) over Time, RPM, ...

Psychoacoustics – Basic Analysis (ASP 101)
› (Specific) Loudness, ...

› DIN 45631/A1, ISO 532-1, ISO 532-3, ANSI S3.4-2007 (FFT) / (FFT / 3rd Octave)
› (Specific) Sharpness, ...
› Aures, von Bismarck, DIN 45692 / DIN 45631/A1, ISO 532-1, ISO 532-3, ANSI S3.4-2007 (FFT) / (FFT/3rd Octave)
› Tonality, ...
› DIN 45681, ISO/TS 20065
› (Specific) Fluctuation Strength, ...
› Specific Prominence Ratio, ...
› ECMA-418-1 (3rd), ECMA-74 (9th) / (8th Edition), geometric extrapolation, 3rd Octave bands
› Tone-to-Noise Ratio
› ECMA-418-1 (3rd) / (2nd), ECMA-74 (9th), HEAD HSA

Psychoacoustics - Basic Analysis vs. Control Ch. (ASP 102)
› Analyses from ASP 101 vs. Control Ch.

Psychoacoustics - Adv. Analysis (ASP 103)
› (Specific) Loudness (Hearing Model)
› ECMA 418-2 (2nd) / (3rd–4th)
› (Specific) Roughness (Hearing Model), ...
› DIN 38455, ECMA 418-2 (1st) / (2nd) / (3rd–4th)
› (Specific) Tonality (Hearing Model), ...
› ECMA 74 (15th) / (17th), ECMA 418-2 (1st) / (2nd) / (3rd–4th)

› Specific Fluctuation Strength (Hearing Model), ...
› ECMA-418-2 (4th)
› (Specific) Impulsiveness (Hearing Model), ...
› Spectrum (Hearing Model)
› Relative Approach, ...

Psychoacoustics - Adv. Analysis vs. Control Ch. (ASP 104)
› Analyses from ASP 103 vs. Control Ch.

Speech Intelligibility Analysis (ASP 106)
› Speech Intelligibility Index vs. Time, ...
› IEC 60268-16, STITEL, STIPA, RASTI, SIL-3, SIL-4, P-SIL

System Analysis (ASP 201)
› Transfer Function, ...
› Impulse Response, ...
› (Multiple, Partial) Coherence, ...
› (Cross, Auto) Correlation, ...
› (Cross, Auto) Spectrum, ...
› Harmonic Distortion, ...
› ...

System Analysis vs. Control Ch. (ASP 202)
› Analyses from ASP 201 vs. Control Ch.

Sound Power Analysis (ASP 203)
› Sound Power vs. Time, ...
› ISO 3741, ISO 3743, ISO 3744, ISO 3745, ISO 3746
› Noise Spectrum
› Sound Power K2 Environmental Correction Spectrum

DATA PRESENTATION

APR 020   Report
APR 021   Comparison Report Project

› Creation of Reports from filtered, analyzed, and statistically processed input signals at the click of a button
› Individual configuration of Report templates
› Automated comparison of any number of data sets and analysis results, for example, in benchmarking applications
› Quick comparison of different development stages
› Export of Reports to PowerPoint or to the PDF format, and creation of new Report templates
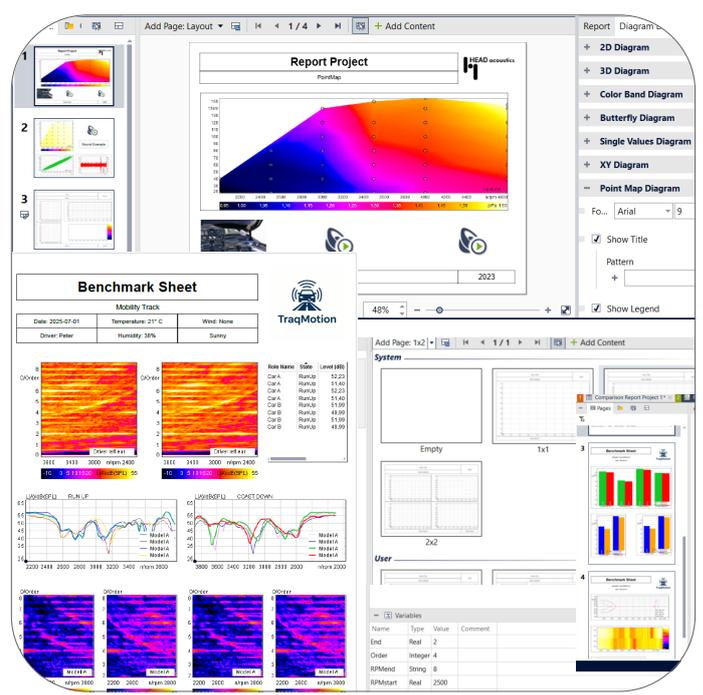
EXTENDED IMPORT / EXPORT

ASP 707	MDF4 Import
ASP 703	MDF4 Export
ASP 704	MTS-RPC Conversion
ASP 705	UFF Conversion

In addition to the import and export functions already provided in APR Framework (APR 000), ArtemiS SUITE offers extended import and export options:

› Data exchange using the ASAM Measurement Data Format (MDF4)

› Import and export of MTS-RPC files (Remote Parameter Control)

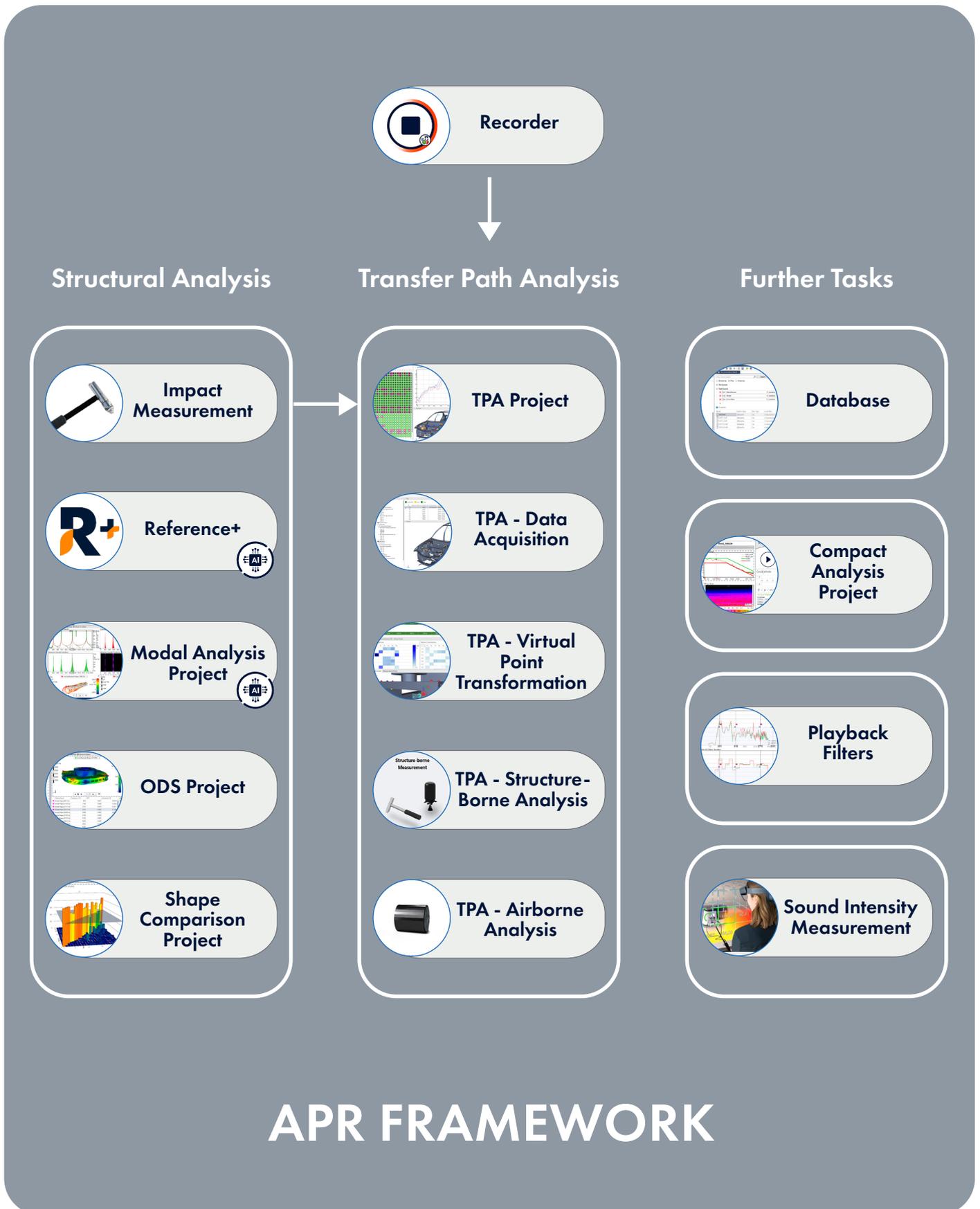› Import and export of UFF files (Universal File Format 58)
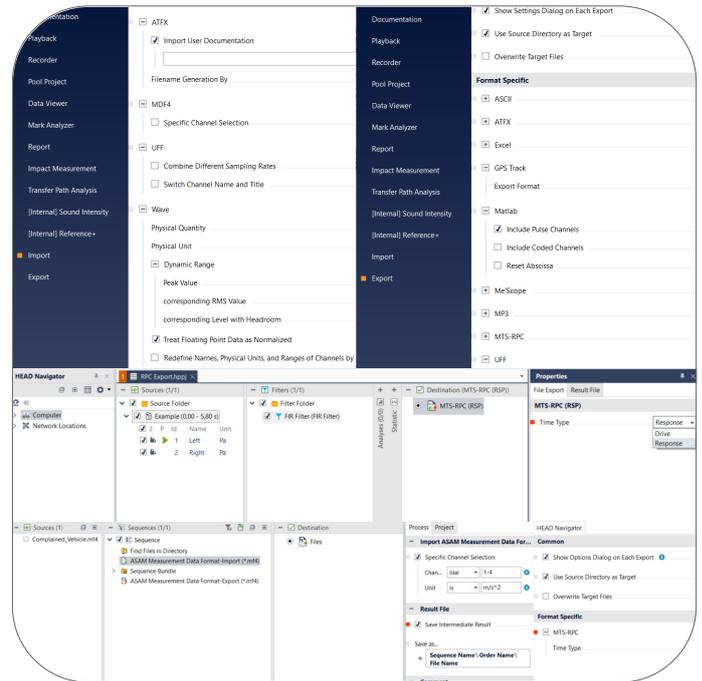
LISTENING TESTS / SOUND EVALUATION

APR 500	Jury Testing - SQala Basic
APR 501	Jury Testing - SQala Lite
ASP 501	Jury Testing - SQala Net
ASP 502	Jury Testing - SQala Server
APR 570	Metric Project

› Modular jury testing software

› Clearly structured user interface

› Quick creation of listening tests for individual workstations or listening studios

› Straightforward management, monitoring, and control of listening tests

› Generation of quality metrics by correlating listening test results with (psycho)acoustic signal analyses

SPECIAL TASKS

Recorder

Structural Analysis

- Impact Measurement
- Reference+
- Modal Analysis Project
- ODS Project
- Shape Comparison Project

Transfer Path Analysis

- TPA Project
- TPA - Data Acquisition
- TPA - Virtual Point Transformation
- TPA - Structure-Borne Analysis
- TPA - Airborne Analysis

Further Tasks

- Database
- Compact Analysis Project
- Playback Filters
- Sound Intensity Measurement

APR FRAMEWORK

STRUCTURAL ANALYSIS

| APR 430 | Impact Measurement |
APR 440	Reference+
APR 420	Modal Analysis Project
APR 400	ODS Project
APR 410	Shape Comparison Project

› User-friendly model analysis supported by automated workflows

› Impact Measurements (Roving Hammer / Roving Accelerometer)

› Quality control with visual and acoustic feedback

› Identification of optimal reference points using AI

› Stability diagram: selection of the model size based on the LSCF algorithm using AI

› Automatic determination, graphical representation, and comparison of MAC values
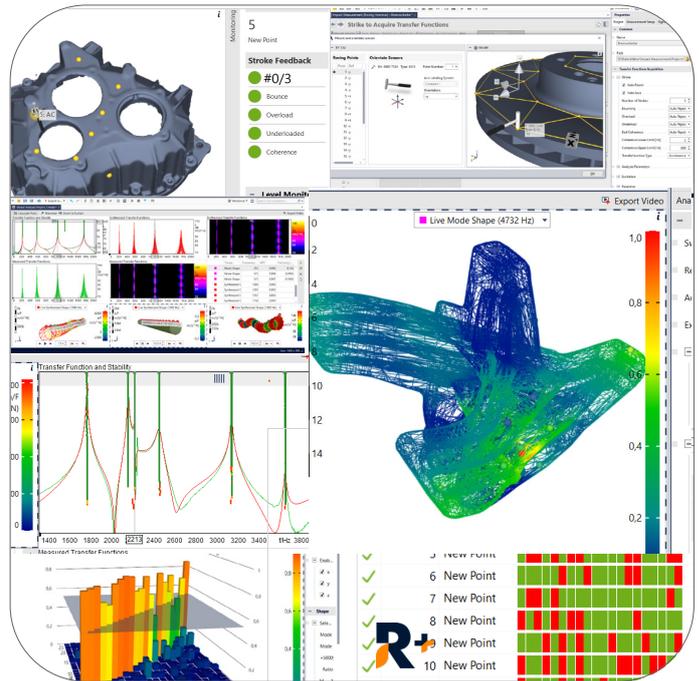
TRANSFER PATH ANALYSIS

APR 600	TPA Project
APR 610	TPA - Data Acquisition
ASP 601	TPA - Virtual Point Transformation
ASP 602	TPA - Structure-Borne Analysis
ASP 603	TPA - Airborne Analysis

› Hybrid classical or in-situ TPA, enabling the integration of measurement and simulation data

› Guided workflows, measurement planning using a 3D model

› Measurements using the Recorder or, for structure-borne sound, using Impact Measurement (Roving Hammer)

› Determination of blocked forces in accordance with ISO 20270:2019

› Evaluation of interface quality using Interface Completeness Criterium Plus (ICCplus)

› Report generation
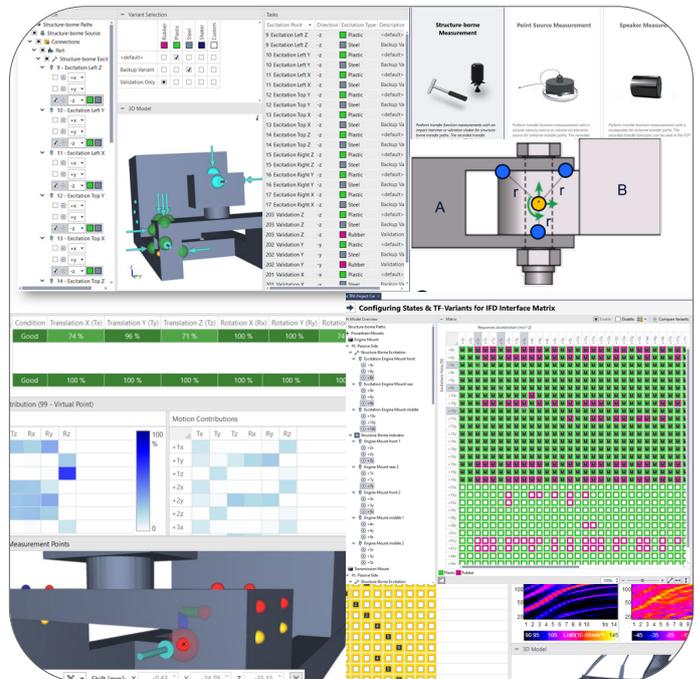
FURTHER TASKS

APR 030	Database
APR 300	Sound Intensity Measurement
APR 100	Compact Analysis Project
APR 110	Playback Filters

Database

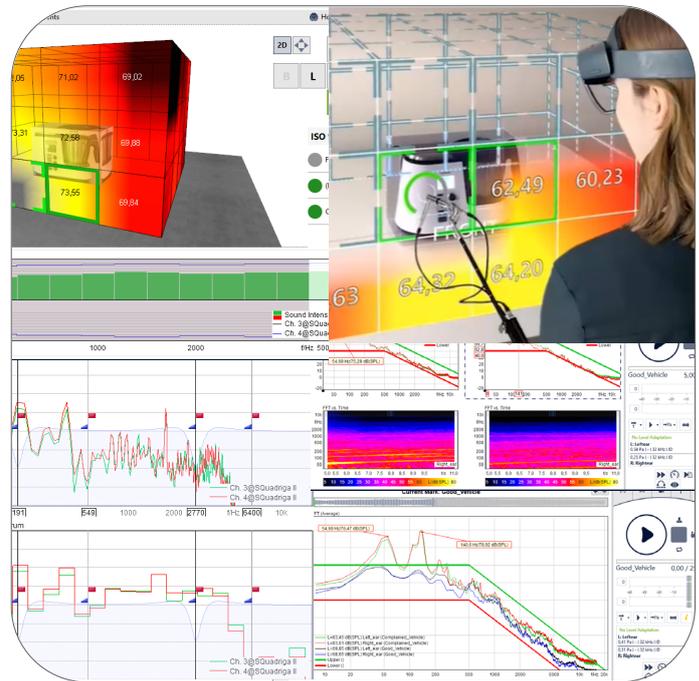› Flexible data management

Sound Intensity Measurement

› Sound intensity measurements and determination of sound power (ISO 9614)

Compact Analysis Project

› Lightweight alternative to the Pool Project for rapid data inspection and analysis, for example, for direct A/B comparisons

Playback Filters

› Interactive filtering of time signals in real time

ASX PROGRAMMING INTERFACES

ASX 00 (license-free)

› Programming and application examples in C#, MATLAB®, and Python as well as programming references and a complete format description of the Sensor Library

ASX 01 (Code 5091)

› Reading, modifying, and writing of HDF and HSVX files

ASX 02 (Code 5092)

› Automated or interactive control of Pool Projects and Automation Projects, execution of Reports, exports, ...

ASX 03 (Code 5093)

› Programming and seamless integration of user-defined listening-test procedures, such as MUSHRA tests, into the SQala jury testing software

ASX 04 (Code 5094)

› Control of various functions of the Recorder

ASX 05 (Code 5095)

› Creation and editing of User Documentation

ASX 06 (Code 5096)

› Use of custom analyses and filters in Automation Projects, Pool Projects, Metric Projects, and Standardized Test Projects (various add-ins are available)
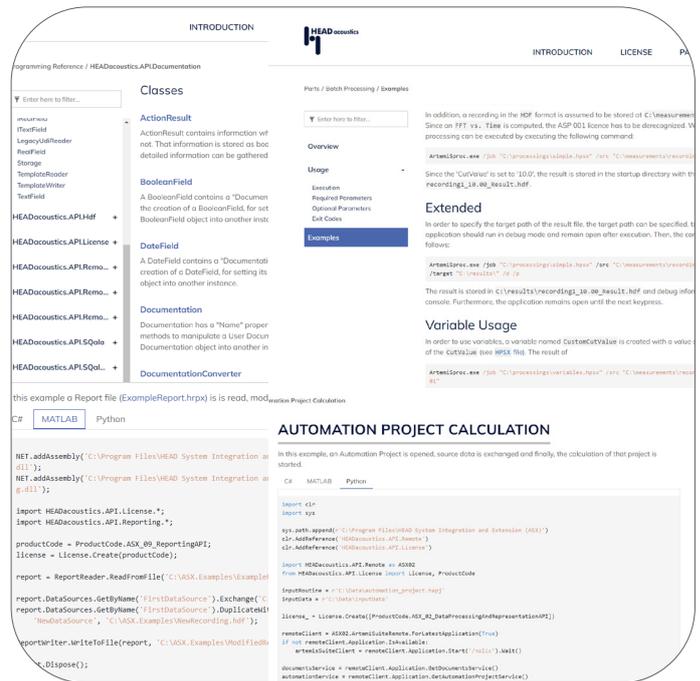
ASX 07 (Code 5097)

› Execution of Automation Projects, for example, on test benches or for batch processing when handling large data volumes.

ASX 08 (Code 5098)

› Execution of stand-alone measurements using the Recorder, initiated either at the push of a button or via start and stop triggers

ASX 09 (Code 5099)

› Report creation based on a Report template

› Programming interfaces for customized integration of your own software with ArtemiS SUITE

› Remote control of selected components of ArtemiS SUITE using your software to execute projects and processes either automatically or interactively

› Extension of ArtemiS SUITE with your analyses, filters, ...

› Combination of multiple ASX programming interfaces into a single workflow,

» for example, for End-of-Line applications:

  » ASX 08: Performing stand-alone measurements

  » ASX 05: Automated insertion of User Documentation

  » ASX 07: Processing measurement data with an Automation Project

  » ASX 09: Output of the results in a Report or as a PDF or PPTX file

› The license-free ASX 00 provides easy-to-handle application examples and programming instructions, enabling you to begin programming right away.

SOFTWARE MAINTENANCE

Automatic Upgrades

› Automatic provision of the current ArtemiS SUITE version, including all newly developed features

› Substantial cost savings compared to standard upgrade prices

Priority Technical Support Provided by Our Support Department

› Processing of your inquiries within 24 hours on business days

› Comprehensible, transparent, and uncomplicated solution service

Prioritization of Your Feature Ideas

› Prioritization of the implementation of your requests and suggestions for feature ideas in upcoming versions

Multiple License Discounts

› Favorable software maintenance conditions when multiple licenses are in place

› Discounts applied to the purchase of multiple new licenses

SYSTEM REQUIREMENTS

› Windows 11 x64 (Pro, Enterprise, Education; version: 21H2 or later; languages: US, Western European, or: Windows 10 x64 (Pro, Enterprise, Education; version: 1809 or later; languages: US, Western European)

› Xeon E5-1680, Core i7-7700, Core i5-8250U, Ryzen 5 1500X, Ryzen 5 2500U (recommended: Core i7-9700KF, Core i9-9980HK, Ryzen 5 3600, Ryzen 9 4900HS)

› 8 GB memory (recommended: 16 GB)

› DirectX 9.0c-capable graphics card 512 MB (recommended: 2 GB)

› Display with WXGA resolution (1366 x 768) (recommended: FHD resolution (1920 x 1080))

› .NET Framework 4.8

› HEAD USB Driver (optional)

› Microsoft 365, Microsoft Office 2024, Microsoft Office 2021, Microsoft Office 2019 (optional)

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HEAD acoustics

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