ArtemiS SUITE Overview

Software solution for sound and vibration analysis

Overview

ArtemiS SUITE is a universal software solution for almost all areas of sound and vibration analysis.

A major characteristic of ArtemiS SUITE is its easy handling. The straightforward Pool Project structure allows a wide range of different tasks to be performed quickly and conveniently. Alternatively to the interactive Pool Project workflow, the Automation Project as well as the Standardized Test Project allow repetitive tasks to be processed. For less experienced users, ArtemiS SUITE provides the affordable Compact Analysis Module, which allows HDF files to be analyzed quickly and easily.

Another specific feature of ArtemiS SUITE is that it offers various possibilities to hear the effects of sound manipulations through filters in real time while analyzing in order to identify problems or specify target sounds.

Various customized solutions for specific tasks extend ArtemiS SUITE. Detailed information of the modules of ArtemiS SUITE briefly described here can be found in the corresponding datasheets.

ArtemiS SUITE - advantages

One software environment for all applications
- Easy handling with a straightforward user interface
- Seamless switching between different tools

Get started right away without a steep learning curve
- Versatile customization possibilities

Broad range of analysis and processing possibilities
- More than 120 analysis functions
  - Standardized methods such as level calculation, FFT, octave analysis etc.
  - Calculation of transfer functions and single value results
  - Psychoacoustic analyses
  - Complex methods resembling the pattern detection of human hearing
  - Analyses for special applications
- Various pre-processing operations, filters, statistical calculations, etc.

Project-oriented workflow structure
- Interactive working in Pool Projects
- Automated operation using the Automation Project (possible without any user interaction, too)
- Structured execution of standardized test series using the Standardized Test Project
- Quick viewing and analyzing of data with Compact Analysis Module

Acoustic perception as an integral part of the analysis process
- Optimizing of sound quality and determining of target sounds
- Interactive real-time filters

Support by additional, user-friendly tools
- Easy-to-use Recorder
- Impact and sound intensity measurements, RPM Generator and measurement data pre-processing (e.g. CAN and Pulse Decoders) etc.
- Interactive sound design
- Analyzing and animating of deflection shapes F (ODS)
- Modelling of noise metrics
- Creating and performing listening tests with the jury testing software SQala

Easy management of important information
- Customized reporting
- Quick, uncomplicated data documentation and management

Networked with hardware from HEAD acoustics
- Perform recordings with up to several hundreds channels, analyses, processing operations, and result presentations in one step with a click on a button

Adaptation to different requirements
- Modular design allows custom ArtemiS SUITE configurations to be compiled
### ArtemiS Suite 11 Modules (ASM) at a glance

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ArtemiS Suite 11 Modules (ASM) - contents (overview)

**ASM 00 Basic Framework (Code 5000) - Basis of ArtemiS Suite**

- Navigation tool HEAD Navigator
- Player for playing back time domain signals
- Sensor Library with sensor database (1200 sensors) / Pulse Sensor Geometry Editor
- Channel Editor for editing the channel properties of one or several HDF or DAT files (time signals, 2D and 3D results)
- Data Viewer for convenient display of analysis results
- Measurement Point Library for creating 3D grid models
- Tolerance Scheme Editor
- Structured documentation / Documentation template editor
- Intelligent cache management
- Editor for specifying physical quantities
- Import and export options (Wave / ASCII / ATFX / MP3 / Excel - Excel need not be installed -, Excel import via CSV format)
- PowerPoint Add-In: HEAD Interactive Diagram
- Workbook for storing and restoring a current status of work

**ASM 01 Basic Analysis Module (Code 5001)**

- Basic analyses: FFT vs. Time/(average)/(peak hold)/vs. RPM / Harmonic Distortion / Order Spectrum
- Single value calculation for 2D analyses / Definition of threshold values / Export of single value results to XLSX format
- Single value analyses (Level / Loudness / Sharpness / from Documentation / Vibration Dose Value)
- Single Values Table (with export to XLSX format)
- Mark Editor for cutting time-domain signals by time or revolution speed
- Basic filter options: serial/parallel filter banks or filter chains / FIR filter / IIR filters / Parametric IIR filters / Filters for frequency weighting / Equalization filters
- FIR Filter Editor
- Several statistical functions
- Pool Project for interactive execution of tasks
- Automation Project for automated execution of tasks
- Mark Analyzer for displaying, analyzing, filtering, and playing time-domain signals / Diagram with direct export (PPTX, PDF, PNG, JPEG, TIFF, GIF)
- Mark Editor for cutting time-domain signals by time or revolution speed
- Sampling rate conversion of input signals
- Integrate / Differentiate / Delay

**ASM 02 Basic Report Module (Code 5002)**

- Standardized reporting with only one click on a button
- Export of report results to PPTX or PDF format
- Individual layout templates
- Embedding of audio contents in PowerPoint presentations
- Single Values Tables can be integrated into a report (with ASM 01)
- XY Diagram
- Single Values Diagram
- Color Band Diagram
- Processing of various measurements in the Pool Project together in one report (with ASM 01)
- Creation of reports
  - from a Pool Project (with ASM 01)
  - from an Automation Project (with ASM 01)
  - from a Standardized Test Project (with ASM 22)

**ASM 03 Basic Database Module (Code 5003)**

- Convenient indexing of data sets
- Inclusion of system documentation and user documentation in the search
- Transfer of files from the results lists to other program parts via copy & paste or drag & drop
- Several Navigation Views for a custom sorting of the database
- Further processing directly from the search results with a Pool Project, Automation Project, Standardized Testing, Compact Analysis Project, Sound Engineering Project, Data Viewer, Channel Editor etc.
ASM 04 Data Acquisition Module (Code 5004)
- Artemis suite Recorder / HEAD Recorder
- Structured planning of the measurement setup and safe execution of measurements by means of measuring points and a grid model
- Visual representation of the measuring setup for intuitive and safe configuration via drag-and-drop
- Several trigger functions
- Online monitoring

Acquisition of several parameters (including pulses, temperature, video, CAN, CAN FD, OBD-2, FlexRay, GPS)
- Online generation of new channels or pulse signals
- Programmable Flow Control
  - (Automatic) control of recurring tasks without programming knowledge

ASM 05 Automation API Module (Code 5005)
- Execution of existing Automation Projects (it is not possible to create a new Automation Project)
  via:
  - HEAD Navigator
  - Flow Control function (with ASM 04)
  - Programming interface
- Unlocking the basic analyses:
  - FFT vs. Time
  - FFT (averaged)
  - Level vs. Time
  - 1/n Octave Spectrum (FFT)

ASM 06 Automation Basic Analysis Module (Code 5006)
- Unlocking all analyses and several functionalities of ASM 01 (Mark Creation / statistics / filters / single values / miscellaneous) for an Automation Project

ASM 06 can only be used in combination with ASM 05

ASM 10 Compact Analysis Module (Code 5010)
- Affordable alternative to a Pool Project for quick and easy analysis of HDF files:
  - Straightforward interface
  - One-click analysis of file
  - Suitable even for inexperienced users
- Easy-to-use common analysis functions with a reduced set of configuration options
- Overlay of tolerance schemes
- Display of single value results
- Optimized view for A/B comparisons
- Export options (Artemis suite report with ASM 02)

ASM 11 Advanced Playback Module (Code 5011)
- Use of interactive real-time filters while playback: Any number of serial and parallel IIR filters: allpass, lowpass, highpass, bandstop, bandpass, parametric bandpass, parametric lowpass and parametric highpass / tracking filter (order filter) / one serial FIR filter
- Playlists for compiling any number of audio files, e.g. for acoustic comparisons
- Playback Spot for selecting distinct sound components (with ASM 01)
- HEAD Audiometer for measurement of human hearing capabilities
- Video Viewer (videos, recorded with the SQobold and SQuadriga III frontends)
- Map Viewer

ASM 12 Psychoacoustics Module (Code 5012)
- Loudness vs. Time / Specific Loudness vs. Time according to DIN 45631/A1 / ISO 532-1 / ANSI S3.4-2007
- Sharpness vs. Time according to DIN 45692 / Aures / von Bismarck
- Articulation Index vs. Time
- Specific Prominence/ vs. Time
- Fluctuation Strength vs. Time / Specific Fluctuation Strength/ vs. Time
- Speech Intelligibility Index vs. Time
- Speech Interference Level vs. Time
ASM 12 in combination with ASM 13:
- Specific Prominence Ratio vs. RPM
- Articulation Index vs. RPM
- Order Loudness vs. RPM / Order Loudness vs. Time / Specific Order Loudness vs. Time / vs. RPM
- Order Roughness vs. RPM / Order Roughness vs. Time / Specific Order Roughness vs. Time / vs. RPM
- Fluctuation Strength vs. RPM / Specific Fluctuation Strength vs. RPM
- Sharpness vs. RPM
- Loudness vs. RPM / Specific Loudness vs. RPM
- Speech Intelligibility Index vs. RPM

ASM 13 Signature Analysis Module (Code 5013)
- Calculation methods: Variable DFT length / RPM-synchronous resampling / Time domain average
- Reference Quantity (...) vs. Time
- Order Spectrum (average) / (peak hold)

ASM 13 extends the functionality of the following modules: ASM 12, ASM 14, ASM 15, ASM 16, ASM 17

ASM 14 Octave Analysis Module (Code 5014)
- Use of recursive filters for: 1/nth Octave Spectrum Filter / (peak hold) / vs. Time
- 4th or 6th order selectable as filter properties

ASM 14 in combination with ASM 13:
- 1/n Octave Spectrum (filter) vs. RPM

ASM 15 System Analysis Module (Code 5015)
- System analyses / MIMO structural analyses
- Analysis of the signal paths / Transfer Function / vs. Time
- Impulse Response / vs. Time
- Coherence / vs. Time / Coherent Spectrum / Multiple Coherence / Multiple Coherent Spectrum / Partial Coherence / Partial Coherent Spectrum

ASM 15 in combination with ASM 13:
- Auto Spectrum vs. Time
- Cross Spectrum vs. Time
- Auto Correlation vs. Time / vs. Band
- Cross Correlation vs. Time / vs. Band
- Impulse Response vs. RPM
- Coherence vs. RPM
- Transfer Function vs. RPM

ASM 16 Advanced Psychoacoustics Module (Code 5016)
- Evaluation of sound measurements with psychoacoustic parameters
- Analytic description of audibly-perceived sound quality
- Tonality (Hearing Model) vs. Time / Tonality (Hearing Model) Frequency vs. Time
- Specific Tonality (Hearing Model) vs. Time
- Impulsiveness (Hearing Model) vs. Time / Specific Impulsiveness (Hearing Model) vs. Time
- Spectrum vs. Time (Hearing Model)
- Roughness (Hearing Model) vs. Time / Specific Roughness (Hearing Model) vs. Time
- Relative Approach 2D/3D
- HSA (average) vs. Time
ASM 16 in combination with ASM 13:
- Tonality (Hearing Model) vs. RPM / Specific Tonality (Hearing Model) vs. RPM
- Impulsiveness (Hearing Model) vs. RPM / Specific Impulsiveness (Hearing Model) vs. RPM
- HSA vs. RPM
- Roughness (Hearing Model) vs. RPM / Specific Roughness (Hearing Model) vs. RPM

ASM 17 Advanced Analysis Module (Code 5017)
- Modulation Frequency vs. Time / Modulation Spectrum vs. Band / Time / Degree of Modulation vs. Time / Weighted Modulation Analysis
- Wavelet
- Cepstrum vs. Time
- Kurtosis vs. Time
- Level vs. Time (filtered) vs. RPM (filtered)
- GFT (Gated Fourier Transformation) vs. Time
- Spectral analyses with VFR (Variable Frequency Resolution)

ASM 17 in combination with ASM 13:
- Kurtosis vs. RPM
- Cepstrum vs. RPM
- Modulation Frequency vs. RPM / Modulation Spectrum vs. RPM / Degree of Modulation vs. RPM

ASM 18 Online Analysis Module (Code 5018)
- Sound intensity measurement Determining sound power according to ISO 9614-1 / 9614-2 / ISO 9614-3
- Discrete points / Scanning
- Assistant-guided procedure
- Quick diagnostics (troubleshooting)
- One-click report, either ISO-compliant or freely designed
- Export: Excel, image file (PNG)

ASM 19 Advanced Filters Module (Code 5019)
- Sound Engineering Project
- Identification of disturbing noise using FIR and IIR filters
- Targeted editing, removing, synthesizing or adding of sound components or orders (Target Order / Order Generator)
- Design of target sounds based on the users requirements
- Interactive operation similar to graphic image processing
- Easy workflow via the graphic user interface
- Immediate acoustic and visual feedback after each change
- Real-time filtering with the USB frontend SQuadriga II
- Filtering with four independently configurable filter sets (each set consisting of up to four custom 4th order real-time filters)
- Zero-latency playback of the filtered signal
- Signal monitoring with Instant Spectrum, Instant 1/3 Octave Spectrum and Instant Order Spectrum
- Volume control / optional A-weighting
- Pitch Shift
ASM 20  Signal Editor Module (Code 5020)
- Channel Sort Tool
  - Manual and automatic sorting of channels in batch mode
- Concatenate Tool
  - Concatenation of multiple, identically structured data files
- Merge Tool
  - Synchronization and merging of channels from HDF or DAT files into a new file

ASM 21  Signal Generator Module (Code 5021)
- Creating and editing artificial and other signals generated
  - Periodic or non-periodic basic wave forms, e.g. sweeps / mathematical functions / existing recordings
  - Automatic error display
- Snapshot function
- Automatic recalculation of several channels to a new channel
- Custom concatenation of artificial and recorded signals or signal sections
- Easy, intuitive editing
  - Free-hand drawing
  - Mute / interpolate / smooth
- Automatic preview (diagram) of the time-domain signal and FFT spectrogram (in the Generator)
- Saving to a Signal Generator Project

ASM 22  Standardized Testing Module (Code 5022)
- Measuring and evaluating of standardized test series according to defined test procedures
- Clear display of extensive test procedures
- Safe procedure for structured data acquisition
- Automatic data routing
- Custom-configurable sequences for different test conditions
- Automated processing of all measurements
- Presenting the results in a report (with export to PPTX or PDF)

ASM 23  Advanced Import & Export Module (Code 5023)
- MATLAB
- Ogg Vorbis
- RPC
- SDF
- UFF
- ME’scope

ASM 24  Data Preparation Module (Code 5024)
- Decoder Project for the extraction of CAN, OBD-2 (WWH-OBD incl.), FlexRay, pulse, and GPS data
  - Creation of custom Decoder Projects for specific tasks
  - Straightforward pool structure
  - Preview and status indicators for a visual check of decoding results
- RPM Generator
  - Creation and saving of artificial revolution speed signals from visible order curves
  - Integration of the artificial RPM signal in the measurement as an analog channel
  - Direction Angle Decoder for creating an analog channel with signed direction angle information from digital pulse or trigger signals

ASM 27  Calculation Module (Code 5027)
- Metric Project
  - Metric design: sequences (processing chains) for determining the single value results
  - Particular jury test ratings from SQala jury test results (ASM 50ff) for using in a Metric Project
  - Add-In (with ASX 01/ASM 01 or ASX 01/ASM 06)
    - Integration of user-specific filters and analyses into Artemis SUITE
    - Filter Add-In (time signal to a time signal) / Analysis Add-In (time signal to a 2D analysis) / Post-Analysis Add-In (2D analysis from a 2D analysis)
- Channel calculations
  - Processing of multiple channels using scripts
  - Execution of various mathematical functions (e.g. sin, log, sign)
ASM 28  Data Acquisition Support for DATaRec 4 Module (Code 5028)
- Required for using DATaRec 4 systems with ArtemiS SUITE
  - Recording with a DATaRec 4 system (requires ASM 04)
- Impact measurements with a DATaRec 4 system (requires ASM 18)

ASM 40  Operating Deflection Shape Analysis Module (Code 5040)
- Operating Deflection Shape Project (ODS) for identification, analysis, and animation of relevant deflection shapes in a defined stationary operating status
  - Presentation of frequency spectra of all selected channel
  - Using the sliders for identification of problematic frequencies and channels directly in the diagram
  - Automatically calculated MPC value (Modal Phase Collinearity)
- Time Domain Animation Project (TDA) for evaluation of the time-variant oscillation behavior of a test object
  - Animation and analysis of time-variant motions
  - Time data (Color Band diagram)
- Detailed detection of patterns and problematic frequency ranges
- Validation of simulation results
- AVI export of results (video)

ASM 41  Shape Comparison Module (Code 5041)
- Analyzing and comparing of deflection shapes
- Detailed observation of individual deflection shapes
- Detection matching deflection shapes via the Shape Table, which provides specific information and automatically determined MAC index (Modal Assurance Criterion)
- Individual group threshold adjustable
- Displaying the MAC values of modal Shape Tables in a 3D bar diagram or 2D display
- Dual operating mode for displaying two Shape Tables
- Animation of the deflection shapes in the model
- Zooming, turning and tilting a model during animation
- AVI export of results (video)

ASM 50/51/58/59  Jury Testing Modules - SQala (Code 5050ff)

SQala Basic Module (Code 5050)
- Quick creation of complex listening tests without expert knowledge
- Performing listening tests in single-user mode / group mode (listening studio)
- Category Judgement / Simultaneous Category Judgment / Paired Comparison / Ranking / Semantic Differential

SQala Net Module (Code 5051)
- Performing listening tests with multiple participants in a listening studio

SQala Server Module (Code 5058)
- Storing and managing SQala Projects

SQala Client Module (Code 5059)
- SQala Client must be installed at each listening place; no dongle and no license is required

Recommended:
- ASX 03 (Code 5093) - SQala Extension API
  The programming interface allows users to develop new test steps, integrate them into SQala, and execute them in local mode.
- ASM 11
  Advanced Playback Control (Studio Control) for seamless switching between different playback scenarios (e.g., headphones / headphones + subwoofers / loudspeakers + subwoofers / loudspeakers / …)
System Requirements ArtemiS SUITE 11.5

- Windows 10 (x64): Pro, Enterprise, Education; version: 1809; branch: SAC; languages: US/Western European
- Min. Core2Duo processor with 2 GHz
- Min. 4 GB RAM (recommended: 8 GB)
- DirectX 9.0c-compliant graphics adapter with 256 MB (recommended: 1 GB)
- Display with WXGA resolution 1366 x 768 (recommended: FHD resolution 1920 x 1080)
- .NET Framework 4.8
- Internet Explorer 11
- HASP dongle driver
- Optional: HEAD USB driver
- Optional: Microsoft Office 2019 x86, 2016 x86, and 2013 SP1 x86

⇒ For information on the system requirements of the modules see the respective data sheets.

Supplements

License Management

- ArtemiS SUITE supports three license management variants:
  - Single User License / Network License (net) / Extended Network License (net+)

Software maintenance

- The software maintenance and update contract for ArtemiS SUITE covers the maintenance, adaptation and extension, i.e. new developments and improvements, of ArtemiS SUITE software.

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