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.

Advantages of ArtemiS SUITE

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 recording module (HEAD Recorder)
- Impact measurement, RPM Generator and measurement data pre-processing (e.g. CAN and Pulse Decoders) etc.
- Interactive sound design with the Sound Engineering Project
- Modelling of noise metrics

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

09.2017   D5000ffe11   Subject to change
### ArtemiS Suite Modules - ASMs

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<td>Support of DATaRec 4 front-end systems</td>
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### 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

- Tolerance Scheme Editor
- Structured documentation / Documentation template editor
- 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

### Basic Analysis Module (Code 5001)

- Basic analyses: FFT vs. Time/(average)/(peak hold)/vs. RPM / Harmonic Distortion/vs. Frequency/vs. Time / Level vs. Time/vs. RPM / Signal vs. RPM / Octave/Third Octave analyses (from FFT) / Order Spectrum vs. Time/vs. RPM / Power Spectral Density vs. Time/(average)/(peak hold)/vs. RPM / Reverberation/vs. Band / Specific Loudness (DIN 45631/A1 and ANSI S3.4-2007) / Bypass
- 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

### 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 Value 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)

### 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.
<table>
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<th>Data Acquisition Module (Code 5004) - HEAD Recorder</th>
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<tr>
<td>• Easy configuration of front ends</td>
</tr>
<tr>
<td>• Acquisition of several parameters (including pulses, temperature, video, CAN, OBD-2, FlexRay, GPS)</td>
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<tr>
<td>• Online monitoring</td>
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<td>• Online generation of new channels or pulse signals</td>
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<tr>
<td>• Several trigger functions</td>
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<tr>
<td>• Programmable Flow Control</td>
</tr>
<tr>
<td>- Inclusion of Automation Projects in the Flow Control functionality (with ASM 01 or ASM 05)</td>
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<tr>
<td>- Automated insertion of recordings into the Source Pool of a Pool Project (with ASM 01) or an Automation Project (with ASM 01 or ASM 05)</td>
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<tr>
<td>• Structured data acquisition via a Task List for a Standardized Test Project</td>
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<th>Automation API Module (Code 5005)</th>
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<td>• Execution of existing Automation Projects (it is not possible to create a new Automation Project) via:</td>
</tr>
<tr>
<td>- HEAD Navigator</td>
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<tr>
<td>- Flow Control function (with ASM 04)</td>
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<tr>
<td>- Programming interface</td>
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<tr>
<td>• Unlocking the basic analyses:</td>
</tr>
<tr>
<td>- FFT vs. Time</td>
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<td>- FFT (averaged)</td>
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<td>- Level vs. Time</td>
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<td>- 1/n Octave Spectrum (FFT)</td>
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<tr>
<th>Automation Basic Analysis Module (Code 5006)</th>
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<tbody>
<tr>
<td>• Unlocking all analyses and several functionalities of ASM 01 (Mark Creation / statistics / filters / single values / miscellaneous) for an Automation Project</td>
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<td>• ASM 06 can only be used in combination with ASM 05</td>
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<th>Compact Analysis Module (Code 5010)</th>
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<td>• Affordable alternative to a Pool Project for quick and easy analysis of HDF files:</td>
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<tr>
<td>- Straightforward interface</td>
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<td>- One-click analysis of file</td>
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<td>- Suitable even for inexperienced users</td>
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<tr>
<td>• Easy-to-use common analysis functions with a reduced set of configuration options</td>
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<tr>
<td>• Overlay of tolerance schemes</td>
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<tr>
<td>• Display of single value results</td>
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<tr>
<td>• Optimized view for A/B comparisons</td>
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<tr>
<td>• Export options, ArtemiS SUITE report incl.</td>
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<th>Advanced Playback Module (Code 5011)</th>
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<td>• 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</td>
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<tr>
<td>• Playlists for compiling any number of audio files, e.g. for acoustic comparisons</td>
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<tr>
<td>• Playback Spot for selecting distinct sound components</td>
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<td>• HEAD Audiometer for measurement of human hearing capabilities</td>
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<th>Psychoacoustics Module (Code 5012)</th>
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<tr>
<td>• Loudness vs. Time / Specific Loudness vs. Time according to DIN 45631/A1 / ISO 532-1 / ANSI S3.4-2007)</td>
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<tr>
<td>• Sharpness vs. Time according to DIN 45692 / Aures / von Bismarck</td>
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<tr>
<td>• Articulation Index vs. Time</td>
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<tr>
<td>• Specific Prominence vs. Time</td>
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<tr>
<td>• Fluctuation Strength vs. Time / Specific Fluctuation Strength vs. Time</td>
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<tr>
<td>• Speech Intelligibility Index vs. Time</td>
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<tr>
<td>• Speech Interference Level vs. Time</td>
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</table>
**Extensions ASM 12 & ASM 13**
- Specific Prominence Ratio vs. RPM
- Articulation Index vs. RPM
- Order Loudness vs. RPM / Specific Order Loudness vs. Time / RPM
- Order Roughness vs. RPM / Specific Order Roughness vs. Time / 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

**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)
- 1/n Octave Spectrum (FFT) vs. RPM
- Time Signal vs. Rotation
- Gated Time Cuts / Gated Time Cuts (average)

The Signature Analysis Module ASM 13 extends the functionality of other modules: ASM 12, ASM 14, ASM 15, ASM 16, ASM 17

**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
- ANSI S1.11 (filter 6th order)
- IEC 61260 (3rd octave filter 6th order)
- DIN 45652 (3rd octave filter of 4th and 6th order)

**Extensions ASM 14 & ASM 13**
- 1/n Octave Spectrum (filter) vs. RPM

**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
- Auto Spectrum vs. Time
- Cross Spectrum vs. Time
- Auto Correlation vs. Time / Band
- Cross Correlation vs. Time / Band

**Extensions ASM 15 & ASM 13**
- Auto Spectrum vs. RPM / Cross Spectrum vs. RPM
- Auto Correlation vs. RPM / Cross Correlation vs. RPM
- Impulse Response vs. RPM
- Coherence vs. RPM
- Transfer Function vs. RPM

**Advanced Psychoacoustics Module (Code 5016)**
- Evaluation of sound measurements with psychoacoustic parameters
- Analytic description of auditorily-perceived sound quality
- Impulsiveness (Hearing Model) vs. Time / Specific Impulsiveness (Hearing Model) vs. Time
- Hearing Model Spectrum vs. Time
- Roughness (Hearing Model) vs. Time / Specific Roughness (Hearing Model) vs. Time
- Relative Approach 2D/3D
- HSA (average) vs. Time

**Extensions ASM 16 & ASM 13**
- 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
### Advanced Analysis Module (Code 5017)

- Modulation Frequency vs. Time / Modulation Spectrum vs. Band vs. 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)
- VFR (average) vs. Time
- Tone to Noise Ratio vs. Time
- Envelope filter for calculating the envelope of a bandpass-filtered input signals (Filter Pool)
- Sound Power vs. Time / RPM / Sound Power Spectrum vs. Time / vs. RPM

### Extensions ASM 17 & ASM 13

- Kurtosis vs. RPM
- Cepstrum vs. RPM
- Modulation Frequency vs. RPM / Modulation Spectrum vs. RPM / Degree of Modulation vs. RPM
- Tone to Noise Ratio vs. RPM
- Tone DIN 45681 vs. RPM
- VFR vs. RPM

### Online Analysis Module (Code 5018)

- Guided step-by-step instructions
- Choice of different coordinate systems
- Measurements according to the “roving hammer” or the “roving accelerometer” method
- Automatic configuration of the desired measurement parameters
- Automatic quality control for hammer strikes, repetition prompt in case of double strikes or if the level of the impact hammer signal is too high or too low
- Visual and acoustic feedback for test strikes and impact measurements
- Checking of coherence between impact hammer and reference signal
- Display of the results in the Data Viewer and as a report
- Export of measurement results e.g. to Excel and UFF (UFF with ASM 23) formats, and to ME’scopeVES™ (for further processing with the analysis software ME’scope from Vibrant Technology)

### Advanced Filters Module (Code 5019)

- Sound Engineering Project
  - Identification of disturbing noise using FIR and IIR filters
  - Targeted removing or synthesizing of sound components or orders
  - 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 front end 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

### 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
### 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
- Automatisches Datenrouting
- Automated processing of all measurements
- Presenting the results in a report (with export to PPTX or PDF)

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

### Data Preparation Module (Code 5024)
- Decoder Project for the extraction of CAN, OBD-2, 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

### Calculation Module (Code 5027)
- Metric Project
  - Metric design: sequences (processing chains) for determining the single value results
  - Weighting of the sequences based on jury test results
  - Rating and optimization of single values
  - Export of metric definitions for use in Pool, Automation, and Standardized Test Projects
- Channel calculation
  - Simultaneous, script-based processing of multiple channels
  - Execution of various mathematical functions (e.g. sin, log, sign)
  - Smoothing / changing of channel measurement units
  - Use of predefined code segments
  - Compatible with ArtemiS Classic scripts

### 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)
System Requirements

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- Windows 10 (x64): Pro, Enterprise, Education; languages: US/Western European or:
- Windows 8.1 (x64): Pro, Enterprise; languages: US/Western European or:
- Windows 7 (x64): Professional, Enterprise, Ultimate; languages: US / Western European, Service Pack 1
- Min: Core2Duo Processor 2 GHz; recommended: Intel i7 Quad.
- Min: 4 GB RAM; recommended: 8 GB
- DirectX 9.0c-compliant graphics card with 256 MB; recommended: 1 GB
- .NET Framework 4.5.1
- DirectX 9.0c
- HASP dongle driver
- Display with SXGA resolution (1280 x 1024); recommended: 1920 x 1080 / 1920 x 1200

⇒ 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.