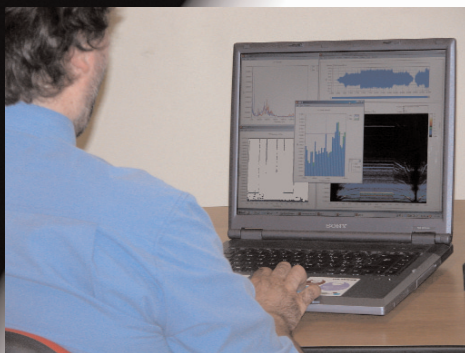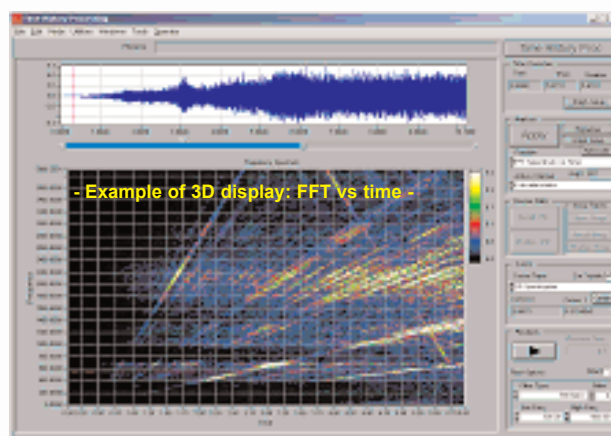# SCS-EUROACOUSTIC

## SCS 9002TH

## NOISE & VIBRATION INVESTIGATION TOOLS

**TIME HISTORIES PROCESSING SOFTWARE FOR ACOUSTIC AND VIBRATION PHENOMENA**



*A comprehensive user-friendly approach to the study of Noise and Vibration signal, oriented to the Problem Solving concept*



- Example of 3D display: FFT vs time -

### BASIC FEATURES

Recording & Playback
Frequency Range:
FFT: 4 channels - 20 KHz
1/3 Octave: 51.2 KHz Fixed
FFT Block: up to 16384
Time & Spectral windows
Units: rms, pk, PSD, etc.

Weighting: linear or A
Averaging: linear, peak hold, exponential.
lapping: 0-99%
Order resolution: 0.1 - 1.0Order Table
Order Overall vs. Time.



- Data selection form -
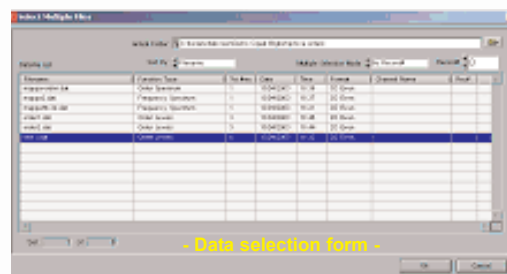
### Interactive diagnosis for Problem Solving and Quality Control.

SCS9002W - Time History Processing is a comprehensive application for Time History Recordings and Post-processing. Born as a tool of the SCS9002W Quality Control package, it's now an independent application, for general purpose acoustic and vibration investigations, NVH studies, structural and rotating machinery analysis.

A specific utility has been developed fo multi-channel recording, calibration, input monitor, etc.

Once the time histories have been recorded, the user can postprocess them extracting time, frequency, or RPM related information's.

A "two layer" user interface architecture makes the softwere very easy to use.

Multiple time history processing, multiple data recall and display, playback and filtering, RPM extraction utilities, data import/export are available and extremely useful tools.

*recording*
*playback*
*editing*

### MAIN FUNCTIONS

- Time History Range
- FFT Spectrum Average
- FFT Spectrum vs time
- Cepstrum Average
- RPM Vs. Time
- Order Spectrum Average
- Order Spectrum vs RPM
- Order Levels (incl. Overall) vs Time
- Order Levels (incl. Overall) vs RPM
- Overall Level vs RPM
- Filtered Overall vs time
- 1/3 Octave Spectrum
- 1/1 Octave Spectrum
- Frequency Variation
- Frequency Response Function
- Auto-correlation
- Cross-correlation
- Coherence
- Impulse Response

S.C.S.

euroAcoustic

## SCS 9002TH (Time Histories) Overview

### RECORDING

Multiple channel recording (up to four channels).
Aggregate sampling rate: 200 KHz (equally divided between channels).
Channel table: name, coupling, range, sensitivity, unit.
Recording Parameters: sampling rate, max recording time, Hardware settings.
Start condition: manual, RPM trigger (runup, rundown), input level trigger.
Add RPM channel (analog input).
Oscilloscope-like input monitor, for troubleshooting and voltage range adjustment.
EU/Volts calibration level is automaticallystored in the recording configuration file.

### TIME HISTORY PROCESSING

The user can switch at any time between two operating modes:
Time history processing: a single multichannel recording is displayed on the upper window: the user can select a time subset, then in the lower window the analysis result is displayed, according to the selected function, in a 2D or 3D format. The results can be stored in a multiple record result file, for future analysis and comparisons with other recordings.
Review: in this mode only pre-stored results (like FFT spectra or order levels), can be recalled, overlay, compared with other results. No time history data are displayed.

### PLAYBACK AND FILTERING

Any selected time subsets can be played back to the Sound Card: the user can evaluate by listening specific frequency or time components. Different filter types can be applied before playing back, with selectable cutoff frequencies and filter order: Lowpass, Hipass, Bandpass, Bandstop. The playback volume is normally optimized in order to have the best possible playback quality, but it's also possible to keep the original recording level.

### MULTIPLE TIME HISTORY PROCESSING

One specific analysis of a single time history, can be automatically applied, with the same settings, to selected time histories: the results are automatically stored in result files with same name and .dat, instead of .thr, extension. The user can then easily access multiple results for data comparison. This is a very convenient and quick way for processing multiple recordings, either recorded with the Recording utility or with the standard SCS9002W Quality Control Software.

### RPM EDITING

A dedicated utilities is available for extracting and processing the RPM information's from the recorded tachometer signal. The user must specify some basic parameters for RPM detection, like trigger level, slope, #pulses/rev: additional tools like RPM smoothing, time interpolation, automatic spike removal, RPM editing are available for improving the RPM vs time result. The user can check immediately the result, just pressing the recalculate button. The resulting RPM vs time function is then stored permanently together with the time history data: analysis like order spectrum vs RPM, order levels, and in general

### DATA STATISTICS

A statistic table, including RMS value, min, max, avg and other statistic parameters is available for all analyzed data

### IMPORT/EXPORT (Available formats):

Import / Export File Wave
Import / Export SCS 8610 Recording system
Export ASCII, Excel, UFF (Universal File Format)
Data interfaces with advanced analysis packages (like 01dB cmg files, Head Acoustics Artemis or MTS Ideas) are available on request.

### ACQUISITION BOARDS (for data recording)

Standard: National Instrument DAQ-DAQ/Mx (bus USB, FW, PCI or PC Card), 4 parallel or 8 multiplexed Analog Input Channels, Single ended or differential input type
Input range (software selectable): +/- 50 mV up to +/- 5 V, 200 KHz aggregate Sampling Rate 16 or 24 Bit A/D Converter, Dynamic range: 85-120 dB, opt. Signal Generator.
Optional (on request):
National Instruments Dynamic Signal Analyzer board (2 Input channels, 2 output channels)
Other National Instruments acquisition boards (check hardware/software compatibility)
01dB Symphonie (2 channels DSP based)
SCS-Mesa S4 - 4 channels 24 bits card

### CHARACTERISTICS DIAGNOSTIC FEATURES

All functions have specific settings, user configurable: different configuration setup files can be stored and recall.
**Graphics**: configuration setups (X, Y, Z axis type and scale, trace type - line style, line width and colors, plot area colors, etc.) can be stored and recall.
Bar graph or traceline plots, Calormap editing for 3D plots, 2D and 3D cursors with autocentering
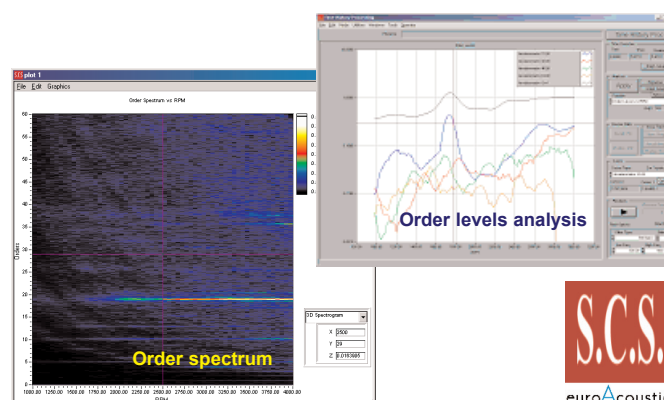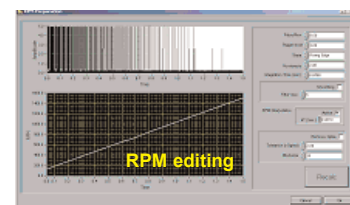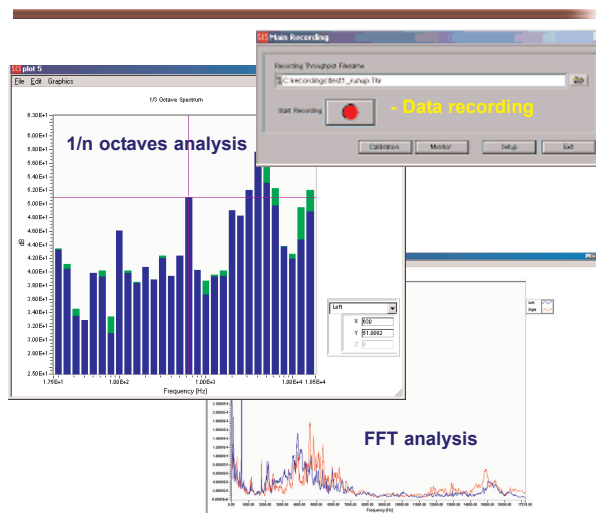Legend On/Off, X-Y Grid On/Off and colors, Automatic axis Autoscaling, Active Channel selection for 3D displays
**Files recall:** Group selection for quick recall group of data (Use Group, Save Group, Recall Group, Overlay Group). Multiple data selection form, with sorting and filtering features, for easy data recall and overlay.
**Save** analysis in result files, Save a time history range as new recording.
**Windows type**: Time + Analysis (Default in time history proc. mode), Time only, Analysis only (Default in Review mode).
**Recalibrate** Time History: the time history recordings can be recalibrated, if a calibration tone is stored inside the recording: this is useful, for example, if time history data are exchanged between different applications through a .wav format.
**Edit Time History** Header: channel information's and user header can be viewed and edited.



1/n octaves analysis

- Data recording



FFT analysis



RPM editing



Order spectrum



Order levels analysis

**S.C.S.** euroAcoustic