PRODUCT DATASHEET

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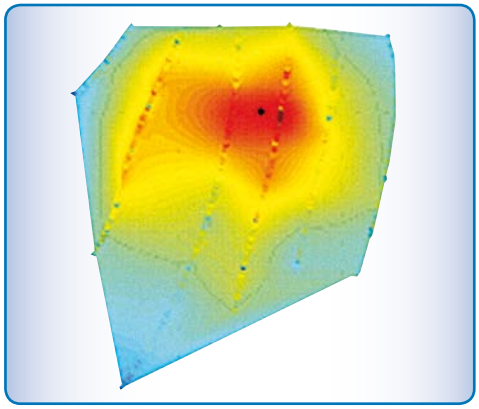
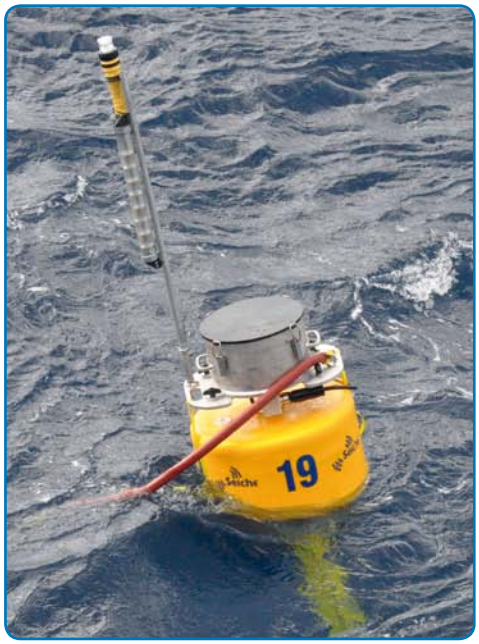
Seiche
Marine Acoustic Solutions

SPL TOOLBOX

SOURCE PRESSURE LEVEL FIELD DATA PROCESSING AND ANALYSIS SOFTWARE

SPL TOOLBOX is Seiche's new proprietary software that allows underwater acoustic and navigation data to be processed, analysed and interpreted for actionable and understandable results to clients.





Regulators are increasingly recognising the value of field data and mandating their use in operational planning. SPL TOOLBOX has the capability to reveal the temporal, spatial and spectral characteristics of a sound field produced by one or more underwater acoustic sources.

SPL TOOLBOX integrates a variety of tools that provide the versatility necessary to adapt to the specific requirements of each project, while following a seamless four-stage methodology (data import, processing, revision and post-processing/representation).

MAIN FEATURES
Processing of continuous and transient sounds
Support for WAV and RAW audio formats
Support for GPS, AIS and P190 navigation formats
Automatic detection of individual, transient sources (e.g. air guns, pile strikes, sonar)
Single event (SPLrms, SPL0-p, SPLp-p, SEL) and multiple event (cSEL) acoustic metrics
Broadband and frequency band analysis
Calculation of navigation parameters for receiver and sources, including speed, course, range, bearing and bearing-to-source heading angle
Marine mammal auditory weighting based on latest research, current and older legislation, as well as guidelines for Europe and the US
Spatial, temporal and spectral representations of processed acoustic measurements, for single events or in the form of statistical analysis
Practical graphic user interface (GUI)
Estimation of exclusion zones for marine mammals
Generation of lightweight database per audio file containing settings parameters and processed acoustic and navigation data

APPLICATIONS

- Sound Source Verification
- Ambient and soundscape studies
- Environmental Impact Assessment
- Exclusion zone estimation

PART OF SEICHE WATER TECHNOLOGY GROUP

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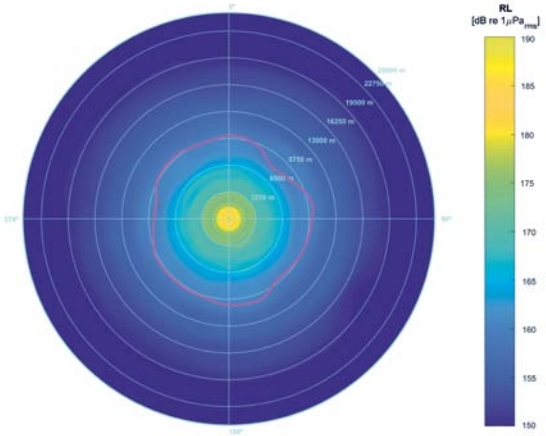

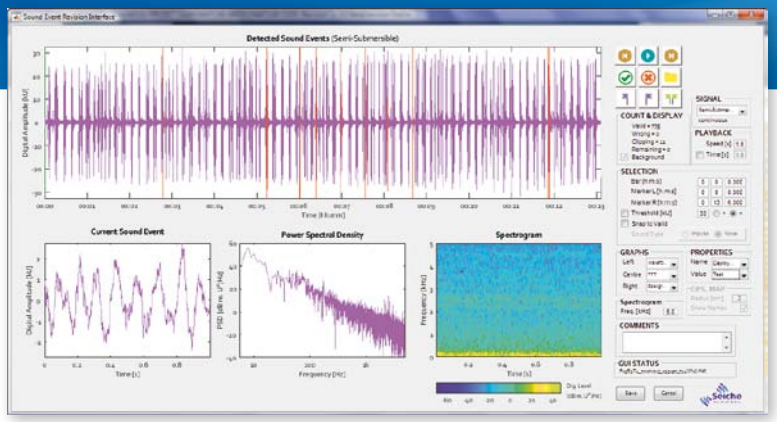

SPL TOOLBOX is divided into four individual modules: Import, Processing, Revision and Post-Processing:

IMPORT MODULE

- Reads audio files in WAV or RAW format
- Reads GPS, AIS or P190 files
- Efficient FFT resampling allows for faster processing, reduced storage of audio waveform and improved band analysis for low-frequency acoustic sources

REVISION MODULE

- Graphic user interface for analysis of temporal and spectral characteristics of individual acoustic detections
- Individual sound detections can be investigated through various temporal, spectral and statistical representations
- Operations map to assess how noise from nearby operations or vessels influence a sound detection
- False Positives and True Negatives addressed by setting a validity tag
- Play speed and Time can be altered to allow the user to hear frequencies outside hearing range or outside the sound system's response (e.g. sonar, low-frequency tones)
- Property tags and comments can be added to each sound detection
- Marker selection to highlight sections of audio file – selection can be refined by setting an amplitude threshold

PROCESSING MODULE

- Constant window audio segmentation for continuous, ambient noise processing
- Automatic detection of transient sound events based on band-filtered, moving average algorithm
- Calculation of navigation parameters for receiver and sources (e.g. speed, course, receiver to source distance, bearing and source directivity angle)
- Calculation of single and multiple event acoustic metrics, inc. SPLrms, SPL0-p, SPLp-p, SEL and cSEL
- Matching of audio and navigation data with automatic PC-UTC time offset correction
- Signals from multiple sources can be processed in individual sessions and stored in the same database, with minimal increase in file size

POST-PROCESSING MODULE

- Generation of temporal, spatial and spectral representation of the measured sound field from previously processed data
- Supported statistical or direct representation of received levels
- Supported weighted or unweighted received levels using marine mammal auditory response
- Supported single event and cumulative sound exposure levels
- Exclusion range calculation based on weighted levels and specific thresholds for different marine mammal species
- Available graphs include: sound level vs range, sound level vs range vs azimuth, band-level spectrum, sound level vs time