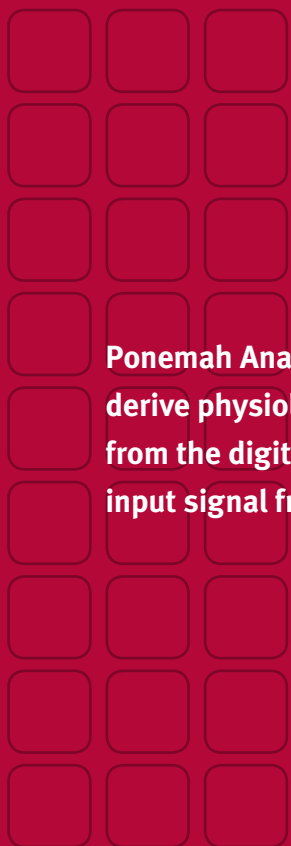


Ponemah Analysis Modules

Accelerating the delivery of better information



DSI™



**Ponemah Analysis Modules
derive physiological parameters
from the digitized primary
input signal from any species.**

Accelerate the performance of your study

Ponemah Analysis Modules are trusted by toxicologists, safety pharmacologists and researchers worldwide for consistent, reliable and robust results that are superior to conventional systems typically used in biomedical research studies.

Our Analysis Modules

- Offer an integrated solution for all applications, including telemetered and non-telemetered signals
- Provide validated algorithms for accurate, continuous reporting in acquisition or post analysis
- Can be easily configured for various signal types
- Include digital filtering in algorithms
- Feature built-in validation assistance by placing marks on the signal at key points of interest
- Allow the creation of secondary signals which can be displayed and recorded in certain analysis modules with specific graphical presentations

Ponemah Analysis Modules are validated and compliant

Our engineers use the latest scientific and peer-reviewed journals to develop application algorithms. We continually develop and test new modules to meet the changing requirements of the research community. As with the core Ponemah platform, the Analysis Modules can operate in a regulatory-compliant and GLP environment.



Ponemah Analysis Modules derive physiological parameters from the digitized primary input signal from any species. The Analysis Modules function by applying a series of logical tests to the digitized signals using criteria selected by the user for a reliable and robust analysis of the data. Each Analysis Module has a host of features, including filters, validation marks, Part 11 audit notes and precision settings. In addition, specific functionality for each physiological signal type is incorporated to ensure proper signal detection.

Raw Electrical Mean

Allows the recording of any type of input signal that has no specific analysis module. The module can analyze the signal for basic parameters such as peak, valley and rate. (This module comes with the P3 Plus application).

- Mean • Maximum • Minimum • Period • Beats per Minute • Area • Total Activity • Non Pulsatile Mean

Blood Pressure

Analyzes both arterial and venous pressures and can derive values for the cardiac cycle on a per cycle basis.

- Systolic • Diastolic • Mean • Pulse Height • Heart Rate • Time to Peak • Ejection Time • +dP/dt • -dP/dt • %Recovery • Non Pulsatile Mean • Q-A • Mean 2 • Pulse Transit Time • Pulse Wave Velocity

Multiple Lead Electrocardiogram

Available as Standard ECG Analysis or include ECG PRO (Pattern Recognition Option). Analyzes ECG signals and detects the presence of arrhythmia on a beat-to-beat basis. Can analyze a single lead or perform cross-lead comparisons with superior noise detection and elimination.

- P, Q, S and T Degree of Match using ECGPRO • R-R Interval • Instantaneous Heart Rate • R Wave Height • P Wave Height • T Height • T Height Negative • ST Interval • Variable ST Elevation • QRS Width • P-R Interval • QT Interval • Q Alpha T Negative • Multiple Corrected QT Calculations • Timing, Channel and Dispersion Information Across Multiple Leads • QT Dispersion • QR Interval • QR Amplitude • +dV/dt Max • T Area • P Count • T Count • QT Count • Bad Waves • Good Waves • Total Waves • Pwidth • T Peak and T Peak Interval • Noise

Left Ventricular Pressure

Designed specifically for the LVP morphology, the LVP algorithm analyzes pressure signals from the ventricle and is used as a reference signal for other analysis modules such as Cardiac Volume.

- Systolic • LVEDP • Minimum Pressure • Time Tension Index • Developed Pressure • Heart Rate • +dP/dt • -dP/dt • Contractility Index • Relaxation Times (1 & 2) • dP/dt at Selected Pressures • Non Pulsatile Mean • Q-A Interval • IVT (Time from Systolic to LVEDP) • TTI-T (Time from LVEDP to -dP/dt) • Tau • Period

Coronary Blood Flow

Analyzes coronary flow providing flow and volume information during systolic and diastolic periods when using an LVP channel for timing information.

- Mean • Flow Maximum • Flow Minimum • Cardiac Output • Stroke Volume • +dQ • Systolic Flow • Diastolic Flow • Systolic Volume • Diastolic Volume • -Flow • Total Volume • Non Pulsatile Mean

Segment Length & Wall Thickness

Utilizes signals from sonomicrometry equipment to determine length and thickness. A representation of volume will also be calculated.

The derived parameters below are applicable to both segment length and wall thickness

- End Systolic Length • End Diastolic Length • %Segment Shortening • End Systolic Length Min. • End Systolic Length Timed • Work • Peak Power • Dynamic Interval Volume • External Shell Volume • Area • % Elastance • Max Elastance • Min and Max First Derivates

Blood Pressure Respiration

When used in conjunction with BP, can analyze most blood pressures from the circulatory system and derive, on a beat-to-beat basis, respiration values from the cardiac cycle.

- Interval and Breaths-per-Minute

Cardiac Volume

Analyzes any volume from the circulatory system, and can derive values relative to the cardiac cycle, such as filling and emptying rates, and stroke work.

- HR • Minimum Volume • Maximum Volume • Stroke Volume • Volume at LVP Min Slope • Pressure at LVEDP • Volume at LVEDP • Ejection Fraction • Peak Filling Rate • Peak Emptying Rate • Time to Peak Filling Rate • Diastolic Filling Time • Time to Peak Filling (Percentage) • Pressure at Max Elastance • Volume at Max Elastance • Stroke Work • Arterial Elastance

Pressure-Volume Loop

Permits the display and analysis of LVP cycles plotted against cardiac volume cycles. Offers a seamless integration with commercially available hardware.

Characterization of End Systolic Pressure Volume Relationship, End Diastolic Pressure Volume Relationship and Pre-Recruitable Stroke Work.

Systemic Blood Flow

Analyzes systemic blood flow from the circulatory system and eliminates drift resulting from certain types of flow meters.

- Mean • Flow Maximum • Flow Minimum • Cardiac Output • Stroke Volume • +dQ • Iso Flow • Total Peripheral Resistance • Non Pulsatile Mean

Isolated Organ

Collect and analyze data from smooth muscle tissue, pulsatile tissue or isolated organ preparations.

- Various calculated and graphical output available based on user-defined application.

Pulmonary Compliance & Resistance

Measures and analyzes pulmonary signals from either a plethysmographic chamber or a pneumotachometer along with a pressure in anesthetized or conscious animal models.

- Peak Inspiratory Flow • Peak Expiratory Flow • Tidal Volume • Minute Volume • Breaths-per-Minute • Inspiratory Time • Expiratory Time • Total Time • Apnea Time • Resistance • Compliance • Conductance • Multiple Resistances at Specified Points • Average Compliance • Average Resistance • Pressures at Start of Inspiration/Expiration • Flow and Pressure at Isovolumetric Points • PEnh • Relaxation Time • Work and Power of Breathing Calculations • Tidal Volume (Expiration) • Accumulated Volume • Inspiratory/Expiratory Flow 50%

Unrestrained Plethysmography

Collects and analyzes signals obtained from “free roaming chambers.” The ability to enter environmental conditions allows for adjusted volumes to be calculated.

- Peak Inspiratory Flow • Peak Expiratory Flow • Tidal Volume • Minute Volume • Breaths-per-Minute • Inspiratory Time • Expiratory Time • Total Time • Pause • PEnh • TVadj • MVadj • Apnea Time

DSI continually advances and develops new derived/calculated values to better serve the changing requirements of the research community. Contact DSI for the most current list of derived/calculated values available.

Pulmonary Volume



Analyzes pulmonary volume signals such as those obtained from respiratory impedance transmitters. It also calculates, on a breath-to-breath basis, values for the respiratory cycle using volume-based attributes.

- Peak Inspiratory Flow • Peak Expiratory Flow • Tidal Volume • Minute Volume
- Breaths-per-Minute • Inspiratory Time • Expiratory Time • Total Time • Apnea Time • PEnh • Relaxation Time • Tidal Volume (Expiration) • Inspiratory/Expiratory Flow 50% • Accumulated Volume • Volume Baseline • Volume Fluctuation • Flow Fluctuation • Median Tidal Volume • Median Tidal Volume Expired • Tidal Volume Throughout • Tidal Volume Expired Throughout • PZr Ratio

Pulmonary Air Flow and Airway Resistance



Analyzes any pulmonary signal derived from a plethysmographic chamber or pneumotach.

- Peak Inspiratory Flow • Peak Expiratory Flow • Tidal Volume • Minute Volume
- Breaths-per-Minute • Inspiratory Time • Expiratory Time • Total Time
- Apnea Time • Specific Airway Resistance • Phase Shift • Delay Time • PEnh
- Relaxation Time • Tidal Volume (Expiration) • Accumulated Volume
- Inspiratory/Expiratory Flow 50%

Cystometry



Analyzes pressures resulting from non-voiding bladder contraction cycles, or longer time-scale pressure changes resulting from bladder filling/voiding cycles.

- Peak Pressure • Base Pressure • Rise • Period • Peak Duration • Inter-Contraction Interval • Duty Cycle • Time to Peak • Peak Count • Peak Count Time • Area
- Start Time • Peak Time • End Time • Maximum Derivative • Minimum Derivative

Pulsatile Tissue and Gut Motility



Analyzes signals from isotonic or isometric transducers from spontaneously or repetitively beating preparations.

- Maximum • Minimum • Average • Delta • Rate • Time to Peak • +d_/dt
- -d_/dt • %Recovery 1 • %Recovery 2 • +d'/dt • -d'/dt • Motility Index • Area

Action Potential



Analyzes a host of action potentials with focus on key regions such as plateau, recovery time and upstroke velocity.

- Maximum • EDV • Minimum • Plateau • Amp • Rate • +dV • -dV • Recovery 1
- xR1 • Recovery 2 • xR2 • Recovery 3 • xR3 • %Max • Time • Count • RiseT

Electromyogram



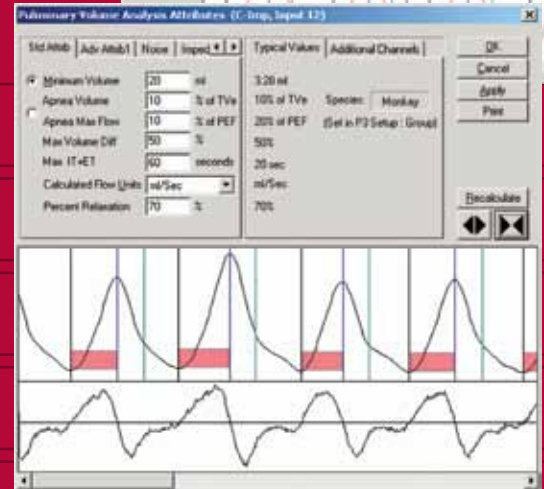
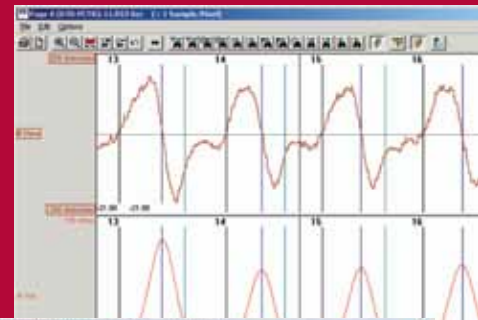
Provides an analysis of the electrical activity of muscle tissue.

- Integral • Peak

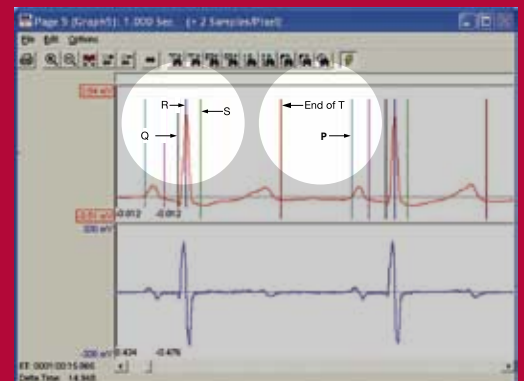
Electroencephalogram



DSI offers NeuroScore™ CNS software which is fully compatible with the Ponemah System. (See back page.)



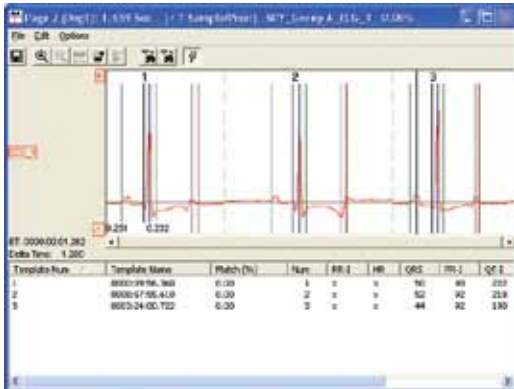
Example of a respiratory waveform and some of the user adjustable pulmonary volume analysis settings.



Automated validation marks for Q, R, S, End of T and Beginning of P are shown. The validation marks provide visual, online verification of the accuracy of the system.

Accelerate your research

Powerful ECG Analysis – Plus ECG PRO Option



Standard ECG Analysis

Ponemah's Standard ECG Analysis software allows the user to analyze data in real-time or re-analyze portions or all of the data post as well as manually add or move interval marks.

- Automated noise reduction
- Heart rate variability (frequency domain)
- Ideal for acute studies

ECG PRO - Pattern Recognition Option

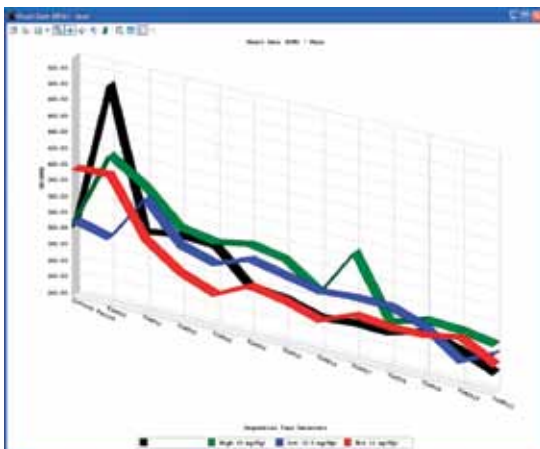
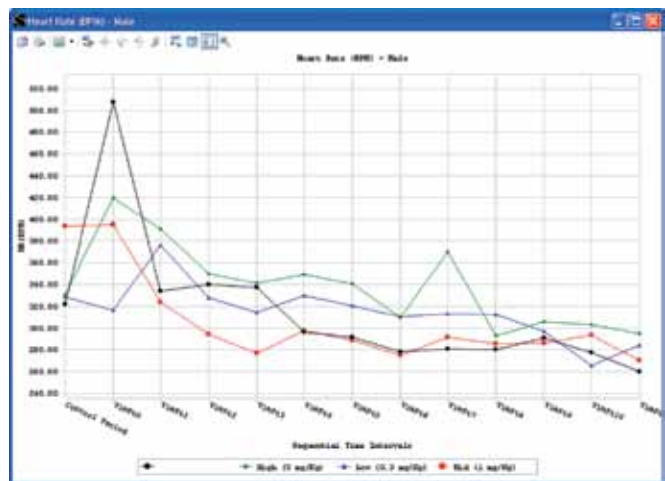
Greatly reduce post-processing time. ECG Template-Based Analysis allows selection of a template cardiac cycle which is then used for more precise comparison to other cycles in the dataset.

- Faster processing than the competition because each time you run it, you have the option to analyze only the cycles that were previously unmatched
- Validation marks are adjusted automatically in the data set based on the template(s)
- Multiple templates can be used in a dataset and templates can be added to a template library for use in other studies

Customizable data organization, analysis, visualization and reporting from a single source.

DSI Reporting is a powerful user-friendly tool designed by real world drug development scientists to organize, analyze, visualize, and report data acquired with the Ponemah software platform. All data acquired with the Ponemah software platform from active and completed studies are available for customizable analysis, visualization, and reporting almost immediately after acquisition. Features include:

- DSI Reporting generates individual derived data listings, group mean summary tables and graphs
- Many graph presentations to choose from like smooth line, bar, symbol and 3D/2D
- The output is directly incorporated into MS Word 2007 for simple report creation using company-specific templates
- The GLP feature locks tables and graphs so no changes can be made to the final report
- Easily export data for use in other applications



Time	Dose	C _{50%} (ng/dl)	C _{10%} (ng/dl)	Mean (ng/dl)
Control Period				
	High (2 mg/Kg)	(2) 119.71 ± 5.20	(2) 90.68 ± 7.50	(2) 105.67 ± 6.38
	Low (0.2 mg/Kg)	(2) 125.53 ± 10.35	(2) 96.92 ± 16.30	(2) 109.97 ± 14.98
	Mid (1 mg/Kg)	(2) 120.18 ± 6.51	(2) 91.24 ± 8.77	(2) 104.27 ± 7.99
	Mid (1 mg/Kg)	(2) 118.04 ± 2.94	(2) 89.14 ± 5.90	(2) 102.02 ± 4.65
TinP=0				
	High (2 mg/Kg)	(2) 144.95 ± 4.97	(2) 119.00 ± 18.20	(2) 125.54 ± 9.42
	Low (0.2 mg/Kg)	(2) 139.55 ± 15.33	(2) 106.99 ± 16.12	(2) 121.99 ± 16.34
	Mid (1 mg/Kg)	(2) 154.60 ± 10.40	(2) 119.57 ± 15.00	(2) 125.10 ± 11.16
	Mid (1 mg/Kg)	(2) 140.28 ± 9.76	(2) 110.08 ± 8.95	(2) 124.75 ± 9.20
TinP=1				
	High (2 mg/Kg)	(2) 147.55 ± 5.97	(2) 115.99 ± 10.11	(2) 121.26 ± 6.18
	Low (0.2 mg/Kg)	(2) 162.86 ± 20.99	(2) 124.74 ± 20.60	(2) 142.85 ± 27.98
	Mid (1 mg/Kg)	(2) 154.25 ± 26.55	(2) 118.62 ± 29.47	(2) 129.91 ± 21.58
	Mid (1 mg/Kg)	(2) 154.99 ± 25.36	(2) 117.93 ± 21.79	(2) 125.99 ± 19.75



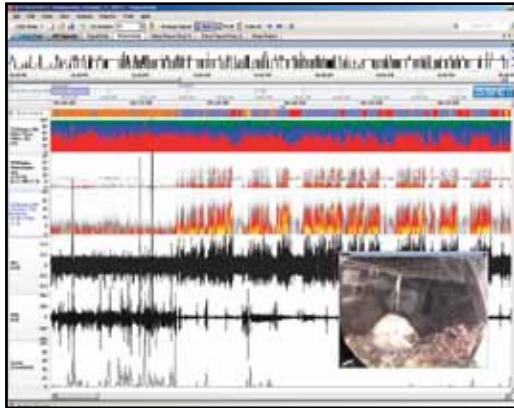
To learn more, talk to a DSI representative at 1-800-262-9687 (U.S.A./Canada), 1-651-481-7400 (worldwide), or visit www.datasci.com

Sleep Scoring and Seizure Analysis

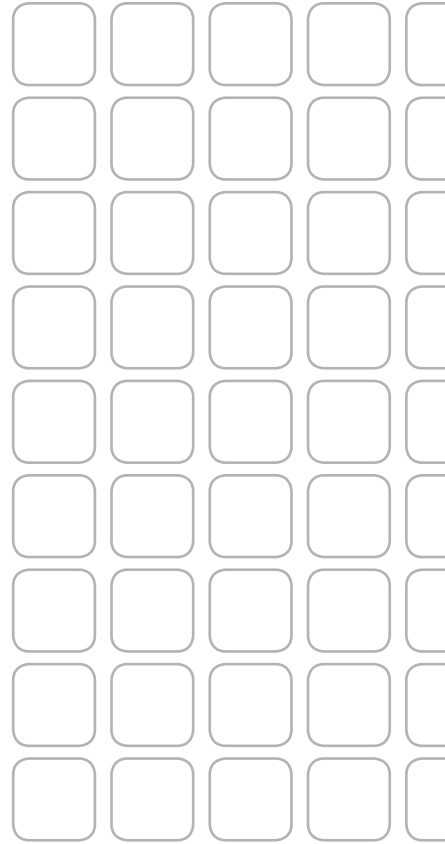
NeuroScore

DSI's NeuroScore software offers CNS analysis based on EEG, EMG, and other waveform signals, including data collected by implantable telemetry, external telemetry, or hardwired amplifiers. Frequency analysis tools and sophisticated graphical displays facilitate manual sleep and event scoring. Signal grid and report templates quickly summarize results. DSI currently offers four optional add-on modules:

- **Automated Rodent Sleep Scoring:** Automatically assigns a vigilance stage to each epoch based on EEG, EMG and activity data. Stages include slow wave sleep (SWS), paradoxical sleep (P), wake (W), and active wake (A).
- **Automated Large Animal Sleep Scoring:** Automatically assigns a vigilance stage to each epoch based on EEG, EMG, EOG and activity data. Stages include non-REM sleep (N1, N2, N3), REM (R), wake (W) and active wake (A).



- **Seizure Detection:** Automatically identifies spike train events based on amplitude thresholds and other spike characteristics. Identified events are displayed graphically or numerically.
- **Video Synchronization:** Incorporates video data acquired with Dataquest ART or Ponemah with the physiologic waveform data. Video information allows visual assessment of the subject's behavior, confirmation of scoring events, classification of seizure types and more.



119 14th Street NW • Suite 100 • St. Paul, MN U.S.A. 55112
Sales and Support 1-800-262-9687 (U.S.A./Canada) or +1 (651) 481-7400 (worldwide)
www.datasci.com • information@datasci.com