The latest release (ver 3.0) of our respected analysis applications includes several major new features such as: synchronous A/V (.mpeg) playback, new analysis and event modes, additional analysis methods, new EDA graphical editor, all new Blood Pressure variability application and a streamlined GUI interface. The new applications are designed to take full advantage of the power and flexibility of our BioLab acquisition software and optimize the use of our BioNex desktop and ambulatory/wireless instruments.

Applications are compatible with native Acknowledge (BIOPAC Systems) files allowing for fast and accurate assessment. Using the ASCII import function, text files generated from platforms such as EGI, Biosemi, and Psylab can easily be analyzed.

The MindWare suite of physiological analysis applications provides the researcher with a sophisticated array of tools to quickly and accurately analyze autonomic and central function. Their ease of use, flexibility, and intuitive graphical interface make these the tools of choice for researchers worldwide. With proven and validated methodologies these applications are a reliable and accurate means of converting raw physiological data into meaningful statistical representations. This allows for significantly faster and more accurate data reduction allowing researchers more time to focus on their core science.
**New Features:**

The new MindWare 3.0 Analysis Applications add many significant upgrades to our respected signal processing suite. All of the MindWare Analysis Applications now include a full featured A/V playback tool (.mpeg). This playback is synchronized with the data collected and displays a movable cursor on the data that is time correlated to the video. The configuration screen and analysis/event mode interface have been completely transformed into a single streamlined interface. The new applications also feature the ability to output to text files and excel documents or both.

The overall look and feel of the applications has been improved to compliment and integrate with the MindWare BioLab Acquisition software and hardware and utilize their full power and flexibility.

**New Features:**

- Data slider that controls both video and data for synchronous analysis
- Video Screen with full video controls. Dock/Undock Video feature
- Full Mpeg Audio/Video Playback Tool
- All new configuration and event mode interface with several new analysis modes
- Easily report analysis data to Excel or .txt formats
- Includes support for BioNex Event Files and .txt Event Files
- Analysis results easily imported into NOLDUS Observer allowing integration of behavior and physiologic activity
- NOLDUS Observer output easily imported allowing data analysis based on behavioral events
- All new interface for streamlined integration with the MindWare BioLab Acquisition Software
- ASCII file import/conversion to .mw format
- Summary screen display
- 48 channel support EMG and EEG
- All new BPV application, new IMP SV methods

**Additional Features:**

- Process data in user defined intervals, by event, with combinations of event and time, or by event to event
- Works with MindWare (.mw) and BIOPAC (.acq) file formats. Includes (.txt) import/conversion for capability with platforms such as EGI, Biosemi, and Psylab.
- Ability to filter events by type or name
- User controls for most filters and bands
- Ability to save and recall edited data
- Powerful graphical editors for modifying physiological data and removing artifacts
- Segment switching for fast and easy toggling between data segments (page up/page down)
- Automatic Batch scoring of datasets
Heart Rate Variability (HRV) Analysis

- Calculates VLF, LF, HF/RSA power and RSA, HR, Respiration Rate, IBI series, HR and Respiration power spectrums and peak frequencies using spectral analysis.
- Derives respiration rate and amplitudes from a traditional respirometer or from impedance cardiograph signals (Z0 or dZ/dt).
- Allows for the import and export of previously edited ECG time series data to minimize artifact editing.
- Includes user programmable power band settings.
- Easy to use graphical editor allows for easy insertion and deleting of ECG time series data.
- Derives HR, Mean HR, IBI, and Mean IBI from ECG time series.
- Includes the ability to import ASCII IBI data for RSA and HR calculation.
- Calculate HR and IBI by user programmable time intervals.
- Dual ECG artifact detection algorithms, MAD/MED and IBI check.

Impedance Cardiography (IMP) Analysis

- Calculates LVET, PEP, SV, CO, HR, Z0, and dZ/dt max.
- Three methods for SV calculation; Kubicek, Sramek-Bernstein and Bernstein-Lemmons.
- Calculates Total Peripheral Resistance (TPR) when used with the MindWare Blood Pressure variability analysis application.
- Allows for the import and export of previously edited ECG and Impedance time series data to minimize artifact editing.
- Derives dZ/dt from Z0 or uses measured dZ/dt signal where available.
- Includes user selectable Q and B detection algorithms.
- Programmable Rho, L, and ensemble average window settings.
- Programmable Z0 and dZ/dt gains for compatibility with a wide range of Impedance cardiographs.
- Incorporates newly validated mathematical methods for detection of Q and B landmarks, allowing analysis of previously unusable and noisy data.
- Compatible with wide range of cardiographs including MindWare MW1000A, MindWare BioNex IMP Cardiograph, HIC-2000, Minn 304B, BIOPAC NICO and EBI.
- Dual ECG artifact detection algorithms MAD/MED and IBI check.

Basic Signal Analysis (BSA)

- Calculate basic statistics (mean, median, mode, max, min, RMS, AC, DC) for any type of waveform.
- Signal-specific analysis:
  - ECG: Rate, Mean Peak Amplitude.
  - PLE, BP: Rate, Mean Peak Amplitude (FPA on PLE), and Mean Trough Amplitude.
  - Respiration: Resp Rate.
  - Activity Pad, Accelerometer: Wiggle Factor (measure of movement detected in signal) and TWF (sum of all calculated wiggle factors).
  - Computes PTT (pulse transit time) and FPA (finger pulse amplitude, mean peak amplitude) from ECG and PLE or BP.
- Scale each channel to desired units with preview of result on signal using the Map Ranges or Slope Intercept scaling methods.
- Auto-scaling of Skin Temperature data collected from BioNex chassis.
- Ability to view and analyze up to 8 channels simultaneously (All Channel mode).
- Ability to zoom in on a single channel with marked peaks/troughs when applicable (Single Channel mode).
- Toggle between All Channels and Single Channel modes on the fly.
- Graphical editor allowing user to spline or remove data from up to 8 channels simultaneously.
- Easy to navigate Excel spreadsheet output separating channel stats into individual worksheets.

Heart Rate Variability (HRV) Analysis

- Calculates VLF, LF, HF/RSA power and RSA, HR, Respiration Rate, IBI series, HR and Respiration power spectrums and peak frequencies using spectral analysis.
- Derives respiration rate and amplitudes from a traditional respirometer or from impedance cardiograph signals (Z0 or dZ/dt).
- Allows for the import and export of previously edited ECG time series data to minimize artifact editing.
- Includes user programmable power band settings.
- Easy to use graphical editor allows for easy insertion and deleting of ECG time series data.
- Derives HR, Mean HR, IBI, and Mean IBI from ECG time series.
- Includes the ability to import ASCII IBI data for RSA and HR calculation.
- Calculate HR and IBI by user programmable time intervals.
- Dual ECG artifact detection algorithms, MAD/MED and IBI check.
Skin Conductance (EDA) Analysis

- Programmable rolling filter for artifact correction
- Locates and marks event specific and non-specific SCR’s and calculates SC
- Includes a user defined threshold (micro Siemens) and max/min latency intervals for skin conductance responses
- Calculates peak, trough, half-recovery amplitude and times, mean SCL, mean SC, and tonic period
- Volts to micro Siemens scaling
- Calculates Tonic and Phasic responses aligned to user defined pre/post stimulus presentation windows
- Derives and displays respiration from a traditional respirometer or from impedance cardiograph signals (Z0 or dZ/dt)
- Includes two powerful graphical editors to easily add, remove, and change the location of key SCR points

Blood Pressure (BPV) Analysis

- Allows for the import and export of previously edited Blood Pressure time series data to minimize artifact editing
- User defined mmHg per volt setting
- Calculates and displays SBP, HR, MAP, IBI and respiration stats
- Derives peak frequency, power, RSA through spectral analysis of HR, BP, and Respiration time series
- Locates and marks Baroreflex series clearly on the plot and derives average BRS
- Add and remove Systolic and Diastolic points using the powerful graphical editor
- Compatible with wide range of instrumentations including Colin BP508, Colin 7000, Medwave Vasotrak/Fusion, and Finometer.

Electromyography (EMG) Analysis

- Calculates VRMS, VMean, Integral, Peak Frequency, and Peak Power statistics
- Capable of analyzing 48 channels at a time
- User programmable Band and Low Pass filters
- User enabled Notch Filter(50/60 Hz) and Rectification
- Displays raw, filtered, and spectral data
- Startle Response amplitude and latency calculations aligned to pre/post stimulus presentation
- Export raw, filtered, and spectral time series data to ASCII format
- Spline data sections in up to 48 channels using the robust graphical editor
- Customize the display with channel separation for easy viewing

Electroencephalography (EEG) Analysis

- Calculates Power, Peak Frequency and Peak Power in six user defined frequency bands
- Allows for the import and export of previously edited EEG time series data to minimize artifact editing
- Capable of analyzing 48 channels at a time
- User programmable power bands
- User selectable 60 Hz notch filter
- Works with native BIOPAC Systems Acknowledge format (.acq extension)
- User programmable channel names
- Customize the display with channel separation for easy viewing
- Spline data sections in up to 48 channels using the robust graphical editor