HRV Premium

Kubios HRV Premium is the market leader in heart rate variability (HRV) analysis software for scientific research and professional use.

With Kubios HRV Premium, you can turn your ECG device or HR monitor into a powerful tool to probe the cardiovascular system or to evaluate the effect of stress and recovery on heart health. Kubios HRV Premium provides the most detailed HRV analysis on the market with over 40 analysis parameters. For example, it includes an accurate QRS detector and an automatic correction algorithm to guarantee high quality HRV data in all conditions.
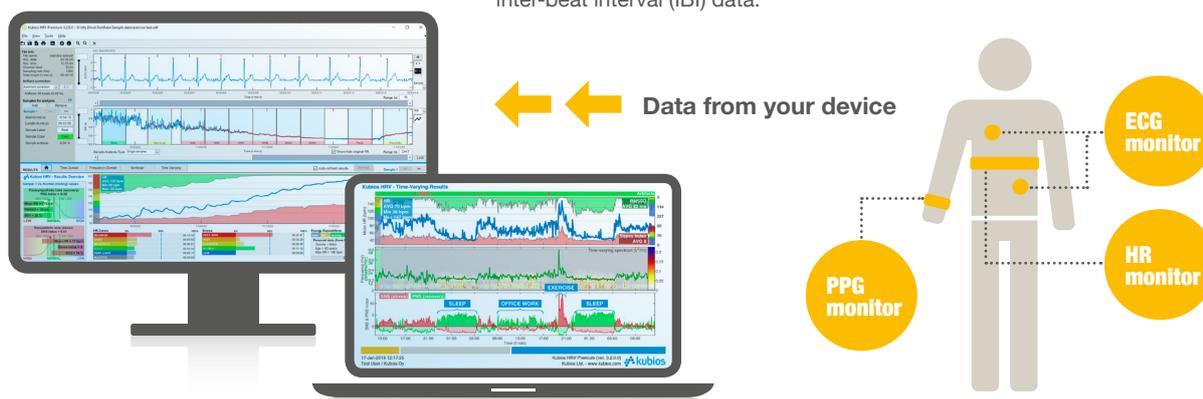
For Scientific Research

Kubios HRV is a **scientifically validated** software and is being widely used in both clinical and pre-clinical research. The software has been developed during the past 15 years by experienced medical physicists. The software was originally published in 2004[1] and underwent a significant update in 2014[2]. These two publications have attracted **around 1 000 citations.**

Stress and recovery monitoring

Kubios HRV Premium provides detailed and illustrative monitoring of changes occurring in the activity of the autonomic nervous system. With its powerful time-varying analytical protocols, you can easily **monitor your daily stress levels or evaluate how exercise and training affects your health.**

Supports your measurement device

Kubios HRV Premium is compatible with several commonly used electrocardiogram (ECG) devices and with most of the HR monitors on the market. The only requirement for the HR monitor is that it can record inter-beat interval (IBI) data.

Data from your device

ECG monitor

HR monitor

PPG monitor

www.kubios.com

1 Niskanen J-P et al. Software for advanced HRV analysis. Comp Meth Programs Biomed, 76(1):73-81, 2004.
2 Tarvainen MP et al. Kubios HRV – Heart rate variability analysis software. Comp Meth Programs Biomed, 113(1):210-220, 2014.

Kubios HRV Premium Specifications

Operating system

- Kubios HRV Premium is available for 64-bit operating systems: Windows (7 SP1, 8 and 10), MacOS, and Linux
- Minimum system specifications: 4 GB RAM, 3-5 GB of disk space and screen resolution 1024 x 768 or higher.

Usability

- Easy-to-use graphical user interface (GUI)
- Adaptable to user needs due to adjustable analysis settings through software preferences.

Supported data formats and devices

- Inter-beat-interval (IBI) or RR interval data files: Direct export from Polar Flow; Garmin and Suunto FIT files; custom formatted text and CSV files
- ECG/PPG data files: European data format (EDF/EDF+); Cardiology XML; ISHNE Holter ECG data format; Biopac ACQ3; General data format (GDF); and custom formatted text and CSV files
- Supported ECG/PPG devices: Actiwave Cardio, AliveCor Kardia, Biopac, Bittium Faros, Empatica E4, Mindfield MindMaster, Shimmer and several clinical Holter and ECG monitors
- Supported HR monitors: ActiHeart, emWave, Firstbeat Bodyguard, Garmin (Forerunner and Fenix series), Polar (V800), Suunto (Ambit and Spartan series), Zephyr BioHarness.

Pre-processing features

- Built-in QRS detector for accurate detection of ECG R-waves and pulse wave detector for PPG data
- Automatic correction algorithm for correcting missed, extra and misaligned beats from RR interval time series. The algorithm was validated using the MIT-BIH arrhythmia database, showing 97.0% accuracy in detecting ectopic beats and 99.9% accuracy in identifying normal beats
- Smoothness priors method for removing very low frequency trend components when performing short-term HRV analysis.

HRV analysis features

- Stress level and indexes for parasympathetic (PNS) and sympathetic nervous system (SNS) activities
- Time-domain parameters: Mean RR and HR, min and max HR, SDNN, RMSSD, pNN50 (with adjustable threshold), HRV triangular index and TINN
- Frequency-domain parameters: Welch's/Lomb-Scargle periodogram and AR spectrum estimates. VLF, LF and HF peak frequencies and band powers, and LF/HF ratio
- Nonlinear parameters: Poincare plot (SD1, SD2, and SD2/SD1), ApEn, SampEn, Detrended fluctuation analysis (DFA), Recurrence plot analysis (RPA), and Multiscale entropy (MSE).

Respiratory Sinus Arrhythmia (RSA) estimation

- Built-in algorithm for ECG derived respiration (EDR) providing an accurate estimate of respiratory rate, which is needed in reliable RSA component estimation (to ensure that respiratory rate is within the HF band) and individual resonance frequency assessment.

Time-varying analysis features

- Time trends in the HRV parameters to detect changes in HRV e.g. during a 24-hour recording or during exercise and recovery periods
- Analysis window can be adjusted for investigating long-term or short-term dynamics
- Spectrogram with "Fire" colormap, a graphical illustration of dynamic changes in HRV components, at a glance, one can appreciate how stress affects the cardiovascular system and how therapeutic actions can hasten recovery.
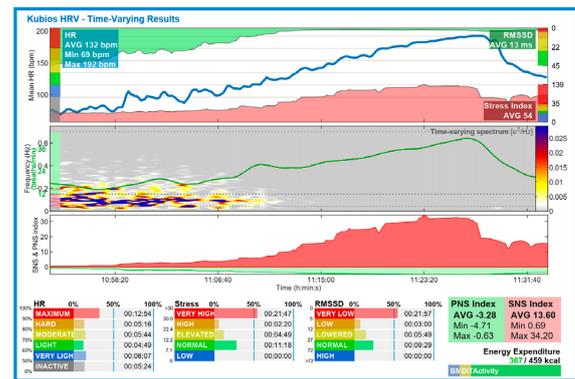
Reports and exporting results

- ECG printout option for printing the ECG signal (single lead) on a standard paper ECG layout
- PDF reports with detailed HRV analysis results and graphics
- Text file export for saving all the analysis results into a structured text file
- Matlab MAT file export for saving the analysis session and the results. Previously performed analysis session can be reopened by opening the MAT file, which enables an easy way to change analysis settings and reanalyse the data
- "SPSS friendly" batch file export to save analysis results into a CSV file, which can be opened in Excel or imported into SPSS.

Pricing and licensing policy

- Pricing is available at www.kubios.com/hrv-premium
- Kubios HRV Premium purchase price includes access to all software updates for 1-year period. Access to updates after the first year is available by paying an annual maintenance fee
- One license allows you to use the software on one computer
- Quantity discounts are available.

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