MARS® Ambulatory ECG Analysis

The power to assess and predict

Connecting hearts and minds

Prevention starts with knowledge

Around the world, heart disease is one of our fastest-growing health issues. Sudden Cardiac Death (SCD) claims the lives of millions every year, and many of those did not know they were at risk. The ability to quickly and accurately predict who is at the greatest risk for SCD has the potential to make a real difference in global health.

The comprehensive suite of the GE Healthcare Marquette® algorithms available in MARS Ambulatory ECG system and MARS Enterprise *i* puts the power to predict right in your hands. The MARS system applies the breadth and depth of the various risk-scoring analytics to provide physicians with one combined report and enables them to make clinical decisions supported by in-depth, validated information.

Identify high-risk patients effectively. Begin treatment sooner. Make a real difference in global health, one life at a time. That's the real power of prediction—through a revolutionary system that opens the door to a new standard of cardiac care.

EK-Pro™ ECG analysis

EK-Pro uses up to three simultaneous ECG leads for analysis and optimized arrhythmia event detection. EK-Pro meets AHA recommendations for up to three simultaneous leads for arrhythmia analysis.[1]
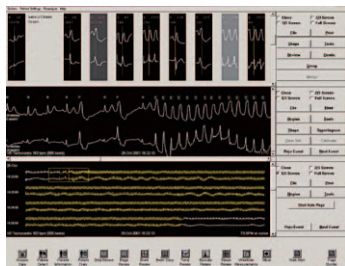
- Atrial fibrillation detection and trending

- P-wave recognition

- Four-lead analysis for optimized event detection

1. Mirvis D.M., et. al. Instrumentation and practice standards for electrocardiagraphic monitoring in special care units. A report for health professionals by a Task Force of the Council on Clinical Cardiology. American Heart Association 79, 464-471 (Feb. 1989).
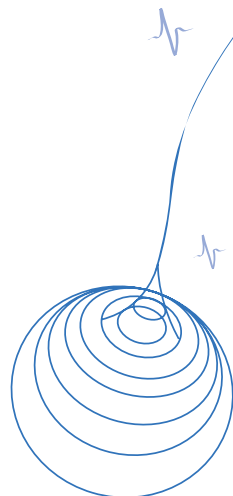
Atrial fibrillation detection

The atrial fibrillation algorithm detects, quantifies, and documents episodes of atrial fibrillation by using the MARS system's beat detection, timing, and beat labeling information. The program produces a comprehensive final report to aid in physicians' risk assessment and treatment decisions.
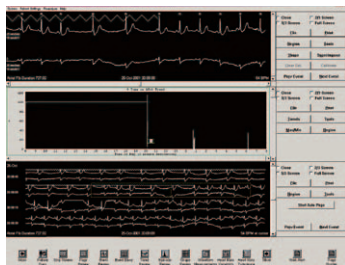
- Program can be run automatically or manually during the editing process

- Documents the presence of atrial fibrillation throughout the recorded period

- Incidences of atrial fibrillation are easily accessed by clinicians for rapid assessment and documentation

QT interval measurement

This algorithm simplifies the process of identifying prolonged QT, a genetic or drug-induced complication that can lead to serious arrhythmias. The algorithm runs during the standard ECG analysis and provides a comprehensive understanding of a patient's QT through interactive tools and displays. The patient's QT strip is documented in the MARS system's final reports, with QT summary reports, QT/RR trends, and QT strips.
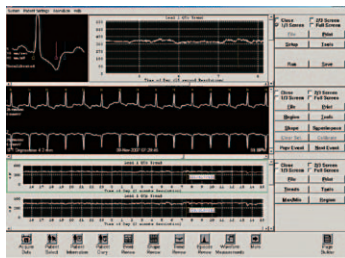
- Real-time measurement and trending of QT interval for each channel over the entire recording period

- Measures both QT peak and QT end intervals

- Detailed QT trends based on beat-to-beat analysis

- Multiple QT correction trends generated to speed analysis and reporting

- Assessment includes day and night QT/RR trends

ST segment measurement

Through continuous monitoring of ST segment deviation, this algorithm works through the MARS system to provide a detailed understanding of ST segment deviation and slope.
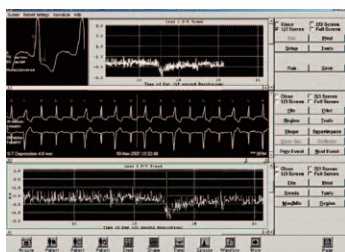
- Measures and trends ST segment deviation and slope every 15 seconds throughout ECG recording

- Measurements are made at the J point and at a user-selectable ST measurement point

- Final report includes separate trends for each channel, maximum ST deviation, and detailed documentation of each ST event's time, duration, and measurement
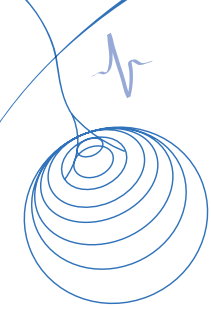
Heart Rate Variability (HRV)

The HRV algorithm quantifies the body's ability to maintain a normal heart rate by measuring small variations in heart rate change over a 24-hour period. This allows physicians to assess a patient's autonomic system for cardiac risk. Furthermore, HRV added to Heart Rate Turbulence provides a more comprehensive view of a patient's autonomic system.
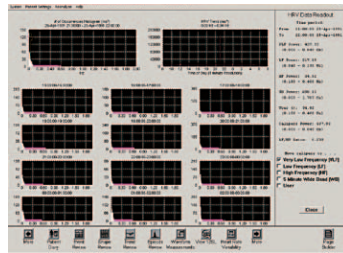
- Provides both spectral and temporal HRV measurements
- Works with other algorithms to identify crucial risk factors

Pacemaker detection

Patients with pacemakers present specific testing concerns. The pacemaker analysis program used through the MARS system provides a complete report of a patient's pacemaker function and abnormalities—enabling physicians to spot problems quickly for rapid diagnosis and action.
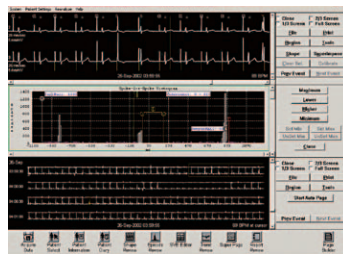
- Captures pacemaker spikes and synchronizes with the ECG signal
- Unique Pacer Spike histogram allows clinicians to verify pacemaker operation and abnormalities
- Documents failures to capture, sense, and output
- Hourly pacemaker summary report indicates percent Paced, Atrial Paced, and A/V Paced, and a trend report showing rates of all paced beats

The power to assess

Marquette 12SL analysis program

Recognized across the globe as one of the most validated programs in the industry, the GE Marquette 12SL analysis program supports clinical decision-making by providing consistent analysis and comparison of ECG waveforms, leading to accuracy and reproducibility.

Through the MARS system, physicians have the ability to access Marquette 12SL measurement results and transmit Holter reports directly into the GE Healthcare MUSE® Cardiology Information System. This provides physicians with easy access to reliable data for confident decision support, combined with the predictive
risk-scoring analytics and other cardiac diagnostic test results stored in MUSE.

12SL measurements available in MARS include:

- Sequential 12-lead for trending increases the likelihood of detecting heart anomalies
- 12-lead QT trending to help detect prolonged QT
- PR interval trending to allow detection of AV block
- QRS interval duration to detect conduction defects

The power to predict

Diagnostic algorithms support better outcomes

Since the introduction of the industry-leading Marquette 12SL™ ECG analysis program, GE Healthcare has continued to develop the diagnostic tools physicians need to help identify at-risk patients and intervene with treatments that help avoid SCD.

From the doctor's office to the cardiology department, the MARS Ambulatory ECG System applies advanced risk-stratification algorithms to help clinicians identify which patients are at a higher risk for SCD. These highly sophisticated programs, including Modified Moving Average T-wave Alternans (TWA) and Heart Rate Turbulence (HRT), measure anomalies that can be missed by the human eye—allowing clinicians to take action while there is still time.
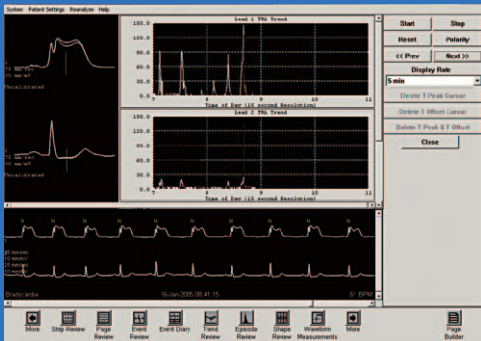
Modified Moving Average T-wave Alternans (TWA)

The TWA algorithm measures and quantifies alternations on beat-to-beat patterns, precisely detecting fluctuations in the ECG waveform. TWA enables physicians to identify an often-missed pattern variation that may indicate a high level of SCD risk and helps support earlier treatment decisions.

- Detects and measures TWA regardless of fluctuations in heart rates over time
- Localizes area in heart where TWA is occurring the most
- No proprietary electrodes or special protocols required
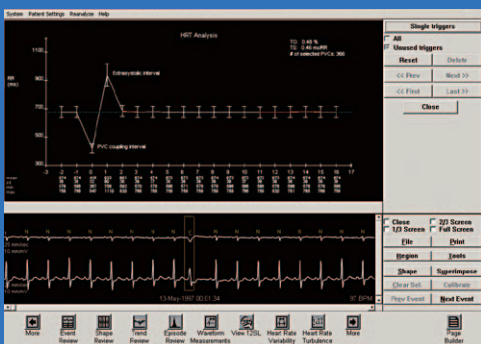
Heart Rate Turbulence (HRT)

The HRT algorithm measures and compares the heart rate before and after premature ventricular contractions. These comparisons are used to determine the status of the autonomic nervous and cardiovascular systems, which are indicative of cardiac health.

When HRT is used in conjunction with TWA, HRV, and QT analysis, multiple risk factors can be measured simultaneously, giving clinicians a comprehensive view of a patient's risk.

- Provides clinicians with visualization of data used to calculate HRT
- Simple to use, with default settings linked to current literature recommendations
- User-flexible criteria