VIZITECH USA

VIRTUAL ECG

By Vizitech USA

Vizitech USA's Virtual ECG system (VECG) leverages a rare convergence of medical knowledge and advanced visualization to bring clear insight into the education and science of 12-lead electrocardiography (ECG). This product establishes the new platform of learning for the medical industry. Vizitech USA has also successfully produced training and simulations programs that have dramatically raised the standards of learning for numerous government, military and private industries.

Virtual ECG brings the science and application of electrocardiography into a new level of pedagogics. VECG allows users to learn a critical medical skill set by engaging the subject through visual, spatial and haptic means. This new approach to learning establishes a better theoretical and foundational understanding of the intricacies of electrocardiography. The VECG system allows the learner to see and take command of the diagnostic complexities that are so vital to the successful understanding of electrocardiography.

This program allows the user to become immersed in various ECG tasks by enabling the user to perform novel tasks. The user can use their hand to physically place electrodes on a human figure, use their hand to bring a holographic heart out into their haptic envelope and examine a 360^{o} look at the outside and inside. They can explore the dimensionality as well as exert direct control over the complex and life-altering practice of proper 12-lead electrocardiography.

The VECG program uses a new stereoscopic display known as zSpace, which allows ECG imagery to break the screen plane and become a personal part of the users learning environment. VECG also allows the user to have direct control over the imagery through the use of a stylus and allows the user to grab, manipulate and highlight objects floating within their dimensional learning environment.

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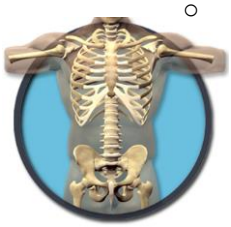
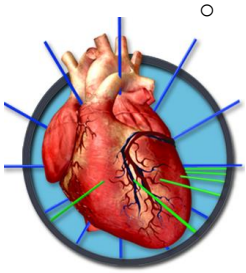
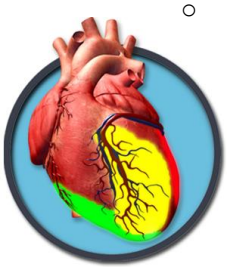
The Virtual ECG system provides economical hands-on training, an ability to gain proficiency, and an ability to test your knowledge for ECG. VECG is comprised of three modules with the following goals:



- Module 1: The goal of this module is to click on each electrode and move them into position on the human figure. The correct placement of 12-lead ECG electrodes is critical to the successful diagnosis of heart conditions in prehospital and hospital situations. In this Electrode Placement module the user learns the recommended electrode placement for proper ECG results. To successfully complete this module, click on each electrode and move them into proper position on the human figure.



- Module 2: The goal of this module is to explore and understand the relationship between electrodes, leads, and the ECG printout. The leads indicate a view of the electrical activity of the heart from particular angles. Each lead is vector of electrical measurement that intersects specific regions of the heart depending on the group of electrodes. Medical Professionals read the ECG printout to understand the electrical activity of the heart where a collection of leads intersect.



- Module 3: The goal of this module is to explore and understand the relationship between the leads and an abnormal ECG printout for some, but not all heart conditions. This module will color the region of the heart that is associated with various abnormal conditions. By examining the heart, the leads, and the ECG printout for each abnormal condition, the user can assemble a better understanding of the conditions and indicators.

Each module contains guidance on objectives and tasks as well as an explanation of the user controls available. Please open the info guidance in each module and follow the instructions for that module. You can toggle the instructions on an off by clicking the info button.

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Module 1 details

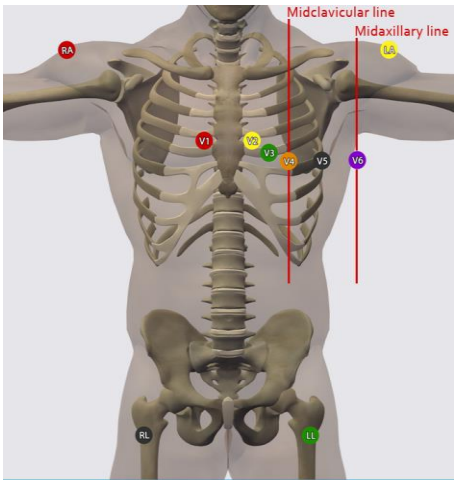
The goal of this module is to teach the correct placement of 12-lead ECG modules onto a human body. To accomplish this, click on each electrode  with the zSpace pen and move them into proper position on the human figure. The correct placement of 12-lead ECG electrodes is critical to the successful diagnosis of heart conditions in prehospital and hospital situations. In this Electrode Placement module the user learns electrode placement for proper ECG results. Click the info button for guidance and available user controls.

To successfully complete this module, click on each electrode with the zSpace pen and move them into proper position on the human figure. Rotate the human figure and/or the electrodes as necessary to place them on the skin surface. Once all electrodes are placed on the human figure the user may toggle on the electrode indicators by clicking the electrode button.

To facilitate the placement of electrodes the user may elect to make the skin  translucent and the muscles  transparent. To facilitate the placement of electrodes the user may slightly rotate the on-screen human figure by pressing the keyboard arrow keys in  the necessary direction. Press the “R” key to reset the position of the on-screen human figure.

The placement for the 12-lead electrodes are as follows:

- V1 - fourth intercostal space to the right of the sternum
- V2 - fourth intercostal space to the left of the sternum
- V3 - midway between V2 and V4
- V4 - fifth intercostal space at the midclavicular line
- V5 - anterior auxiliary line at the same level as V4
- V6 - Midaxillary line at the same level as V4 and V5



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- RL - right leg anywhere between the torso and ankle
- RA - right arm anywhere between the shoulder and elbow
- LL - left leg anywhere between the torso and ankle
- LA - Left arm anywhere between the shoulder and elbow

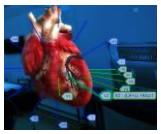
Definition: Midclavicular line - middle of the clavicle
Definition: Midaxillary line - middle of the armpit

Once this exercise has been successfully completed the user may go to the next module by clicking the home icon.

Module 2 details:

The goal of this module is to explore and understand the relationship between electrodes, leads, and the ECG printout. The leads indicate a view of the electrical activity of the heart from particular angles. Each lead is vector of electrical measurement that intersects specific regions of the heart depending on the combination of electrodes used. Medical Professionals read the ECG printout to understand the electrical activity of the heart where a collection of leads intersect. Click the info button for guidance and available user controls.

The user can click on each individual lead on the ECG printout to see a correlation between the heart measurement vectors and the electrodes. When any lead is selected on the ECG printout the corresponding electrodes for that lead on the human figure will glow, the lead - which measures the electrical activity through a specific region of the heart will glow, and the formula will appear showing which electrodes are used to generate that measurement vector, also commonly referred to as that heart lead.



The user may click on the front face of the heart to remove it to see the internal heart, and right-click the front face to replace to original position. The user may toggle rotation of the heart by selecting the “Rotate” button with a click of the stylus and use the + and - keys to adjust rotation speed. The user may “lean their head into the image slowly” to clip into the heart. Once this exercise has been successfully completed the user may go to the next module by clicking the home icon.

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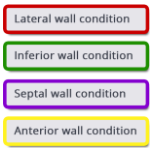
Module 3 details:

The goal of this module is to explore and understand the relationship between the leads and an abnormal ECG printout for some, but not all abnormal heart conditions. This module will color the region of the heart that is associated with various abnormal conditions. By examining the heart, the leads, and the ECG printout for each abnormal condition, the user can assemble a better understanding of the conditions and indicators. Click the info button for guidance and available user controls.



To use this module the user can select each of the four abnormal heart condition buttons to visualize the correlation between each heart condition and which group of leads are employed in that diagnosis, and which region of the heart is affected. The user may left-click the heart and “grab” and rotate it in different directions to inspect the leads and regions of the heart. The user can select one of the four abnormal heart conditions to view that heart condition, or choose the normal ECG button.

The user may select the ECG printout with the zspace pen, to bring it closer for clearer inspection. The user may click on the front face of the heart and remove it to see the internal heart, and right-click the front face to replace to original position. The user may rotate the heart by clicking the rotate button and use the + and - keys to adjust rotation speed. The user may “lean their head slowly toward the screen” to clip into the heart. Once this exercise has been successfully completed the user may return to the main menu by clicking the home icon.

We hope you enjoy this exciting new method of interactive instruction. Please give us your feedback, and contact us in order for ViziTech USA to work with your great organization. Our contact information is:

csr@vizitechusa.com 706-749-8099 www.vizitechusa.com
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