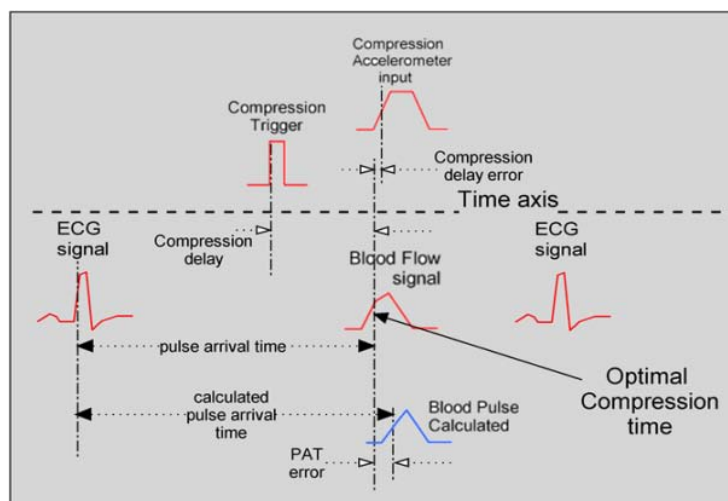


09/2008- Quest is awarded \$1,020,000 by the National Institutes of Health

The National Institutes of Health has awarded Quest Product Development Corp an SBIR Phase II grant to continue research into their novel CardioQuest™ Cardiac Synchronization Technology. The National Heart, Lung and Blood Institute reviewed Quest's proposal, and funded \$1.02M over a two year program. NIH reviewers summarized the project as *"The concept is novel and has great clinical relevance."*

Each year approximately 340,000 people die from sudden cardiac death in the United States alone, with estimates of costs for failed treatment and lost productive years of life over \$400 billion per year. While other areas of medicine have experienced significant reductions in mortality, little progress has been made in resuscitation medicine where the rate for successful resuscitation of cardiac arrest patients using CPR is quite low, and in particular, there are no truly effective resuscitation methods for patients with pulseless electrical activity (PEA) cardiac arrest. Cardiac Synchronization Technology (CST) aims to increase survival rates for patients experiencing PEA, using new technology to synchronize automated life support devices to the residual heart rhythm. Especially for the aging U.S. population, where cardiac arrest is a major health issue and cause of death, improvements in resuscitation techniques could have tremendous societal, economic and personal benefits.



Cardiac Synchronization Technology (CST) will provide external chest compressions synchronized with the weak residual mechanical heart action present in PEA cardiac arrest, and will result in higher systemic blood perfusion pressures and improved outcomes for PEA cardiac arrest patients receiving CPR. CST uses innovations in digital signal processing to control automated CPR compression devices and enable chest compressions synchronized within milliseconds of the residual central pressure pulse, providing an improved resuscitation

therapy.

Phase I work successfully demonstrated that synchronized compressions provide up to 110% increase in coronary perfusion pressure (CPP), and indicated that even correctly synced compressions resulted in 46% lower CPP if given after out-of-phase compressions. Phase II work will develop next generation digital circuitry and algorithms in a CST prototype device for controlling the timing of chest compressions in a pre-clinical animal study. Phase II development includes a novel method of using ECG data to predict the aortic pulse arrival time and feedback control mechanisms that enable CST to be integrated with automated compression devices and AED's for use by pre-hospital Emergency Medical Service personnel.

Specific goals of this project are to demonstrate CST can synchronize cardiac compressions to real-time ECG data; demonstrate CST can adjust for physiological differences in the aortic pulse arrival time; demonstrate feedback signals from external Doppler ultrasound sensors and accelerometers can improve compression timing; integrate CST with a commercial automated CPR resuscitation device; and demonstrate increased coronary

perfusion pressure and cerebral perfusion pressure of synchronized compressions versus current standard clinical practice asynchronous CPR.

In Phase II development, a CST prototype will be designed, built and tested. Knowledge will be obtained of the effectiveness of this new technology and how to integrate it into existing resuscitation devices.

This research is being lead by Principal Investigator Jon VonOhlsen, a VP and experienced medical device designer at Quest Product Development Corp, teaming with emergency medicine researchers Drs. Todd Larabee and Charles Little, Professors in the University of Colorado Denver School of Medicine Emergency Medicine Department.

cardioQuest™ could save lives, an important public health care need, for a large and growing market. cardioQuest™ could increase cardiac arrest survival, and could be an additional tool for pre-hospital emergency care for cardiac arrests.