

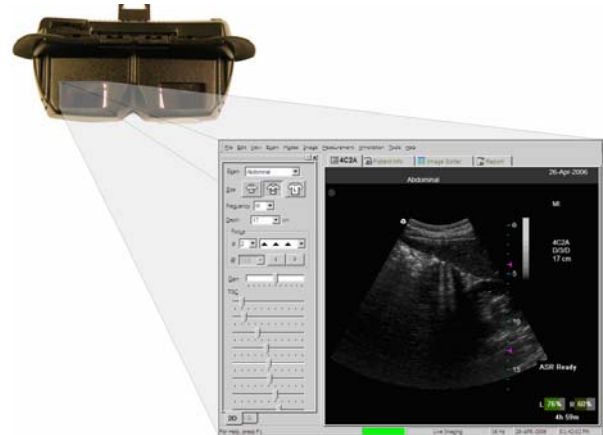
Reconfigurable Ultrasound Imaging Systems

MOTIVATION

Develop a reconfigurable, untethered ultrasound scanner system for the medical community, primarily for military, trauma, emergency and rural health applications.

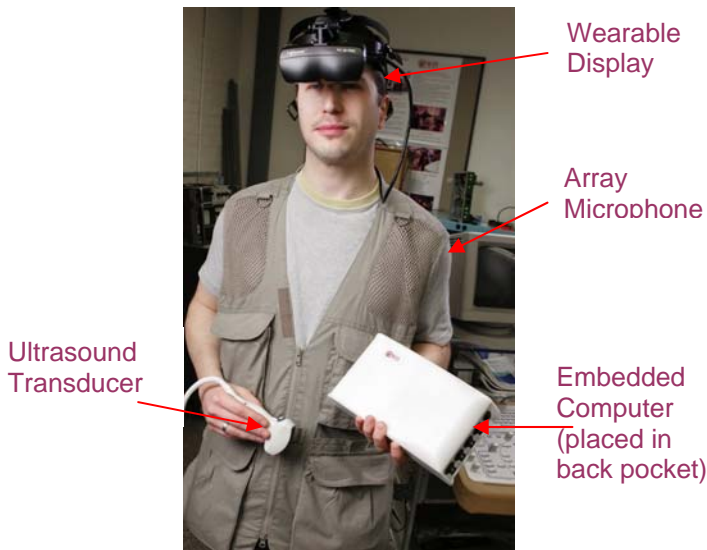
Make ultrasound imaging a diagnostic tool for non-specialists, by simplifying the image interpretation through 3D ultrasound and enhancement algorithms.

Provide imaging capabilities available anyplace – during ambulance transport, at rural health clinics, at disaster locations for remote triage, at field hospitals.



MAIN FEATURES

- Based on either the Terason™ 2000 or 3000 portable scanners
- Voice operated, allowing single-handed operation, alleviating the need for keyboard
- Image is viewed on a wearable display (see above)
- Wireless image transmission to remote facilities
- Audio channel for listening to Doppler sounds
- Typical operational time without recharging is 8 hours
- Two configurations:
 - self contained, wearable system, integrated into a vest
 - self contained, configurable system, integrated into a bag. This system can be enhanced with additional sensors such as EKG, camera, pulse oximeter, or stethoscope



Vest configuration of Ultrasound System

MAIN APPLICATIONS AREAS

- Military medicine (forward echelons)
- Disaster response
- Rural health
- FAST exams
- Medical triage
- Diagnostics during ambulance transport
- Teaching in medical schools (thanks to the built-in wireless and remote viewing capabilities)

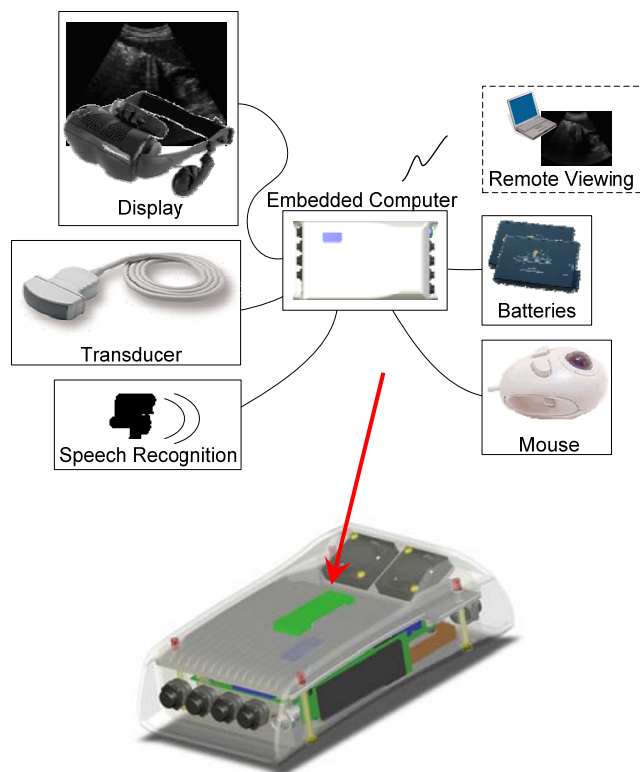


Bag configuration of Ultrasound System

BENEFITS OF THE RECONFIGURABLE ULTRASOUND SYSTEMS

- Ultrasound imaging is capable of assessing internal injuries in trauma and emergency, and offers immediate real-time diagnostic capability
- For many types of combat injuries, survival depends on appropriate intervention within one to two hours
- Ultrasound imaging may provide guidance regarding the most effective surgical intervention or therapy

SYSTEMS CONFIGURATION



Embedded XP computer system in custom housing

CLINICAL EVALUATION

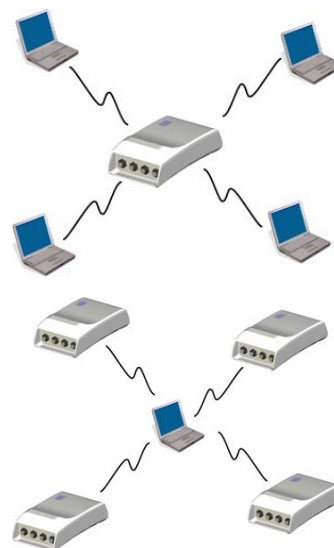
Clinical evaluations are currently being carried out at various places to provide a mix of environments including modern teaching hospital environments and also under military field conditions to evaluate ease of use, integration with other systems and other operational characteristics.

Recent testing locations include:

- Vascular Surgery, Madigan Army Medical Center, Ft. Lewis, WA
- 3/2 Stryker Brigade, National Training Center, Ft. Irwin, CA
- Emergency Department, Massachusetts General Hospital, Boston, MA

REMOTE VIEWING

With the built-in wireless and remote viewing capabilities, the system allows for:

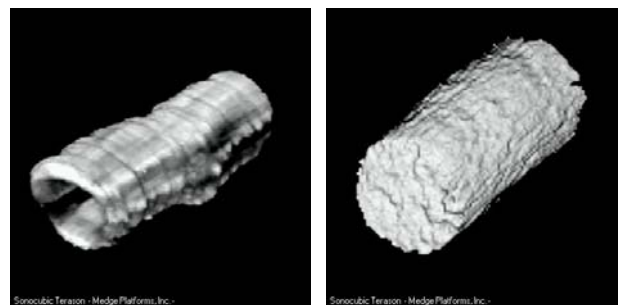


Many observers of one ultrasound system – useful for training purposes

One observer of many ultrasound systems - provides for remote expert consultation

3D IMAGING with POSITION SENSING

Free-hand undistorted 3D visualization area using position and angle sensing integrated into transducer housing is under development.



Sample 3D images of carotid artery and phantom vessel using 3D positioning system

This imaging and positioning system is also being integrated with boundary detection and volume estimation to allow real-time interactive 3D visualization.

ACKNOWLEDGEMENTS

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FURTHER INFORMATION

Please contact Peder C. Pedersen, Dept. of Electrical and Computer Engineering, WPI, Worcester, MA 01609 or visit the *ImagiSonix*™ website at www.imagisonix.com to learn more about available products.

Patents pending.