Portable Ultrasound - A Peek at the Future Interview

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Portable Ultrasound - An Interview with Cheryl Vance Terry J. DuBose, M.S., RDMS, OBGYN.net Editorial Advisor interviews Cheryl Vance, MA, RDMS, RVT, OBGYN.net Editorial Advisor, 382nd Training Squadron at Sheppard Air Force Base, Texas

Professor DuBose: Master Sergent Vance, please tell us, how long have you been in the United States Air Force, and what has been your career path?

MSgt. Vance: I have been in the Air Force for 17 years. I began my career as a computer operator in 1996. After three years of working on everything from mainframe computers, to intel message tracking and NORAD missile warning systems, I realized I was more of a people-person and asked to retrain into radiology. After I completed Diagnostic Imaging training, I expanded my skills by learning mammography, computed tomography, and then eventually I was fortunate enough to be selected to train in ultrasound. Shortly after I completed my Master's Degree in Curriculum and Instruction, the Air Force began a formal ultrasound school (1998). I was selected to be an instructor at this school and then eventually I moved into the Program Director position.

Professor DuBose: Cheryl, how long have you been a sonographer and where did you get your education?

MSgt. Vance: I have been a sonographer for ten years. The Air Force sent me to a five-week mini ultrasound course when I was first introduced to ultrasound, but primarily my training was on-the-job. During my early training, I was fortunate enough to work with a registered civilian sonographer who shared her expertise with me and encouraged me to strive to obtain my ARDMS registries.

Professor DuBose: You are certified by the American Registry of Diagnostic Medical Sonographers (ARDMS), correct? In what specialties are you certified?

MSgt. Vance: I am registered in OB/GYN and ABD. I am also looking forward to challenging the vascular registries in the near future.

Professor DuBose: You have had the opportunity to work with some cutting edge, miniature sonographic equipment. Can you describe the equipment and how you think it will be used by the military?

MSgt. Vance: The equipment is basically just a wearable computer connected to an ultrasound system that runs on a Windows-based operating system. The laptop version of the ultrasound system has been marketed commercially since January 2001. The ultrasound machine is a "system in a probe". The entire ultrasound system is a small box that is built into the transducer cord. This complete system just needs to be plugged into any computer. Rather than using the laptop version that the vendor supplies with the "system in a probe", the AF requested a wearable computer. The wearable computer came with a keyboard that attaches to your arm, a handheld mouse and a head-mounted viewing display.

The military applications for this technology are endless, but the most prevalent is its field use. A military sonographer can be deployed to a remote location, perform a sonogram using the wearable technology, then bounce his/her images off from a satellite to send the images to a radiologist safe in the United States for interpretation. You can even take that scenario one step further to have
the radiologist either call the field sonographer on a cellular phone or e-mail any additional image requests instantaneously. Beyond its ultrasound capabilities, the system can be used for any personal computing (e-mail, PowerPoint, Word, Excel) since it is after all a regular computer. As you can see, the only limitation is your imagination.

**Professor DuBose:** What about in civilian hospitals, do you believe there will be a use for this miniature equipment in the standard hospital or clinic setting?

**M Sgt. Vance:** That is the best thing about this system! It is not just for field use. We can take advantage of its portability in any hospital/clinic setting. Instead of pushing a massive conventional ultrasound machine to a distant location in the hospital and then having to worry about squeezing into the over-crowded patient room, you can now just strap on your ultrasound machine and walk to any bedside location. Since the system is running off a computer battery, you do not even have to worry about finding a free power outlet. The fear of fighting with IV lines and other patient care equipment is practically eliminated. Again, in this setting, the images can be downloaded on your hospital's network and sent to the radiologist while you are still bedside. Any additional image requests can be requested before you leave the patient room.

**Professor DuBose:** Now, as for operating this new equipment with the head-mountable display, keyboard, and hand-held mouse (pointing device),... is it a lot more difficult to use than standard sonographic machines? I can imagine getting used to the head-mounted display is a good bit different.

**M Sgt. Vance:** The viewing display is set up very similar to a conventional ultrasound unit. One challenge we have found with this unit is fine-tuning the image. All image adjustment functions are controlled using the mouse. So there are pick lists and bars to adjust image quality. It is very simple to use these functions on the laptop version, but on the wearable version, the head-mounted display's pick lists are so miniaturized that unless you have already become familiar with the system, you will have a difficult time finding some of the adjustment options. The head-mounted display is a little awkward at first, but I have found you get used to it pretty quick. The display can be placed over either eye and then you just adjust it to a position where you have best visibility. Keep in mind, this is the one of the first of its kind and before it is extensively marketed to the public some of these issues may be resolved. Overall, I would say it has not been any more difficult than learning any other new ultrasound machine for my current ultrasound students. For those of us who have been scanning for awhile, it is just a matter of breaking our mindset, not being afraid of change, and just getting out there and familiarizing ourselves with the technology. This certainly is where ultrasound is headed in the future.

**Professor DuBose:** As the profession moves toward these wearable sonographic machines, can you give us any "lessons-learned". You are probably the world expert on this subject, what mistakes can you help the rest of us avoid?

**M Sgt. Vance:** The project is still VERY new, so I still have a lot of testing before I would be able to answer that question in depth. From my limited experience, I would say one area that could use improvement is the head-mounted display. I would recommend a head-mounted display that is more rugged. Although we have not have any problems with it, it appears to be very delicate. Another suggestion would be to have your sonographers first become comfortable with the laptop version before progressing to the wearable because of the miniaturized display viewing.

**Professor DuBose:** Cheryl, you have attended the SDMS Annual Conference on several occasions in the past, will you be dancing in Atlanta this October?

**M Sgt. Vance:** The SDMS Conferences are the highlight of my year. The Air Force ultrasound instructors from across the nation try to meet each year at the SDMS conference to re-group, see the latest advancements, and educate ourselves on the most current practices in ultrasound. I certainly am trying to fit it into my schedule. It will be hard to beat all the fun I had dancing with Elvis last year though!

**Professor DuBose:** It has been great interviewing you, we will be looking forward to seeing you do great things for sonography in the future. Do you have any final comments?

**M Sgt. Vance:** Thank you for expressing such an interest in the wearable ultrasound technology. I am very excited to be apart of this project. This is just the tip of the iceberg on where ultrasound is headed in the future. I can't wait to see what evolves next! I would recommend sonographers try to keep an open mind and be ready for all the inevitable changes we will see in ultrasound.

**Professor DuBose:** Thanks.