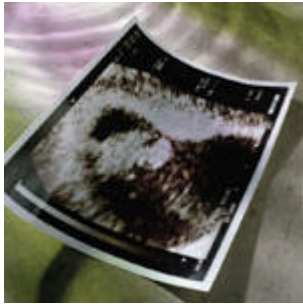


New medical ultrasound technology rides wave of the future



A fully digital 4D ultrasound system is set to provide a 'next generation' integrated solution for medical imaging applications, allowing practitioners to provide faster treatment and improve therapeutic success rates.

Developed by [ADUMS](#), an IST-funded project that ended in April 2005, the advanced high-quality imaging system will significantly reduce diagnostic time. In addition, the technology uses off-the-shelf computer hardware, making it a much cheaper alternative to expensive, purpose-produced ultrasound machines.

"The whole process of ultrasound devices has been moved away from the traditional hardware and is now implemented in software," says Dr Georgios Sakas, ADUMS project coordinator. "The hardware of the device creates mechanical waves and receives the echoes. Once the echoes are received, they are converted in digital form and the rest of the processing is performed by software."

A 4D ultrasound takes multiple images in rapid succession, creating a three-dimensional motion video, which is invaluable for diagnosis purposes.

An important factor in ultrasound image processing is the beamformer, the part of the system that provides the focusing for the ultrasound beam.

Dr Stergios Stergiopoulos, president of the Canadian National Medical Technologies, one of the project partners, maintains that even today's most advanced state-of-the-art medical ultrasound imaging systems suffer from very poor image resolution.

"This is the result of the very small size of deployed arrays of sensors and the distortion effects by the influence of the human body's non-linear propagation characteristics," he says. "The ADUMS project technology replaces the beamformer of the ultrasound systems with the adaptive beamforming scheme that has been developed for the sonar array systems of the Canadian Navy. The ADUMS project results demonstrated that the new adaptive beamformer significantly improves, at very low cost, the image resolution capabilities of the ultrasound imaging systems, which will result in better diagnosis."

Until now, every new generation of the hardware component of ultrasound devices was, effectively, a complete redesign.

"On the other hand, ADUMS technology is based on a complete software approach, using off-the-shelf PC components," explains Dr Sakas. "Thus, a redesign from scratch will not be necessary and future improvements can be made by extensions of existing software."

The portability and the low cost of the 4D ultrasound systems allow medical practitioners and family physicians to have ready access to diagnostic imaging systems on a daily basis and will make a valuable contribution in the field of preventive medicine, adds Dr Stergiopoulos.

Consortium partners are currently using the new technology for their businesses and are promoting it to other organisations that use ultrasound technology.

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