Ultrasound systems feature automation, ease-of-use gains

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Ultrasound systems on display at the RSNA meeting will transport automation and ease of use to a new level of sophistication. Established and newbie vendors alike will promote innovative approaches that tune equipment to a patient's unique environment, promising more accurate images that depend less on the skill of operators.

In its first visit to the RSNA meeting since it was formed in 1999, Zonare Medical Systems of Mountain View, CA, will launch Zone Sonography, a technology that recognizes the unique paths of echoes coming from individual patients, optimizing images efficiently and consistently in real-time. Conventional ultrasound imaging systems acquire echo data in narrow lines, processing these data line by line, forming one or only a few beams from each transmission. Zone Sonography gathers echo data from large zones, using a broad transit beam, and consequently speeds up data acquisition. Acquisition time for an image depth of 20 cm can be as short as 5.2 msec, compared with 52 msec for conventional ultrasound systems, according to the company.

Zone Sonography eliminates the otherwise distinct beamforming, image processing, and scan converting hardware typically found on conventional ultrasound systems, combining the three components in a software-based channel domain processing (CDP) unit. The system aggregates and stores data in channel domain memory, using original raw echo data from each transducer channel to form an image. The ability to access complete CDP, accelerate image processing, and increase processing power through software enhancements sets the stage for multiple processing of echo data, allowing focus on different points in the image, and assembles the results in a single, high-quality image, the company said.

In its formal North American debut, Philips Medical Systems' iU22 will demonstrate xStream architecture with as many as 57,000 dynamically scalable digital channels for precise beam control, focusing, and image formation, and high-bit digital circuitry for enhanced tissue differentiation and Doppler sensitivity.

Other features of the iU22, which was launched at the European Congress of Radiology in March, include adaptive broadband flow imaging for automatically optimizing Doppler bandwidths during color flow imaging. Equipped with SonocT real-time compounding and XRES adaptive real-time image processing, the iU22 produces enhanced spatial and contrast resolution, improves artifact suppression, minimizes speckle noise, and dynamically enhances tissue margins, according to Philips.

Siemens Medical Solutions will show an automated version of native TEQ (tissue equalization) technology on its high-end Sequoia line. An algorithm that provides real-time motion analysis enables users to scan any anatomical region and optimize image gain in axial and lateral directions without making gain adjustments to the image, said Bill Carrano, vice president of worldwide marketing for Siemens Ultrasound.

Although native TEQ was available on the Sequoia last year, it was not automated. Users had to push a button to optimize every image. "We've now eliminated the need to push any buttons at all. As soon as the transducer touches the patient, it samples a second or two of echo information, and, based on the raw echo information, the system makes an intelligent decision to optimize the gain for any anatomical area of interest," Carrano said.

Hand-carried systems
Ease of use takes on new meaning in light of portable ultrasound units designed for performing exams in emergency departments, operating rooms, and intensive care units, as well as in imaging centers and physicians’ offices.

The Vivid i echocardiography system from GE Healthcare will debut at the RSNA meeting. The hand-carried unit weighs just 10 pounds yet offers many features found on high-end cart-based systems, according to the company. Its portability is suited to use in urgent care areas such as the operating room and critical care and for mobile imaging services and outpatient clinics.

SonoSite popularized the notion of hand-carried ultrasound. This year the company will showcase upgrades to its 7.7-pound Titan hand-carried system. Since the Titan was released a year ago, SonoSite has added DICOM compatibility and work lists and a full range of transducers for ob/gyn, abdominal, neonatal, superficial, and vascular imaging. The company will display a full echocardiography and vascular expansion that began shipping in June. The Titan 2.2 cardiology upgrade provides cardiac and vascular calculation packages, pulsed- and steerable continuous-wave Doppler, and tissue harmonic imaging, as well as velocity-based color Doppler and M-mode capabilities. SonoSite will also show for the first time velocity-color Doppler on the curved array probe for abdominal and ob/gyn imaging.

Siemens plans to display the compact Sonoline G20, which was released in May. The high-performance, fully digital, cart-based gray-scale unit is designed for private physicians’ offices and hospital operating rooms and emergency departments that perform musculoskeletal and small part imaging, as well as urological, vascular, and ob/gyn scanning, Carrano said.

Toshiba America Medical Systems will show the 5.5 upgrade to its Aplio system, which uses the company’s patent-pending differential tissue harmonic technology to improve scan penetration and resolution in technically difficult studies. It does this by enhancing the effective bandwidth of transducers and subtracting the difference between harmonic and differential frequencies, the company said. Also on display will be a workflow productivity enhancement tool, a one-button image optimization option.

**All-in-one tool**

A work-in-progress 6.0 upgrade will expand Aplio’s reach from strictly abdominal imaging to endovaginal scanning and use with high-frequency array transducers. The Expanded Visualization package will offer extended field-of-view, differential tissue harmonics, workflow productivity enhancement, and trapezoid imaging as an all-in-one tool.

Toshiba will also exhibit its first 4D offering onboard the Nemio, a family of products launched three years ago. The 4D technology includes not only high-quality images of fetal faces but postprocessing options for taking obstetrical measurements of 4D volumes.

Similarly, Siemens will introduce lightweight 4D transducer technology on its Antares unit, which was designed from the ground up to accommodate 2D, 3D, 4D, and color Doppler imaging, Carrano said. A Siemens' work-in-progress at last year's RSNA meeting, Clarify is now available on the Antares line. The vascular enhancement technology optimizes image quality within blood vessels by analyzing Doppler flow in conjunction with B scan information.

TeraRecon and Fukuda-Denshi will announce the UF-850XTD, a new midrange cart-based ultrasound system. This multi-application, fully digital scanner includes an adjustable 15-inch LCD monitor.

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