Consolidation heightens development of advanced ultrasound technologies

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Traditionally, diagnostic ultrasound was a hotbed of competition, characterized by brutal marketing battles among the small and midsize companies that dominated this sector. So brisk was the pace of development that companies hardly had time to reap even a meager return on their R&D investments before launching some new advance or platform. This game has changed, however, with the gobbling of smaller companies by industry giants. The most recent consolidation was completed in midsummer when Philips took over Agilent¹s Healthcare Solutions Group. The names of competing firms have changed radically, and marketing and distribution arms have expanded. R&D has changed as well but seems as prolific as ever. GE executives, for example, called the 2001 RSNA meeting one of its best ever in terms of showing new products.

Helping to drive this process is the ability of ultrasound engineers to leverage expertise and capabilities outside their own labs, drawing from other modalities and even other industries. The best ideas and technologies of one-time competitors are coming together under one roof. Siemens¹ development of the Antares system, with ergonomic design optimized for productivity and operator ease of use, demonstrates the first product of the collaboration of teams formerly operating separately at Siemens and Acuson.

Advanced Diagnostics
ADI is exploring a dynamic, real-time imaging technique using «through wave» ultrasound technology to generate detailed information about soft tissue. Clinical opportunities are expected in breast and orthopedic imaging.

The Avera breast imaging system was introduced. This new product provides detailed images of the breast without ionizing radiation or painful compression.

Aloka
Best known as a provider of value-oriented ob/gyn equipment, Aloka has been steadily ratcheting up its product offerings.

ProSound 4400 was launched. Shown as a work-in-progress at the 2000 RSNA meeting, the system is an economically priced high-performance scanner, ranking below the company¹s flagship SSD-5500 Pure HD and SSD-5000.

The 4000 enables users to add or delete functions, depending upon their needs and budgets. Sales of the new system will begin in the first quarter of 2002. The 4000 is expected to sell for less than $100,000.

Analogic
Through its various subsidiaries, Analogic provides components and systems for use in several different modalities. B-K Medical makes ultrasound equipment.

Hawk 2102 XDI debuted as a high-performance system optimized for surgical interventions. Each ultrasound transducer, including a four-way laparoscopic probe, has biopsy capability. The FDA-cleared product sells for about $80,000.

The Merlin is a lightweight portable system for breast imaging. Not shown before at the RSNA meeting, the low-cost system is being marketed to clinics and private practices.

The AN2300 digital ultrasound engine combines a true 64-channel digital beamformer front end, vector processor, scan converter, video merge, real-time controller, and Intel PC system host with a Windows NT operating system. Supplied to other manufacturers for inclusion in their products, the engine is designed to help them achieve faster time to market through reduced system development.
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**GE Medical Systems**
The multimodality vendor is a relative latecomer to the high-end of diagnostic ultrasound. GE was content to dabble in the ob/gyn marketplace until the 1993 RSNA meeting, when the company released its Logiq 700. That flagship platform was finally eclipsed this fall when GE introduced its next generation of products.

Logiq 7 and 9 have assumed the number one and two positions in the GE lineup. (Their counterparts in echocardiography are the Vivid 7 and 3.) Although making their first appearance at an RSNA meeting, the two Logiq products were unveiled in early October. The Logiq 9 and 7 differ primarily in their abilities to support clinical applications and perform advanced functions. The Logiq 9 supports obstetric B-flow studies and performs quantitative measurements in 3D, for example, which the Logiq 7 cannot.

The two systems incorporate a fundamentally new architecture called TruAccess, which processes and stores raw digital data. TruAccess software replaces the midprocessor and scan converter found in most competing systems.

TruAccess is composed of several elements. CodeScan, featuring GE’s fourth-generation coded technology, improves B-flow, coded excitation, coded harmonics, and coded harmonic angio. SmartScan uses adaptive processing techniques to improve patient management with tools such as 3D imaging and on-board image management display. ComfortScan creates a user-friendly scanning environment.

**Hitachi Medical Corporation of America**
Hitachi offers a wide range of EUB ultrasound systems. These include the 405 Plus, the 500, the 2000, the 525 CFA, and the 6000 series. The 405 is portable, the 500 is a compact mobile black-and-white unit, the 2000 is an advanced black-and-white system at a midlevel price, and the 525 CFA is a color Doppler system.

The all-digital 6000 product line was highlighted. The 6000 operates on a Windows NT-based platform and provides total connectivity options and many software upgradable features. It features 256-channel quad processing and 150 dB dynamic range. Wide-band focusing enables the user to maximize frame rate and resolution from the near field to the far field.

**Kontron Medical**
The company, which is owned by French firm Amphora, left the U.S. market several years ago because of a mismatch between its product line and the marketplace. It returned this last spring with a midrange color-flow system.

The Sigma 330 was featured as a high-performance yet cost-effective platform offering Doppler and color-flow imaging. The midrange system comes in different configurations and can be equipped with several types of probes, including curved-array, linear-array, and convex transducers, as well as intracavity products with biopsy capabilities. Among the features are 3D gray-scale, color-flow Doppler, and high-frequency imaging.

**Medison**
Korea-based Medison is a long-time advocate and developer of 3D imaging, while selling reliable, low-cost black-and-white scanners directly to OEMs. Some five years ago, Medison acquired Austria-based Kretztechnik, building on that company’s 3D technologies. The firm this year sold its stake in Kretztechnik to GE but maintained control of key 3D-processing technologies.

SonoAce 8000 was featured as a digital multispecialty system that performs 2D imaging, versatile 3D functions, and digital image management on a compact, ergonomically designed platform. Harmonic imaging, pulsed inversion harmonics, and multibeam processing enhance resolution for cardiac and abdominal applications. The 8000 will begin shipping this month.

SonoAce Live is for specialized ob/gyn. Featuring live 3D and volume 3D for abdominal and vaginal imaging, the system delivers 3D images in real-time at up to four volume frames per second.

SonoAce 8000 EX offers every function available on the 8000 Live except 3D. It is highly compact for internal medicine and shared service applications.
Also introduced was the 128BW, a black-and-white system that performs 128-channel digital beamforming and freehand-styled 3D ultrasound. The system eliminates artifacts through pixel-based focusing and digital implementation processing technology.

**Philips Medical Systems**
The Dutch multimodality firm entered the premium end of ultrasound in 1998 with its acquisition of ATL, then broadened its offerings this year by finalizing the purchase of Agilent HSG. The company is hoping to capitalize in ultrasound using engineering capabilities found outside this area.

Philips upgraded its flagship HDI 5000 with XRES imaging, assisted border detection, and a panoramic measurement capability. The upgrade was introduced in September for the high-end general-purpose scanner. XRES, an imaging algorithm that Philips borrowed from the MRI engineering group, improves image quality by reducing speckle and noise and enhancing tissue margins and boundaries.

**Shimadzu Medical Systems**
Shimadzu products reflect an uncommon simplicity and efficiency. Ultrasound products are relatively low cost, yet they incorporate advanced features and digital technology.

Upgrades were launched for two digital color Doppler units, the SDU-2200 and SDU-1200. Enhancements found in the new version 2.00 software support 3D fetal studies and general imaging, as well as cardiac continuous wave Doppler. The upgrade will begin shipping in January on new systems and as a field upgrade.

Version 3.10.1 software, displayed as a work-in-progress, adds tissue harmonic imaging to the SDU-450XL. The package has not yet received FDA clearance.

**Siemens Medical Systems**
A year ago the purchase of Acuson transformed Siemens into one of the world’s largest ultrasound vendors. Siemens had begun moving to this point years earlier, establishing an in-house ultrasound capability that created world-class scanners.

Sonoline Antares made its RSNA meeting debut as a premium ultrasound system. Launched in spring 2001, Antares is notable for its ergonomic features as well as its advanced digital technology. It was developed as part of a joint effort between Acuson and Siemens engineers.

New Antares transducers unveiled at the RSNA meeting exhibit developed technology built into Acuson’s Sequoia platform. The Ph4-1 provides extended penetration, while the Ch6-2 provides extremely high contrast and spatial resolution.

A proprietary tissue equalization technology was shown for both the Antares and Sequoia systems. The technology, which is applied prior to image formation, sets the correct brightness and gain in two dimensions in soft tissue for any ultrasound exam.

**SonoSite**
ATL spin-off SonoSite has become a premier advocate of handheld ultrasound scanners.

The portable 180 Plus pulsed-wave Doppler ultrasound system, formally launched in April 2001, was featured. The system and its companion SonoHeart Plus are extensions of the SonoSite 180 ultrasound system. The 180 Plus and SonoHeart Plus offer several features usually found only on cart-based systems, including tissue harmonics imaging, an ECG capability, M-mode, and PC connectivity. The all-digital, handheld system costs between $14,000 and $25,000.

**Terson**
This spin-off from the Massachusetts Institute of Technology’s Lincoln Laboratory was formed in 1994. Development of the handheld Terson 2000 began as part of a military R&D contract.

Version 2 software boosts the diagnostic capabilities and image quality of the microminiaturized ultrasound system-in-a-probe technology. The Terson 2000 proprietary software translates signals obtained by the 10-ounce beamforming SmartProbe and displays, stores, and transmits the images via standard laptop.

**Toshiba America Medical Systems**
A decade ago, Toshiba was the only multimodality vendor with a strong presence in ultrasound.
Thanks largely to its dominant position in Japan, the parent company held claim to worldwide leadership in this segment. It remains a major shareholder in the global ultrasound marketplace, despite the corporate changes that have occurred over the past several years.

The all-digital Aplio was launched. Described by Toshiba as an intelligent, ergonomic, and user-driven system, Aplio features a wideband transducer design, pivoting user panel, and 17-inch tilt-and-swivel, noninterlaced, height-adjustable display monitor. It offers a wide selection of contemporary measurement and calculation capabilities that address all clinical applications. The system, which sells for $155,000 to $175,000, is capable of fast-fusion 3D and advanced dynamic flow.

Nemio, which was released in spring 2001, is both mobile and customizable. Also fully digital, the Doppler-capable system produces high-quality 2D and 3D images. Nemio is capable of producing high-resolution renderings of fetal structures as well as fusion 3D for in-depth correlation of vascularity to soft-tissue organs. The product sells for between $55,000 and $90,000.

I-View personal video display glasses enable doctors and patients alike to easily view ultrasound images during a procedure. Weighing only 8 ounces, I-View provides full-color image viewing that is comparable to viewing an 80-inch monitor from 11 feet away.

**U-Systems**

The company designs and manufactures ultrasound equipment specifically for breast evaluation. The scanners provide high-resolution 2D and color Doppler imaging, as well as high-frequency, wide-aperture transducers.

The Vista platform debuted as a dedicated breast system. Features include lesion border identification with contouring, enhanced visualization of lesions, and automatic needle visualization within a lesion during interventional procedures. Five systems have been sold since Vista cleared the FDA in June. The company hopes to sell up to 50 units during 2002. Vista may eventually be enhanced for use in other applications.

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