Technical exhibit at 1995 RSNA conference shows managed care's influence on radiology

Corporate partnering and image management are major trends

Last month's Radiological Society of North America meeting capped a year that saw vendors continuing to retrench in response to managed care's impact on medical imaging. Equipment sales throughout the year were flat in nearly all modalities, with CT, cardiac catheterization labs and mammography showing strength. MRI continues to be a tough sell: Most vendors said the market is down about 10% this year -- a discouraging prospect given the modality's sharp fall in both 1994 and 1993.

Despite the lack of growth, many imaging companies began to post improving financial results in 1995 as restructuring efforts started last year began bearing fruit (SCAN 8/30/95). It took some pain to get there, but vendors now sport leaner organizations that are more in line with the realities of managed care.

Vendor partnering was a major trend at last month's conference. Few companies now can afford to spend the $200 million to $300 million Siemens laid out for its new Sonoline Elegra ultrasound scanner. Instead, they are choosing OEM alliances with other firms as a means of broadening their product lines without massive R&D investment.

The following pages of Scan Special Report offer a brief review of new developments in major modalities that were on display on the technical exhibit floor in McCormick Place.

PACS firms grab RSNA spotlight

If one were to choose an overall theme for the 1995 conference, it would have to be the increasingly pervasive influence of digital image management and networking. Radiologists beset by managed care are demanding more efficient solutions to help them manage images, and the ACR-NEMA's DICOM 3.0 connectivity standard is enabling vendors to make those solutions a reality.

Indeed, a recent study by Andersen Consulting of New York City should be a wake-up call for companies without image management products or OEM relationships: Hospitals are shifting purchasing dollars from scanners and other big-ticket equipment to information technology. Medical imaging vendors without such products risk missing this wave, and are scrambling to avoid getting left behind. Many vendors have already responded by forming partnerships and OEM alliances to access PACS solutions.

ISG Technologies was a major beneficiary of this trend. The Mississauga, Ontario, vendor cemented new workstation supply relationships with Shimadzu, Access Radiology and Konica. ISG also announced its appointment of former Siemens nuclear medicine chief executive Thomas Cafarella as president and CEO.

ISG rival Cemax-Icon of Fremont, CA, touted its new relationship with 3M and Hewlett-Packard (SCAN 11/8/95). Under the terms of the alliance, Cemax-Icon will develop applications software, 3M will
provide sales and marketing expertise and HP will offer hardware and service. HP will be the preferred hardware platform of the alliance, although Cemax-Icon will continue to offer Sun-based workstations.

Agfa of Ridgefield Park, NJ, emphasized an OEM deal struck in November with Elscint in which the Israeli vendor would promote Agfa products to its sites interested in PACS. Agfa also featured its ADC 70 computed radiography reader, which it can now market in the U.S. thanks to a licensing deal with Fuji.

Eastman Kodak is in the process of restructuring its Health Sciences division, with a major emphasis on reorganizing its PACS business (SCAN 12/13/95). At the RSNA meeting, the Rochester, NY, vendor said it was negotiating an alliance with MedImage to bring that company's nuclear medicine image processing workstation into Kodak's Imagelink PACS line. Kodak showed progress in integrating ATL's Access workstation into Imagelink, and the company said its Digital Science logo will be used on digital healthcare products. In addition, Kodak signed a deal with Siemens for computed radiography sales.

Philips has been restructuring its PACS effort since the demise of CommView in 1991, and at the Chicago meeting the Dutch vendor unveiled Inturis for Radiology, the company's modality cluster-based PACS product. Inturis relies on EasyReview primary diagnosis workstations, EasyVision modality workstations and SiteView PC-based remote viewing workstations. E-Med debuted TruView, a 2k x 2.5k version of its MegaScan monitor that will be used exclusively with E-Med workstations. E-Med, of San Antonio, TX, also said it has hired Siemens veteran Larry Ware as vice president of sales and marketing.

Loral scored a major coup in the months prior to the RSNA show by landing all three filmless-hospital contracts put up for bid this year by the Department of Veterans Affairs. Loral, of Hoffman Estates, IL, estimated the aggregate value of the contracts to be $7.8 million. Loral also inked a deal with EMASS for that company's archiving products and unveiled a new version of its Vantage software.

GE's Network Products and Services division made its second RSNA appearance after debuting at last year's show (SCAN 12/14/94). The Milwaukee company announced at this year's meeting that it had begun a $19 million collaborative project with information systems vendor Shared Medical Systems (SMS) and the U.S. Department of Commerce to develop solutions for capturing, integrating and transmitting multimedia medical information across health information networks like local and wide area networks (LANs and WANs).

Olicon Imaging Systems is another PACS software developer that has latched onto the partnering trend. The San Clemente, CA, firm announced a new relationship with Picker International's Health Care Products division that will complement OEM deals with Du Pont and Bell Atlantic signed earlier this year (SCAN 9/13/95 and 7/6/95). Olicon announced that it has ported its PACS software from DOS to Windows NT. The vendor formed a dedicated services division to sharpen its image-management offerings.

3M reassured customers about its plan to spin off its Medical Imaging Systems division into a new company. 3M officials say the move will make the new company a more responsive entity with fewer layers of corporate bureaucracy. With its alliance with Cemax-Icon and Hewlett-Packard in place, 3M of St. Paul, MN, has retooled its electronic imaging division to focus on sales and marketing rather than internal development of PACS products. 3M also showcased its DryView dry-process laser printer. 3M is developing a second-generation version of DryView for high-resolution applications such as full-view digital mammography.

DR Systems displayed a patent the company received from the U.S. Patent Office for its method of automating the display and reading of medical images (SCAN 6/7/95). In November, the San Diego company sent a letter to 70 medical imaging firms notifying them that it had received the patent. Company officials say they want to share the technology with other PACS firms, but will not comment on what strategy they will take to defend the patent.

Siemens displayed MagicView 50, a work-in-progress PC-based teleradiology workstation for referring physicians. Siemens also touted its new computed radiography relationships with Kodak and Fuji. The Iselin, NJ, vendor publicized several large filmless hospital contracts it won this year. Newcomers to the PACS market debuting at the RSNA meeting included Canon subsidiary AOP Medical of Gardena, CA, with its PF-PACS line. X-ray digitization firm Infimed of Liverpool, NY, jumped into image management through its acquisition of Archival Data Management, which is developing an image and patient records management system. EMASS of Englewood, CO, unveiled its large-scale media-independent archiving technology. Rogan Medical Systems is a Dutch PACS vendor trying to transfer its success in Europe to the U.S.

Siemens' Elegra debut is ultrasound highlight
Siemens Ultrasound of Issaquah, WA, may have raised spirits with the launch of its high-powered Sonoline Elegra scanner, but last month's RSNA exhibition for the most part was a routine outing for connoisseurs of ultrasound technology.

Siemens was the undisputed crowd-pleaser. The company demonstrated the virtuosity of Elegra with unique features like extended field-of-view imaging, which scrolls a real-time image across the screen during long acquisitions.

Diasonics of Milpitas, CA, demonstrated progress toward the introduction of the industry's first practical 2-D probes. Side-by-side comparisons of gray-scale images acquired in 1-D and 2-D modes showed that the 2-D technique improves the definition of tissue textures and the detectability of lesion boundaries in all dimensions, while disclosing more diagnostic information. Regulatory clearance is pending.

Diasonics also showcased Synergy, a new scanner that provides selected high-performance features on a moderately priced platform. The investigational PC-based scanner is equipped with matched impedance confocal array probes, UltrasoundAngio, color Doppler and patient-specific imaging.

ATL of Bothell, WA, enhanced the clinical value of its premium HDI 3000 scanner with 3-D Color Power Angio, a major improvement to amplitude-based color Doppler imaging. The optional feature operates with standard ATL probes.

Biosound of Indianapolis went to Chicago to raise its visibility by more closely associating itself with its Italian parent Esaote Biomedica, which this year released the AU3 and AU4 scanners. Both systems offer gray-scale and color-flow capabilities for shared-service customers. AU3 is designed for portable applications with multi-frequency, wide-bandwidth characteristics and frequency ranges between 2.5 and 10 MHz. AU4 is another shared-services platform but is capable of producing frequencies up to 20 MHz.

Philips of Shelton, CT, introduced the Advanced Value Platform as a standard feature for SonoDiagnost 600. It includes Color Velocity Imaging, Philips' exclusive time-domain blood velocity imaging technique. CVI-Q, a blood-volume measurement technique, is available as an option.

Acuson of Mountain View, CA, emphasized a new upgrade to the Acoustic Response Technology platform (SCAN 11/8/95). Tissue Contrast Resolution (ART/TCR) improves the ability of Acuson's 128 XP/10 scanners to differentiate between types of soft tissue.

GE claimed substantial U.S. and world ultrasound market-share growth stemming from increased high-performance radiology sales, according to Omar Ishrak, general manager. Worldwide sales revenue rose 38% in 1995, he said. A key to that growth was the introduction of the Advanced Logiq upgrade in September. It has helped Logiq 500 go head-to-head with the best technology Acuson, ATL and Diasonics have to offer, Ishrak said.

Aloka of Wallingford, CT, shone the spotlight on its new MultiView upgrade for the general-purpose SSD-2000 radiology scanner. The enhancement endows SSD-2000 with PowerFlow amplitude-based color Doppler capabilities and improves its frequency-selection function, allowing users to adjust the frequency of its multi-frequency probes in gray-scale and color Doppler modes.

Acoustic Imaging displayed progress on its investigational maximum entropy method (MEM) color-flow technique. This unique algorithm was applied in breast imaging research conducted by Dr. Christof Sohn at the Women's Clinic of the University Hospital in Heidelberg, Germany. He has been able to classify the severity of tumors by quantifying blood flow using MEM. The Phoenix company also disclosed its plan to consolidate with parent Dornier Medical Systems.

Perception Imaging of Miami released GPS 5000, a general-purpose ultrasound scanner capable of supporting 2 to 15-MHz electronic transducers. GPS 5000 supports traditional ultrasound applications while offering special features, such as the ability to incorporate on the scanner a database function capable of storing up to 500 patient files, including annotations, diagnostic information and historical studies.

Shimadzu unveiled EchoView SD-350, a 30-pound portable scanner that handles applications in radiology, ob/gyn, urology and breast imaging. The work-in-progress unit will operate with Shimadzu's TrueVision 128-channel probe technology.

Shimadzu also introduced the Plus-Alpha upgrade for its SDU-400 scanner. Plus-Alpha permits the ob/gyn platform to run the company's new multihertz superficial probe, biplane transrectal probe and endfire transvaginal probe.

Shantou Institute of Ultrasonic Instruments debuted as the first ultrasound equipment vendor based in the People's Republic of China to participate in the RSNA exhibition.

**Vendors turbo-charge MRI gradients**

This was a year when the excitement in MRI at the RSNA show resided in the details of gradient performance improvement and the promise of new applications illustrated in clinical images.
scattered among the vendor displays. New gradient coil designs improved scanner speed and resolution while enabling echo-planar imaging capabilities to proliferate. More companies featured cardiac packages that depicted coronary arteries with better resolution.

Tustin, CA-based Toshiba showed Visart as a work-in-progress that features the same Silicon Graphics computer and icon-based user interface that Toshiba touts as strengths of its 0.5-tesla Flexart platform. The 17-mtesla gradient package operates at a slew rate of 23 mtesla/m/sec. After a seven-year hiatus, Fonar of Melville, NY, returned to the Chicago meeting with a new generation of open MRI equipment. CEO Dr. Raymond Damadian sees opportunities for his low-cost technology in addressing the need for cost-control. He also plans to target clinics that cater to claustrophobic, obese and pediatric patients.

There's no doubt that Fonar's two new products offer the industry's largest open imaging platforms. Quad 7000 is designed around a 0.35-tesla permanent magnet. Damadian promoted the 0.6-tesla Quad 12000 as the industry's first “high-field” open MRI, because of its vertical-field electromagnet and efficient solenoid surface coils. Quad 7000 and Quad 12000 cost $650,000 and $850,000, respectively.

Other show highlights included Elscint's release of an 18-mtesla gradient upgrade for the 1.5-tesla Esteem. The Israeli vendor also received FDA clearance for its 2-tesla Prestige and 0.5-tesla Privilege scanners.

Hitachi showed investigational upgrade packages for the 0.3-tesla open Airis and 1.5-tesla Stratis that feature fast-scanning and MRA techniques.

Lunar of Madison, WI, displayed the Release 4.0 upgrade for the Artoscan niche scanner made by Esote. It incorporates 3-D imaging improvements, including better 3-D reconstructions, multiplanar reformating and image storage. Niche competitor Magna Lab of Hicksville, NY, showed examples of T2-weighted images and gradient-echo inversion recovery.

Philips unveiled the PowerTrak gradient series, which includes the 15-mtesla PowerTrak 1000 for all three field strengths in its Gyroscan NT line, the 21-mtesla PowerTrak 3000 for the Gyroscan NT 1- and 1.5-tesla platforms, and the ultra-fast 21-mtesla PowerTrak 6000 package with a higher slew rate for research customers. PowerTrak 3000 and 6000 await FDA clearance.

Siemens displayed TurboGradient, a 20-mtesla gradient set for the 1-tesla Magnetom Impact. The vendor also featured a 15-mtesla gradient upgrade for its Magnetom Open magnet.

GE introduced the U.S. market to Signa Contour, a 0.5-tesla scanner that debuted at the European Congress of Radiology meeting in March (SCAN 3/15/95). New 23-mtesla gradients for the 1- and 1.5-tesla Horizon were packaged in performance options that include HiSpeed for multishot EPI and EchoSpeed for single-shot EPI. The vendor also showed commercial versions of its PROBE (proton brain exam) spectroscopy applications software.

Picker highlighted its new 27-mtesla PowerDrive gradient option for its 1-tesla Vista scanner. Multishot EPI is possible on the 0.5-tesla Picker Asset when equipped with new gradients.

New at the Shimadzu booth was the 0.5-tesla Magnex Alpha II equipped with 14-mtesla gradients, as well as the 1-tesla Magnex 100/AP and Magnex 100/XP scanners. The fully featured Magnex 100/XP can be equipped with 15-mtesla gradients capable of one-second T2-weighted imaging.

Debuting at the RSNA conference was the work-in-progress 0.18-tesla Ortho 8000 scanner developed by InnerVision MRI of the U.K. for niche orthopedic applications. The scanner will be marketed in the U.S. by Vision Medical of Ontario, CA.

Varian Associates of Palo Alto, CA, introduced its next generation of ultra-high-field scanners with the rollout of its UnityInova 4-tesla magnet for spectroscopy research. Israeli vendor Direx showed its open-access 0.1-tesla Marex magnet as a work-in-progress (SCAN 3/29/95).

**New product offerings bolster CT**

CT remains one of the few bright spots in the medical imaging industry. Sales surged in 1995, spurred by the expansion of spiral imaging to lower price points, while aggressive price competition added incentive for users to upgrade.

Moderately priced platforms introduced at the 1995 RSNA show boasted features previously reserved for premium scanners. At the same time, new performance standards based on fast scanning were established for systems on the high end.

Picker claims its new PQ 2000S sets a new standard for spiral coverage and spatial resolution improvement. Double Volume Spiral (DVS), a high-speed spiral mode using a 2:1 pitch, is credited for allowing these performance improvements. DVS covers a given volume in half the time of scanners tuned to standard 1:1 pitch protocols, according to the manufacturer. Radiation dose and tube...
loading are cut in half.

For its HiSpeed Advantage line, GE displayed CT/i, a new console operator interface. CT/i is designed to be more intuitive for users and employs an icon-based, point-and-click interface. GE also showed a 90-slice option for its ProSpeed line, optional helical scanning on the entry-level Sytec Synergy, and Navigator, a 3-D virtual fly-through image processing technique for the Advantage Windows workstation.

Toshiba touted Aspire CI as an important advance in the application of CT for interventional radiology. The CI in Aspire stands for continuous imaging, which is what customers will get from Aspire CI when it gains regulatory clearance as a hardware and software upgrade to the top-of-the-line Xpress/SX, according to David Easton, CT product manager.

Philips is also looking to expand CT's role as a surgical guidance instrument. This interest encouraged Philips engineers to develop virtual real-time reconstructions for the Advanced Volume Tomoscan CT line. Enhancements to Philips' high-performance CT scanner generate reconstructions at a rate of one image per second, according to Marc Lawrence, product manager. Philips also displayed two new tubes in its MRC line: the 6.2-million-heat-unit (MHU) MRC 201 and the 3.5-MHU MRC 160.

Speed and convenience are key selling points for Shimadzu's new slip-ring SCT 7000T series. The work-in-progress SCT 7000TX features one-second scan times and three-second cycle times. The companion SCT 7000TH handles scans in 1.5 seconds and completes cycles in five seconds, according to Donald Karle, MR/CT marketing manager. It is also a work-in-progress.

Elscint displayed SeleCT, a work-in-progress entry-level scanner with spiral capability. The company will sell the system primarily in developing markets.

Elscint also introduced MasterWorks, a series of processing and hard-copy production enhancements. MasterCut is an interactive curved-plane image-processing technique that enables users to gain cross-sectional views of the lumen to evaluate stenosis rates. MasterMatch is an investigational multimodality image fusion technique.

Siemens introduced numerous enhancements under the CARE brand-name for its high-performance Somatom Plus 4 spiral CT scanner. They include CARE Topogram, a real-time growing topogram that tells the technologist when to halt scanning to minimize patient dose; CARE Slice, a volume artifact reduction technique; CARE Filter, a system that eliminates soft radiation that doesn't contribute to image resolution; and CARE Bolus, new bolus-tracking software.

Siemens also revamped its MagicView CT processing workstation with a new icon-driven menu that makes the system more intuitive and user-friendly, according to Chuck Armstrong, national sales manager.

**ADAC takes lead in high-energy imaging**

Nuclear medicine firms continued their emphasis on high-energy imaging, with one firm -- ADAC Laboratories -- building a strong lead in the technology. ADAC of Milpitas, CA, debuted molecular coincidence detection (MCD), its version of the technology, at the Society of Nuclear Medicine meeting in June. ADAC solidified its head start at the Chicago meeting, receiving 510(k) clearance just days before the show.

ADAC also discussed its acquisition of JD Technical Services, which will enable it to service and refurbish cameras manufactured by other vendors. ADAC is building a teleradiology component for its gamma camera workstations through a relationship with Evergreen Technologies of Castine, ME.

GE provided the only major nuclear medicine product introduction that had not already been seen at the Minneapolis SNM meeting. The vendor entered the market for hybrid digital gamma cameras -- those with photomultiplier tubes and all-digital signal processing architecture -- with its debut of Millennium. Millennium is a single-head cantilever-style camera that features a digital signal processing technique called correlated signal enhancement (CSE).

GE places an analog-to-digital converter on each PMT tube, and CSE detectors gather and sum signals from PMT rows and columns before any signal processing is done. The detectors dramatically improve Millennium's count rate relative to GE's other cameras and enable the development of coincidence detection imaging, according to the company. GE is also developing solid-state detector technology, but did not feature that work in its RSNA booth.

Elscint won FDA clearance shortly before the meeting for two nuclear medicine advances: its VariCam variable-angle dual-head gamma camera, introduced at the SNM meeting, and its TransACT simultaneous attenuation correction protocol. Elscint is developing a coincidence detection capability for VariCam as well as the dual-head Helix camera.

Picker emphasized the SIM-400 cardiac gamma camera it acquired when it bought Scinticor's assets in September. The company showed panels on 511-KeV and coincidence detection imaging, as well
as ongoing investigational work in scintimammography. Picker also featured an Odyssey VP workstation with Image EXpress, a work-in-progress telemedicine component, and 3-D image viewing using special glasses made by StereoGraphics.

Making its RSNA debut was SMV, the product of the merger between Sopha Medical and Summit Nuclear. The Twinsburg, OH, company showed coincidence detection images from investigational work being conducted in Europe, as well as a new fully automatic cardiac processing protocol. Siemens' nuclear medicine group announced that it would move all its gamma cameras to an open architecture. It also emphasized its HD digital detectors, which are now shipping. Toshiba showed 511-KeV images and said it was revisiting work done years ago with its cameras in coincidence detection. Park Medical of Montreal, Quebec, showed high-energy imaging research and said it is working on a technique for nonuniform attenuation correction that does not require an external transmission radiation source.

Digirad of San Diego appeared at an RSNA meeting for the first time with its solid-state detector technology (SCAN 7/6/95). Trionix of Twinsburg, OH, announced that it had completed work on its absolute quantification modules for addressing the problems facing SPECT quantification: scatter, attenuation and geometric collimator response.

**Fischer shows full-field digital unit**

Fischer Imaging's debut of a working prototype full-field digital mammography unit highlighted the growing importance of the technology. Denver-based Fischer's SenoScan uses a slot-scanning technique and an array of six charge-coupled device (CCD) detectors for converting x-rays into digital data. Other developments at Fischer's booth included a new CCD camera for its MammoTest Plus prone stereotactic biopsy table. The new camera has a larger 5 x 10-cm field-of-view and can also be used on Fischer's upright systems.

Unlike Fischer, Lorad and Bennett -- now sister companies under the aegis of ThermoTrex Medical -- have redirected their full-field digital programs away from a dedicated system. Instead, they plan to integrate each company's technology into a full-field detector that can retrofit to Lorad's new M-IV system as well as Bennett's Contour. Second-generation versions of the detector could be used to convert conventional R&F to digital, according to ThermoTrex Medical president and CEO Hal Kirshner.

M-IV is a new premium mammography platform from Danbury, CT-based Lorad that features the vendor's new high-transmission cellular grid (HTC) technology, which will also be adapted for Contour (SCAN 10/11/95).

GE introduced two new mammography systems, Senographe 700-T and Senographe 800-T. The products integrate technology from GE's Senographe 600-T with that of the vendor's premium DMR system. DMR will be GE's platform for digital spot and full-field digital devices under development, according to the company.

Elscint introduced Glory, a work-in-progress system that features a new 100-kHz generator, a biangular x-ray tube and a new master exposure control feature that automatically adjusts exam parameters.

Picker again displayed its Preference system, which has received FDA clearance since its debut at last year's meeting.

Siemens showed the Mammomat 300 and Mammomat 3000 systems, which like Preference were also introduced at the 1994 conference.

Computer-aided diagnosis developer R2 Technology of Los Altos, CA, made its RSNA debut with MammoChecker, which flags areas of interest for mammographers.

Biopsy Medical of San Juan Capistrano, CA, introduced MammoTome, a new percutaneous biopsy device that uses a vacuum technique to draw tissue into the probe.

Milwaukee-based Instrumentarium displayed a new breast biopsy table and a new patient ID flasher.

**Disclosures:**

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