

rad review

rad review of CT and MRI

RSNA update on new MRI technology

The last meeting of the Radiological Society of North America (RSNA) offered the chance to MRI equipment manufacturers to showcase their latest developments. The general focus was on broadening the application field of MRI systems, especially in 3D high-resolution, cardiac imaging and body diffusion imaging. Multiple products were also presented that can improve workflow by simplifying imaging and post-processing and by making review and analysis tools available across applications. In addition, new algorithms were introduced that enhanced the quality of parallel imaging techniques. New coils were also offered that tap into the powerful performance of multi-channel RF systems.

GE Healthcare has added the Signa HDe 1.5T to its family of MRI products. It has a single electronic cabinet that can be positioned inside the scanner room rather than in a separate equipment room. According to GE, installation of the Signa HDe can be completed within 10 days. The gradient specifications of HDe are lower than other GE Signa 1.5T MRI systems, and it is available only with four and eight channel radiofrequency (RF) systems, but it can support clinical applications in cardiac and spectroscopy imaging.

GE has upgraded its 1.5T and 3.0T Signa HD products to Signa HDx. This upgrade includes a new RF system with 32 channel architecture and a new, scalable, image reconstruction engine, XVRE, which enables faster data acquisition techniques. Signa HDx also features advancements in parallel imaging by introducing GEM (Generalised Encoding Matrix) reconstruction, which merges the calibration with the main scan in order to speed up acquisition and increase signal-to-noise ratio (SNR). GEM can be combined with new multi-channel coils for head-neck-spine, body, wrist and knee imaging. This allows faster GE proprietary applications: Propeller-XV for motion-resistant brain imaging; Vibrant-XV for breast scanning; Lava-XV for body imaging; and Tricks-XV for time-resolved angiography.

Hitachi Medical Corporation showcased the Airis Elite 0.3T open MRI system, which combines mid-field performance with higher-order active shim technology, high homogeneity and sophisticated application and sequence capabilities.

Philips Medical Systems unveiled Intelligence – a concept that offers automated examination planning to optimise workflow. It also introduced improvements to its NetForum online MRI community initiative, which provides users with a central location for information, support and services. Philips presented two imaging techniques that take advantage of its multi-channel FreeWave RF system: 4D contrast and K-T Blast. 4D contrast combines centra, keyhole and sense imaging techniques to provide faster, high resolution angiography

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studies. K-T Blast offers high spatial and temporal resolution cardiac imaging that can also be combined with Sense imaging coils to further increase imaging speed.

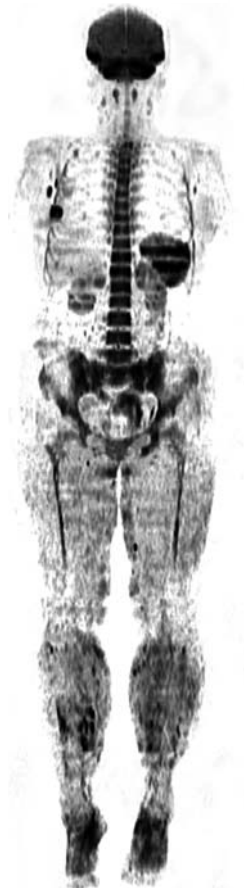
Philips has updated its Fibertracking package to offer diffusion imaging with up to 128 directions and introduced a new whole body diffusion imaging package (DWIPS). Spectroscopy has also been enhanced with 3D-Stein sequences with shorter echo times, Sense-coil compatibility and data analysis on the main workstation. These enhancements have been applied to the Achieva 3T, Achieva 1.5T and Panorama 1.0T systems. Philips has a new 16 channel body coil, which can be combined with the 16 channel neurovascular coil for body imaging studies. Philips also offers a new workstation 32" display monitor, USB connectivity and a DVD burning facility.

Siemens Medical Solutions has added the Magnetom Trio MRI system to its line of total imaging matrix (TIM) technology-based products. The 3.0T system is the first capable of whole body, abdominal, cardiac, spine and orthopaedic imaging. TIM enables flexible coil combinations for high resolution imaging of large anatomical areas without the need to change coils. Siemens also offers the new Intelligent coil control feature that allows automatic selection of coils and elements. Planning the MRI scans has also become easier with the TIM planning suite, which allows simultaneous planning in multiple anatomical areas on the same localiser image. In addition, inline composing fuses images from different areas of the body for more complete demonstration of results. TIM now incorporates the adaptive coil control concept for image reconstruction that increases image SNR by producing distributions of coil sensitivity matched to regions of anatomies under study. The TIM application suite has also been expanded to include susceptibility weighted imaging (SWI), whole body diffusion imaging (Reveal) and diffusion tensor imaging with up to 256 directions. A new application suite for breast imaging offers the option of advanced motion correction algorithms that minimise image errors from physiological motion. Siemens presented 3D Beat as a single tool that simplifies cardiac examinations by combining studies of morphology, function, tissue characterisation and 3D coro-

nary anatomy. Siemens has introduced Expert-I, which allows users to remotely log on to the MRI system and plan an examination. A new image processor board, MCPro Multi 2, offers faster inter-CPU communication that speeds up image reconstruction.

Toshiba Medical Systems highlighted its Vantage F² 1.5T MRI system with upgraded ZGV gradient system (strength 33mT/m and slew rate 200T/m/s). This is expected to get Food and Drug Administration (FDA) approval in the US by the end of 2005. New features include an eight channel RF system and new multi-channel coils for breast, knee, head-neck-spine and head imaging. The new V7 software package includes automatic image fusion and gain algorithms that reduce apparent noise and correct distortion. There is also a new patient-table control system that offers better accuracy in positioning the patient at the magnet's isocentre.

FIGURE 1 Diffusion body scanning, with DWIPS for oncology (courtesy of Philips).



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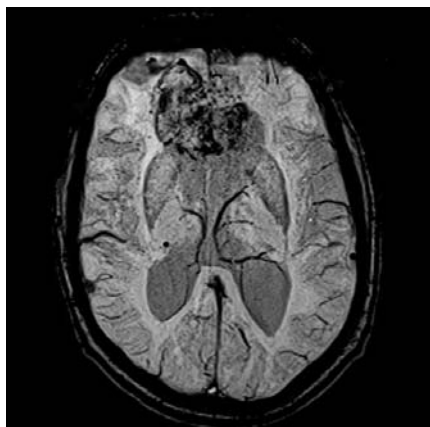


FIGURE 2 SWI demonstrates the vascular component and the haemorrhage within the tumour (courtesy of Siemens).