

Innovating Every Workflow Step

At this year's Radiological Society of North America Annual Meeting, Siemens introduces its latest crop of new and exciting products. All are designed to fill the needs of customers in today's climate of rapid technological change and workflow improvements, and are adaptable to serve them well into the future.

By Haig Simonian

To say that innovation is an essential part of Siemens seems like stating the obvious. This, after all, is the company that introduced the world's first X-ray tube, the first commercially available ultrasound system with real-time display, the first instant image generated by computed tomography (CT), and the first common user interface across imaging modalities, *syngo*[®]. But innovation today means much more than fancy products with long names. As busy physicians and technicians know all too well, 'new' is no longer enough. Stretched budgets – whether from public-sector healthcare providers or private-sector reimbursement schemes – mean a new diagnostic or therapeutic tool has to offer real advances in terms of reducing costs or improving quality of care, and ideally both.

"Innovation for me means something that offers a significant improvement for my customers. Even though improved patient care is still the primary criterion, financial benefits from these innovations are also getting more and more important," says Norbert Gaus, Head of the Angiographic, Radiographic and Fluoroscopic (AX) Division at Siemens Medical Solutions. "We support our customers by specifically developing products and solutions that increase the quality of healthcare and preferably simultaneously lower its cost." Take the new Artis™ zee family featuring Artis zeego* from Gaus' own Division. Designed for a wide range of interven-

tional procedures, the family offers not only patently better image quality, but also significantly enhanced operability for physicians and technicians, saving both time and money. Siemens philosophy when developing the Artis zee family was to help customers to see more, so they can do more – because only excellent image quality helps them to make better treatment decisions and improve patient care. The company wants their customers to be at the forefront of technology and get the most from their interventional suite. They are achieving this goal by providing systems with excellent imaging capabilities and enhanced workflow improvements, so customers can invest with confidence.

Such advances are critical – and potentially lifesaving – in the intricate heart, brain or abdominal procedures, among others, for which the new equipment has been designed. "We can acquire high-quality, cross-sectional images in the interventional suite," explains Gaus, an electrical engineer who has spent much of his career in research, especially in information technology. Artis zeego* is the first multiaxis system that can be positioned exactly the way it is needed, and controlled with far greater ease and precision than any traditional floor- or ceiling-mounted system, he says. "It provides greater positioning flexibility and broader coverage, including large volume cross-sectional imaging." "If you have clarity after ten minutes, you

maybe save a life, and you certainly save cost," agrees Bernd Montag, speaking of the improvements in the products being unveiled by the Computed Tomography (CT) Division he runs. Montag highlights the new adaptive scanner (AS) version of his Division's SOMATOM[®] Definition era system, a 2007 RSNA debut building on the breakthroughs of the first SOMATOM Definition product two years ago. "This is the world's first adaptive scanner. It can be matched to any patient, including those who might have been difficult to scan before. This is what I call the transition from 'almost' to 'always,'" says Montag, describing the system's significantly enhanced flexibility. SOMATOM Definition AS** also allows radiologists to be much more specific in their judgments, thanks to exceptional clarity. Moreover, adds Montag, with the ability to produce up to 128 slices per rotation with down to 0.24 millimeter resolution – far more than any previous system – it can create a virtual three-dimensional copy of a patient.

Customer Input Drives Improvements

But it is not just one or two Divisions of Siemens Medical Solutions that will share

* The information about this product is being provided for planning purposes. The product is pending 510(k) review, and is not yet commercially available in the USA.

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Artis zee: An Entirely New Family for Interventional Imaging

With Artis™ zee, Siemens Medical Solutions launches a completely new family that provides high-end imaging for interventional suites in radiology and cardiology. The versatile systems offer excellent image quality, enhanced speed and workflow, as well as improved ease of use, which also makes them suitable for the operating room (OR). A highlight of the new Artis zee family is Artis zeego*, the first multi-axis system that can be controlled with far greater ease and precision than any traditional floor- or ceiling-mounted system. It offers many possibilities.

Installed in an interventional lab, the system provides excellent 3D imaging including Large Volume *syngo* DynaCT* and improved stent visibility with IC Stent*. Installed in an OR environment, Artis zeego is readily available when required, but easily stows away when not needed, giving the surgical team all the access it needs for pure surgical procedures, such as anesthesia, while at the same time it leaves the ceiling free for laminar airflows, lighting, and other installations. The great flexibility of the multi-

axis stand allows the OR to be used for both surgical and endovascular or cardiovascular procedures. During emergency situations, the surgeon can directly start with open surgery without wasting valuable time to transfer the patient to the OR. Thanks to its flexible working height, it also helps prevent back pain and fatigue in the surgical team.

The great flexibility of the whole Artis zee family for angiography and cardiology suggests some changes in the clinical processes to improve financial benefits as well. For example, hospitals could move interventional needle procedures to the angio suite, utilizing *syngo* iGuide to provide planning for live and integrated needle guidance. This would free the computed tomography (CT) system for better reimbursed diagnostic examinations. *syngo* DynaCT offers cross-sectional imaging in the interventional suite and provides easy navigation and control during procedures like chemoembolization or radiofrequency ablations.

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Norbert Gaus, President, Angiographic, Radiographic and Fluoroscopic Division, Siemens Medical Solutions, Forchheim, Germany

the limelight at RSNA. Over at Magnetic Resonance (MR), the Division is unveiling a pair of groundbreaking – and surprisingly complementary – newcomers.

MAGNETOM® Verio promises to combine Siemens best performance levels in a novel format that should be noticeably more patient-friendly, while also improving workflow for staff. It is the most exciting equation in MRI: three Tesla field strength plus 70 centimeter Open Bore, plus Tim® (Total imaging matrix) technology. Adding ten centimeters of width to the bore may not sound like much to the layman, admits Walter Märzendorfer, Head of the MR Division. “But offering a first-ever, 70-centimeter bore while maintaining 3 Tesla field strength will make a massive difference for

patients who have felt uneasy about the restricted space available in the past,” he says. “We’ve also managed to build the shortest 3 Tesla system on the market today. That means patients can have a good experience during the examination. And noise levels are optimized thanks to intense work by our researchers on the system.”

Märzendorfer, who formerly led development in CT, is justly proud of his new product. But he also understands that not every hospital or practice will have the financial resources to afford such equipment. So MR is also unveiling what he calls a “value product” in the form of the new MAGNETOM Essenza scanner, designed for smaller hospitals and prac-

Norbert Gaus

Head of the Angiographic,
Radiographic and
Fluoroscopic Division at
Siemens Medical Solutions



tices that want to take advantage of the opportunities offered by MR, but at a more affordable price.

"This system will make MR imaging attainable for many hospitals and practices that simply can't run it today. MAGNETOM Essenza represents a paradigm shift. It could change the market," Märzendorfer predicts. The key lies in the fact that Siemens put many innovations together,

including Tim, that allow combining excellent performance with a patient-friendly design, "in a package really optimized for total cost of ownership," he says. "We know there is enormous cost pressure on our customers, so we've got to find ways to make MR more affordable for new users." Whether in AX, CT, MR or other key Divisions, all new Siemens products reflect intense interaction between the company's

research and development and marketing staff with key customers. For Klaus Hambüchen, Head of the Ultrasound (US) Division, such interaction starts well before the first ideas reach the drawing board. At his headquarters in Mountain View, CA, USA, Hambüchen and his teams invite about 100 ultrasound power users and key customers a year to visit the Siemens Ultrasound Innovation Center



**MAMMOMAT Inspiration:
Increasing Mammography Acceptance**

With MAMMOMAT® Inspiration*, Siemens is developing a product platform for mammography with the goal to combine technical innovation and patient-centered design. In its different configurations, MAMMOMAT Inspiration shall address the needs of a screening environment and additionally provide easy upgradeability to diagnostic mammography and stereotactic biopsy. It is planned with high throughput and workflow efficiency for screening as well as excellent image quality at low dose in mind. An equally important aspect in its development is patient well-being and thereby increasing the acceptance of the screening process. Backlit MoodLight™** panels are planned to support MAMMOMAT Inspiration providing a mammography environment with the aim to help alleviate patients' fears and improve the diagnostic center's image. In addition, it shall represent a technology platform that opens customers a smooth upgrade pathway from today's configuration to future three-dimensional mammography with tomosynthesis*.

* CAUTION: Investigational Device. Limited by U.S. Federal law to investigational use. This product is not commercially available in the United States (USA). The information about the MAMMOMAT Inspiration is being provided for planning purposes. The product must be reviewed via the FDA PMA review process and its future availability cannot be ensured.
** Planned to be an option.

“We want to optimize everything from how you conduct an examination to distributing the data to provide the highest image quality and the maximum throughput.”

Jochen Dick, President, Special Systems Division, Siemens Medical Solutions, Erlangen, Germany

and discuss how the Division's products can be further improved. “This is where we gain a lot of direction and perspective about the clinical priorities,” says Hambüchen, a long-time Siemens executive who has spent virtually his entire career in different Divisions at Siemens Medical Solutions. “Such contacts are especially important in the early phase.” The filtering process from initial idea to eventual innovation is relentless – and sometimes ruthless. “You cannot assume that every concept, no matter how promising, will result in a product,” he explains. “We consider it a success if out of every ten early-stage ideas, three survive into further development.” Hambüchen argues that the sheer variety of ultrasound, with applications from general imaging, gynecology, urology, obstetrics to cardiovascular imaging, makes customer feedback particularly important. “Ultrasound covers the widest range of applications,” he says. “Compared to other

imaging modalities, however, true innovation in ultrasound has been slow over the last ten years. This is why we're focusing on reestablishing ultrasound's credentials by introducing a new generation ultrasound platform that will be offering unprecedented customer demand fulfillment.” The ACUSON S-Class, making its debut at RSNA, breaks new ground in the specificity of ultrasound with the introduction of Acoustic Radiation Force Impulse (ARFI) imaging. ARFI exploits differences in the mechanical properties of soft tissue to delineate tissue structure that is not necessarily apparent with conventional B-Mode ultrasound. This technology has the potential to differentiate, for example, tumors from healthy tissue. Says Hambüchen: “Our customers and their passion for workflow improvements helped us to achieve this goal.” “In the past five to ten years, there have been some dramatic changes,” adds Montag of CT. “We have gone from being



Jochen Dick

Head of Special Systems
Division at
Siemens Medical Solutions

a very technology-focused company to one driven by the exciting interplay between technology and customer requirements.”

Emphasis on User-Friendly Products

The demand on making new equipment easier to use is another reflection of that mentality. It has also been at the center

for the design of the Acuson S-Class. “The new S-Class anticipates the fusion of a Porsche performance with the comfort of a Mercedes Benz,” says Hambüchen of Ultrasound. With these specifications in mind, the engineers designed an ergonomic and tactile user interface as well as auto-navigating software.

Jochen Dick, Head of Special Systems (SP) Division, uses the phrase “one-click tech-

nology” to describe what his research and development teams and designers want to accomplish when thinking about ease of use. The MAMMOMAT® Inspiration digital mammography system, currently being developed, is planned to be the SP Division’s first such product to be conceived from the start for the digital era, with its design brief focusing on streamlining throughput while maintaining



ACUSON S-Class: Acoustic Mastery

The ACUSON S2000™ ultrasound system is the first product of the new Siemens next-generation ultrasound platforms, the S-Class. With roots in Siemens leading image quality and workflow advancements, the S-Class drives efficiency and specificity in clinical procedures. Workflow and new applications expand its clinical utilization.

The S-Class will feature a combination of new clinical applications such as Automated Breast Scanning (ABS)*, Knowledge-based Imaging, Isotropic Volume Imaging, Molecular Contrast Ultrasound and ARFI (Acoustic Radiation Force Imaging), extending diagnostic capabilities and outcome beyond the traditional roles of ultrasound. In addition, the ACUSON S-Class next-generation ultrasound systems are Silicon Ultrasound enabled, making them ready for true isotropic volume imaging, previously the domain of magnetic resonance imaging (MRI) and computed tomography (CT).

With their compact ErgoDynamic™ system design, optimized control panel, and logical, intuitive user interface, the ACUSON S-Class systems will set a new industry benchmark for clinical workflow ergonomics.

* The information about this product is preliminary. The product is under development and not commercially available in the USA, and its future availability cannot be ensured.

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Klaus Hambüchen, President,
Ultrasound Division,
Mountain View, CA, USA

image quality. “Take a high-volume screening environment, such as breast scanning,” says Dick. “You have a lot of patients, many of them nervous. So for the patient, the whole procedure must be as quick and palatable as possible. For the clinic, on the other hand, speed, efficiency, and accuracy are of the essence.”

Dick’s “one-click technology” means simplifying procedures to raise throughput to 15 patients an hour. The new MAMMOMAT Inspiration is being designed accordingly to accelerate everything from initial patient positioning to selecting the right patient data and then transferring it to the central database. “We want to optimize everything from how you conduct an examination to distributing the data to provide the highest image quality and the maximum throughput,” he says.

Siemens concentrated on user interfaces early on and, already in 1999, introduced the first *syngo*-speaking CT scanner. Today, all Siemens imaging modalities ‘speak’ *syngo*, thus making the transition to a new system a seamless process for technicians and physicians alike. The new Siemens

products also include features to harness the latest leaps in information technology and data communications. In CT, for example, the new SOMATOM Definition series allows data to be accessed through a Web interface, rather than – as in the past – exclusively via complex hospital workstations. That means that a physician can see relevant patient information whether he or she is working in a practice or even from home. “The whole idea has been to optimize the workflow to allow all those authorized immediate access to the data. These are the guiding principles of our high-end CT range,” explains Montag. The Siemens executives recognize that stress on improving workflow reflects the concerns of customers who are facing ever-increasing financial pressures. Dick, for example, notes how important it is for SP Division customers – such as those involved in high-volume screening – to calculate the cost of equipment against patient volumes and reimbursement rates before authorizing any spending, no matter how great the quality improvements. “Take mammography,” he says. “Invest-

Klaus Hambüchen

Head of the Ultrasound
Division at
Siemens Medical Solutions



ment decisions are highly influenced by quality and patient friendliness. But workflow is the most significant differentiator in our field."

Helping customers make the right investment decisions is central to what Siemens can offer; irrespective of whether X-ray, computed tomography, magnetic resonance or ultrasound is concerned. "Obviously, every setting is different," says Dick.

"The country, precise location, throughput, and reimbursement regime are all decisive. But working with our country specialists and sales staff, we have learned to create immensely detailed models. We start with the number of patients likely to be handled, then add variables such as the mix between screenings and, say, diagnostic work. Reimbursement regimes for different procedures are also critical;

so are staff numbers and salary costs, as well as space requirements and property rental prices. In the end, we can produce a realistic package tailored individually to each customer." Such modelling may seem more appropriate for smaller private practices or physicians' partnerships than for massive teaching hospitals, but Märzen-dorfer of MR says it is just as relevant for large departments acquiring multimillion



SOMATOM Definition AS: Adapting CT to Clinical Needs

SOMATOM® Definition AS* is the first single source computed tomography (CT) system to truly break through the barriers of conventional CT. It intelligently adapts on the fly to a patient, physician, and the clinical task. Innovating by modifying every component of multislice CT, SOMATOM Definition AS is the only CT to adapt to any patient, transforming into an expert in any field, at the command of the radiologist. This CT system actively manages dose in 100 percent of all exams. Its Adaptive Dose Shield dynamically removes clinically irrelevant dose. With its unique Adaptive 4D Spiral, SOMATOM Definition AS moves beyond fixed detector limitations to provide full coverage of any organ in 4D. In stroke or tumor assessment, this gives invaluable functional information. Additionally, with its built-in 3D minimally invasive suite, the system makes routine and complex procedures easier. SOMATOM Definition AS adds precision while reducing procedure time.

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Bernd Montag, President,
Computed Tomography Division,
Siemens Medical Solutions,
Forchheim, Germany

dollar systems as individual practices seeking more modest tools. “Large hospitals or, depending on the healthcare system, entrepreneurial private practices are key customers for us. But even dealing with such large units, we place immense importance on each individual customer’s needs,” he says. “That can start with help on planning everything from the positioning of our equipment to training staff. Adding value and quality while improving efficiency are our watchwords.”

A Balance between Evolution and Revolution


With efficiency and productivity so crucial, reliability is paramount. All of the Siemens executives speak proudly of the Guardian Program™, a plan offering not only turn-key maintenance but even, where technologically possible, real-time fault prevention.

Dick of SP explains: “If there is an issue, instead of sending out an engineer, we can tackle it from one of our Regional Support Centers. In many cases, especially

with software, they can be fixed remotely. Moreover, with proactive monitoring, systems are constantly checking up on themselves. If something’s amiss, we automatically receive an alert and can often take action before use becomes limited. You can imagine what an out-of-action system means for a customer handling 100 patients a day!”

Deciding whether to sign up for the Guardian Program is, of course, up to each customer. But the package is sufficiently flexible for it to be selected even after the sale. “Guardian can be built in from the start. But we also have customers who prefer to wait until after warranty,” notes Märzendorfer of MR. “None of our competitors have anything like it,” adds Gaus of AX.

“With the Utilization Management service, we can even offer benchmarking, allowing customers to see how they are performing compared with others in similar settings. That can help them fine-tune their procedures in case there is room for improvement,” notes Märzendorfer. While the new Siemens systems represent the



Bernd Montag

Head of the Computed
Tomography Division at
Siemens Medical Solutions

pinnacle of today's technology and promise impressive reliability, physicians are among the first to admit that scientific progress is relentless. So the issues of allowing for technological updates and – eventually – of dealing with obsolescence, are prominent on their agenda. With new technology releasing ever greater volumes of data, for example, fears of flooding a

hospital's picture archiving and communications system (PACS) with every new generation of equipment is an often-mentioned concern.

Executives from Siemens Medical Solutions believe they have found a reasonable balance between evolution and revolution. "To keep our customers on top of software and hardware upgrades and updates, and

to extend their systems' life cycles, our customer care solution, Life, offers packages and service contracts to help them benefit from the latest workflow improvements, clinical applications, and diagnostic functions," says Gaus of AX. Building in flexibility to allow technological updating is a prime design criterion. "Whether software or hardware, when we



MAGNETOM Essenza:
The New Business Partner in MR Imaging

Customer demand for a low-cost and high-quality magnetic resonance (MR) scanner led to the development of MAGNETOM® Essenza. Siemens used its innovation power to design an affordable* all-new 1.5 Tesla system that also offers the benefits of the latest Siemens MR technology, with its clinical applications and high throughput, to customers with lower budgets who want to enter the realm of MR imaging. The system was developed from the ground up to be an affordable, reliable powerhouse, and is packed with innovations to support both clinical and financial success. These innovations include a brand-new, ultra-light, small footprint 1.5 Tesla magnet, Siemens-unique Tim® (Total imaging matrix) technology for easy coil set-up and reduced examination times, as well as workflow automation tools based on Siemens unique syngo® user interface. With these innovations, it's not just the purchasing price that makes the system affordable, but also its low installation and operating costs and workflow advantages, which all join forces to maximize revenue.

* Results may vary. Data on file.



MAGNETOM Verio:
The Most Exciting Equation in MR Imaging

On the ultra-high field side, Siemens introduces MAGNETOM® Verio, the world's first 3 Tesla magnetic resonance (MR) system with a 70-centimeter gantry opening. Siemens is the only vendor to offer 70-centimeter Open Bore technology at 1.5 Tesla and now even introduces it at 3 Tesla, allowing for more patient comfort, better workflow and reduced costs in high-end MR imaging for the diagnosis of challenging diseases. MAGNETOM Verio comes with Tim® (Total imaging matrix) technology for fast and easy coil setup and reduced acquisition times, T-class for shorter order-to-report turnaround time and seamless workflow, and I-class advanced applications. Its 70-centimeter Open Bore enables better patient comfort and thereby improves workflow and outcomes in the MRI suite: Fewer claustrophobic or pediatric patients need to be sedated; bariatric patients can be examined without triage; patients in pain can be positioned more flexibly; less anxiety-related movements lead to better image quality; patient access is improved for both intensive-care patients and MRI-guided interventional procedures; and kinematic studies can be performed.

“Whether software or hardware, when we make changes, we try to ensure everybody has a migration path to the next level.”

Walter Märzendorfer, President, Magnetic Resonance Division, Siemens Medical Solutions, Erlangen, Germany

make changes, we try to ensure everybody has a migration path to the next level,” explains Märzendorfer. “We put a lot of effort into making sure that customers who invested in our solutions can also profit from the latest developments.” Modular design plays an important part in supporting this effort. Märzendorfer draws attention to his Division’s Tim technology,

Walter Märzendorfer

Head of the Magnetic
Resonance Division at
Siemens Medical Solutions



which provides the ability to upgrade MRI systems dating back as much as ten years. "A significant amount of what we do involves working with research institutes, and modularity is very important for them; eventually, that feeds back into the product pipelines," he says.

Such sentiments are echoed by all of his colleagues. Whether AX, CT, MR, SP, or

US, keeping customers at the forefront is the parameter that characterizes all of the outstanding new equipment being unveiled at RSNA this year.

Haig Simonian is the Switzerland and Austria correspondent for the Financial Times.

Further Information

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