

“Now We Can See the Smallest of Details.”

The first SOMATOM Sensation 64 is operated jointly by the Institute of Medical Physics and the Institute of Diagnostic Radiology at Friedrich-Alexander University Erlangen-Nuremberg. Medical Solutions talked to the Institutes’ directors, Professor Willi A. Kalender, Ph.D., and Professor Werner Bautz, M.D., about their first experience with the new system.



PROFESSOR WILLI A. KALENDER, Ph.D. (left), and **PROFESSOR WERNER BAUTZ**, M.D. (right), were the first to gather clinical experience with SOMATOM Sensation 64.

MEDICAL SOLUTIONS: What did you expect from SOMATOM Sensation 64?

BAUTZ: Actually we were very satisfied with our SOMATOM Sensation 16. For example, we would not have needed faster volume coverage, as today’s 16-slice scanners already need a very refined bolus tracking in order not to overtake it. But to achieve a confident diagnosis, you always look for the highest isotropic resolution. Here SOMATOM Sensation 64 offers true clinical advantages, particularly in resolution along the z-axis. Also, due to its fast gantry rotation, it virtually eliminates movement artifacts.

MEDICAL SOLUTIONS: Now that you have worked with the system since the beginning of May, does it meet your expectations?

BAUTZ: For sure! And it has been running reliably right from the start.

KALENDER: I can only agree. All the technical specifications, that is, the STRATON X-ray tube – which is an enormous improvement – the new detector system, and the high rotation speed were available and running stable from the first day of operation.

MEDICAL SOLUTIONS: How satisfied are you with the image quality of SOMATOM Sensation 64?

BAUTZ: It’s excellent – not only concerning resolution. Windmill artifacts are gone, which leads to a more reliable diagnosis.

MEDICAL SOLUTIONS: Which clinical advantages does SOMATOM Sensation 64 offer? Do you see any new applications that profit primarily from 0.4 millimeter isotropic resolution or high gantry rotation speed?

BAUTZ: SOMATOM Sensation 64’s imaging quality, sharpness and speed give us the opportunity to study the human anatomy at a level we wouldn’t have dared to dream about. Through the eyes of the scanner, we now can see the smallest of details, which ultimately may improve early diagnosis and treatment options. Vessel and CT angio examinations show a lot more detail, and this is also true for cranial, cardio, thorax and abdominal studies. We can run true arterial phases, for example, of the carotis, without running into the venous phase. Also, we experience a significant reduction of sub-

cranial artifacts, so SOMATOM Sensation 64 greatly improves brain perfusion and neuro exams. And the new system offers a lot of potential for low-dose exams.

MEDICAL SOLUTIONS: With SOMATOM Sensation 64, Siemens introduces a new technology: a focal spot that alternates along the patient's axis, which is the key for 0.4 millimeter isotropic resolution. What are the advantages, compared to a conventional 64 slice CT?

KALENDER: The Double z-Sampling Technology is a great improvement, especially concerning the resolution along the z-axis already mentioned. But it also virtually eliminates spiral artifacts, which is not possible by simply utilizing thin slices for high resolution, but only by double sampling.

MEDICAL SOLUTIONS: Slices of 0.4 millimeter also lead to more raw data. How do you handle it?

BAUTZ: There are two aspects: the acquisition of scan data itself and the generation of diagnostic images. The combination of 0.4 millimeter imaging and 0.33 seconds rotation time allows us to routinely utilize high resolution even for large scan ranges, resulting in more raw data. However, the new software WorkStream4D allows us to utilize the 64-slice capabilities of increased detail while decreasing the axial data set size compared to a 16-slice CT. As part of the standard scan protocol, we can now directly generate sagittal, coronal, or double-oblique diagnostic images with full resolution. This immediate availability of images in any desired slice plane significantly reduces the amount of individual data.

MEDICAL SOLUTIONS: With 64, the number of slices quadruples compared to a 16-slice CT. Does patient dose multiply by the same ratio?

KALENDER: No, simply because it does not require more dose to read out the detector slices twice. The radiation is there anyhow, now just better utilized. Also, as the detector slices themselves still have the same slice thickness – 0.6 millimeter – the area of dose absorbing interspace between slices does not increase.

MEDICAL SOLUTIONS: What additional staffing and training issues were required?

KALENDER: Hardly any – thanks to *syngo*, Siemens' multimodality user interface.

BAUTZ: Beside the introduction of the new reconstruction platform for the direct generation of diagnostic images in arbitrary planes, the user interface indeed did not change. We experienced a seamless migration from the 16-slice CT to the new 64-slice solution. We recognized that the contrast injection timing was an area where we had to gather some experience to perfectly utilize the increased scan speed offered by the scanner. A new dose automation called CareDose4D helps us to further reduce the complexity of our scanner. It provides us with a fully automated and real-time anatomy-based dose regulation resulting in a simplified workflow without the need of individual protocol optimization. The tendency also goes towards multiphase protocols with diagnostic advantages in, for example, liver tumors and kidney lesions. Looking at the clinical workflow, the speed of SOMATOM Sensation 64 greatly simplifies this.

MEDICAL SOLUTIONS: What productivity efficiencies have been realized so far?

BAUTZ: With its routine 0.33 seconds gantry rotation, the system provides up to 87 millimeters table feed per second with sub-millimeter collimation. Thus, isotropic 0.4 millimeter resolution goes hand in hand with considerably reduced scan times, increasing patient throughput, facilitating examination of patients with limited ability to cooperate and reducing the amount of contrast material needed. A CT-Angio of the supra-aortic vessels requires only five seconds scan acquisition time for a scan range of 350 millimeters. For the first time, true arterial phase imaging of the entire carotid artery and the circle of Willis can be performed with 0.4 millimeter spatial resolution.

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Professor Werner Bautz, Institute of Diagnostic Radiology, University Erlangen-Nuremberg, Germany