

Getting the Full Benefit from Imaging

syngo.via is a breathtaking new imaging software that helps save physicians time, hospital administrators money, and CIOs the burden of dealing with complicated IT systems.

By Irène Dietschi and Oliver Klaffke

Overview:

- 12 **Roundtable Discussion:** Reaping the Benefits of Advanced Visualization
- 20 ***syngo.via*:** Taking Image Processing to the Next Level
- 24 **Magnetic Resonance Imaging:** Faster and Easier than Ever Before



Discussing the impact of *syngo.via*: Siemens' Bernd Montag, PhD, journalist Oliver Klaffke, IT expert Andreas Engler, journalist Irène Dietschi, radiologists Markus Lentschig, MD, and Jacques Kirsch, MD (clockwise from left)

Radiologist Jacques Kirsch of the Hôpital Notre Dame in Tournai, Belgium; Markus Lentschig, a private radiologist from Bremen, Germany; Andreas Engler, IT-Administrator from the University Hospital in Erlangen, Germany; and Bernd Montag, CEO of Siemens Healthcare's Imaging & IT Division, sat down with *Medical Solutions* and shared their views on the needs and benefits of advanced imaging software. One thing they all agree on: In the near future, *syngo®.via*¹ will change the way images are handled.

Dr. Montag, what problems did Siemens want to address by developing *syngo.via*?

MONTAG: Today, radiologists don't fully benefit from the progress made in imaging technology over the past ten years.

¹ The information about this product is provided for planning purposes. The product is pending 510(k) review, and is not yet commercially available in the U.S. *syngo.via* can be used as a standalone device or together with a variety of *syngo.via*-based software options, which are medical devices in their own rights.

Very few other fields have seen such giant leaps of progress, and many of today's standard imaging technologies were not available a couple of years ago. However, the way images are handled and managed has changed very little, and we have not yet arrived in the 21st century. Almost all scans are digital, but we continue to look at them in almost the same way as when they were hung on a light wall for examination. The present-day light wall is the PACS [picture archiving and communication system]. It shows very clearly the full progress that has been made in acquiring the images is not transferred to the daily work of the medical professionals who analyze them. I am very proud that we can easily produce four-dimensional cardio screens, but I am not happy that the standard outcome is still a two-dimensional, black-and-white image. We, at Siemens, would like to make all of the diagnostic benefits accessible to radiologists and, ultimately, to the patients. That's why we developed *syngo.via*.



Are you taking the full advantage of medical imaging technology today, Dr. Lentschig?

LENTSCHIG: We can do so only if we are inclined to spend a great amount of time for every diagnosis. The time needed is increasing with the progress made in imaging technology. The reason behind it is the accelerating volume of data. Some ten or 15 years ago, an abdominal examination would yield results in four- or five-millimeter-thick layers. Today, we have arrived at two millimeters with more than ten times the number of images produced. We face the challenge of working with more than 2,000 images for a diagnosis today, compared to 150 a decade ago. Given the financial constraints of our present working conditions and the shortage of trained personnel – at least in Germany – it is fairly impossible to meticulously look through them all. In the end, one has to be very selective in order to get the work done. This will be even trickier in the future, as the capability of imaging technology increases.

What is urgently needed are innovations that will help us make diagnoses more easily, faster, and ultimately more efficiently. There is no way around increasing our productivity.

KIRSCH: I agree. We've seen the time needed to do a CT [computed tomography] scan decrease considerably over the past several years. It once took ten to 15 minutes to do a CT scan. Now, a cardiac CT only requires seconds to acquire, but we need 45 minutes to prepare the data and make the diagnosis. Of this time, more than half is spent doing uninteresting and boring work, for example, a run-off, where one is busy finding and marking blood vessels. Or when doing a heart examination, I have to remove the ribs from the image in order to see the structures I need, and then to mark the coronary arteries. These are very tedious tasks. Only when they are done can the diagnostic work start. Having an automated system that assists and takes over these jobs would be a great



“What I like most is the approach of *syngo.via* based on workflows and indications.”

Jacques Kirsch, MD,
Radiology Department, Clinique Notre Dame,
Tournai, Belgium

“As it becomes easier to share images, I am convinced communication among medical professionals will increase and improve.”

Bernd Montag, PhD, CEO,
Imaging & IT, Siemens Healthcare,
Erlangen, Germany

“With *syngo.via*, I can conveniently do all the work from one computer and do not have to change places all the time.”

Markus Lentschig, MD, CEO,
MRI and PET/CT Center Bremen-Middle,
Radiology/Nuclear Medicine Group Practice,
Bremen, Germany

“A client-server structure is easier to maintain and more cost-efficient to run than the workstation solution we have at the moment.”

Andreas Engler, IT Administrator,
University Hospital Erlangen,
Erlangen, Germany

Traditional Workflow



Workflow with *syngo.via*



help. I had the chance to test Siemens' *syngo.via*, and I must say that it makes my work as a radiologist much easier and faster. A lot of this preparatory work is now done automatically.

Was making work more efficient the objective when Siemens decided to develop *syngo.via*?

MONTAG: Yes, we would indeed like to help our customers get their cases ready in less time, have the data available wherever they want to work, and benefit from innovations in the future. With *syngo.via*, we've built a system that can deal with the large amount of data that medical imaging technology is producing today. Our aim was to make it readily available and easy to handle. It is important for any diagnosis to have the best images at hand. It will also help other medical specialties, as *syngo.via* will make three-dimensional images easily accessible from virtually everywhere. This way, cases are better understood because they are well presented with exactly the images and all other information needed for a diagnosis.

Are the three-dimensional images a real benefit or simply a "nice-to-have" feature?

KIRSCH: They are a great plus. The possibility of switching with just one mouse-click from a two-dimensional PACS presentation to a three-dimensional one is very important. Surgeons will find this

very useful when planning an operation because they have a spatial image of their patient that will give them more insight. Here is an example from my own experience: When I was at the golf driving range, my son hit me by accident with his golf club, and my cheekbone was broken. Normally, this would have meant a full operation and fixing the bone with screws. However, when the surgeon had a look at the 3D image, he thought he might be able to put the bone back in place with a hook. In the end, that's what he succeeded in doing. Also, any physician will find it easier to talk to his patients and to show, for example, a tumor or a fracture in a three-dimensional image.

syngo.via is a client-server solution. Why did you move away from the workstation concept of the past?

MONTAG: Workstations were the best choice in the past because there was no other way to bring the huge amount of data to the radiologists' workplace. In the meantime, this has changed. Transmission of huge volumes of data is possible today, so we can benefit from everything a client-server solution offers. We want radiologists, the hospital as a whole, and IT personnel to benefit from the innovations Siemens will be developing in the future. This is also one of the reasons we set up *syngo.via* as a client-server solution – it's much easier to update the server with the latest version of the software. It also helps to keep costs at bay,

because the cost of ownership is fairly predictable and makes it a safe investment.

LENTSCHIG: Productivity is really what matters in radiology today, and the client-server approach is a huge step toward increasing it. Today, we are limited in our work by the restrictions of software licenses. This often leads to unnerving situations, such as being forced to change workstations because of licensing reasons. If a certain software was installed on another workstation, you had to go to that very one to do a certain task. If you were lucky, this workstation wasn't already occupied by a colleague. With *syngo.via*, I can conveniently do all the work from one computer and do not have to change places all the time.

KIRSCH: What I find very helpful with the client-server solution is that I can switch directly from PACS into *syngo.via* and have all kinds of images available. Before, I had to go to a different workstation – now a click is all that is needed. Overcoming the license issue is also a bonus to me. Our hospital has two branches at separate sites, but we don't need to worry about distance in the future. Having a client-server solution also has positive clinical implications, since everyone can access the case from wherever he or she wishes. When a colleague is a specialist in cardio cases, for example, I can easily send him the 3D images for his advice.



ARCHIVE

Potential Time Savings

He can turn them around, zoom in, and create exactly the views he wants. This really makes a difference. These are great advantages, because we can concentrate on diagnosis instead of losing time.

LENTSCHIG: Being networked is really one of the great advantages of *syngo.via*. It makes cases available to the specialist wherever he wants to work.² Today, an orthopedist has to go to the radiology department to look at the images, and the radiologist has to spend some time preparing them and explaining them to him. Making 3D images easily available offers a lot of improvements. Imagine having a computer screen in the operating theater: A surgeon would be able to check the spatial situation in a patient's knee or abdomen, for example, even while doing the operation.³

Is the client-server structure a benefit from an IT specialist's point of view, Mr. Engler?

ENGLER: It certainly is, and there are two sides to it. A client-server structure is easier to maintain and more cost-efficient to run than the workstation solution

we have at the moment. Maintenance of several workstations requires a lot of time and is prone to errors. A centralized system is comparably easier to maintain. When I come to the office in the morning, a check-up of the system requires less time when it's centralized. Another thing to consider is that individual workstations take up a lot of space, whereas a server is much smaller today than it used to be. The financial aspect is very important, too. A hospital no longer needs to invest in hardware, but can concentrate on software instead. A further plus is that it is a secure investment, since we will be able to take advantage of any innovation simply by installing the latest update.

Is *syngo.via* going to change the way radiologists work in the future?

MONTAG: I think we will see new work methods developing in the medical community that will definitely change the way radiologists and specialists work with images. People will be working together more closely and more efficiently. We've seen a similar development in other walks of life in the past decade with the progress of telecommunication. The effect the cellular phone or the BlackBerry® had on our professional lives is absolutely profound and was actually not foreseeable. As it becomes easier to share images, I am convinced communication among medical professionals will increase and improve. Radiologists and specialists might more frequently ask qualified col-

Summary

***syngo.via*: Cases Ready, Places Networked, Needs Anticipated Radiologists get their cases ready in less time.**

syngo.via makes computed tomography, magnetic resonance, molecular and other clinical images readily available and automatically prepares them for analysis, thereby increasing productivity. Indication-specific layouts, case navigation, and intelligent tools assist radiologists in doing their diagnostic work more efficiently. Reporting can be improved with specific report layouts.

Places are networked and enhance efficiency.

syngo.via is a client-server application. Images and data can be accessed from everywhere² a radiologist or physician wishes. Information is easily shared and efficiency can be enhanced.

Needs are anticipated and investments safe.

Siemens' clients benefit from continued innovations, integrated services, and foreseeable total cost of ownership. With the secure remote infrastructure Siemens Remote Service (SRS) being a prerequisite, automated remote updates enable customers to easily stay up-to-date.

² Prerequisites include: Internet connection to clinical network, DICOM compliance, meeting of minimum hardware requirements, and adherence to local data security regulations.

³ Usage of *syngo.via* in operating room or for an emergency case requires customer to provide respective emergency measures in case of non-availability of system or network.



“Systems like *syngo.via* already lowered expenditure for hardware, maintenance, and handling by 50 percent.”

Stefan Braitingner, MD, CEO,
RADIO-LOG Radiological Group Practice,
Passau, Germany

The Financial Impact

Investing in *syngo.via* is a strategic decision. Radiologist and healthcare entrepreneur Stefan Braitingner argues that modern IT systems are crucial for success.

“Information technology is the new growth driver in the health market, and that is why systems like Siemens’ *syngo*®.via¹ will play a vital role to boost profitability and prepare for the challenges of the future,” says Stefan Braitingner, MD, a Passau-based radiologist and owner of a network of radiology practices in Southern Germany. There are strong strategic reasons for investing in *syngo.via*: an immediate decrease in present costs, a decrease in future costs, plus long-term growth opportunities. And, its scalability is the absolute prerequisite that offers the best adaptation to future requirements of individual care providers as well as the overall healthcare market. Braitingner firmly believes that tomorrow’s hospitals will be closely networked, so they will need open IT systems that interact with those of their partners – and that leads to increased profitability. In the healthcare market, Web-based approaches used by modern IT systems offer new, unforeseen possibilities for every player. “The Internet has shown the enormous potential for collaboration and exchange of data,” he says.

Hospitals and private radiology practices will also see short-term bottom-line benefits from implementing *syngo.via*, which will please every CFO. Data integration, networked architecture, and client-server systems will help to save money, for example, by increasing cost transparency, enabling closer cooperation, or avoiding double examinations. High expenditures for workstations can be saved, as *syngo.via* is a client-server solution that stores data and software on a single server. Computers linked to it are installed in the hospital anyway, and when outdated, they cost less to replace than the sophisticated radiology workstations in use today. Siemens’ new imaging software has an impact on the cost structure of any radiology department. It can be easily administered, is scalable, has an open architecture, and can therefore be extended without any trouble. “In our radiology enterprise, systems like *syngo.via* already lowered expenditure for hardware, maintenance, and handling by 50 percent,” Braitingner says.

¹ The information about this product is provided for planning purposes. The product is pending 510(k) review, and is not yet commercially available in the U.S.

leagues in a different building or city for their advice. Physicians who are not trained radiologists will be able to understand the images better and faster. The different applications we have been developing support them in their daily work. They are available for showing, for example, cancer, neuro, or cardio cases in indication-specific layouts that are designed to meet the special requirements of radiologists and specialists alike. They will also find it easier to explain a diagnosis to their patients, since they can show them the results on any computer in the hospital.

KIRSCH: What I like most is the approach of *syngo.via* based on workflows and indications. For almost every important indication, like cardio, oncology, or neuro, there are predefined workflows that help me go through a case. And, the system is still flexible enough to make allowances for sudden needs. If, for example, I see a node when analyzing the images and am currently not utilizing the specific oncology workflow, that isn't a problem. I simply add a feature with just one mouse click. So I can adjust the workflow to my own demands and those of the case. Those small features of *syngo.via* will also make a great difference. I can operate the system just with the mouse and have the other hand free to hold the microphone to dictate my findings. With the system I use today, I have to constantly put the microphone down and pick it up again.

LENTSCHIG: The indication-specific workflows help to establish quality and best-practice standards, since they ensure that in every branch of a hospital or a radiologist's practice, everybody sticks to the same procedures. Having these workflows is a great help, because they provide good guidance built on sound medical knowledge. The concept of *syngo.via* reflects the way we are doing our work. One example: On a light wall, we are used to looking back and forth between images with the same orientation. In the *syngo.via* layout, they are shown side-

by-side, so you get the overall impression very fast. With *syngo.via*, I can just earmark my findings. When I see a tumor, I simply mark it and it is automatically measured and the volume is calculated. Today, I still need to measure the diameter on the screen and figure out the volume with the help of a pocket calculator. In the future, I won't lose time on that. Plus, when I need to locate the tumor again, *syngo.via* will automatically show it on the images. We can actually increase the diagnostic quality while using less time.

MONTAG: This is exactly the point for the radiologist. *syngo.via* will help raise productivity by increasing the speed of image analysis.

What are the greatest benefits of *syngo.via* for patients?

LENTSCHIG: They will directly benefit in all cases where speed matters. A very good example is patients who have had a stroke – where "time is brain." It is crucial that the images are analyzed as quickly as possible in order to start the right treatment. *syngo.via* has a special application that speeds up this process. It automatically finds the brain region affected by the stroke and then marks and measures it. It does most of the analysis a radiologist is doing manually today.

***syngo.via* automatically finds older images of patients, and they are already available when the radiologist logs into the system. Is that a helpful feature?**

KIRSCH: Indeed it is. We spend a lot of time looking for older images and even have to go to different workstations to find them. With *syngo.via*, the images are already there. When I want to refer to them, a click is enough to have them available. Most examinations are made to get an impression of the progress or regression of a disease. In most oncology exams, we are interested in the results of a treatment, so we need to follow an individual tumor over time. Today, we

need to look through virtually thousands of images to find the tumor again and measure it. This is a very challenging task that demands a lot of resources. Trying to compare this tumor with findings in previous exams was extremely tedious. First, one had to locate the images and then the tumor. This has sometimes taken me up to an hour, but with *syngo.via*, the information is just there, and the measurements are made automatically.

ENGLER: With *syngo.via*, the access to the data is very easy, whereas when dealing with individual workstations, the images have to be loaded manually. When using a central server, you have more processing power at your disposal. This has an effect on the speed in which the tasks are done.

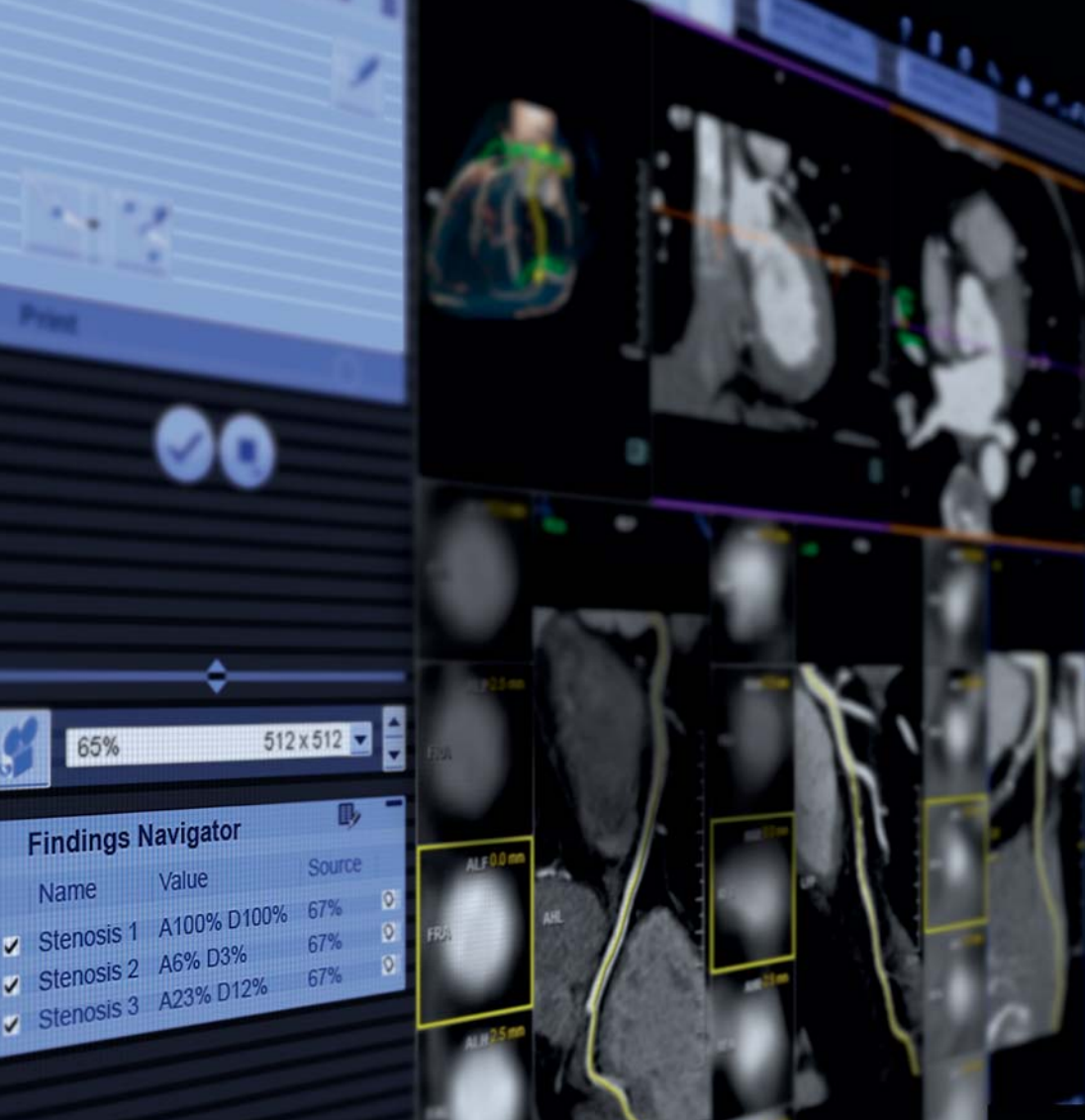
Why did it take so long for innovative software such as *syngo.via* to be developed?

MONTAG: We developed it as soon as the time was right and the technologies were available. Image processing is a very challenging task, and one must truly understand the medical routines. In oncology, for example, it is very difficult to program software so that it will automatically recognize the outlines of a tumor when it is highlighted on the computer screen. Any experienced radiologist can do this upon examining the images. To design software that will do the same is a great accomplishment.

Moderator and Text: Oliver Klaffke

Further Information

www.siemens.com/syngo.via



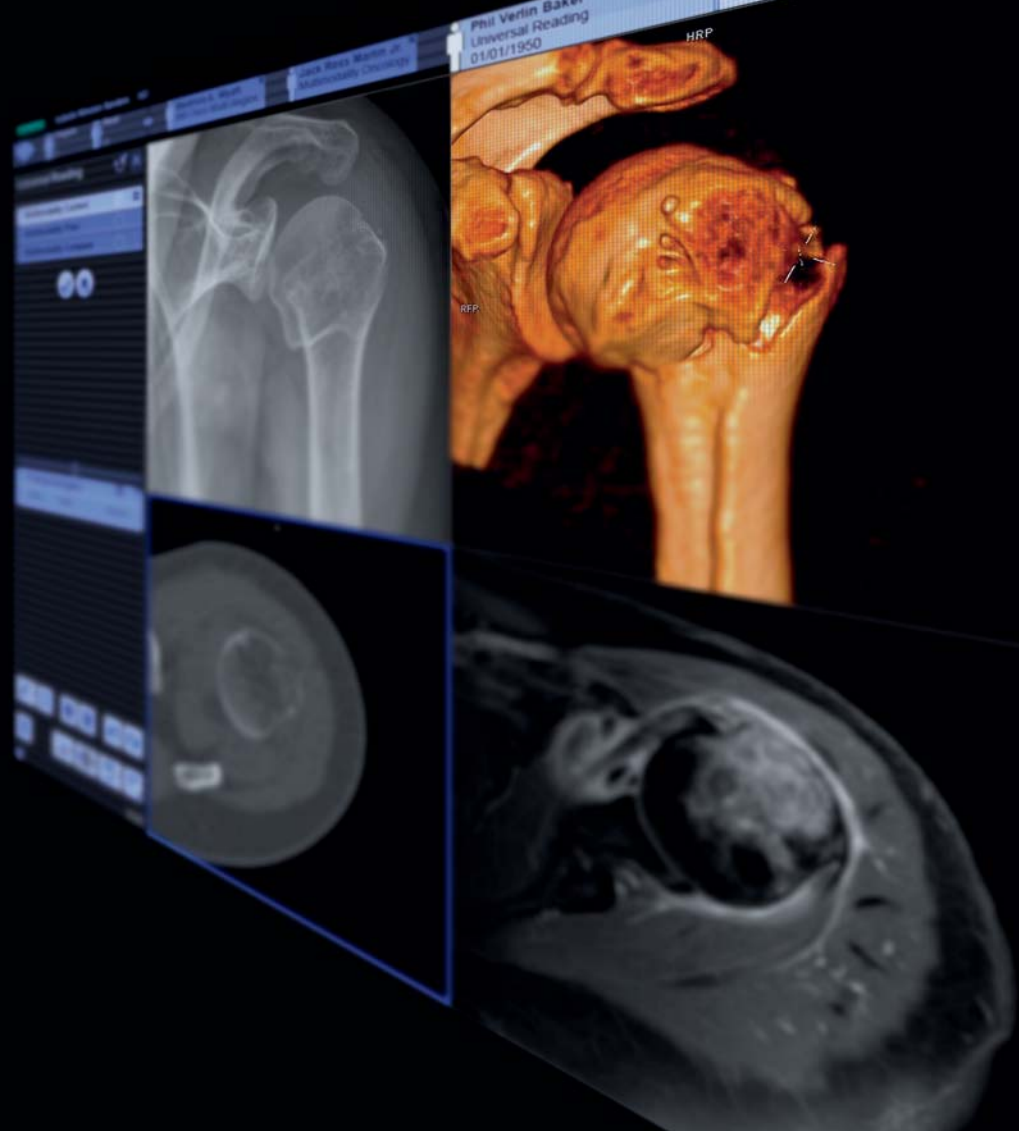
syngo.via automatically prepares cases for reading and provides insightful, disease-specific guidance step-by-step.

Taking Image Processing to the Next Level

Siemens' new and highly innovative imaging software, *syngo.via*, is designed to help physicians use computed tomography, molecular imaging, or magnetic resonance imaging applications more efficiently and get the most out of Siemens' imaging technology.

*syngo®.via*¹ speeds up image processing, enhances diagnostic quality, and enables physicians to share 3D and 4D images with colleagues in a network. Plus, this new technology is a sound financial investment with a predictable lifetime cost. And, since the software is run on one server, maintained remotely, and updated with the latest version, *syngo.via* spares hospital CIOs from the problems that arise with decentralized systems. In the past decade, technological progress in medical imaging technology has taken giant leaps. Even minor lesions can now be spotted, and 3D images of complex anatomical structures are readily available to specialists for easier diagno-

¹ The information about this product is provided for planning purposes. The product is pending 510(k) review, and is not yet commercially available in the U.S.



With *syngo.via*, places are networked – making modalities and IT become one within the hospital and beyond.

sis. However, while the abilities of computed tomography (CT), magnetic resonance imaging (MRI), or molecular imaging (MI) applications have been increasing, physicians' capabilities for dealing with the information changed little. The technology moved on to new frontiers, the medical professionals were often left behind. Ten years ago, a CT examination would deliver around 50 images. This number was easy for physicians to deal with, but nowadays, they get more than 2,500 images – far more than anybody can realistically make use of without the help of an intelligent IT system – like *syngo.via*.

What is needed is a system that displays the wealth of information automatically in the most convenient way, makes older images from the same patient readily available for comparison, and allows shar-

ing the case with all of its information electronically within a network. This is exactly what Siemens had in mind with *syngo.via*: a highly efficient tool helping physicians get their cases done in less time, enabling higher diagnostic quality, and leaving them more time to concentrate on what they do best: caring for the patient.

Up until now, imaging data has been stored in different systems, so the physician often has to switch from one computer workstation to another and back again. He or she finds 3D images on a different workstation than the two-dimensional picture archiving and communication system (PACS), and even refers to a third one to retrieve some older data. With *syngo.via*, all images are displayed on one workstation. In daily life, radiologists spend a lot of time organizing their

cases, postprocessing the images, and sending reports to oncologists or cardiologists, for example. *syngo.via* takes over many of these tasks automatically.

My Cases Ready

When a doctor starts reviewing a patient case on the computer, all of the available patient information on the hospital server has already been assembled. Since *syngo.via* "knows" that the patient has lung cancer, for example, it will show all of the images and information in what Siemens calls an "indication-specific layout." The radiologist may even decide that he or she would like to see a given indication in a specific layout that best suits his or her needs – and in the future, *syngo.via* uses this layout for this radiologist and this indication. *syngo.via* can even guide him or her through the case,



syngo.via makes it possible for physicians to quickly access information and share it with their colleagues and clinical partners.

helping him or her stick to a defined protocol that can be part of a hospital's quality management system and will help to enhance quality and productivity. At the same time, he or she still enjoys the freedom of being able to adapt this workflow in order to make a proper diagnosis.

It is not only what the radiologists see, but also how they see it: Working in a PACS world, they have often relied only on two-dimensional images. A 3D representation was regarded as something for the true specialist, and was used only in certain cases. *syngo.via* shows a 3D image immediately, with just one stroke on the keyboard.

My Places Networked

The easy access of 3D images in *syngo.via* will persuade radiologists to use them more frequently for their diagnoses, helping to improve the quality of their work. The radiologist can even share these

3D images online with any colleague.² This is a great advantage, since some referrers do not feel comfortable with two-dimensional images. The 3D representation is easier for them to understand. With *syngo.via*, the radiologist can simply send the images to a dedicated expert, who will find it in his or her inbox and can then support the diagnosis.

My Needs Anticipated

As a client-server solution, *syngo.via* is easier to maintain and update than the decentralized workstation solutions frequently found in radiology departments today. With new software versions, every workstation has to be updated separately. *syngo.via* runs on only one server, hence a new software version can be easily installed remotely. As software maintenance is highly important in order to protect the investment, Siemens continuously provides customers with managed

remote updates as part of the service agreement.

Remote updating also helps hospitals benefit from ongoing Siemens innovation in the field of image processing. *syngo.via* will help every hospital to keep costs at bay, as the total cost of ownership is foreseeable and additional investments in hardware, such as workstations, are no longer necessary. To use *syngo.via*, all that is needed is a PC – or even a laptop – with a high-speed data line³ to the server.

CT and MR Applications for *syngo.via*

In cardio and vascular CT examinations, the heart is automatically segmented,

² Prerequisites include: Internet connection to clinical network, DICOM compliance, meeting of minimum hardware requirements, and adherence to local data security regulations.

³ For details please refer to the product data sheet.



syngo.via suggests a time-saving reading workflow according to modality and disease and provides the appropriate tools accordingly.

the coronary arteries are segmented and labeled, and the rib cage as well as the blood pool are “removed.”

For MR cardiac examinations⁴, the case is automatically prepared. Images of function and rest/stress perfusion are shown in a special automated layout, and the user is able to see image data in a way that most physicians are used to from echocardiography. When scrolling up and down in one data set, the available data in the other segments is displayed in the same anatomical position. This “linkage” of data is especially useful for getting a fast and easy overview in complex situations, where even minor abnormalities can be detected by comparing all available data of the same anatomy. MR angio cases can also benefit from the automated case preparation. Until now, handling large, possibly even whole-body angiographic images could be quite cumbersome. Now, when acquiring angiography data that covers large parts of

the body, different methods can be used. *syngo.via* automatically recognizes the acquisition method and uses a dedicated layout. This way, the handling of very large datasets is intuitive and easy. In neuro CT cases, patients benefit from fast and accurate stroke examination, for example. Complex neurological disorders of the head and neck can also be studied efficiently with *syngo.via* on CT and MR data. For MR neuro cases, the *syngo.MR Neuro Perfusion Engine*⁴ automatically calculates perfusion maps. Furthermore, workflow for acute neuro cases is supported. In oncology CT, *syngo.via* offers an automated calculation of tumor growth and total tumor burden, as well as other features like 3D Lesion Segmentation. In CT colonography, the small bowels are automatically tagged, and a “fly through” can be initiated. MR oncology⁴ reading and follow-up are made easy through better schematic

representation of all series and images. Even the most complex patient data is presented in a fast and structured way. In the ortho application of the *syngo.MR General Engine*⁴, the radiologist can switch with just one click to 3D views of any sequence without changing the software or task card and combine 2D and 3D images in one layout. Applications for head-to-toe MRI scans, such as the spine (where the software assists in cervical, thoracic, lumbar, or whole-spine examinations) are supported.

⁴ This information about this product is preliminary. The product is under development and not commercially available in the U.S., and its future availability cannot be ensured.

The Future of MRI: Faster and Easier than Ever Before

Productivity is the name of the game. When health budgets are under pressure while the demand for quality and output is rising, one way to cope is to increase workflow efficiency. To achieve that, Siemens is launching Dot and *syngo.via*, two advanced and integrated solutions that will make working with MRI easier and faster.

Both solutions allow the user to automate routine tasks to their standards, which, until now, had to be done manually. These solutions make the most out of the latest advances in Tim® (Total imaging matrix) technology, which are now also ready for the market. Together with the Dot¹ (Day optimizing throughput) engine, the throughput for magnetic resonance imaging (MRI) can be increased by up to 30 percent, Siemens specialists say. In addition, *syngo.via*¹ will help make it easier to process and document the data afterwards, making it more efficient and faster for radiologists, technologists, and their medical colleagues. This new imaging software will further enhance Dot's increase in productivity. Setting up an MRI system for an examination can be a tedious and complicated task. A great number of parameters need to be taken into account and medical professionals might spend up to a half-hour just to prepare an examination. "A lot of these activities can be done by intelligent software," says Christoph Zindel, MD, Vice President of MR and Head of MRI Applications and Software Development at Siemens Healthcare. Thus, Dot is designed to take the complexity out of MRI scans and will have a profound effect on how MRI examinations will be done in the future. The seamless workflow it offers helps radiologists and

technical personnel increase their productivity.

Zindel notes that there is no point in wasting the precious time of medical professionals when routine processes can be automated without compromising quality. This is exactly what Dot is designed to do. It will help to increase the efficiency of an MRI department by speeding up the examination process through Guidance, Personalization, and Automation. Today, a patient enters the scanning room and the technologist places and positions him or her in the MRI system according to the needs and the nature of the examination. With Dot, that positioning will, to a large extent, be done automatically. If, for example, a liver scan is scheduled, the technologist positions the patient on the table and just pushes the Dot Control Center and the patient will be automatically positioned up to the abdomen in the isocenter of the magnet. For a cardio examination, this will be up to the point where the thorax region is in focus. However, Siemens managed to make Dot even smarter when it comes to brain and knee examinations. For example, Dot features AutoAlign, which will even suggest the positioning of the slices that will offer most insight (based on the users standards of care). "The only thing the technologist still needs to do is to approve the systems' suggestions," Zindel says. Even more time is saved when Dot's personalized workflows together with the customer's sequences and protocols are used. Since every patient is different, a

lot of time is spent adjusting the MRI setup to a patient's special requirements. The setup needs to take into account the fact that a person might not be able to hold his or her breath for a few seconds, – something that is often requested of patients during an MR scan – or that a child² simply won't easily lie still during the examination.

"We designed a number of personalized workflows that are tailor-made for cases like these," Zindel says. The radiographer simply chooses which Dot strategy fits the patient best. Dot still leaves ample room for individual preferences of the medical professionals in charge. The radiologist can define personalized protocols that reflect his or her special needs and preferences when doing certain examinations.

Dot also provides guidance for planning the examination. This will help dramatically reduce the time needed to prepare even complex scans, for example, in cardiac MRI. The user is guided from start to finish through every step of the examination and is offered "decision support." The integrated guidance suggests what may be done next or which alternatives are available. However, it remains the radiologist's job to make the final decision. Siemens put great emphasis on designing Dot's user interface as attractive, appealing, and easy to use. During the

¹ The information about this product is being provided for planning purposes. The product requires 510(k) review and is not commercially available in the U.S.

² The safety of imaging infants under two years of age has not been established.

development of the system, customers were an integral part and had a say on what the software should be doing and how it should work. What is always important when designing software is ease of use: It should be possible to learn to use it quickly and, even more important, intuitively.

Higher productivity comes not only from preparing the examinations more efficiently, but also from being able to analyze the images more quickly. Thus, *syngo.via* is designed to speed up image processing, preparing the cases, and making the results available in a network. With the unique networked scanner, a radiologists or technologists can work simultaneously at the new Tim+Dot MRI scanners MAGNETOM® Skyra¹ (3T) or MAGNETOM Aera¹ (1.5T) and *syngo.via* on two screens with only one mouse and keyboard. With this, they can prepare and scan different patients easily without screen overlays and possible confusions, which results in a new level of efficiency at the scanner.

Thus, Dot and *syngo.via* work hand-in-hand to achieve a seamless workflow for the user from acquisition to diagnosis. They are the ideal combination to get the maximum output out of Siemens' innovative imaging technology. Tim, Dot, and *syngo.via* will allow radiologists to concentrate on what they do best: diagnosing and helping patients.

"We would like to see performing MRI scans become easy and even fun," Zindel says. The new Siemens solutions are a giant step toward this goal.

Irène Dietschi is an award-winning Swiss science writer and book author. She covers healthcare and medical issues for leading Swiss newspapers papers, including NZZ am Sonntag and Weltwoche.

Oliver Klaffke is a science and business writer based in Switzerland. He has been on assignment for New Scientist and Nature in the past.

"We would like to see performing MRI scans become easy and even fun."

Christoph Zindel, MD, Vice President MR, Head, MRI Applications and Software Development, Siemens Healthcare, Erlangen, Germany