

A new clinical study conducted by the University Hospital Essen, Germany, comparing head scans produced with and without utilizing Siemens' magnetic resonance imaging (MRI) software solution Dot has confirmed that scanning time can be shortened and workflow can be improved.

By Annette Tuffs, MD



Anton Quinsten (left), Professor Gerald Antoch (center), and Antje Sombetzki discuss the efficiency gains in MRI with the Dot solution.

## Shorter Scanning Times Through Efficient Software

The times are long gone since the German town of Essen was just known for steel and coal. Today, it is home to one of Germany's leading medical centers: The University Hospital Essen is one of the most renowned hospitals in Germany, treating more than 200,000 patients every year. With its main focuses on cardiovascular and oncology medicine and a strong emphasis on organ transplantation, it

not only requires a very high standard of imaging techniques and equipment, but also software solutions that deliver high quality and allow for radiography workflow as well as patient throughput to be optimized.

### Easy-to-Handle Coils

The Essen Institute of Diagnostic Radiology and Neuroradiology has the

advantage of using the most modern MRI technology supplied by Siemens: a MAGNETOM® Aera scanner with its new features, a combination of the next-generation Tim® (Total imaging matrix) technology, Tim 4G, and Dot™ (Day optimizing throughput) engine. MRI imaging is achieved by placing coils next to the patient's body part that is to be examined. The MRI technology Tim



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4G provides higher signal intensity and homogeneity than previous systems. For whole body imaging, up to 204 coil elements can be applied, using up to 128 receive channels. The system uses lightweight coils, which can be easily placed over the different body regions. The coils are easy to handle and allow flexible combinations, which enable parallel imaging to reduce acquisition times and, therefore, offer major advantages in many areas of medical diagnostics, such as orthopedic, breast, and angiographic imaging. Additionally, without coil or patient repositioning, the Tim coils allow the complete anatomy to be examined in fine detail, faster than before.

### **Simplified Parameter Adjustment**

Taking the patients and their needs more seriously is also a prerequisite for adequate planning of MRI scanning procedures, something that Dot facilitates. Siemens developed Dot to help radiologists and technologists combine clinical accuracy with efficiency, improving workflow and imaging quality.

Before the introduction of Dot, a great number of parameters needed to be changed during the examination. This meant extra time and effort for readjustment and possibly poorer image quality. Dot takes away a lot of the complexity through automation tools, such as Auto-Align, or automated decision processes, which reduces the effort for adjustments. Furthermore, all examination-relevant parameters are shown at a glance, helping to ensure a swift examination with high quality. In the extra time saved by Dot, the technologist can focus on the patient and more exams can be performed in a common workday.

A clinical study at the Essen Institute of Diagnostic Radiology and Neuroradiology has now shown that those targets are actually met by using the framework of Dot. “We have examined 32 patients on MAGNETOM Aera, which offers the additional advantages of Tim and Dot, and the same patients in the Tim-only system MAGNETOM Avanto,” says Professor Gerald Antoch, MD, Deputy Director at the Essen Institute of Diagnostic Radiology and Neuroradiology. In this study, the

radiologists decided to focus on patients who needed head scans, for instance, searching for brain tumors or examining the brain after interventional therapy. All the examinations were carried out by experienced, highly trained staff.

### **Scans Shortened by Five Minutes**

“On average, we were able to shorten the examination from 25 to 20 minutes per patient,” says Anton Quinsten, Senior MRI Technologist at the Essen Institute of Diagnostic Radiology and Neuroradiology. The main reason is that the technologist can make use of automated decision processes, which otherwise would have cost valuable time. “With the new MAGNETOM Aera system comprising Dot, a technologist spends about 70 percent of his or her time with the examination in comparison to 85 percent without Dot.”

The data from the study comparing MRI head scans with and without Dot are currently being prepared for publication. “These are very good results,” says Professor Antoch. “From our experience so far, we expect that with other Dot

scanning protocols, especially for heart disease, examination times will actually decrease even more."

Why should Dot have more impact on MRI cardiac scanning? "Cardiovascular scanning requires more experience and skill than other MRI examinations," explains Professor Antoch. The technologist must know the anatomy by heart to angulate the slices according to the very complex anatomy and has to interact closely with the patient so that data is acquired at the right point in the cardiac and respiratory cycles. The necessary adjustments are now done automatically by Dot; the examination time is therefore shorter and the examination is less exhausting for the patient.

### Shorter Scanning Time, Higher Acceptance

With shorter exam times, waiting times can also be reduced, which can

help improve patient satisfaction. More patients can also be examined, which has a major impact on cost savings.

MRI scanning with the new MAGNETOM systems has additional advantages, which help increase patient's satisfaction and acceptance. "The patients feel happier in the wider bore," says Senior Radiography Assistant Antje Sombetzki. "Additionally, they are more comfortable because the system is designed with warmer colors or lighting options, which can be changed at the patients' wishes."

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## Summary

### Challenge:

- Make MRI scanning more efficient and less time-consuming
- Increase patient throughput and decrease waiting times
- Make MRI a more patient-friendly procedure
- Improve quality of MRI images by enhancing patient's compliance
- Test and establish the latest and most efficient MRI technology
- Provide clinical data on higher efficiency of new software application

### Solution:

- Clinical study comparing imaging with and without Dot
- Re-organization of radiological department after software application
- Use of software for different imaging indications (neurology, cardiology, etc.)

### Result:

- Shorter scanning times in comparison to imaging without guiding software
- Higher acceptance by patients undergoing MRI scans
- Better image quality because of improved acceptance and improved coil technology (Tim and Dot)
- Shorter MRI scanning times and higher patient throughput
- Improved cost efficiency because of reduced cost of ownership and optimized workflow

### Further Information

[www.siemens.com/aera](http://www.siemens.com/aera)