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**PROF. DR. REINHARD LOOSE**

Radiologist, Klinikum Nürnberg Nord, Nürnberg, Germany

## With DR solutions, radiology department reaches beyond its walls

Step-by-step, Klinikum Nürnberg is successively upgrading its mobile and fixed imaging

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Interview with PROF. DR. REINHARD LOOSE, Radiologist and CHRISTOPH GUHL, Medical Physicist, Klinikum Nürnberg Nord, Nürnberg, Germany

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When radiologist Prof. Dr. Reinhard Loose first joined Klinikum Nürnberg Nord as head of the radiology department in 1996, he took immediate action to bring the department up to speed with digital technology: “I started networking our X-ray equipment and creating PACS structures as quickly as I could,” he explains. But he didn’t stop there. As the technology became available to make images accessible at any location – including on the wards, thanks to web viewers – it was rolled out throughout the hospital around the turn of the millennium. And the hospital continues to adopt new technologies for imaging, from computed radiography (CR) to direct radiography (DR), supporting the radiology department in providing service not only to patients, but also to other departments and caregivers in the hospital.

### Radiology as a service provider

For Prof. Loose, radiology has a role to play far beyond the department’s walls. One of the key specialties at Klinikum Nürnberg is oncology. In addition to tumor diagnosis and therapy, the hospital maintains one of the largest lung clinics in Germany. Accordingly, the radiology department focuses on oncological diagnosis and intervention, handling more than 120,000 patients per year.

Next to providing day-to-day radiology services, the team led by Prof. Loose offers 24-hour emergency diagnosis and intervention. “Our role is not just in imaging, but also during interventions. Sometimes, we get a call from the operating room that they can’t continue because they urgently need an angiography, embolization or other procedure. One of our radiologists takes care of it: to me, that’s what a clinical radiology department should do,” says Prof. Loose. The main focus remains on inpatient diagnosis, however. During staff meetings, discussing X-rays takes a high priority. “We spend four hours a day discussing X-ray images, and five hours a week on tumor boards,” says Prof. Loose.

### Digital technology brings sites together

With his wealth of experience in digital technology and his background both as a nuclear physicist and in programming data processing systems for physics and medical applications, Prof. Loose had the ideal expertise to lead the hospital’s digital transformation. But he and his team have faced many challenges. Klinikum Nürnberg is one of the largest municipal hospitals in Europe, offering the full range of medical specialties. The hospital has 35 clinics and institutes, 2,370 beds, and 6,000 employees, and treats 100,000 inpatients and 90,000 outpatients every year.

Since 1994 the hospital has consisted of two main sites, ‘Nord’ (north) in the center of Nuremberg and ‘Süd’ (south) in the southeastern part of the city. The Nord site consists of a large number of small campus-style buildings situated far apart.

The medical physics department is now responsible for more than 120 X-ray units at both of the hospital’s main sites, most of which are mobile devices in operating rooms and on the wards. Initially, the hospital used traditional film technology. “The technologist would bring enough film cassettes for three or four patients, make the exposures and then take them to the darkroom,” says Prof. Loose. Introducing CR made a huge difference in the process and productivity of radiography. The darkroom was replaced by a CR system, and the digital-format images could be checked, stored in the PACS and interpreted immediately. But getting the images to the radiologist still took some time.

### DR paves the way to greater efficiency

The drive for change came with the new East campus, which brought together all intensive care units (ICU) on one site. “With CR, the radiology assistant would have to take 15 to 20 cassettes to the East campus every morning, which obviously wasn’t sustainable. So we decided to introduce a mobile direct radiography (DR) system with flat panel detector. We chose the DX-D 100 from Agfa HealthCare,” explains Prof. Loose. “We opted for a cesium iodide (CsI) detector, which we estimated would let us use 30% to 40% lower dose. It is linked into the hospital’s network by WLAN, so images are available immediately after exposure.”

This first DX-D 100 also signaled the start of the radiology department’s gradual transition to DR,

### DX-D Retrofit

- Upgrade to the benefits of DR, without replacing CR existing equipment
- Easy installation, quickly up and running
- Choice of Cesium Iodide (CsI) or Gadolinium Oxy-Sulphide (GOS) detector conversion screens
- Potential dose reduction
- Specially-tuned MUSICA, for gold-standard image processing, and NX workstation for smoother workflow
- Connectivity to PACS, HIS/RIS and imagers

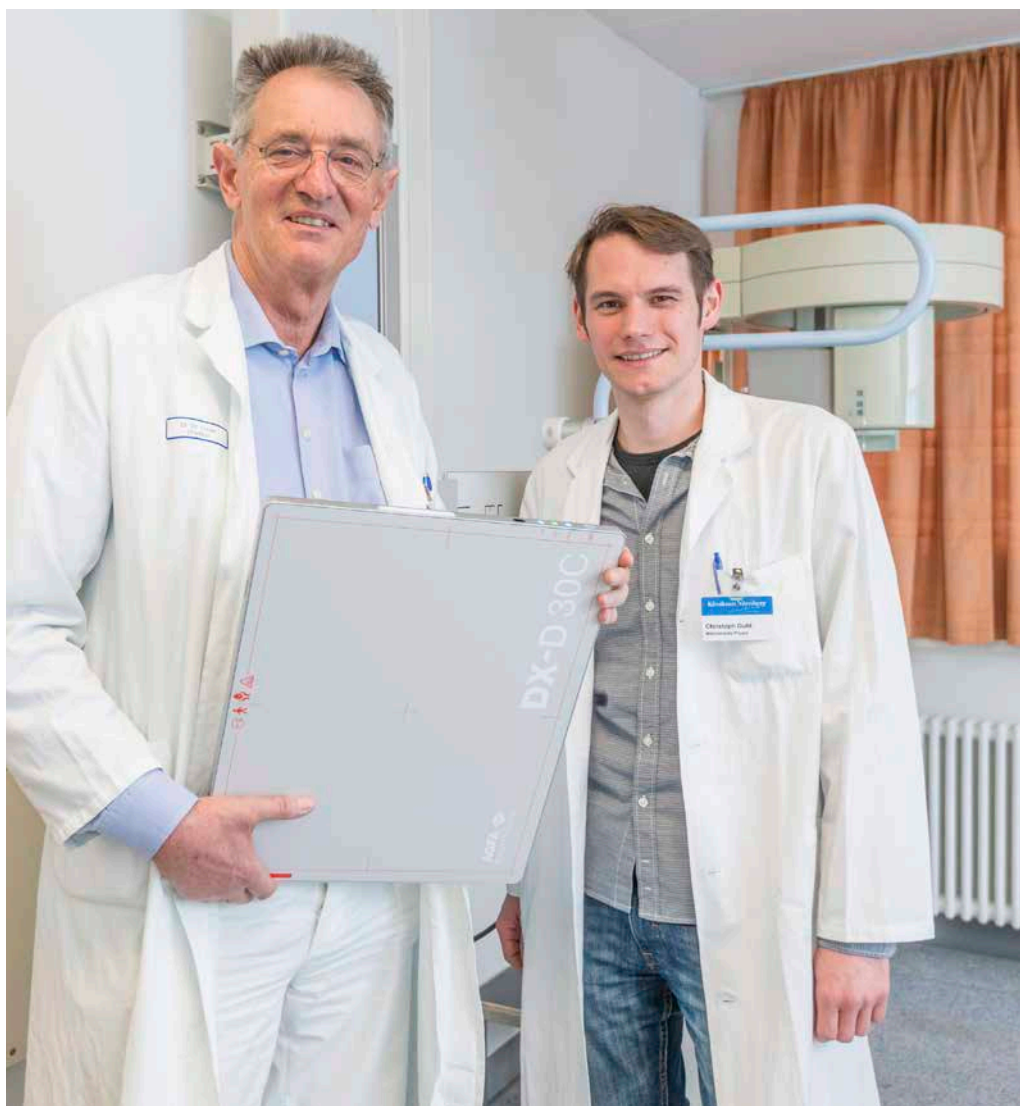


### DX-D 100

- Wireless mobile imaging excellence
- Instant high-quality image capture
- Immediate image validation, transfer and access (HIS/RIS/PACS integration)
- Specially-tuned MUSICA, for gold-standard image processing, and NX workstation, for smoother workflow
- Dose reduction potential
- Easy handling of a broad range of general X-ray exams

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which started with the refitting of one X-ray room with a flat panel detector. The strategy is now to use CR only in specific cases – such as mobile X-ray on smaller wards. “We need to prioritize where it is most effective to implement mobile DR,” explains Prof. Loose. Opposite this newly equipped DR suite is a CR suite, which has been upgraded with the DX-D Retrofit. “The detector is identical to the one in the DX-D 100 DR solution, so we can share them, which increases productivity and cost efficiency,” says Prof. Loose.

The integration of the DX-D 100 and DX-D Retrofit was essentially a matter of ‘plug and play’, as medical physicist Christoph Guhl explains: “The technicians from Agfa HealthCare preconfigured the software so all we had to do was swap the systems around. The integration was completed in a day.”

### Fast and flexible

This flexibility confirmed to Prof. Loose that the Agfa HealthCare systems were the right choice. What’s more: “Agfa HealthCare was the only provider to make its solutions compatible with certified third-party software – in this case a RIS client with DICOM worklist. This makes it much easier and faster for the technologists to make a digital worklist entry for e.g. additional images directly via the RIS client,” says Prof. Loose. He was also impressed by the efficiency of the CsI detector, especially the high image quality in relation to dose.

The DX-D Retrofit has proved to be a very reliable system for the day-to-day clinical practice. In fact, it has allowed the radiology department to close a lung workstation that used to perform 20,000 exposures per year; these exams are now carried out on the system

using a Wi-Fi-based detector. This system is operated with the NX Workstation, which receives the DICOM worklist along with all the image parameters. DICOM Structured Reporting provides all the dose parameters after the image capture. “So we have the same data embedded in the image for all workstations – X-ray tube voltage, tube current-time product, exposure time and dose area product,” explains Prof. Loose.

As the images can be viewed immediately, the technologists save one to two minutes per image. “It’s ideal for the technologists: simple and fast. We radiologists needed time to get used to the new imaging technology, as it is very different from the images produced with CR. But we see a lot more detail with the same dose.”

### Next up: next generation MUSICA and dose reduction

With the physically spread-out wards of the hospital, the large number of mobile systems remains an absolute necessity. But Prof. Loose would like to see all these wards to be equipped with the DX-D Retrofit. He also wants a second DX-D 100 in the large surgical ICU. Both this ICU and the post-anesthesia care unit handle enough patients to make the installation worthwhile. According to Prof. Loose, the acquisition would “pay for itself” when carrying out around 25 images per day.

And Prof. Loose continues looking ahead. The next challenge to tackle: dose reduction. “Agfa HealthCare has announced the launch of the next generation of its MUSICA image processing software. Once we roll out the new software, we will start adjusting dose parameters and optimizing image quality.”

“The technicians from Agfa HealthCare were very well prepared. They preconfigured the software to the point where we simply had to swap the systems around. The integration process was completed in a day.”

**CHRISTOPH GUHL**

Medical Physicist, Klinikum Nürnberg Nord



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