



Innovating MRI for the most vulnerable patients

Neoscan Solutions MRI system | Preliminary information sheet

January 2021



Digital Revolution in MRI.

Sampling to nanosecond precision.

Welcome to new answers in MRI

The world of technical achievements that revolutionize the opportunities in medical diagnostics is in constant change. The progress in high-resolution and safe imaging should be made accessible for as many people as possible. We at Neoscan Solutions are dedicated to bringing this progress to the smallest and weakest patients: An innovative MRI system, compact and easy-to-operate for use in pediatric departments.

At Neoscan Solutions, approved MRI technology is rethought and enhanced in a new future-oriented way. With a focus on patients' and users' needs, we have developed a neonatal MR scanner, that is now ready to be presented.

„We are extremely proud that we can share these news with you. While there is a lot of planning involved, the shown results required more than just planning: Our dry magnet concept gave us as start-up company the opportunity to develop a rock-solid superconducting MRI magnet, whereas many other magnet manufacturers are big players. So, while the first seed of our venture came from the R&D side, we found the best use of this innovation in pediatric MRI, where we found unmet clinical needs and room for improvement.

But even if innovation and clinical need match well, this had been only an idea unless a team of highly skilled and motivated people had made it happen. That we brought these folks together, that we are taking more steps every day, that we made it happen, that I still find surprising, which shall also tell you that I find building a competitive MRI system a high-hanging goal, given the excellent MR systems which are out there.

We are now at the point where we see the light at the end of the tunnel of implementing the technology. Now we are prepared to go the extra mile to win your trust, that our solution can solve the real issues you have and will eventually improve medical care.“

Yours sincerely

Stefan Röll



DISCLAIMER: *The MRI-System which is currently being developed by Neoscan Solutions is not commercially available in all countries. Its future availability cannot be guaranteed.*





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Pediatric MRI



Imaging for newborns and infants

Newborns and infants can have a variety of complications in their first months and years of life. The earlier a child is born, the higher the risk of any mal- and dysfunction of the body. To save life and prevent long-term disorder, possible damage must be recognized as early as possible. The common imaging methods for diagnosing pediatric diseases are Ultrasound and X-ray. For infants, MRI is a much gentler imaging alternative since the patients are not exposed to radiation and are not physically touched.

MRI offers high-resolution imaging of all organs with an excellent soft-tissue contrast, which reveals – in the hand of trained experts - many pediatric problems such as congenital malformations, acute bleeding in the brain, neurological disorders or inflammation and tumors.

But MRI examinations usually require sedation of the newborn, and the transports to the radiological departments are often long, effortful, and sometimes risky for the patients.

For this reason, Neoscan Solutions is devoted to develop a new MRI system especially for the most vulnerable patients, to expand their diagnostic options and making MRI simple and available whenever and wherever it is needed.



Clinical need

Individual capabilities

Placing a sleeping infant in a conventional MRI system at a given time of a tightly packed radiology schedule is difficult to imagine and hard to realize. We want the exam to start when the patient is ready. It should be able to pause at any time in case the infant moves or wakes up. Acoustic noise should be minimized, so MRI becomes as stress-free and comfortable as the young patients need it.



Radiation-free imaging

We want to give the most vulnerable patients the opportunity to be diagnosed at the same high standard as we as adults. Especially in pediatrics there are many questions for which MRI offers profound answers. In contrast to radiation-based radiological examinations, MRI can be used without hesitation and without weighing up the pros and cons. With the Neoscan MRI System, all organs can be examined. For us, this is the future of imaging, especially for infants.



Compact and next to the patient

Long risky patient transports to the radiology department, especially of the premature and newborns or children in intensive care are now a thing of the past. We are developing a compact MR system that can be installed in a small space in an existing facility. Even its operation by a touchpad is straightforward. Thus, MRI is made available where it is needed. Close to the ward. Next to the patient.



Explore new answers in MRI

Compact

Page 11 **Design**
Human simplicity

Footprint
14 m² room. stray field < 10 m²

Installation
mass < 2 tons

Developed for pediatrics

Page 12 **Patient table**
Designed for holding infants

Organs
All organs covered

Page 13 **Stress-free**
MRI available where needed

Quiet
Acoustic-noise reduced imaging



Features overview of the 1.5T Neoscan Solutions MRI system

Innovation highlights

Page 14 Dry magnet

Conductive cooling without liquid helium

Sustainable

First reconfigurable MR magnet

Page 15 Touch UI

Easy usage

Console

Fully digital console

SketchMR

Create your own exam in a new easy way

Technical information

Magnet

Field strength
1.5T, superconducting

Cooling
conductive

FoV
18 cm DSV

Patient bore
30 cm

Magnet mass
< 2 tons

Stray field
< 10 m²

Gradient System

Gradient strength
up to 80 mT/m

Slew rate
up to 200 T/m/s

RF System

RF Coils
Body Coil, Surface Coils

RF Receive channels
up to 32

Console

Console
digital

Organs covered
brain, head, spine, thorax,
abdomen, heart, angio, MSK

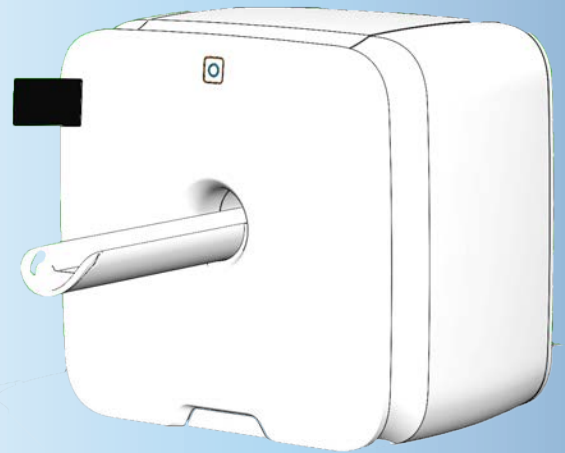
User interface
TouchUI

Compact MRI

Clean design

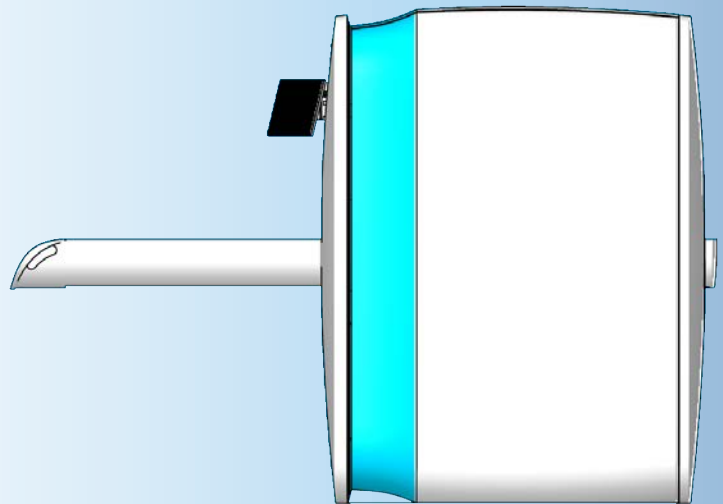
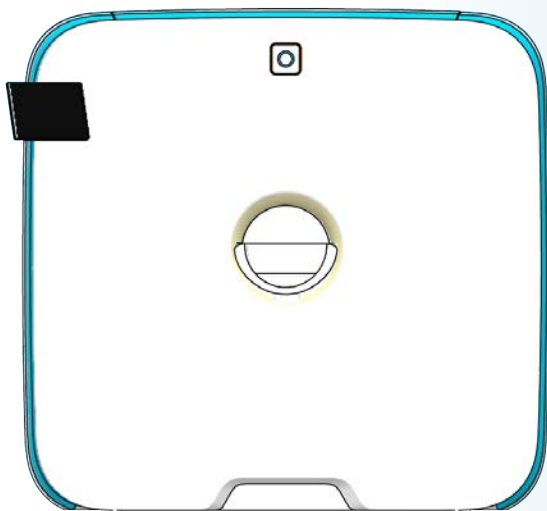
The first Neoscan MR system for pediatrics is an innovative product on all levels. Like our hardware and software developments, the design of the cover of the magnet and the external components such as the patient table and touchpad reflect our product philosophy.

Neoscan Solutions stands for compact and simple systems, modern and future-oriented solutions. We develop products that combine scientific progress with aesthetics.



Small, but impressive

Our 1.5T MRI has a size of H (1.7m) x L (1.8m) x W (1.3m). The stray field of the system is about the quarter of the size of conventional 1.5T systems. Hence, patients can be transported to the direct vicinity of the MR system without using specialized MR compatible equipment. Due to the reduced magnet size, the system can be set up in any hospital room of about 14 m² area.



Installation

The MR device can be installed in any existing buildings and wards. No crane or major structural changes are necessary. Apart from high power electricity and cooling water, no further facilities are required. The magnetic mass of less than 2 tons allows easy installation in rooms even without floor reinforcement.

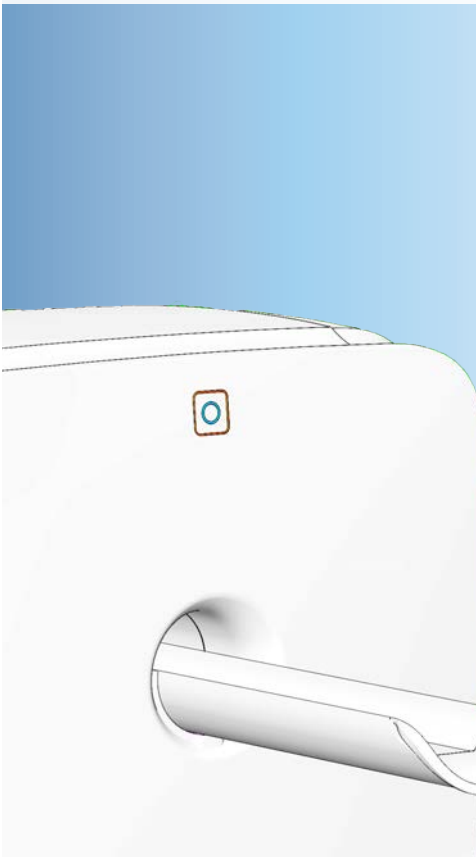
Developed for pediatrics



Patient table for infants' needs

The patient table for infants is developed for an uncomplicated and safe examination of young patients up to an age of 2 years.

The manually extendable patient table offers full protection and maximum control during the examination and, due to the open front cap, provides an all-time good view on the patient. In addition, the patient's face is continuously monitored via real-time video. As soon as the patient shows signs of discomfort, he can be quickly removed from the system at any time.

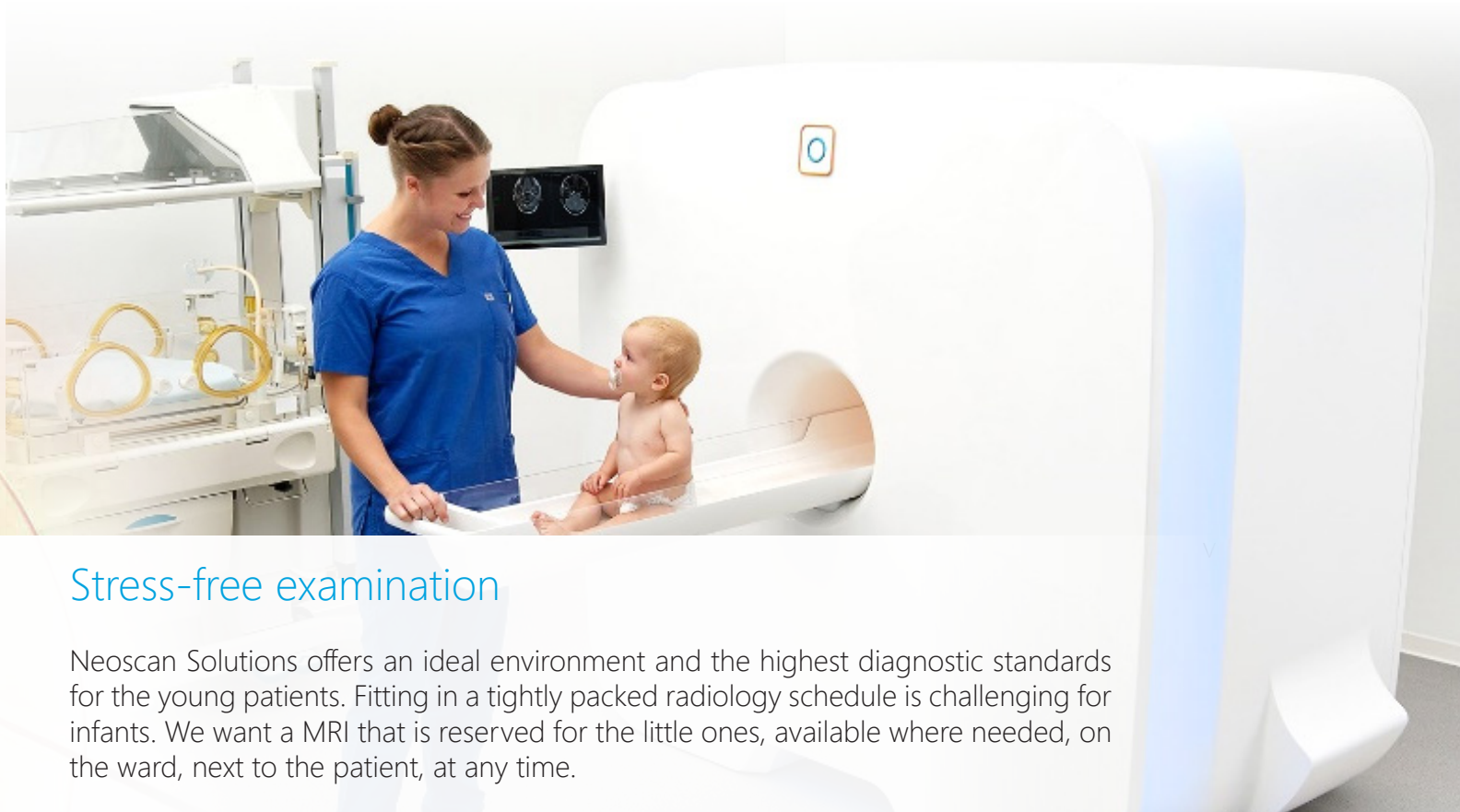


All organs covered



Given an MRI FoV of 18 cm spherical, all organs including the large one thorax and abdomen, can be examined without moving the table. Hence, the organs brain, head, spine, thorax, abdomen, heart, angio, MSK are covered.





Stress-free examination

Neoscan Solutions offers an ideal environment and the highest diagnostic standards for the young patients. Fitting in a tightly packed radiology schedule is challenging for infants. We want a MRI that is reserved for the little ones, available where needed, on the ward, next to the patient, at any time.



Acoustic noise-reduced MR imaging

The acoustic noise level is an important prerequisite for successful exams of the young patients. Our smaller gradient system produces naturally less noise than a larger system. In addition to various noise insulation measures implemented on system level, the user can further control noise by adapting the MR sequences.

Innovation highlights



Dry cooling

Our magnet is the first superconducting magnet for clinical MRI which completely dispenses with the use of liquid helium as a coolant, solely relying on conductive cooling. Customer advantages include lower running costs and easy installation and service; e.g., no quench pipe is required any long for evacuating the evaporating helium in the case of a quench.

Sustainable magnet

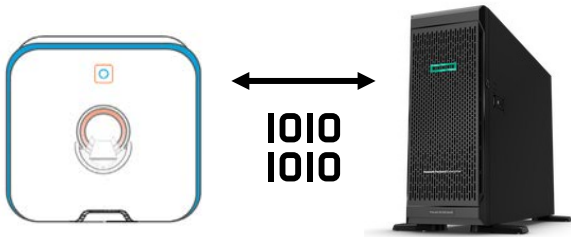
What do we mean by a sustainable magnet? Since no helium is used at all, the cryostat is no longer welded, but it is hold together by screws, and can be opened and closed in the case this is required by deep magnet service. Further, it can be considered to reconfigure the magnet with re-using the cryostat, due to a generic fixation system of the magnet core. So foresee a long lifetime of our systems, which can be kept current by HW and SW upgrades.



Touch UI

Easy and intuitive usage of the MR system by a touchpad. Training of system usage shall take less than a working day.

The idea of the new UI is that the exams are pre-configured at the usual level of detail by technicians and radiologists remotely, while for the actual scan of the single patient a pre-configured exam is only selected by the user. This exam can still be modified, especially, the examination can be paused at any time and easily resumed, so that the needs of the patients can be taken care of. The system adapts to the patient conditions, to achieve optimal results for each patient.

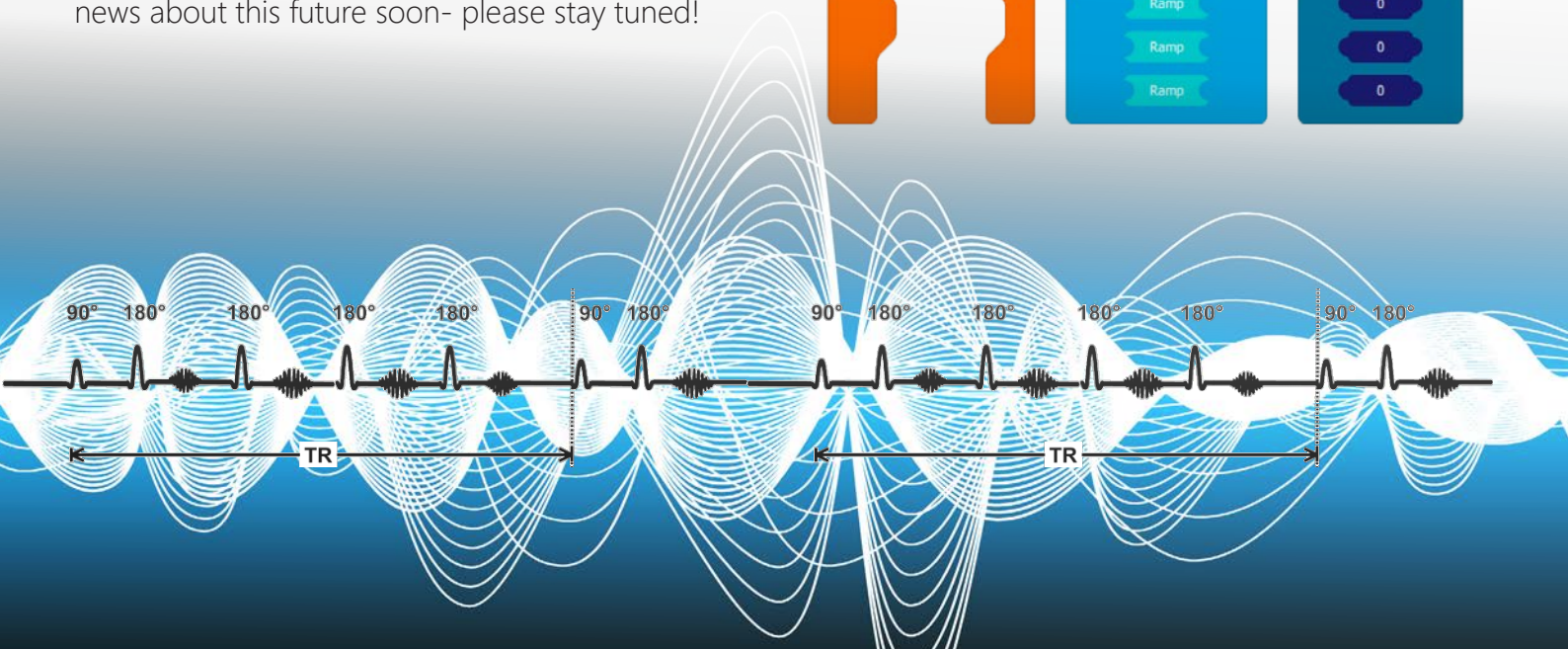
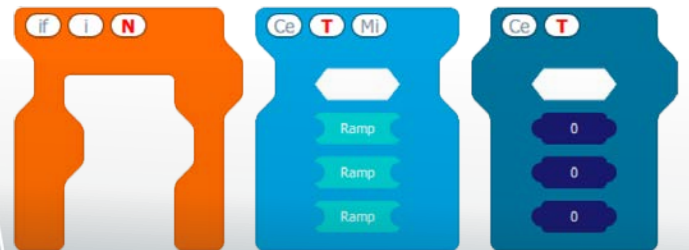


Digital console

This is a hard to believe fact for the experts: There is no oscillator in our system resonating at the Larmor frequency; instead, this critical frequency of every MR experiment is just a SW parameter, for transmitting and receiving MR signal. As a result, you will find this system to operate at an extremely precision, up to nanosecond precise inner-sequence timing.

SketchMR

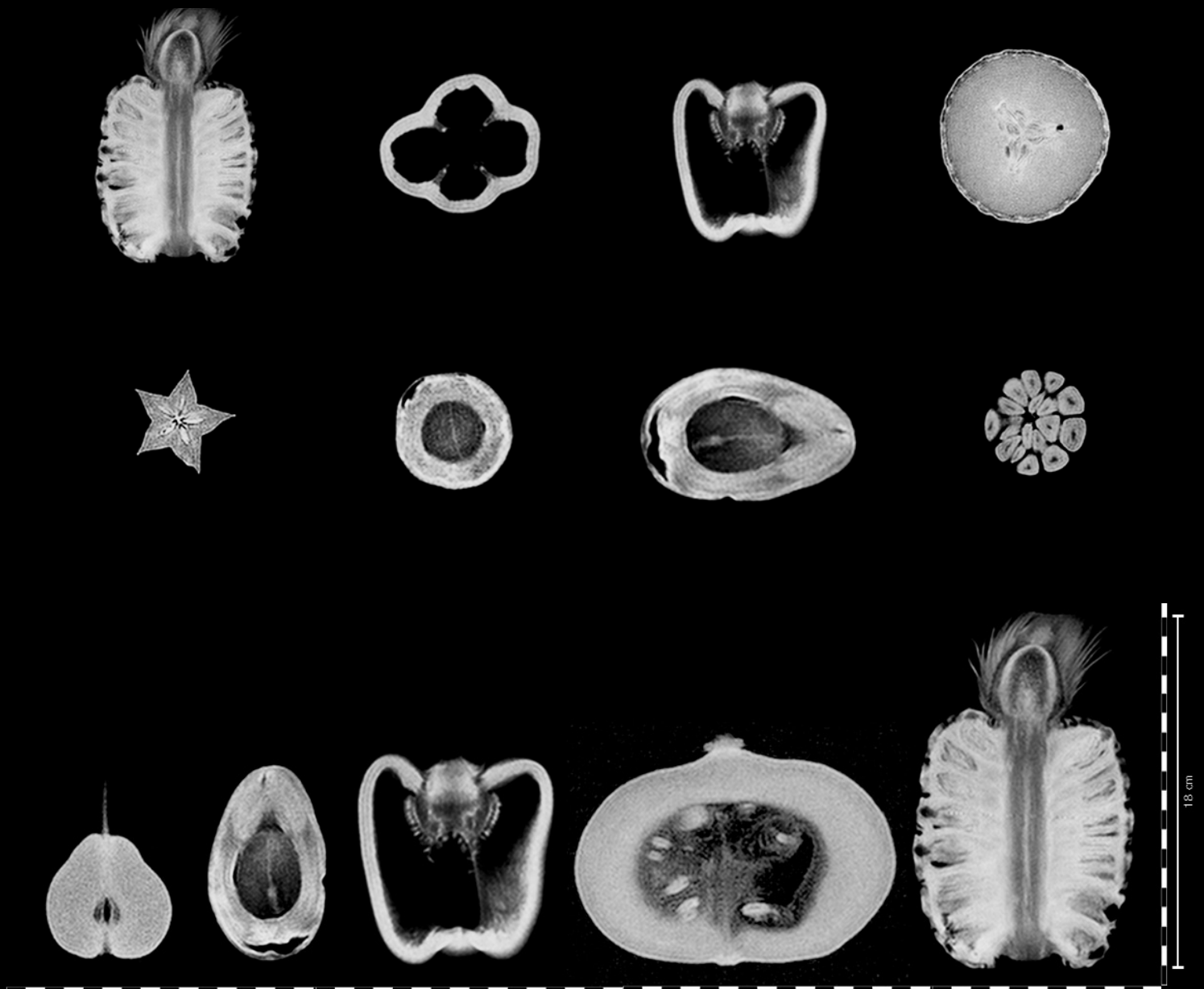
The user interface for accessing a new language of MRI. Creating new MR sequences and protocols has been never as easy and intuitive. We will share news about this future soon- please stay tuned!



Fruity insights

Experimental Still Imaging at 1.5T

Acquisition parameters: Spin Echo 256 x 256 Imaging Resolution at 400 mm squared FoV, Ta 1-2 min.



Key facts



Compact

- Footprint about 14 m², stray field <10 m²
- Total magnet mass <2 tons,
- Easy to install. no major constructional changes
- Design: Human simplicity

Developed for pediatrics

- Patient table developed for infants' needs
- Open system and face monitoring
- All organs covered
- Stress-free examination by individual timing
- Acoustical noise-reduced MR Imaging

Innovative

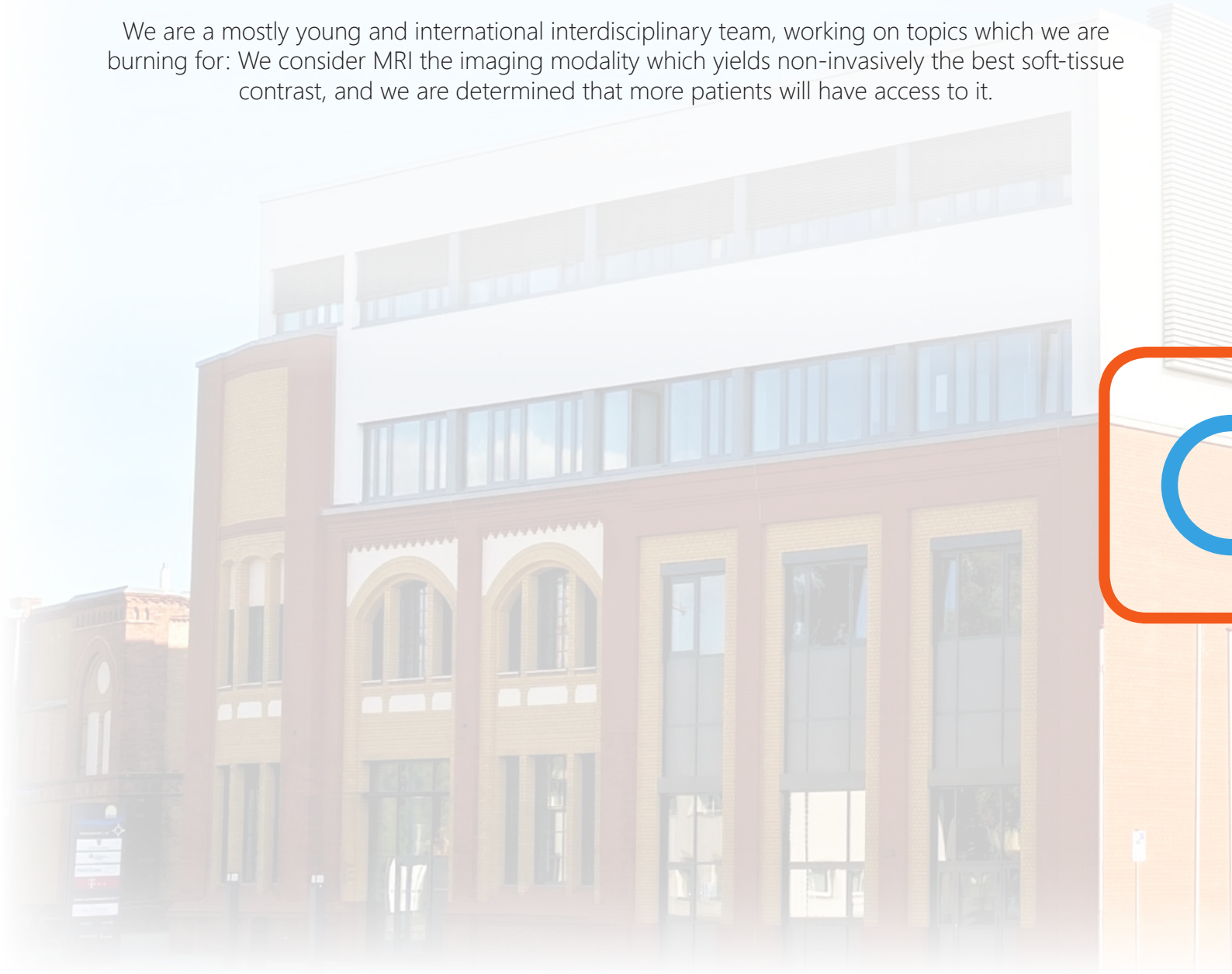
- Dry magnet offering low running costs
- Magnet is re-configurable
- System is easy-to-operate
- Fully digital console
- Remote exam planning by SketchMR
- R&D by an international team based in Germany



About us

Neoscan Solutions is a young venture engaged in developing high-quality solutions for MR diagnostic imaging based in Magdeburg, Germany.

We are a mostly young and international interdisciplinary team, working on topics which we are burning for: We consider MRI the imaging modality which yields non-invasively the best soft-tissue contrast, and we are determined that more patients will have access to it.



We collaborate with Otto-von-Guericke University, and participate in the *STIMULATE* research campus. We are supported by grants from the State of Saxony-Anhalt and the European Union.



Contact

Executive directors:
Dr. Stefan Röhl & Dirk Meyer

Neoscan Solutions GmbH
Joseph-von-Fraunhofer-Str. 6
39106 Magdeburg, Germany

info@neoscan-solutions.com

www.neoscan-solutions.com

+49 391 5639 8540



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Innovating MRI technology.
Compact and digital.
Made in Germany.