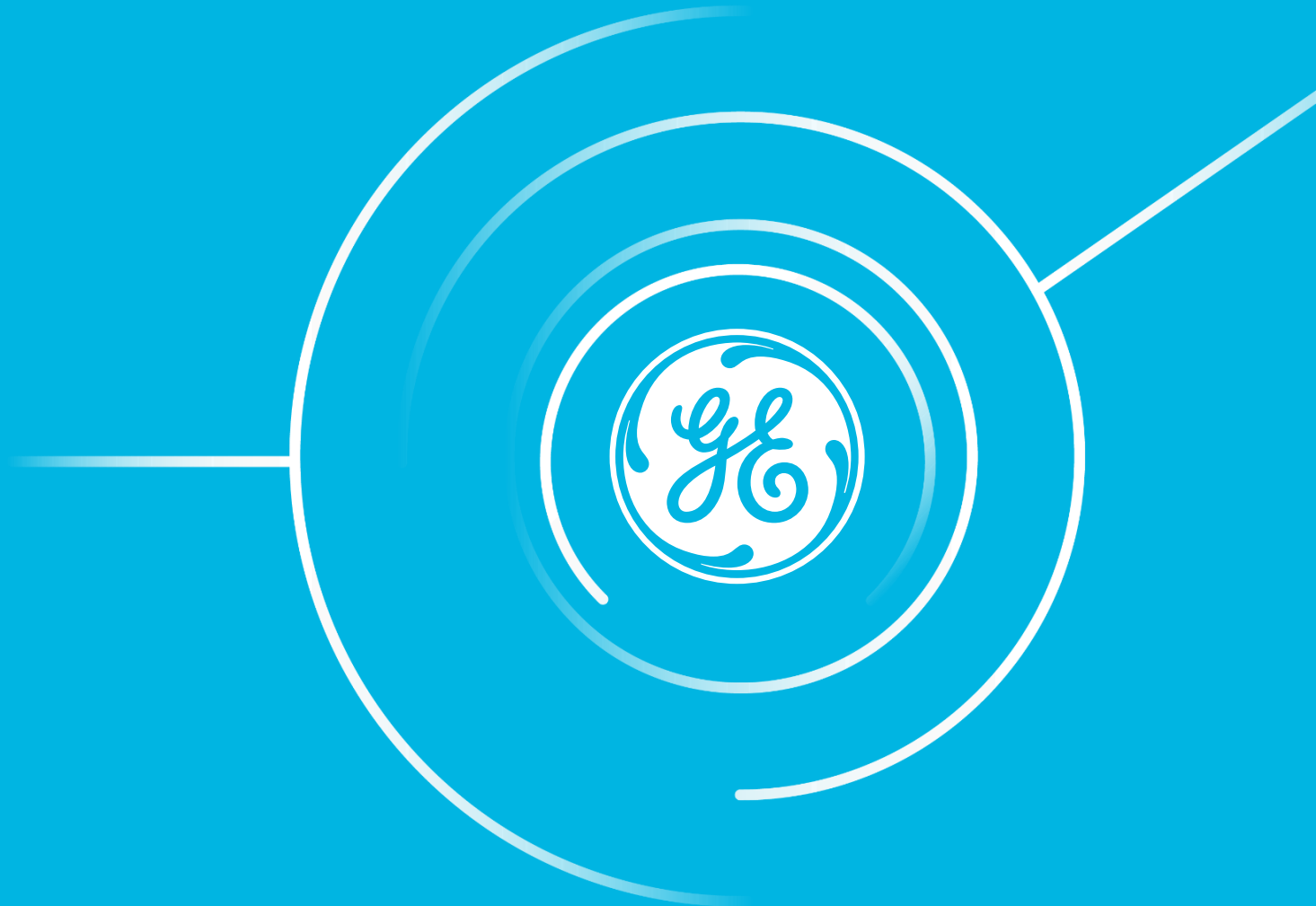


Přehled technických novinek





Prohlášení o finančních zájmech

Pokud jde o předmět této prezentace, mám následující finanční zájmy:

Název společnosti: GE Healthcare

Typ vztahu: Zaměstnanec



Prohlášení o obsahu této prezentace:

Některé části obsahují technologie z probíhajícího výzkumu, které nejsou v současné době schváleny žádným národním regulačním orgánem, a tedy nejsou na trhu dostupné. V budoucnu ani být uvedeny na trh nemusí. Jejich prezentace slouží pouze k účelu hodnocení odbornou veřejností.

GE technologický průkopník

Thomas Alva Edison
11.1.1847 – 18.10.1931



E27



GE technologický průkopník

1/3 světové produkce
elektrické energie

2 ze 3 letadel jsou
poháněny motory GE



Pohled do středověku

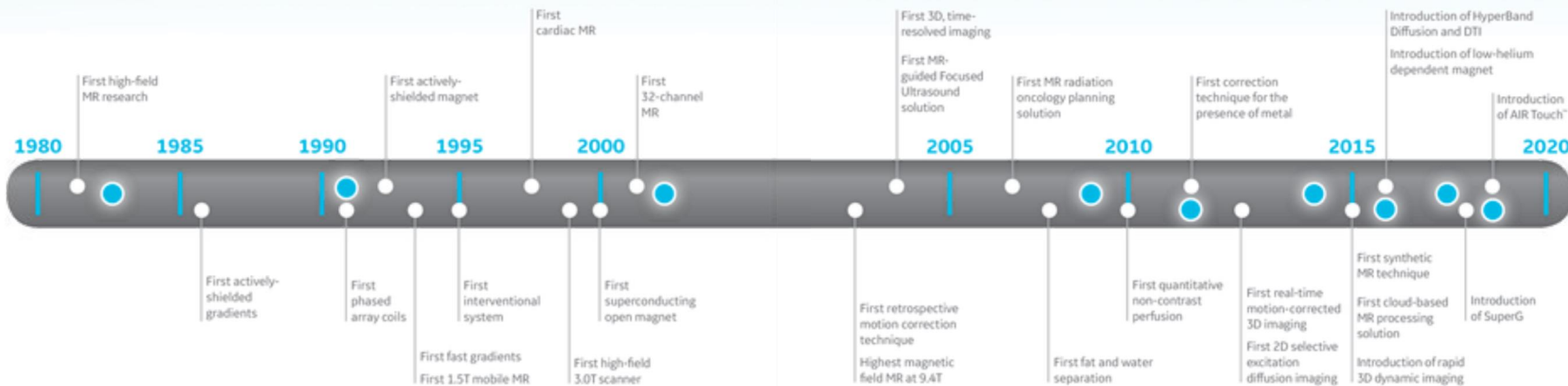
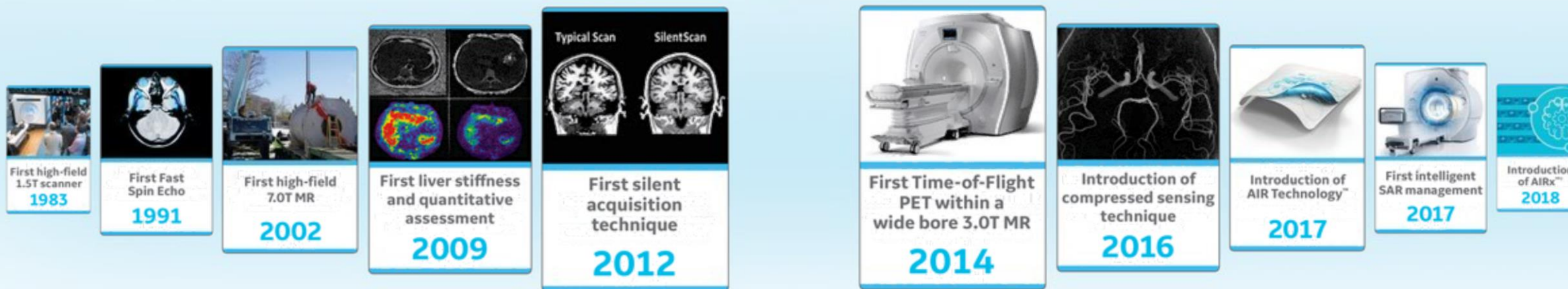


Figure 2. A drawing from the Middle Ages which shows the fantasies (or illnesses) being radiated out from the pot-like structure into which the patient has been put. All those years ago, the conceptual relationship was predicted between the patient and modern imagers or scanners!



36 let průkopníkem technologií

36 Years of MR Leadership



The NMR Phased Array

P. B. ROEMER,* W. A. EDELSTEIN,* C. E. HAYES,† S. P. SOUZA,*
AND O. M. MUELLER*

*GE Corporate Research and Development Center, Schenectady, New York 12301;

†GE Medical Systems, Milwaukee, Wisconsin 53201

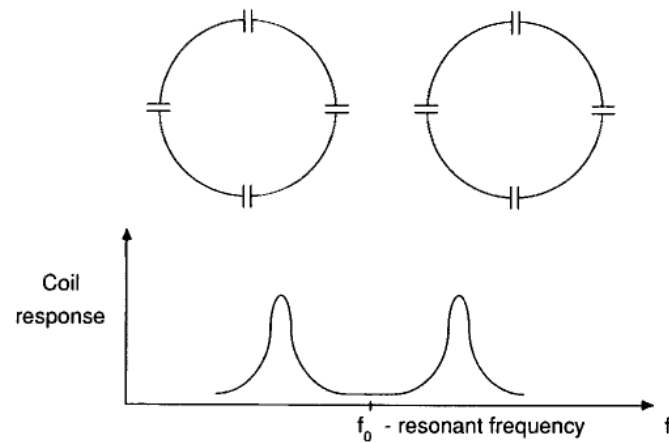


FIG. 1. Response of two adjacent surface coils tuned to the same frequency f_0 . The original resonances split into two resonances and the sensitivity of the coils at frequency f_0 is greatly reduced.

89;

216

ROEMER ET AL.

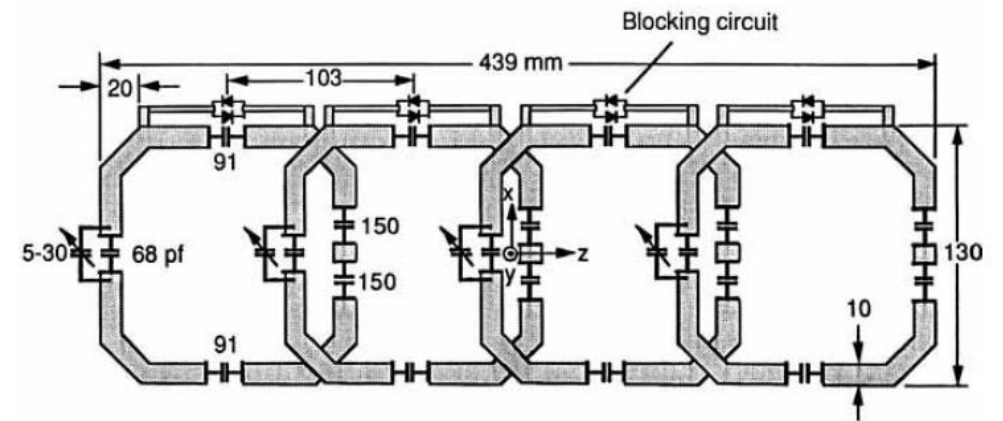
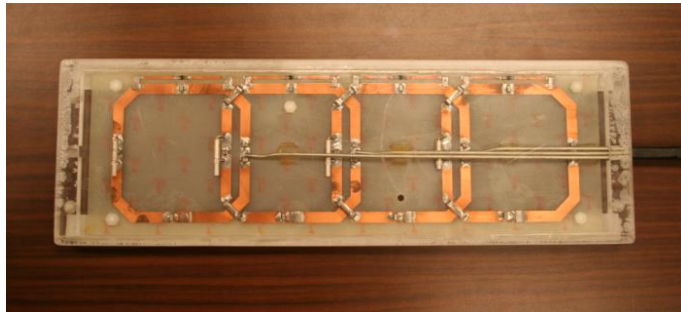


FIG. 14. Schematic diagram of coil in Fig. 13 showing component values and dimensions.

second made of 8-cm square coils, when compared with images from a single 15 x 30-cm rectangular coil and identical imaging parameters, the phased array yields a 2x and 3x higher SNR at the depth of the spine (~7 cm). © 1990 Academic Press, Inc.



Rozvoj elementů zobrazovacích cívek



První fázové pole – 4ch z roku 1990

Majetek Chris Hardy



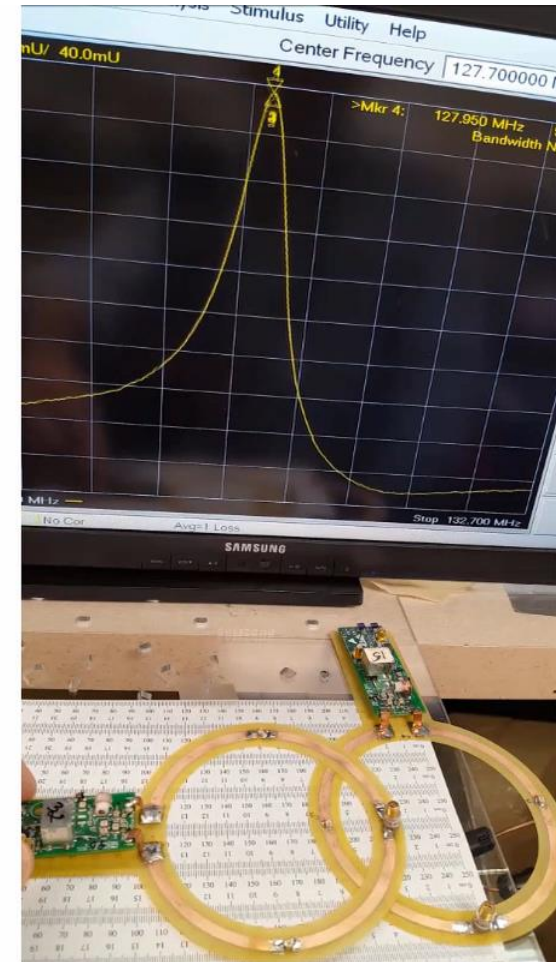
GRC Tělová 128ch

Majetek Chris Hardy

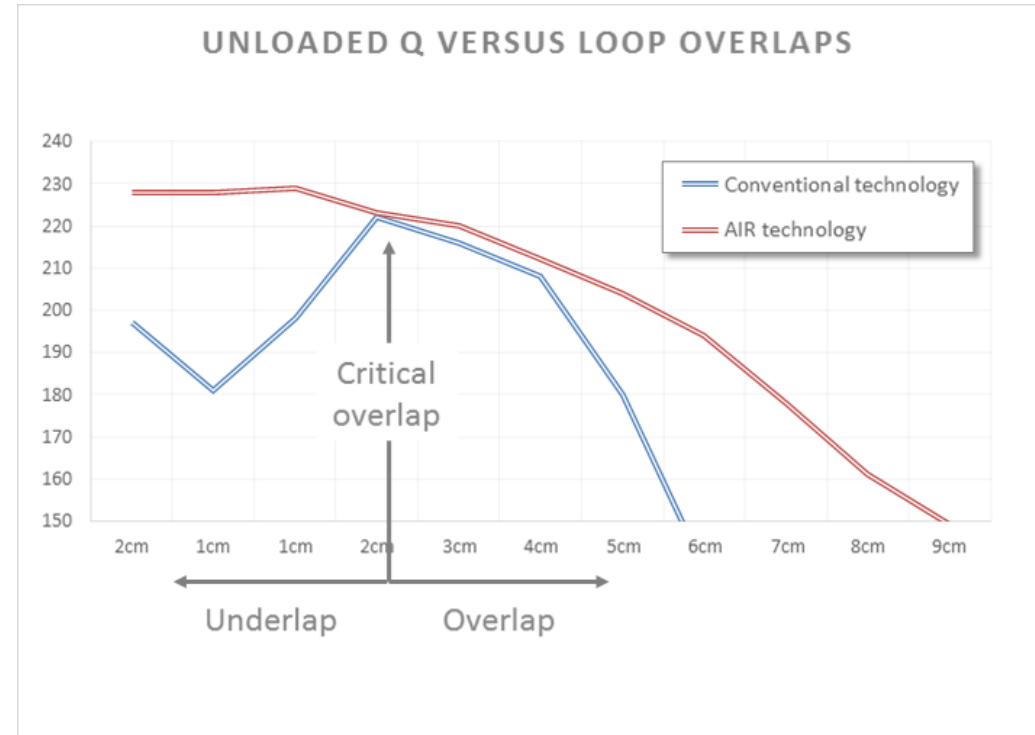
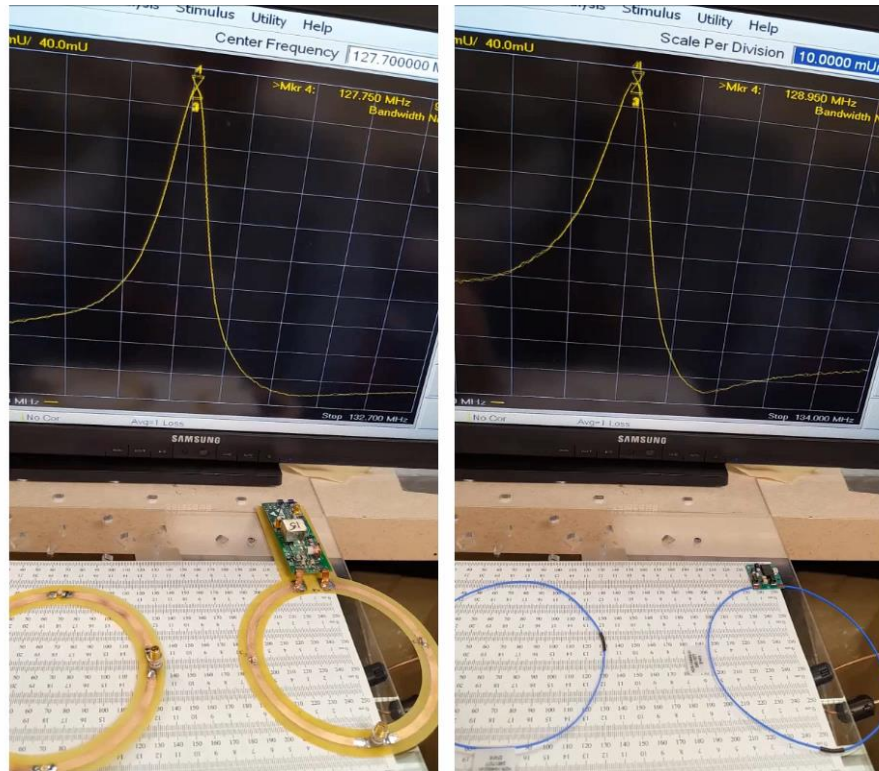


MGH Kardio 128ch

Majetek Larry Wald, MGH



AIR Technology™



S AIR Technologií je “kritické” překrytí minimalizováno

AIR Technology™

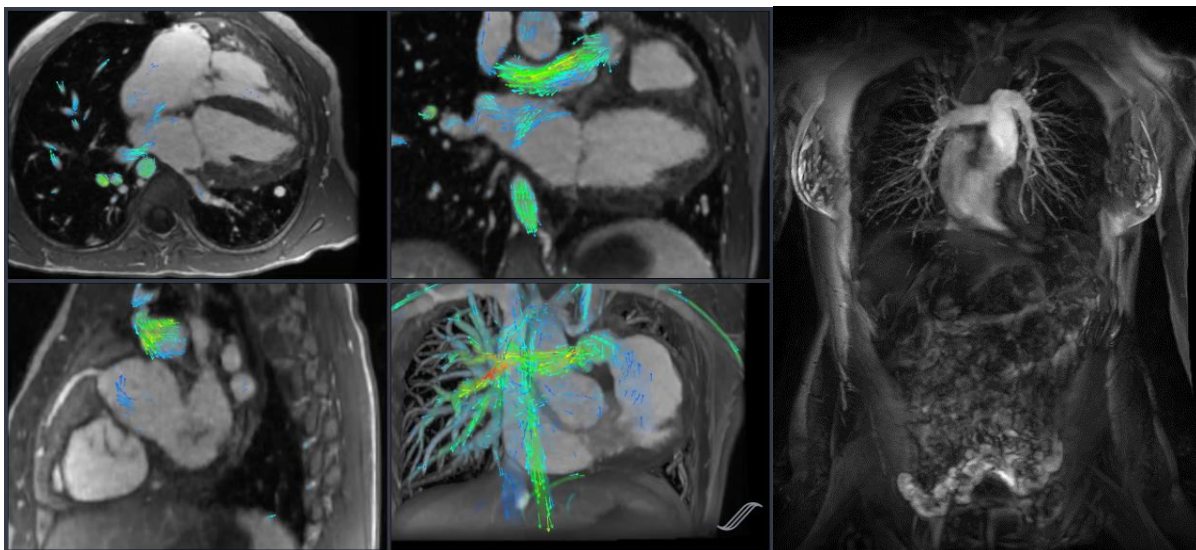
Hlavová cívka: 48-channels over 35 cm

Anteriorní cívka: 30-channels over 65 cm

Pátěrní cívka: 60-channels over 110 cm

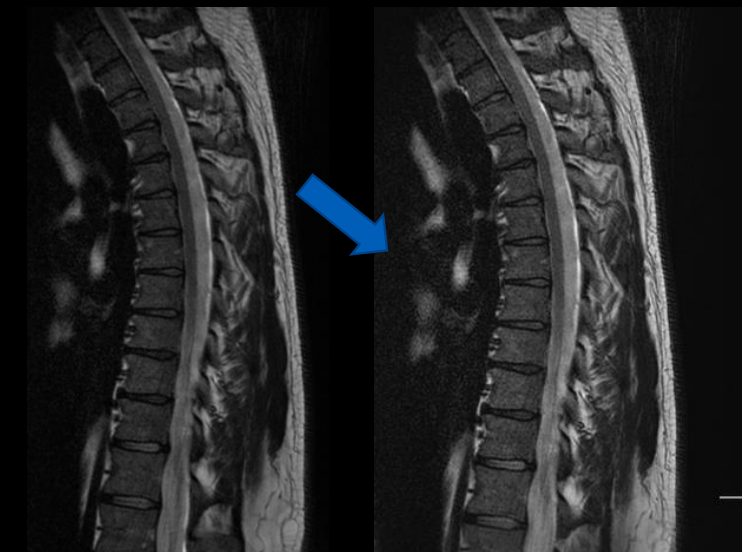
Víceúčelová cívka střední*: 20-channels 48.5 x 30 cm

Víceúčelová cívka velká*: 21-channels 68 x 30 cm



*510(k) certifikováno FDA. Bez CE značky. V EU není dostupné.

AIR páteřní cívka – vyšetření celé páteře



T2_BWS 2:44 min

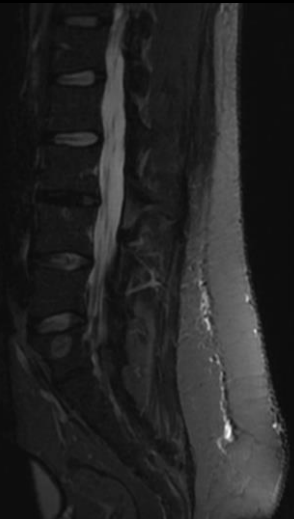


0.8x0.9x3mm (0.3)
Gesamt 6:06 min

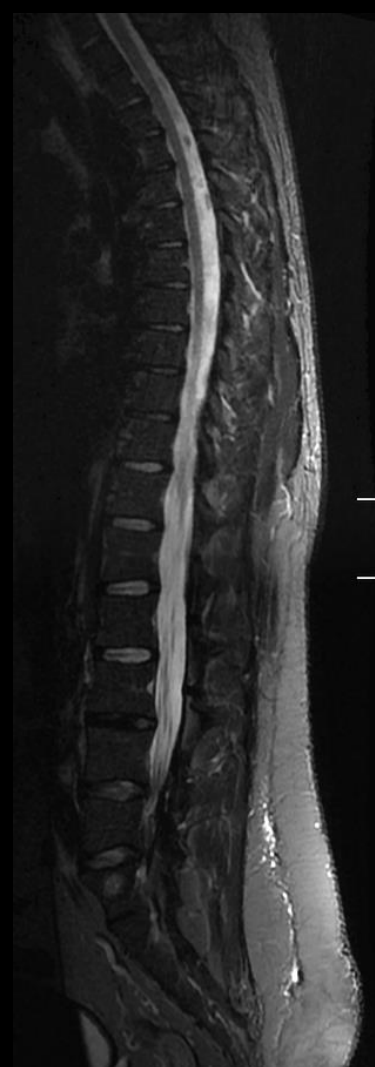
T2_LWS 3:22 min



STIR_BWS 3:35 min



STIR_LWS 4:05 min



1x1.4x3mm (0.3)
Gesamt 7:40 min



T1FLAIR_BWS 2:17 min



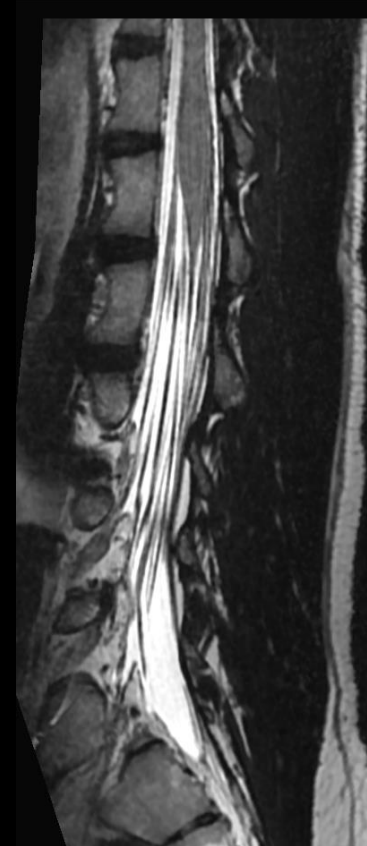
0.9x1.4x3mm (0.3)
Gesamt 4:50 min

T1FLAIR_LWS 2:33 min

TOMORROW TODAY

AIR Technology Coils & HyperWorks

Kombinace nových technologií pro další navýšení rozlišení a zkrácení vyšetření

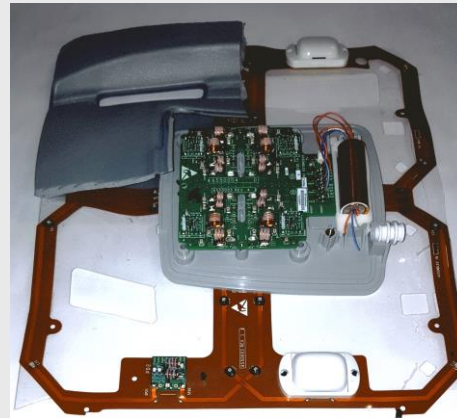


T2 Sagittal HyperCube / HyperSense
0.8mm isotropic, délka vyšetření: 3:42 min

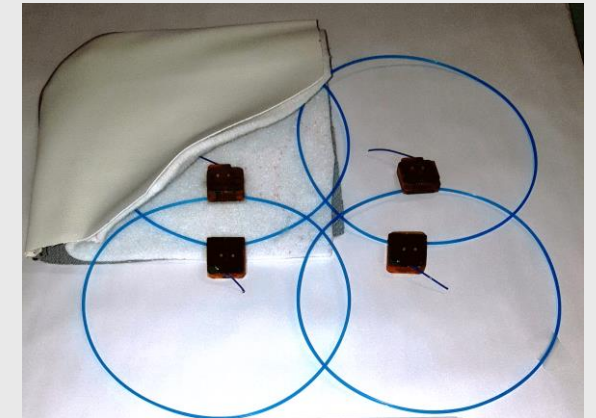
T2 Sagittal HyperCube / HyperSense
Oblique View



AIR Technology™ - GE MRI Coil Engineering, Aurora, OH



Konvenční design



AIR Technology™ patenty

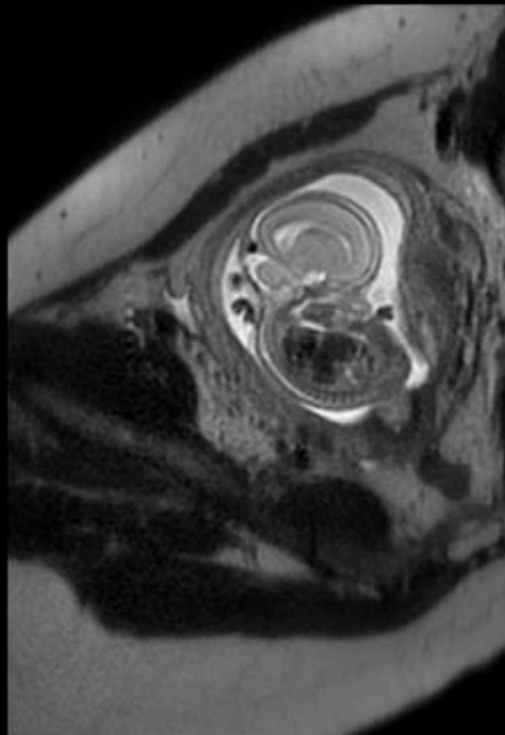
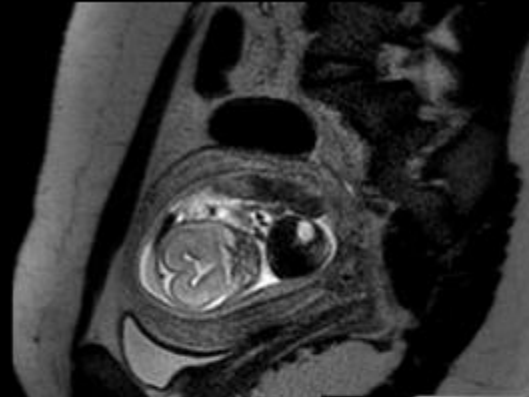
- Inca vodič
- E-mode předzesilovač

Revoluční Design



TOMORROW TODAY

AIR Technology™

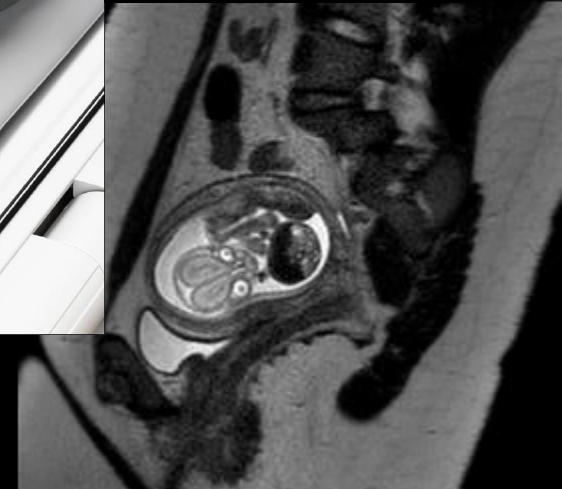


AuntMinnie.com
THE BEST OF RADIOLOGY
WINNER

Named best new radiology device

“We are only limited by our imagination and our customers’ imagination to come up with new and different designs. The sky is the limit... we’re just getting started.”

- Eric Stahre, President & CEO, Global MR



SIGNA™ Architect 3.0T

Image Courtesy of Queen Silvia Pediatric Hospital / Sweden

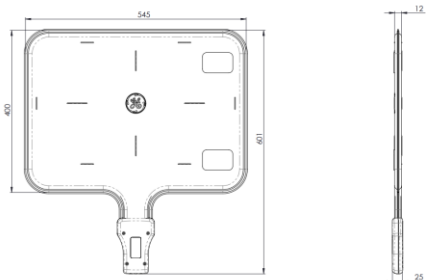
AIR Technology™ Víceúčelová (MP)cívka*

Těsnější upnutí kolem anatomie a zároveň komfortnější pro pacienta

Kotník/chodidlo



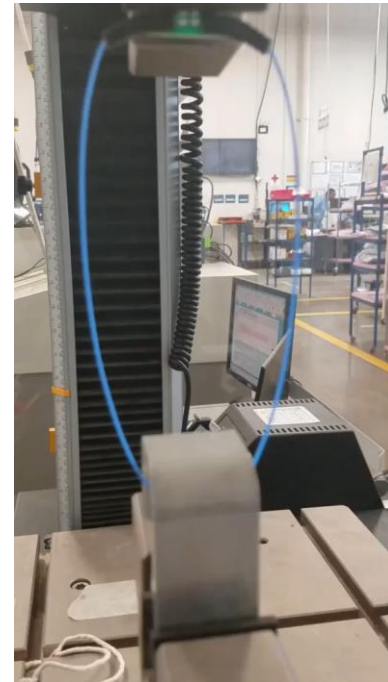
Signál z 360 stupňů



Maximální obepnutí



Může být obepnuto až na poloměr 3 cm



*510(k) certifikováno FDA. Bez CE značky. V EU není dostupné.

TOMORROW TODAY

AIR Technology™

Víceúčelová cívka velká MP*



Ruka/zápěstí/prst



Získaný signál z 360 stupňů pro angiografii
ve vysokém rozlišení



*510(k) certifikováno FDA. Bez CE značky. V EU není dostupné.

TDI cívky 16ch flex – 3 velikosti

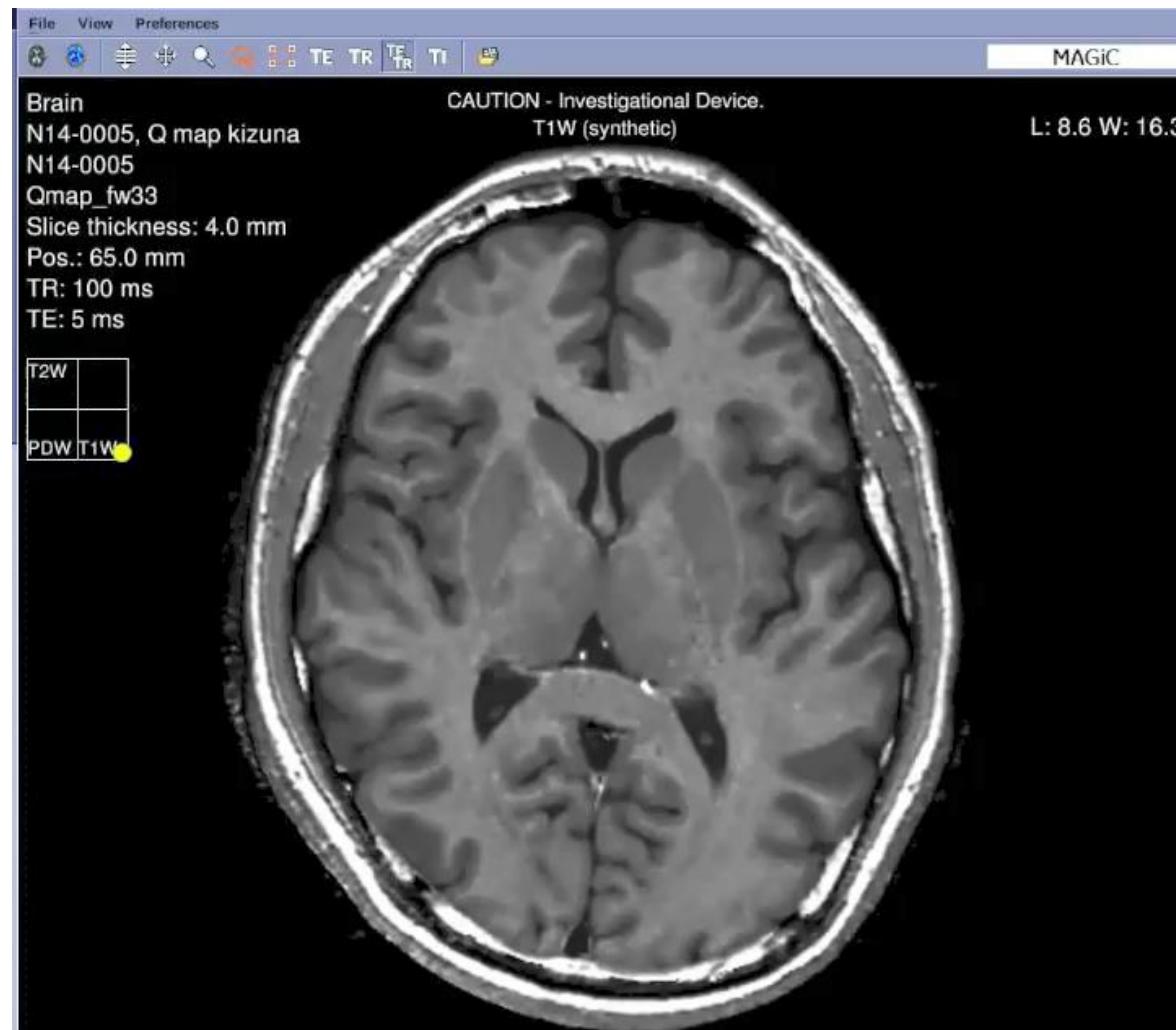
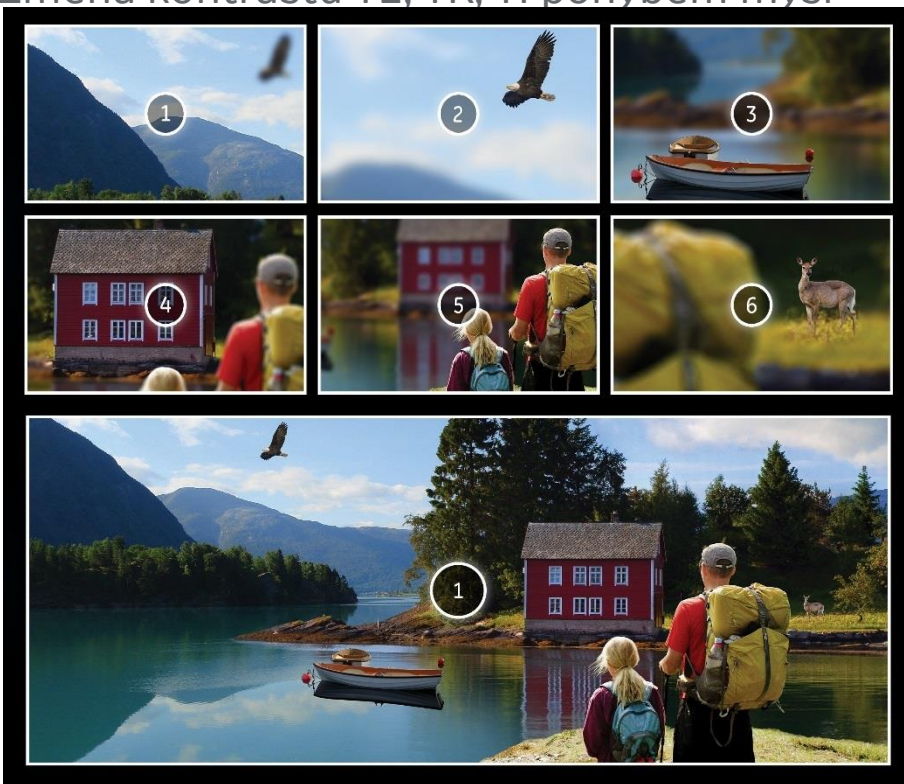


MAGiC ... MAGnetic resonance image Compilation

- MAGiC ... Změna kontrastu, a to i po ukončení vyšetření

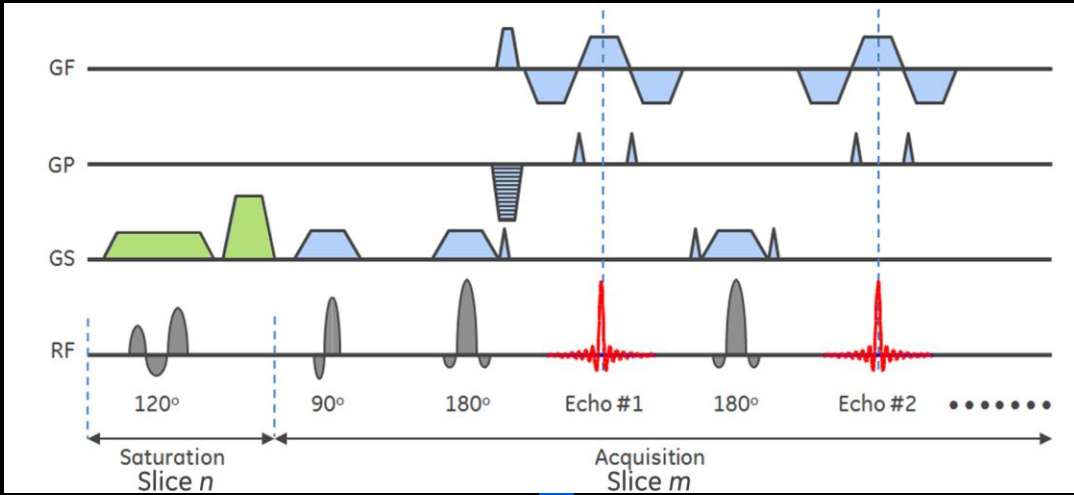
Vyšetření za 6-7 minut

Změna kontrastu TE, TR, TI pohybem myši



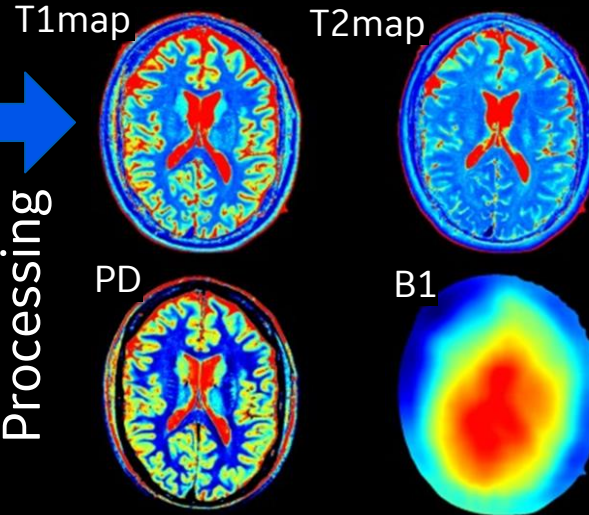
MAGiC ... MAGnetic resonance image

Compilation MAGiC acquisition

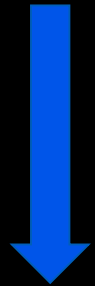


MAGiC

Processing



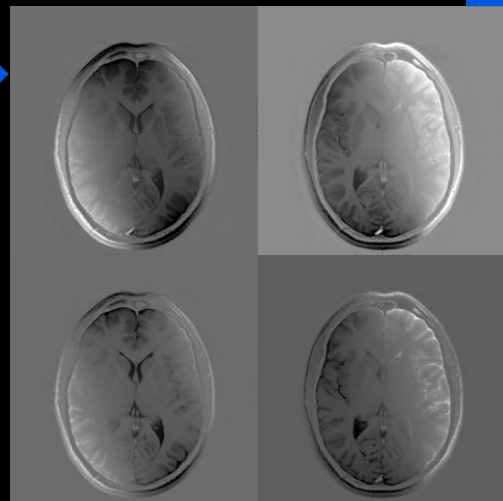
Skwantyfikowane mapy T1, T2, PD do wyestetyzowania pożądanego kontrastu



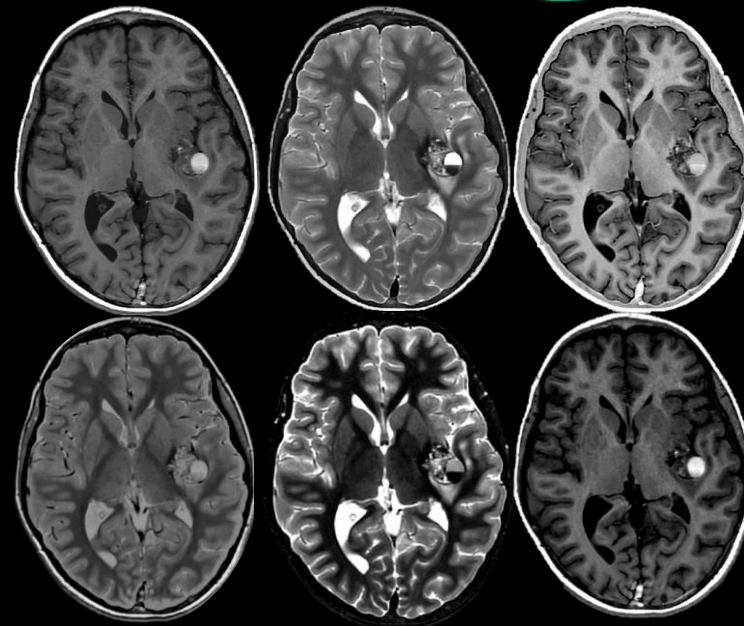
Możliwość ustawienia TR, TE, TI aby obrazy T1, T2, PSIR, PD, STIR, T1FLAIR były generowane automatycznie

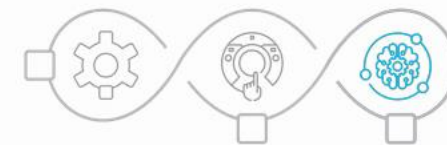
MDME FSE (multi-delay multi-echo) generuje surowe dane (Real + Imaginary):

- 4 bloki tzw. 120° Saturation-Recovery aby oszacować T1
- 2 czasy echa (TE) aby oszacować T2



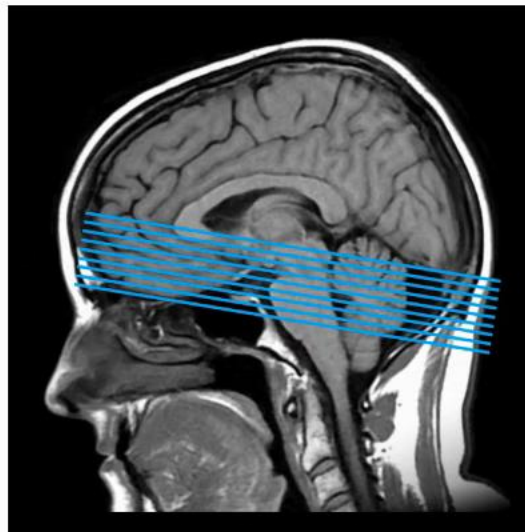
Raw MDME images





AIR x™ Intelligent slice placement

- ✓ **Automatic slice placement**
based on the anatomical reference and orientation defined for the most common requested exams
- ✓ **Consistent and accurate images**
regardless of pathology, patient position, time between scans and technologist variability
- ✓ **Time savings**
by reducing rescans as well as workflow inefficiencies

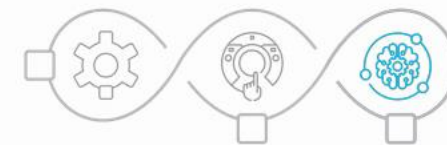


5x
Faster* exam
set up time
using AIR x™
With deep learning**

4x
Fewer*
mouse clicks
with AIR x™
With deep learning**



Powered by a **deep learning** algorithm
created from a database of 36,000 images



AIR x™ Intelligent slice placement

- ✓ **Automatic slice placement**
 based on the anatomical reference and orientation defined for the most common requested exams
- ✓ **Consistent and accurate images**
 regardless of pathology, patient position, time between scans and technologist variability
- ✓ **Time savings**
 by reducing rescans as well as workflow inefficiencies

	AIRx™ GE	ReadyBrain GE	Vendor A	Vendor B	Vendor C
ACPC	X	X	X	X	X
OM	X	X		X	X
IAC's	X		X	X	
Pituitary	X			X	
Hippocampus (Temporal Lobes)	X		X	X	
TOF (MRA COW)	X			X	
Optic Nerve	X		X		
Optic Nerve Right	X		X		
Optic Nerve Left	X		X		
Orbits	X		X		



Powered by a **deep learning** algorithm
 created from a database of 36,000 images





AIR™ Recon* provides consistent image quality

Consistently superior image quality

- Higher SNR without any additional scan time
- Reduced out-of-FOV artifacts
- Darker background and saturation band
- Lower No Phase Wrap factors can be used to save scan time

What is it?

A smart reconstruction algorithm that utilizes noise calibration data acquired during prescan and weights receive channels according to their noise level



Before 1.7 NPW
4:33 min

Before 1.3 NPW
3:33 min

1.3 NPW with AIR™ Recon
3:33 min

- ✓ SNR improvement
- ✓ Background noise reduction
- ✓ Artifact suppression
- ✓ Enables shorter scan time



AIR™ Recon DL*

Better images, faster.

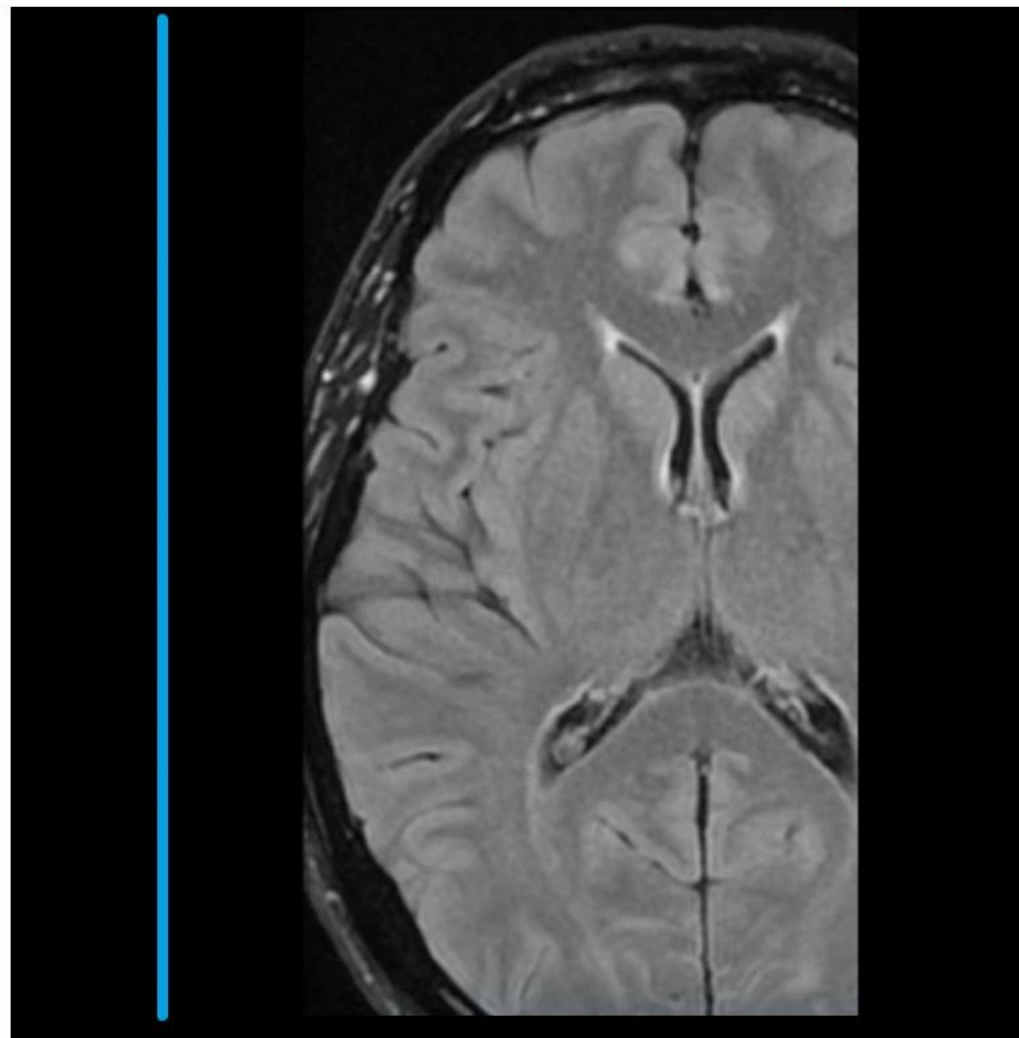
AIR™ Recon DL, a deep-learning reconstruction application, is trained neural networks to reconstruct the good signal and not the noise.

Consistent image quality regardless of

- ✓ Technologist skill
- ✓ Pathology
- ✓ Patient size

Superior image quality

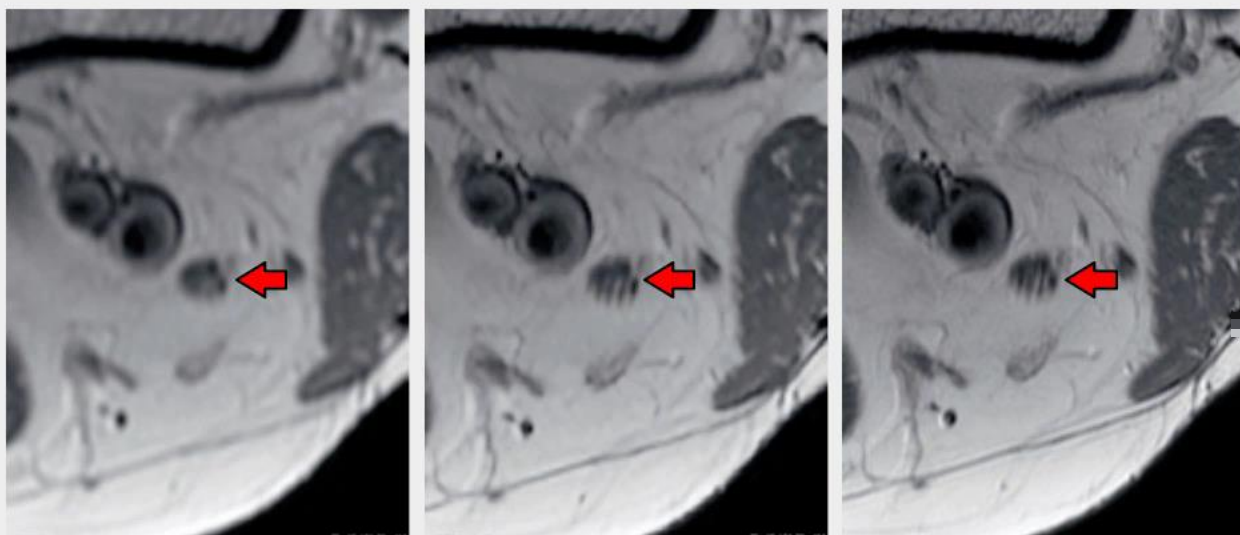
- ✓ Improved SNR
- ✓ Improved image sharpness
- ✓ Enabling reduced scan time





AIR™ Recon DL*

Customer feedback – **Enabling higher resolution**



Elbow (A) Unfiltered, axial 2D FSE, 256 x 180, 1 NEX, 1:10 min. (B) AIR™ Recon DL at maximum-plus SNR improvement, 256 x 180, 1 NEX, 1:10 min. (C) Reference unfiltered, 512 x 352, 2 NEX, 4:09 min.

“In our experience, this tool enables us to back off on the number of averages or achieve a higher matrix, to either save on scan time or achieve a higher resolution image.”

“There is more detail in the image, especially at a lower matrix. In some conventionally-processed MR images, the trabecular pattern is poor, the nerves are blurred and there is a lot of noise in the image. With AIR™ Recon DL, the difference is striking”



Hollis Potter, MD
The Hospital for Special Surgery, NY



**„I have not failed. I've just found
10,000 ways that won't work.“**



Thomas Alva Edison

11.1.1847 – 18.10.1931

