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Leading.
With
MAGNETOM.

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# Upgrade your MAGNETOM Avanto to the new MAGNETOM Avanto$^{fit}$

## The landmark in 1.5T imaging

Answers for life.

# Upgrade now

## and benefit from the latest innovations in 1.5T

**You are working with MAGNETOM Avanto – a perfect starting point to take the next step in MRI innovation. A powerful upgrade is now available for your system, making your 1.5T imaging more accurate, more productive, and more consistent. This will help you to stay secure and ahead with your investment. Today, and for years to come. Making sure patients benefit most in the end.**

Your renowned MAGNETOM® Avanto can now be upgraded with the key technologies Tim® 4G and Dot®. The new MAGNETOM Avanto$^{fit}$ is now fit for the future, fitting your changing needs in a dynamic healthcare environment. Your 1.5T magnet will be working with the 45 mT/m @ 200 m/T/s SQ Gradients together with Tim 4G, the 4$^{th}$ generation of proven Tim (Total imaging matrix) integrated coil technology. Tim 4G – with its all new RF architecture – locates all transmit and receive components at the magnet, resulting in a fully digital architecture. Your benefits include exceptional image quality, faster acquisition and exam time, as well as higher signal-to-noise ratio (SNR).

The upgrade includes Dot (Day optimizing throughput), the next movement in MRI. Dot is a new way of scanning in MRI – a better way. Dot scanning uses a suite of customizable engines – allowing the user to personalize exams according to patient needs, build in step-by-step user guidance, and automate MRI exams – either "out of the box" or based on the institution's standards. Your benefits include increased consistency and reproducibility, greater ease-of-use, and higher productivity.

| Your MAGNETOM Avanto | The new MAGNETOM Avanto$^{fit}$ |
|---|---|
| MAGNETOM Avanto Magnet | > MAGNETOM Avanto Magnet remains |
| Q Gradients 33 mT/m @ 125 T/m/s<br>SQ Gradients 45 mT/m @ 200 T/m/s | > SQ Gradients 45 mT/m @ 200 T/m/s |
| Tim [76x8], [76x18], [76x32] | > Tim 4G [204x48] |
| *syngo* MR B17 | > *syngo* MR D13 with new advanced applications |
| Without Dot | > Up to 9 Dot engines |

## Upgradeability. With MAGNETOM.

Upgradeability solutions for each business need. The new system upgrade including Tim 4G and Dot will bring your system to the latest innovative hardware and software platform in MRI.

# Step-by-step from MAGNETOM Avanto to MAGNETOM Avanto$^{fit}$

Based on your original 1.5T magnet, you will immediately benefit from MAGNETOM Avanto$^{fit}$ latest technologies: Exciting new applications, Siemens' revolutionary Tim 4G architecture, Dual-Density Signal Transfer, and the Dot MRI scanning software platform. And: The upgrade of your MAGNETOM Avanto to MAGNETOM Avanto$^{fit}$ can be completed in only up to 15 working days!



**Magnet room**
The Body Coil is removed and replaced with a new one. The new SQ Gradients are installed.[1]



**Licenses migration**
Installed licenses are migrated into *syngo*® MR D.[2]


[1] If SQ Gradients are not part of your current system installation.
[2] Consult your local Siemens representative for further details.

**Technical room**
Control unit and cooling unit cabinets are removed and replaced with new ones.


**Operator's room**
All workstations, monitors, and keyboards are removed and replaced by new ones.

**Magnet room**
Installation of the DirectRF®, Tim's new all digital-in/digital-out design that integrates all RF transmit and receive components at the magnet for true signal purity and eliminates the analog cables.


**Magnet room**
All removed covers are replaced by new ones with Dot Display and Dot Control Centers. The patient table is replaced with the new Tim Table or the optional Tim Dockable Table.

**Hand-over**
After installation and image quality test, a comprehensive application training is held to help you get the best out of your new system.

# More possibilities
## for your 1.5T magnet

Up to 50% more patient throughput with Tim and Dot.[1]

Are you ready to take the next step in 1.5T innovation?

# Time to

[1] *Data on file. Results may vary.*

# change

*“Dot has the advantages of an automatic gear box: Changing gears is unnecessary, but we stay at the wheel and decide where to drive.”*

*Dr. Professor Henrik Michaely, Section Chief Vascular and Abdominal Radiology, Institute for Clinical Radiology and Nuclear Medicine, University Medical Center Mannheim, Germany*

# Higher reproducibility,

## higher productivity

Dot, the next movement in MRI, is a new way of scanning in MRI. Dot scanning uses a suite of customizable engines – allowing the user to personalize exams according to patient needs, build in step-by-step user guidance, and automate MRI exams.Your benefits include increased consistency and reproducibility, greater ease-of-use, and higher productivity. With MAGNETOM Avanto$^{fit}$, the following Dot engines are available:

### Brain Dot Engine

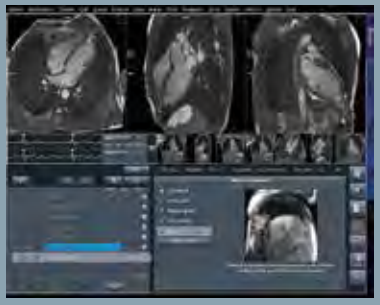
- Up to 20% higher throughput and faster reading[1]
- Reproducible positioning and standardized image quality
- Consistent exam duration and more efficient scheduling

### Abdomen Dot Engine

- Up to 28% better timing accuracy[1]
- Consistent image quality for even complex abdomen examinations

### Cardiac Dot Engine

- Up to 50% increase in patient throughput[1]
- Consistency in slice positioning for reliable image quality over multiple exams
- Ease-of-use helps bringing cardiac MRI into your clinical routine



[1] Data on file. Results may vary. [2] MR imaging of patients with metallic implants brings specific risks. However, certain implants are approved by the governing regulatory bodies to be MR conditionally safe. For such implants, the previously mentioned warning may not be applicable. Please contact the implant manufacturer for the specific conditional information. The conditions for MR safety are the responsibility of the implant manufacturer, not of Siemens.

## Angio Dot Engine

- Automated calculation of contrast agent application
- Interactive contrast timing approach eliminates need for cumbersome calculations
- Increased timing accuracy and image consistency

## TimCT Angio Dot Engine

- Combines integrated Continuous Table move with Dot's optimized timing
- Up to 30% faster acquisitions for whole-body angio exams[1]

## TimCT Onco Dot Engine

- Combines integrated Continuous Table move with Dot's dynamic acquisition of upper abdomen
- Scan thorax, abdomen, and pelvis in less than 30 minutes[1]

## Breast Dot Engine

- Faster planning
- Higher standardization
- Less errors

## Spine Dot Engine

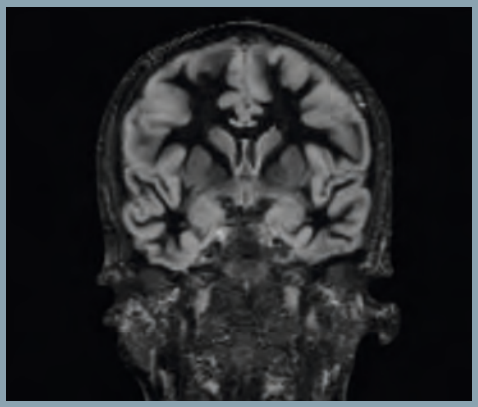
- Complete spine examinations with ease
- Fast and standardized scanning
- Consistent and robust image quality

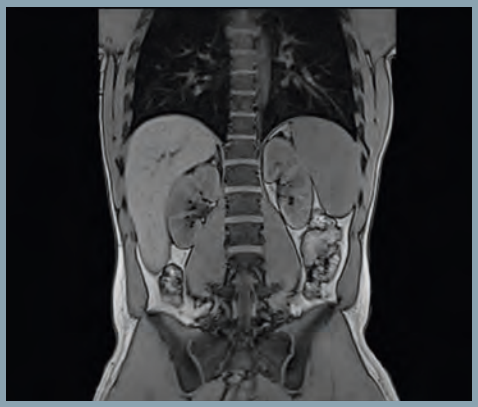
## Large Joint Dot Engine

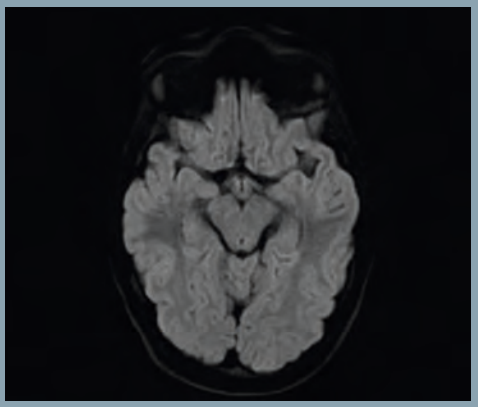
- Standardized examination and reproducible positioning with AutoCoverage and AutoAlign
- *syngo* WARP for reduction of susceptibility artifacts, such as from MR conditional metal implants[2]

**Experience Dot yourself: www.siemens.com/Dot**

# New possibilities, new applications







## *syngo* SPACE DIR

New with *syngo*® MR D13 are Double Inversion Recovery 3D protocols (SPACE DIR) with two user selectable inversion pulses for the simultaneous suppression of e.g. cerebro-spinal fluid and white matter.

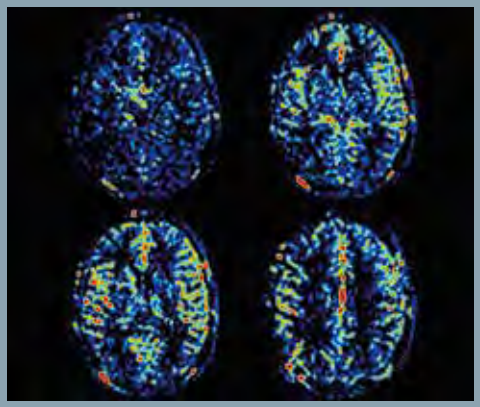
## CAIPIRINHA

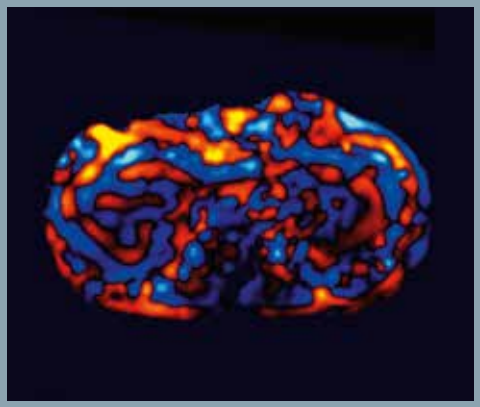
A new iPAT$^2$ sequence technique named CAIPIRINHA (Controlled Aliasing In Parallel Imaging Results IN Higher Acceleration) has been added. It can be applied to volumetric 3D imaging, e.g. in the abdominal region. Higher PAT factors require more oversampling. CAIPIRINHA pattern distributes k-space points more uniformly.

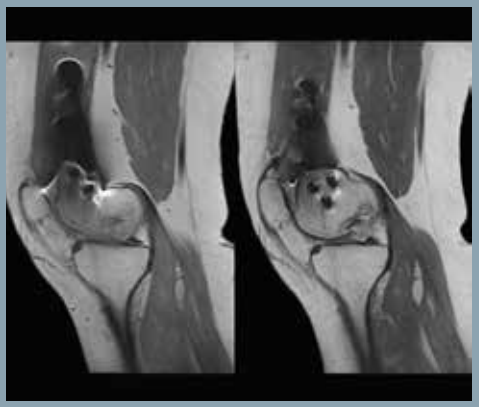
## *syngo* RESOLVE

*syngo* RESOLVE (Readout Segmentation Of Long Variable Echo-trains) delivers high-resolution Diffusion-Weighted Imaging (DWI) to visualize the diffusion properties of fine anatomical structures, enabling accurate lesion evaluation.

Additionally, this technique is largely insensitive to susceptibility effects, providing detailed anatomy-true diffusion imaging for brain, spine, breast, and prostate.







## *syngo* ASL 3D

3D Arterial Spin Labeling (ASL) allows the non-invasive evaluation of brain perfusion without the injection of a contrast agent.

*syngo* MR D13 offers the possibility of measuring 3D ASL with multiple inversion times (TI).

This option provides data which can be used for Bolus Arrival Time (BAT) map calculations. Multiple TI acquisition allows for acquisition of raw label-control pairs at different (equidistant) inversion times. 3D ASL is the radiation-free alternative to PET as it offers an increase in SNR and a shorter scan time with reduced motion sensitivity.

## MR Elastography

MR Elastography provides the possibility to non-invasively assess variations in tissue stiffness to improve treatment decisions especially in liver fibrosis.

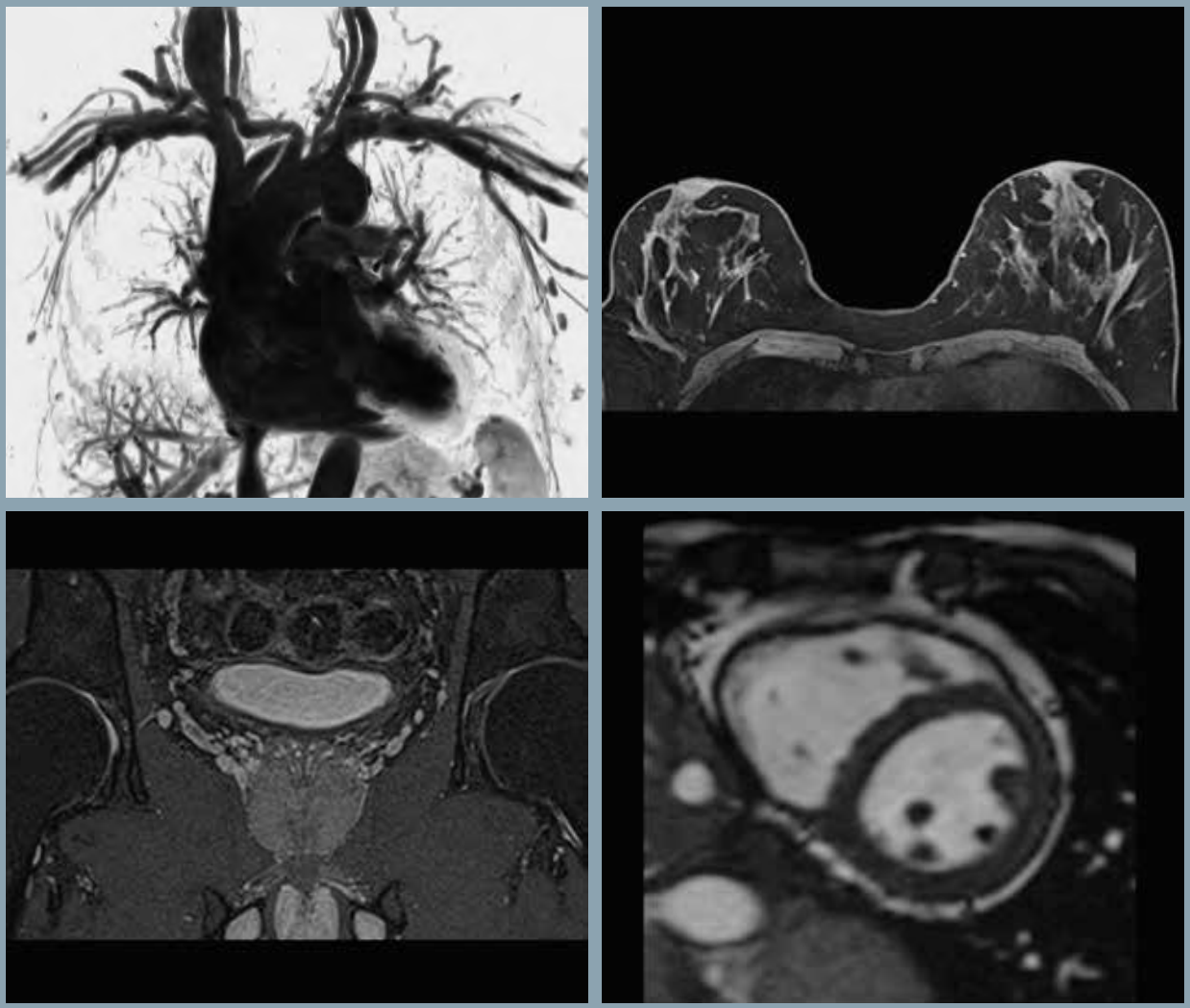
## *syngo* WARP

*syngo* WARP incorporates different susceptibility artifact reduction techniques. The *syngo* MR D13 software comes with basic *syngo* WARP functionality: 2D TSE sequences are combined with high bandwidth protocols and optimized RF pulses tailored to reduce susceptibility artifacts, e.g. originating from MR conditional metal implants.

# See finest anatomical detail and visualize functional processes

Advanced clinical applications,

# higher image quality



# Higher SNR

**MAGNETOM Avanto**

**MAGNETOM Avanto$^{fit}$**

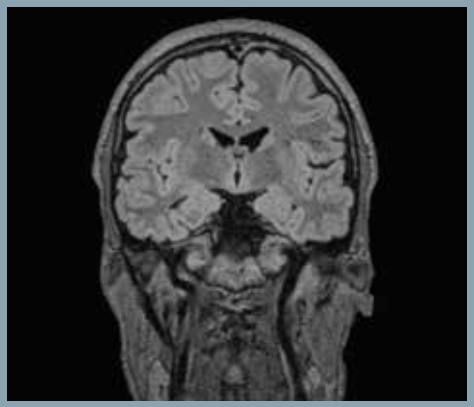
*syngo* REVEAL, b-value 800, SL 5 mm, 4 steps composed

Because of the 48 RF channels and the high-density coils of Tim 4G, SNR can be significantly increased in whole-body imaging with *syngo* REVEAL.

*Left image:*
*Royal Marsden Hospital, Sutton, United Kingdom*

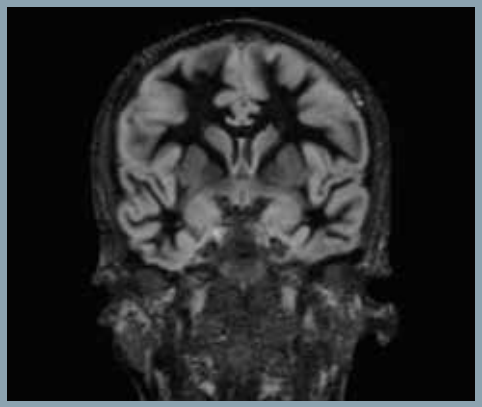
# Excellent contrast

**MAGNETOM Avanto**



*syngo* SPACE IR, GRAPPA 2, matrix 256, TA 5:47 min

**MAGNETOM Avanto$^{fit}$**



*syngo* SPACE DIR, MPR, GRAPPA 2, matrix 192, SL 1.5 mm, TA 6 min

Compared to conventional IR sequences, *syngo* SPACE DIR improves the contrast between the white and the grey matter. This helps to increase diagnostic confidence of lesions in the brain, e.g. multiple sclerosis.

*Left image:*
*Hospital Fach, Santiago, Chile*

# Upgrade now

## and bring your MAGNETOM Avanto to the next level

How to make sure that your MAGNETOM® Avanto stays with the new generation of scanners?

Upgrade it now to MAGNETOM Avanto$^{fit}$ with Tim® 4G, the 4$^{th}$ generation of proven Tim (Total imaging matrix) integrated coil technology and enjoy its exceptional flexibility, accuracy, and speed.

In addition, Dot® (Day optimizing), the next movement in MRI, will bring you reproducibility and consistency with a greater ease-of-use and higher productivity.

Upgrade your MAGNETOM Avanto to MAGNETOM Avanto$^{fit}$ and you'll see the extensive list of new components and applications that you will receive with the upgrade, just like having a new system.

**New hardware:**
- New RF system with 48 independent channels for faster imaging and higher signal-to-noise ratio (SNR)
- SQ Gradients[1] with 45 mT/m @ 200 T/m/s
- New integrated Tx/Rx Body Coil
- New high-order shim
- Fully digital with DirectRF®
- Tx/Rx real-time feedback loop for dynamic RF
- New Tim patient table for easier patient handling
- New covers

**New standard coils:**
The new Tim 4G coil technology with Dual-Density Signal Transfer, DirectConnect®, and SlideConnect® technology combines key imaging benefits: Excellent image quality, high patient comfort, and unmatched flexibility.

- New Head/Neck 20
- Spine 32
- Body 18
- Flex Large 4
- Flex Small 4

[1] If Q Gradients are part of your current system installation.
[2] When used with MAGNETOM Avanto[fit], patient weight is limited to 200 kg (440 lbs).

**New optional coils available with a Tim 4G system:**
- 2nd Body 18
- Peripheral Angio 36
- Foot/Ankle 16
- Hand/Wrist 16
- Tx/Rx 15-Channel Knee Coil
- Tx/Rx CP Head Coil
- 4-Channel Special-Purpose Coil
- Breast 18

**Tim 4G coil benefits:**
- Designed for highest image quality combined with easy handling
- High element density of the coils that increases SNR and reduces examination times
- DirectConnect and SlideConnect technology reduce patient set-up time significantly
- Light-weight coils with an open design allow for highest patient comfort, resulting in better patient cooperation and image quality
- No coil changing with multi-exam studies saves patient set-up and table time
- All coils are time-saving "no-tune" coils

**New computer system for faster reconstruction:**
- New host computer
- New image processor

**New Tim Table:**
- Scan range of up to 204 cm
- Can be lowered to a minimum height of 52 cm for easier patient positioning and better accessibility for geriatric, pediatric or immobile patients
- Can be moved with two clicks into the isocenter – one click to the upmost position and one click into the isocenter

**New optional Tim Dockable Table:**
- Increases comfort for immobile patients, patient transport, and more
- Fast dock/undock functionality for a better patient handling
- Fits the needs for patients up to 250 kg (550 lbs)[2]

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# MAGNETOM Avanto$^{fit}$

## The landmark in 1.5T imaging

Answers for life.

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