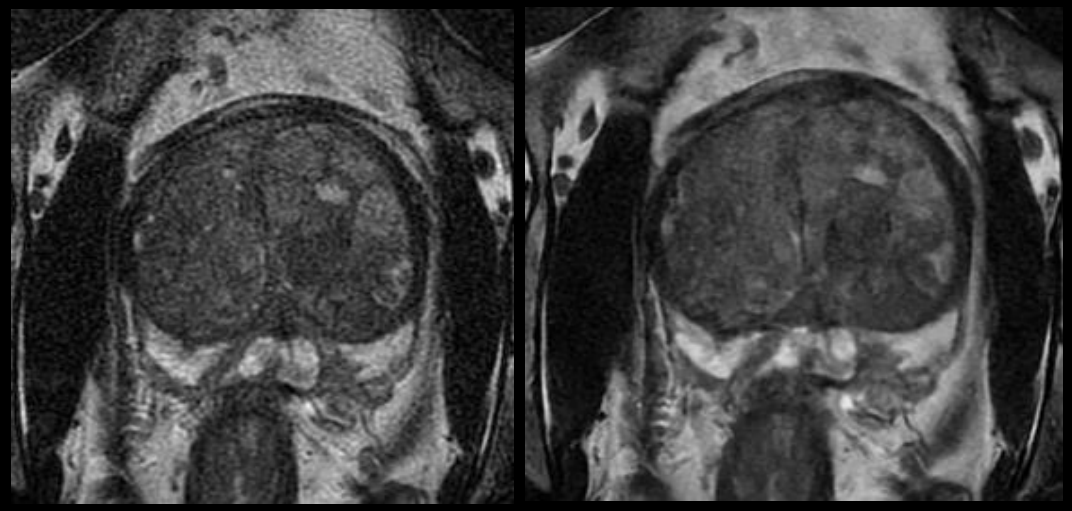
“

*One of things we struggle with, in a **small field of view** pelvic imaging with **super high resolution**, is long scan times. And before we had AIR™ Recon DL, we often got organ blur because of other long acquisition times, secondary to motion in the rectum, or motion with the patient. Now when we **decrease our NEX**, we've got just over **2:30 minute acquisition time**. I think you can all appreciate that the image quality utilizing AIR™ Recon DL in 1/3rd of the time is really far superior.*

Melanie Atkins, MD

Radiologist
Fairfax Radiology Centers

Prostate Exam - Axial T2w, 0.5 x 0.6 x 3 mm



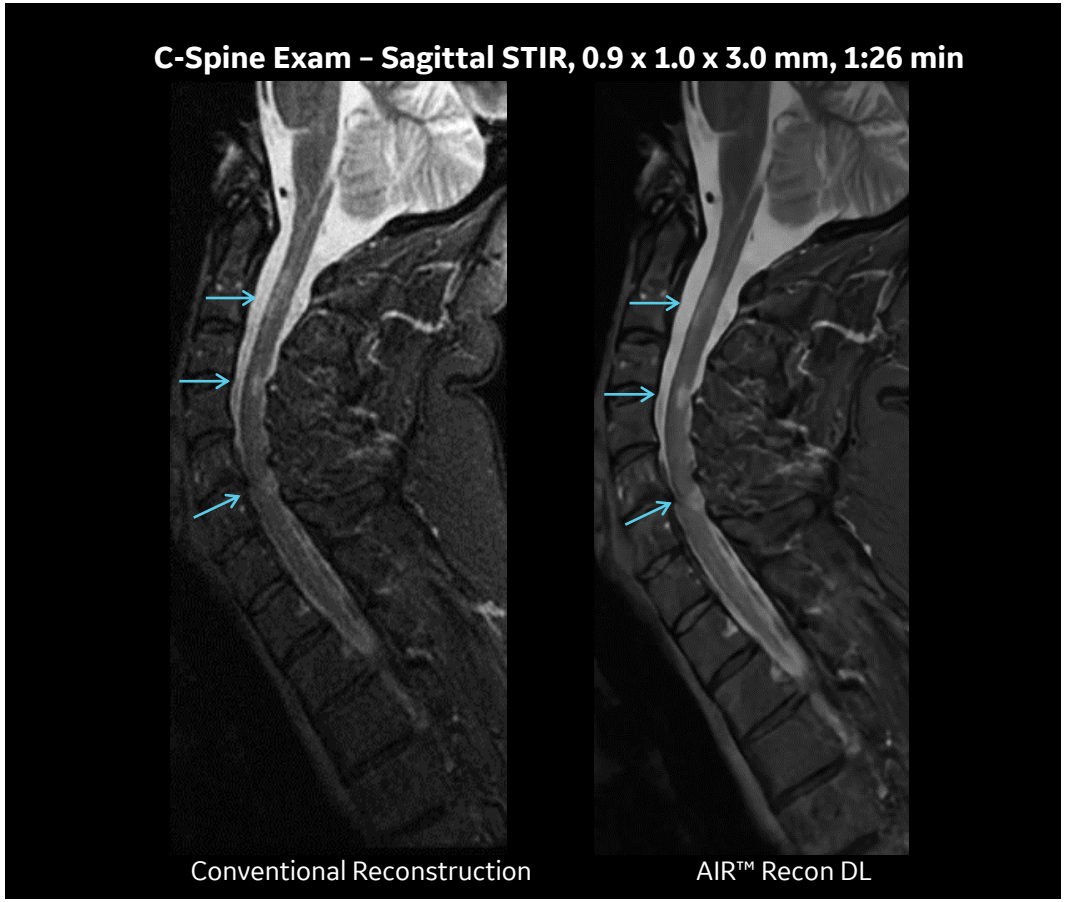
Conventional Reconstruction
High NEX 5, 6:46 min

AIR™ Recon DL
Low NEX 2, 2:39 min

Use the QR Code to get access to the full AIR™ Recon DL webinar with our panel of experts

“

It is easy to switch on AIR™ Recon DL, you just select preferred SNR level from the drop-down menu, you can even choose the original reconstruction. Our observation is that we can ***drastically increase the contrast to noise ratio****, which really* ***improves lesion conspicuity****. It allows us to push protocols or applications to levels that would otherwise be incompatible with conventional reconstruction and works in any anatomy.*



Christopher Ahlers, MD

Radiologist and CEO,
radiomed

Use the QR Code to get access to the full AIR™ Recon DL webinar with our panel of experts

“

*Initially, you think, this will help me go faster. Across the board, and across the range of exams, we run anywhere between **30-50% reduction in scan time**.*

*What does it mean for us? We originally had 20-minute appointment slots; now they are **dropping to 15-minute slots**. With this innovation, we can have one more patient an hour. That’s about **10 more patients a day**.*

Lawrence Tanenbaum, MD

Chief Technology Officer, Director of Advanced Imaging, and Vice President, Radnet, Inc.

Anatomy	Conventional	AIR Recon DL	% Decrease
Shoulder	12:49	6:38	50%
LSP	11:04	6:44	40%
CSP	14:06	8:24	40%
TSP	9:38	6:27	35%
Knee	13:27	8:35	35%
Prostate	17:39	12:50	30%
Hip	17:58	9:23	45%
Wrist	13:47	7:50	45%
Hand	13:07	5:47	50%
Ankle	12:22	7:50	40%
Foot	11:54	7:27	40%
Female Pelvis	17:54	12:09	35%
Abdomen	13:02	7:01	40%

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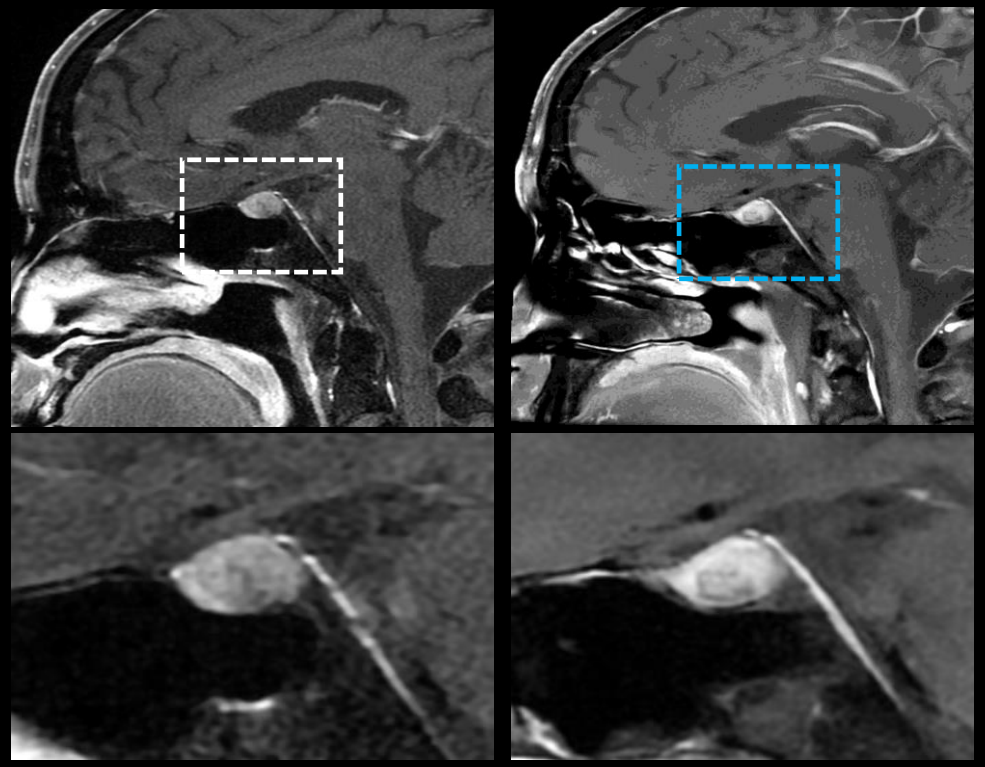
“

*The image quality was fantastic immediately, and we were seeing **dramatic reduction in scan times**. One of our first patients with AIR™ Recon DL was a pituitary scan. In January 2020, it was 30:40 minutes exam and when the patient returned for a follow up 10 month later, the scan was 14:42 minutes, a **52% reduction with AIR™ Recon DL**. And when I sent those images to my neuroradiologist, I immediately got a phone call to ask what in the world had happened. It was the prettiest pituitary scan she'd ever seen.*

Randall Stenoien, MD

Owner and CEO,
Houston Medical Imaging

Pituitary exam – Sagittal T1 Post Contrast



Conventional Reconstruction
0.5 x 0.7 x 2.0 mm, **3:18 min**

AIR™ Recon DL
0.5 x 0.6 x 2.0 mm, **1:48 min**

Use the QR Code to get access to the full AIR™ Recon DL webinar with our panel of experts


TOMORROW TODAY
AIR™
Simply better
gehealthcare.com/mr

Simply better

It's time for a simply better MR experience. An experience that embraces the clinical power of MR with a more ubiquitous design. For us, this is AIR™.

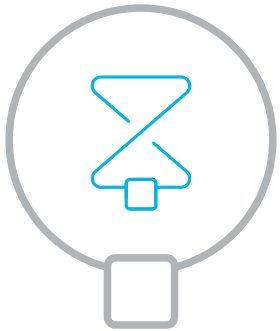
AIR™ is more than a name. It's a way of thinking. A symbol for how we approach both the form and the function of MR. From coils to workflow to image quality, we deconstruct everything down to its most fundamental, simplified version. And improve it. Each new innovation builds off of this core philosophy, increasing the value of the greater AIR™ ecosystem.

Holistically, AIR™ is MR. Simply better.

AIR™ is not available in all regions.
Simply better than conventional coil technology.

Welcome to the AIR™ family

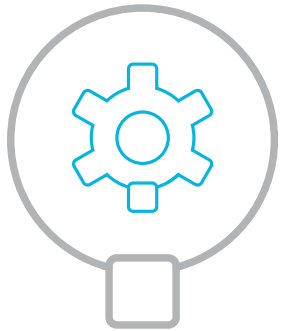
The AIR™ family of products delivers clinical versatility and comfort, intelligent productivity improvements and consistently superior image quality.



AIR™ Coils

It started with an engineering breakthrough that led to the industry's first truly lightweight coil design. A design that conforms to the human body like a comforting blanket completely changing the patient experience. But this was just the start.

- Clinical versatility and comfort



AIR™ Workflow

The technology at the core of this new coil design laid the groundwork for intelligent applications that automate and personalize fundamental steps in the MR workflow, so you can expect consistent image quality in predictable scan times from any technologist.

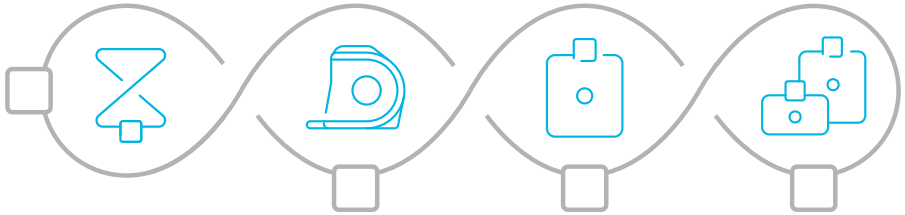
- Intelligent productivity improvements

AIR™ Image Quality

Now, we're adding reconstruction software that reduces background noise and out-of-FOV artifacts to foundationally improve the quality of your MR images. With deep learning, it can remove noise directly from the raw image data.

- Consistently superior image quality


AuntMinnie.com
THE BEST OF RADIOLOGY
WINNER



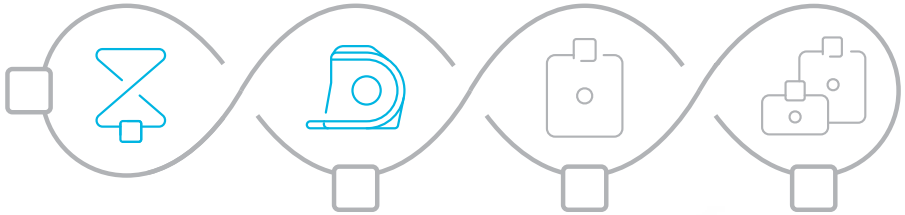
AIR™ Coils

Clinical versatility and comfort

Awarded Best New Radiology Device of 2019, AIR™ Coils are the foundation of a simply better MR experience. The engineering breakthrough at the heart of our AIR™ Coils allowed us to create a revolutionary coil design that is lighter, offers more flexibility and provides greater coverage, laying the groundwork for greater positioning freedom and a comfortable patient experience.

Lightweight and bendable, this series of linked resonators replaces what used to be rigid circuit boards and lumped components. It's the flexible core of our form-fitting coil design.

Brachial Plexus
0.7 x 0.7 x 3 mm
3:30 min



AIR™ 48ch Head Coil

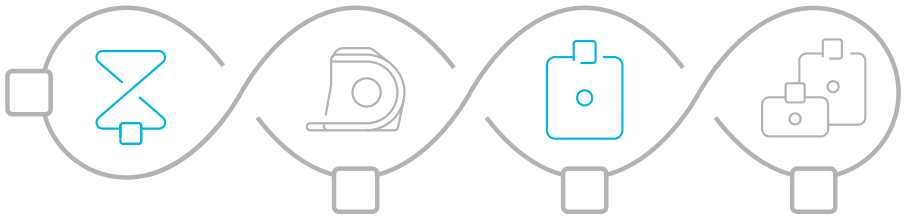
Designed in collaboration with the NFL*
for high-performance brain imaging.

- Adjustable to fit 99.99 percent of patients
- Fit-adaptable, comfort tilt design
- Improved parallel imaging

*In 2013, GE and the National Football League (NFL) teamed up to launch the Head Health Initiative, a collaboration to accelerate diagnosis and improve treatment for traumatic brain injury.

Automatic coil element selection for the prostate with AIR Touch™

Axial T2 FSE
0.7 x 0.7 x 2.5 mm

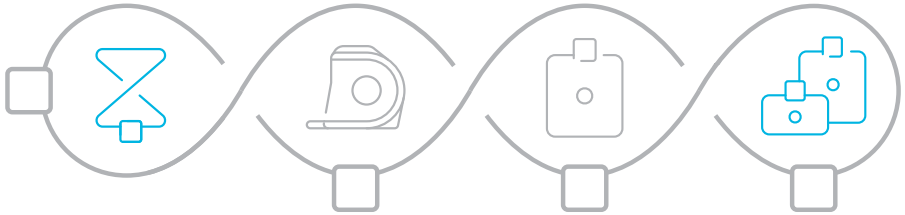


AIR™ Anterior Array Coil

Scan the chest, abdomen and pelvis without repositioning the coil.

- 65 cm of coverage
- 30-channel design
- Weighs less than 0.35 grams per cm^2


360 degrees of coverage
for large feet/ankles
Sagittal PD FSE
0.3 x 0.4 x 3 mm



AIR™ Multi-Purpose Coils*

Easy ortho, body and cardiac scans with medium and large sizes.

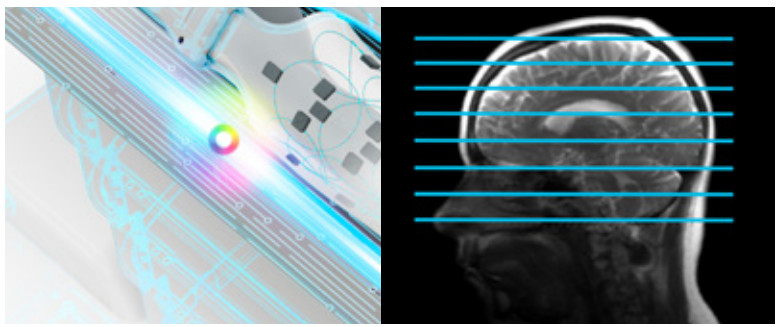
- 360 degrees of coverage
- 20 and 21-channel designs
- As much as 35 percent lighter per channel**

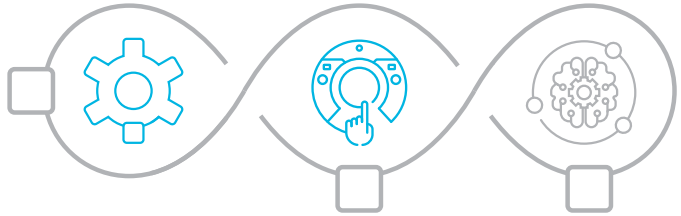
*Not yet CE marked. Not available for sale in all regions.
**Compared to previous generations of conventional coil technology.

AIR™ Workflow

Intelligent productivity improvements

Enhance your MR productivity with intelligent workflow applications developed to optimize your scans with accelerated scan times, increase diagnostic confidence across skill levels and consistently deliver accurate results. Automated applications, AIR Touch™ and AIR x™, make a clinically impactful difference for a simply better workflow.



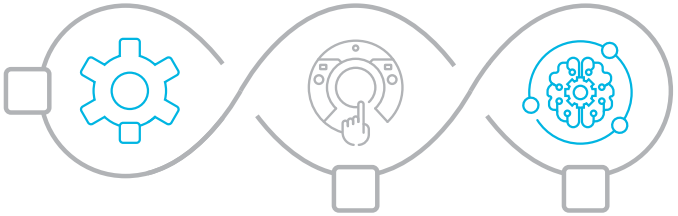


AIR Touch™

Smart coil selection that automatically knows the best combination for every patient.

- Simplifies scan setup with customized parameters
- Optimizes uniformity and SNR
- Automatically selects which coils and elements to use

AIR Touch™ acts as the bridge between the coils and the system, allowing you to landmark your patient with a single touch.

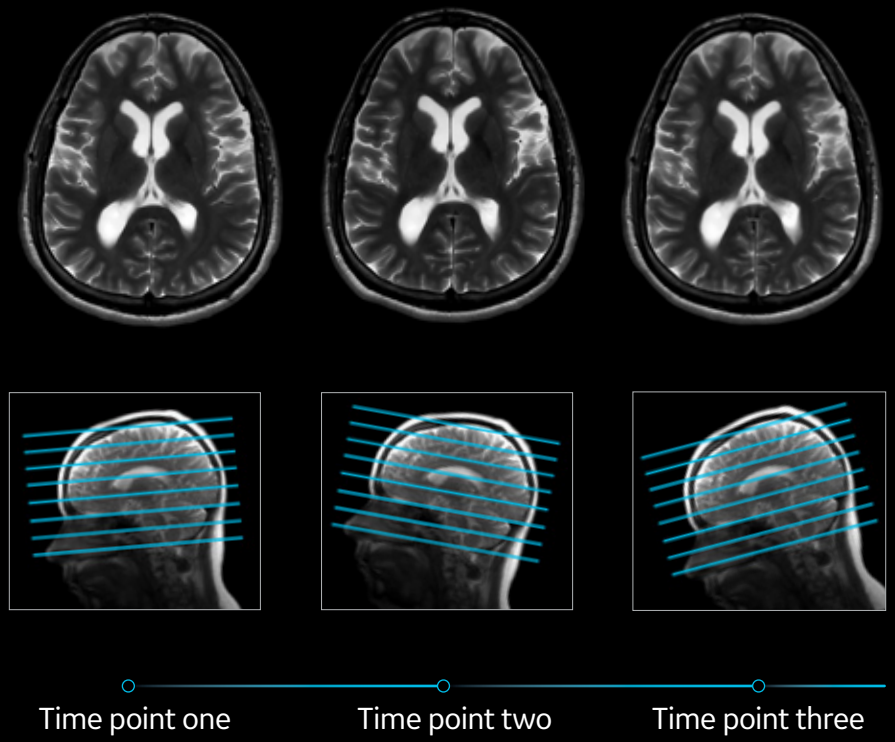


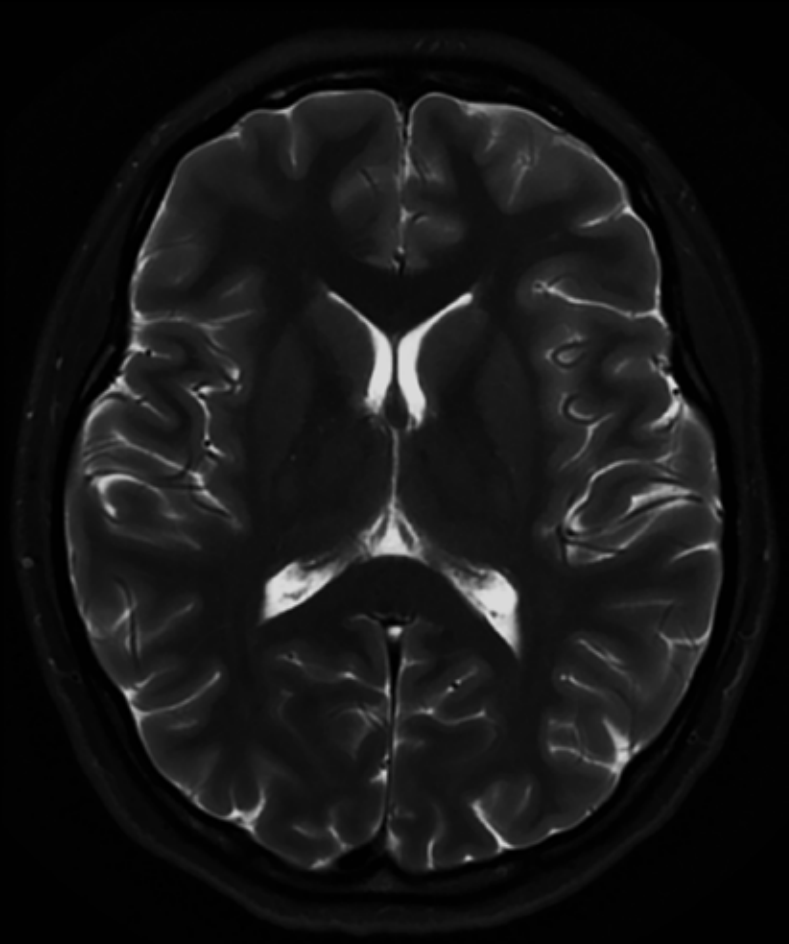
AIR x™

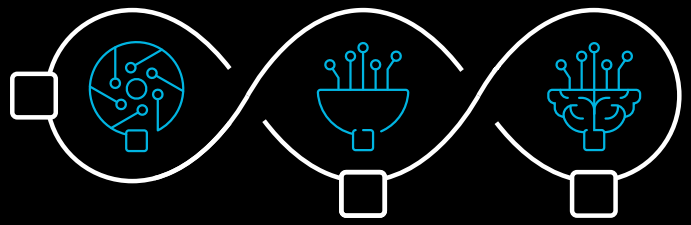
Intelligent MR slice prescription for routine and challenging neurological exams.

- Powered by a deep learning algorithm created from a database of 36,000 images
- Automatically detects anatomy and prescribes slices in the brain
- Delivers consistent and quantifiable results
- Helps eliminate rescans and scanning inefficiencies

Powered By
Edison



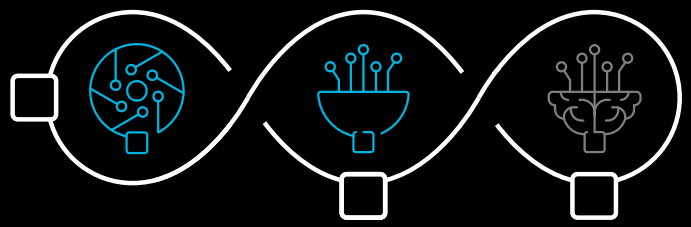




AIR™ Image Quality

Consistently superior image quality

Reconstruction is at the heart of every scan and reducing noise during reconstruction is critical to achieving clear images. AIR™ Image Quality completes the AIR™ family of products with image reconstruction software that helps improve SNR and image sharpness in every image without having to overcompensate in your scanning protocol.



AIR™ Recon

Makes exceptional image quality in faster scan times the new standard for MR imaging. It reduces background noise and out-of-FOV artifacts for an improved SNR and clearer, crisper images.

- Available on the majority of routine clinical scans
- Seamless to use and always on
- Available on several key applications like PROPELLER, Cube, FSE and Flex

Conventional

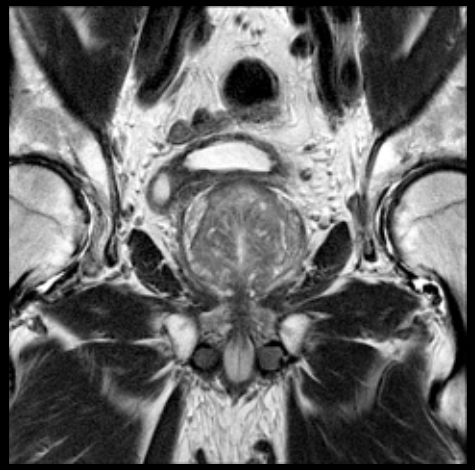
AIR™ Recon

Clearly consistent images with AIR™ Recon

Conventional

AIR™ Recon

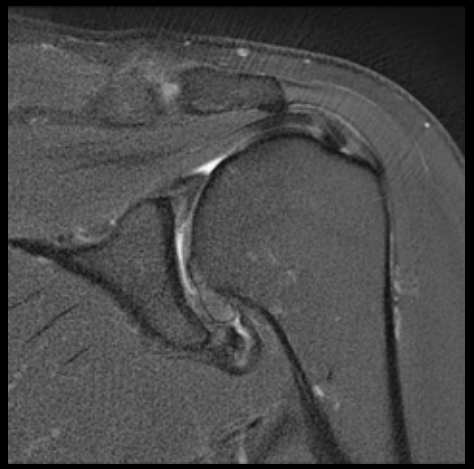
AIR™ 48ch Head Coil
0.5 x 0.5 x 2.5 mm
3:56 min



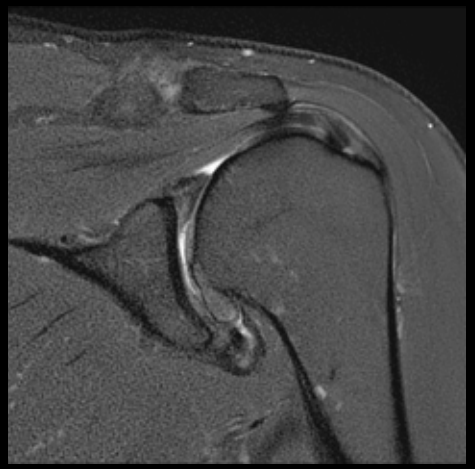
Conventional

AIR™ Recon

AIR™ Anterior Array Coil
0.5 x 0.5 x 3 mm
5:02 min

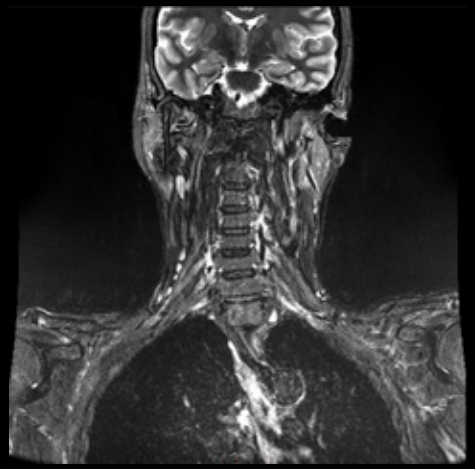


Conventional

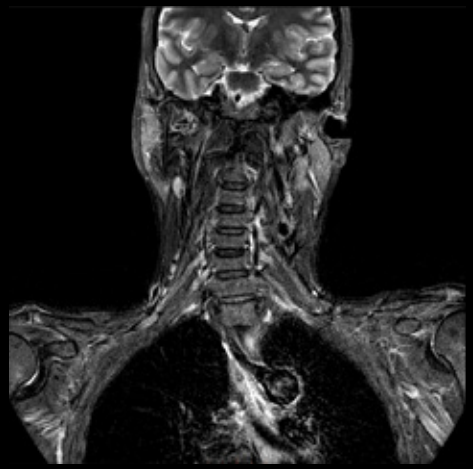


AIR™ Recon

AIR™ Multi-Purpose Coil,* Large
0.4 x 0.4 x 3 mm
3:34 min



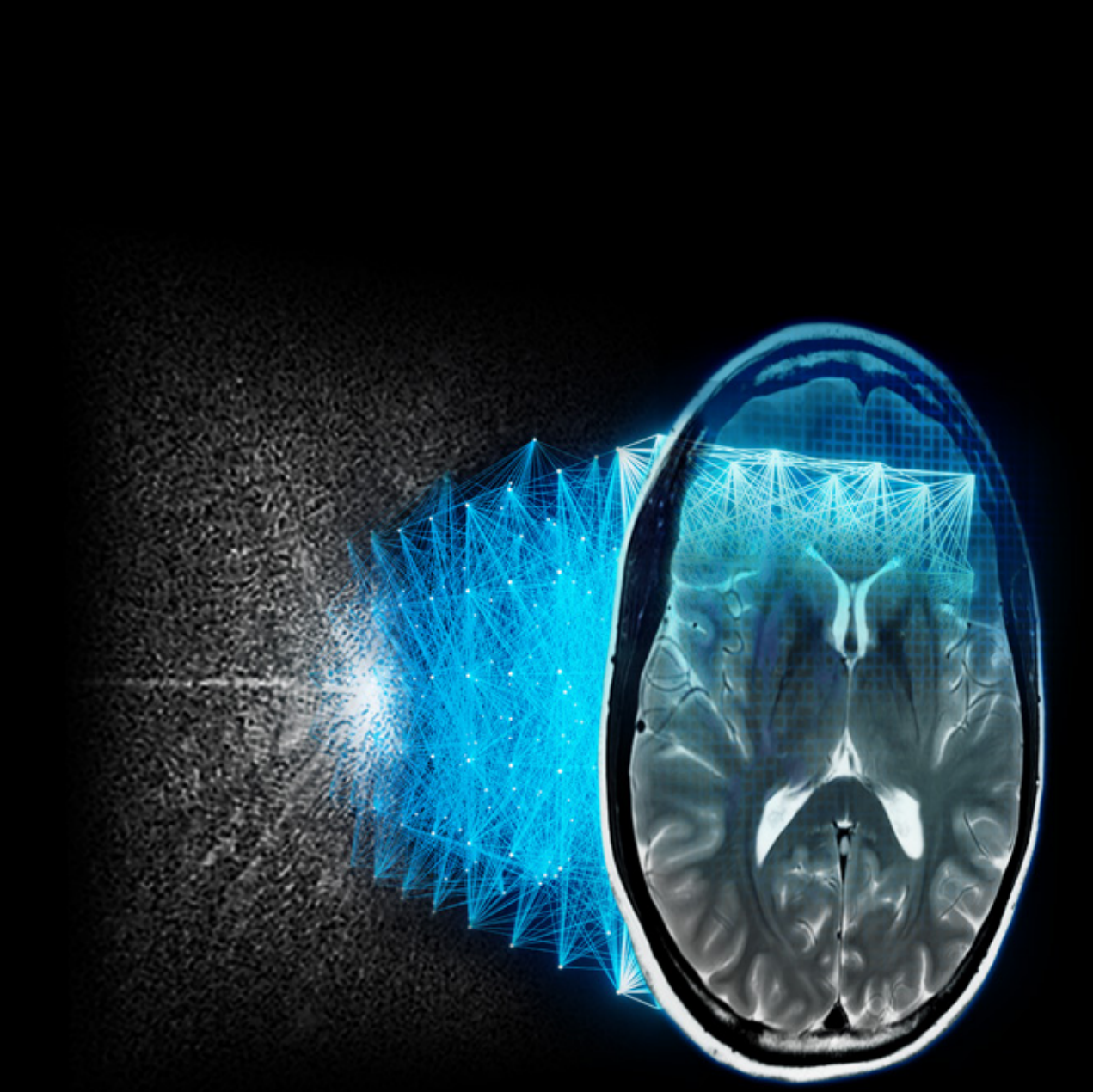
Conventional

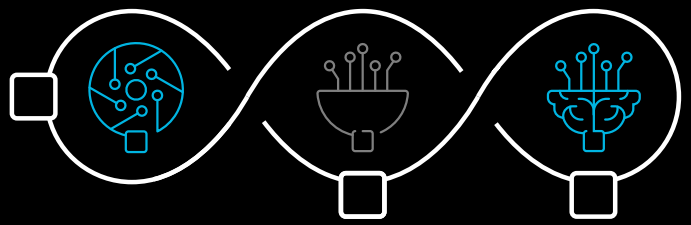


AIR™ Recon

AIR™ 48ch Head Coil
and AIR™ Multi-Purpose Coil,* Large
0.7 x 0.7 x 3 mm
3:30 min

*Not yet CE marked. Not available for sale in all regions.





AIR™ Recon DL

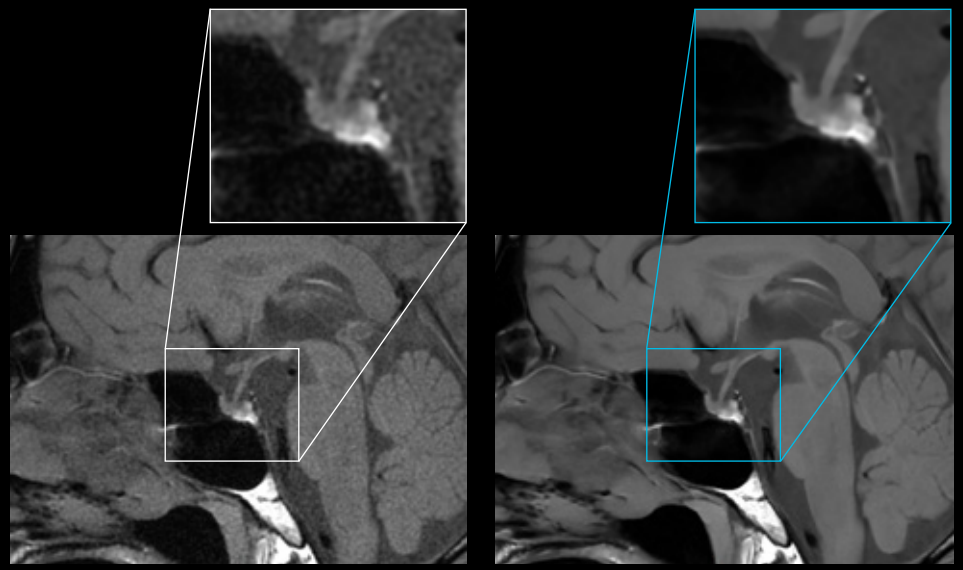
AIR™ Recon DL‡ is a pioneering, deep learning based reconstruction algorithm that improves SNR and image sharpness, enabling shorter scan times. It improves image quality at the foundational level by making use of the raw data to remove image noise and ringing.

- Increases productivity by enabling shorter scan times
- Removes image noise and ringing by leveraging raw image data
- Delivers sharper and clearer TrueFidelity™ MR images
- Enables you to set your preferred SNR improvement level

‡Not yet CE marked. Not available for sale in all regions. Currently only available on 3.0T systems.

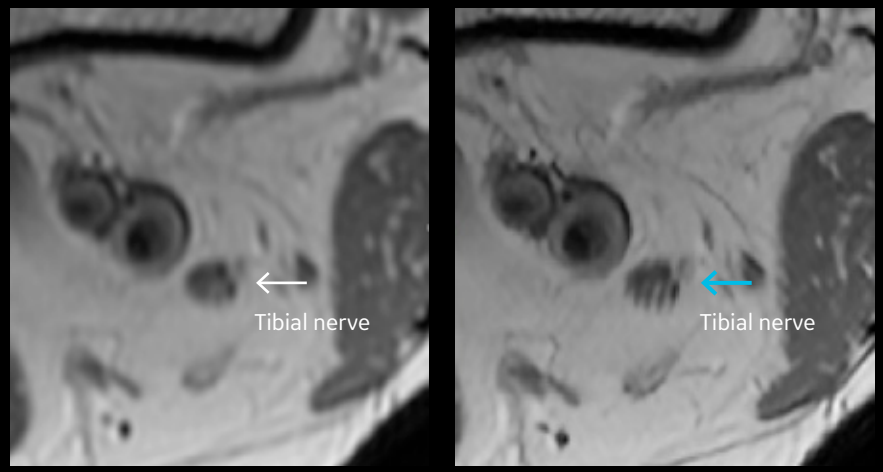
Clinical Gallery

Level up your image quality with AIR™ Recon DL



Conventional

AIR™ Recon DL‡



Conventional

AIR™ Recon DL

AIR™ 48ch Head Coil
FSE T1
260 x 260
2:15 min

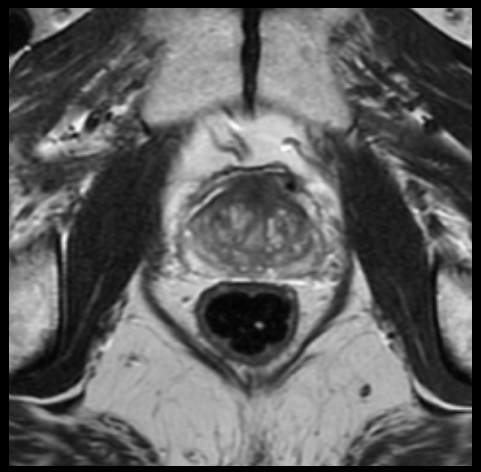
AIR™ Multi-Purpose Coil,* Medium
FSE PD
256 x 180 (1 NEX)
1:10 min

‡Not yet CE marked. Not available for sale in all regions. Currently only available on 3.0T systems.
*Not yet CE marked. Not available for sale in all regions.

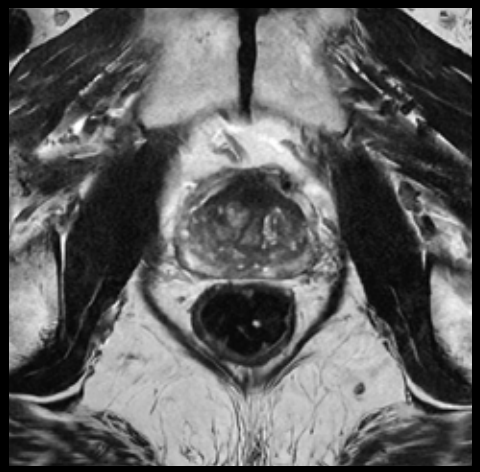
Conventional
352 x 256
1:59 min

AIR™ Recon DL‡
640 x 384
1:18 min

8ch Foot/Ankle Coil
FSE PD



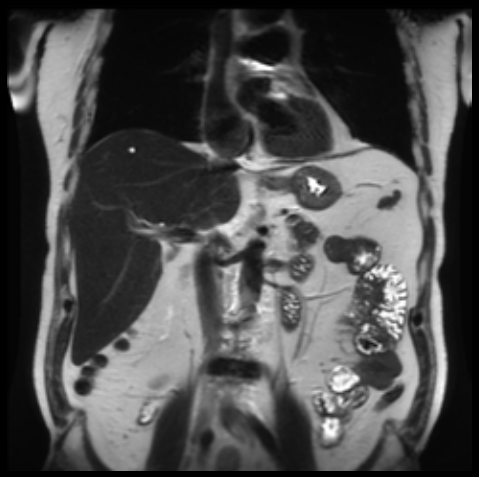
Conventional
0.6 x 1.0 x 3 mm
3:50 min



AIR™ Recon DL
0.4 x 0.6 x 3 mm
1:37 min

AIR™ Multi-Purpose Coil,* Large
FSE T2
300 x 300

‡Not yet CE marked. Not available for sale in all regions. Currently only available on 3.0T systems.
*Not yet CE marked. Not available for sale in all regions.



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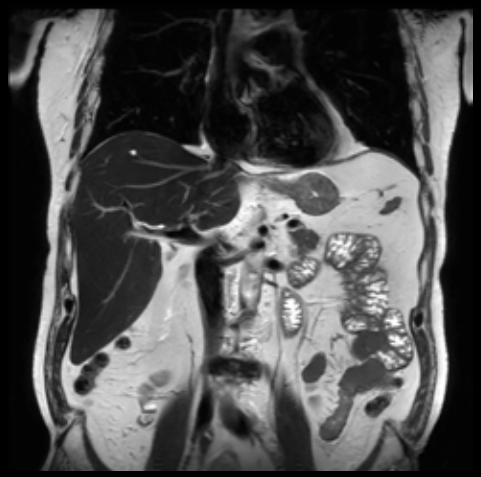
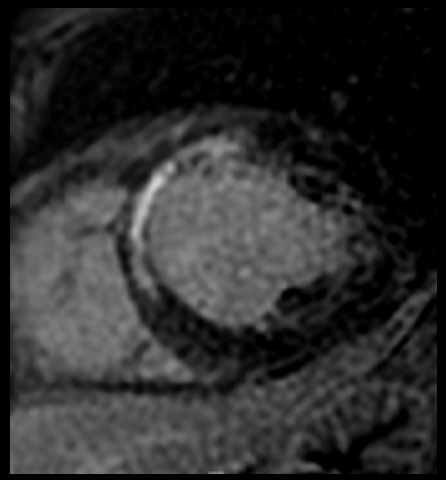
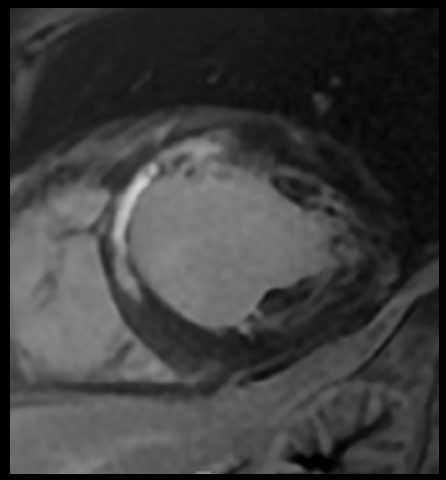


AIR™ Recon DL‡

AIR™ Anterior Array Coil
Coronal T2 SSFSE
1.3 x 2.2 x 4 mm
0.9 sec



Conventional



AIR™ Recon DL

AIR™ Multi-Purpose Coil,* Medium
1.7 x 2.8 x 6 mm
57 sec

‡Not yet CE marked. Not available for sale in all regions. Currently only available on 3.0T systems.
*Not yet CE marked. Not available for sale in all regions.

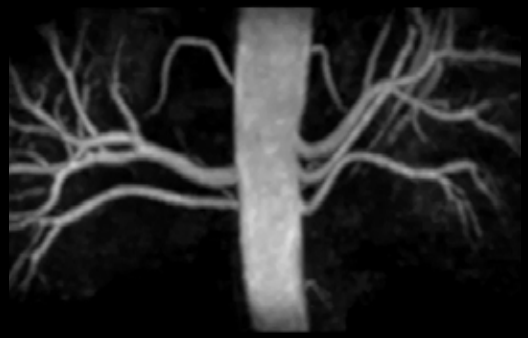
Get closer to what you need to see

AIR™ combined with the advanced applications of SIGNA™Works enables diagnostic confidence in every scan through industry-leading image quality and imaging capabilities.

AIR™ Anterior Array Coil

Two-station chest/abdomen/pelvis acquired without moving the coil or subject

Sagittal T2 PROPELLER MB
0.7 x 0.7 x 3.5 mm

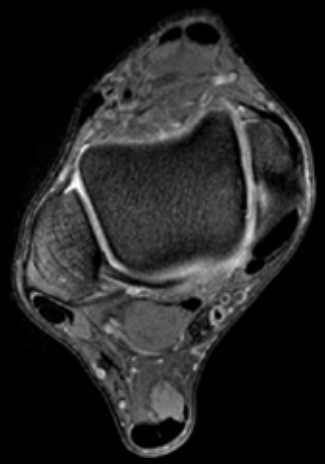


Axial Inhance IFIR
Non-contrast, Coronal reformat
0.8 x 1.3 x 1.6 mm

Clinical Gallery

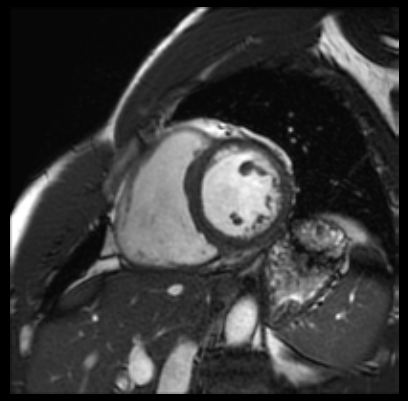
AIR™ Multi-Purpose Coils*

Coronal T1 FSE
0.3 x 0.5 x 3 mm

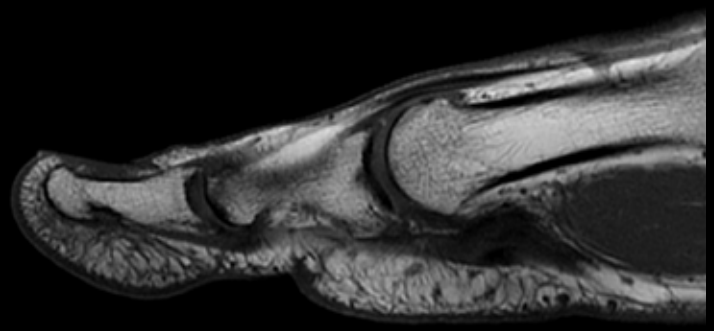


Axial MERGE
0.3 x 0.4 x 2.5 mm

Coronal PD FSE
0.2 x 0.3 x 2.5 mm



FIESTA Cine Short Axis
1.6 x 1.6 x 6 mm



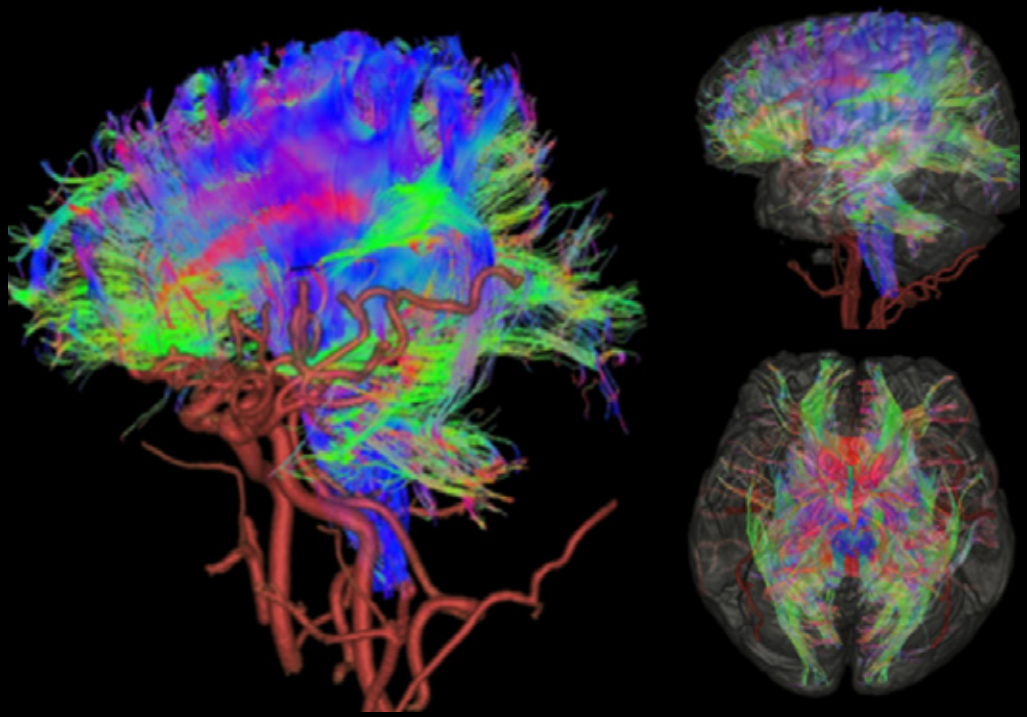
Sagittal PD FSE
0.3 x 0.4 x 2.5 mm

Coronal PD FSE
0.4 x 0.5 x 3 mm

*Not yet CE marked. Not available for sale in all regions.

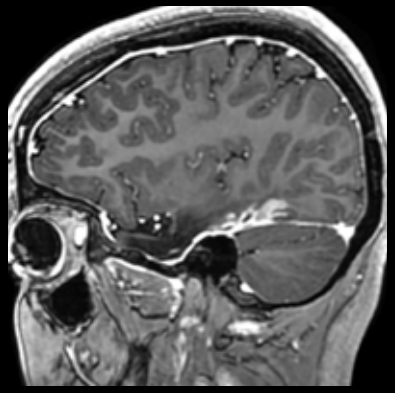
Clinical Gallery

AIR™ 48ch Head Coil

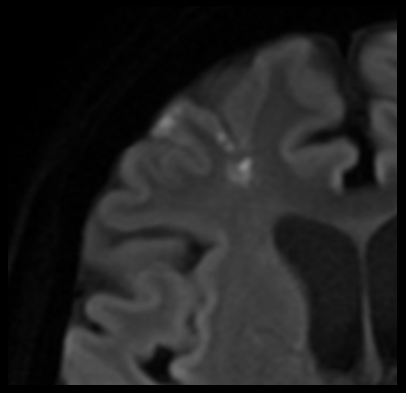


Volume rendering
HyperBand DTI FiberTrak fused with HyperSense 3D TOF

HyperSense
3D TOF
0.3 x 0.3 x 0.5 mm



3D BRAVO
1 x 1 x 1 mm



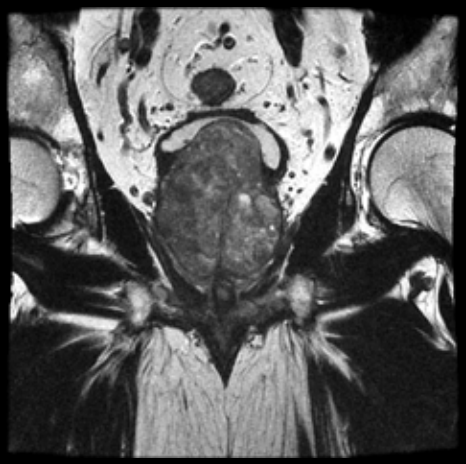
MUSE DWI
b1000
0.9 x 0.8 x 5 mm

Clinical Gallery

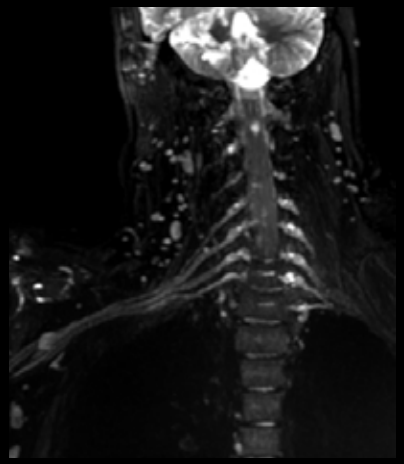
Coil combinations with AIR Touch™

AIR Touch™ automatically selects the best coil combination and utilizes anatomical-based protocol optimization to personalize care and improve exam times by 53 percent.**

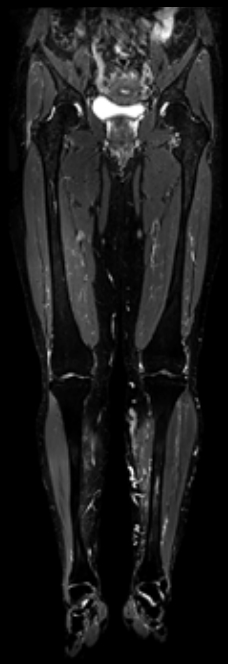
AIR™ 48ch Head Coil +
AIR™ Anterior Array Coil +
Posterior Array
Sagittal T2 frFSE
0.6 x 0.9 x 3 mm



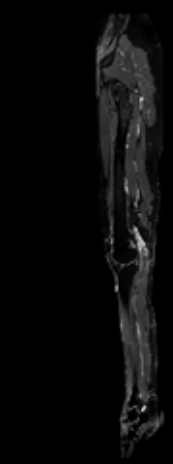
AIR™ Multi-Purpose Coil* +
Posterior Array
Coronal T2 FSE
0.6 x 0.7 x 3 mm



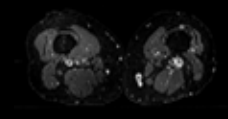
AIR™ 48ch Head Coil +
AIR™ Anterior Array Coil +
Posterior Array
Coronal T2 STIR with
HyperCube and HyperSense
1.25 x 1.25 x 1.6 mm



Curved reformat



Sagittal reformat



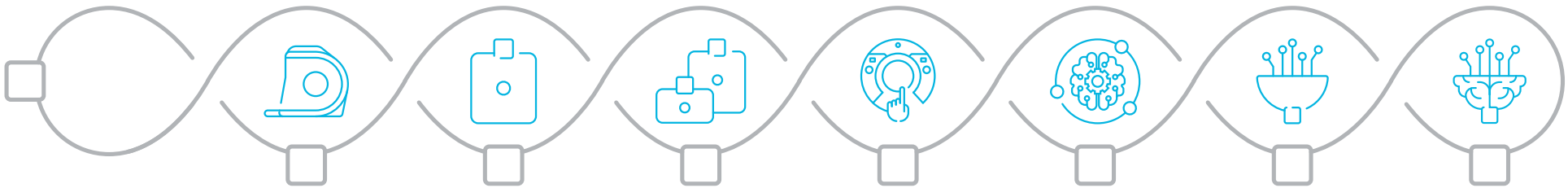
Axial reformat

Two AIR™ Anterior Array Coils +
Posterior Array
Coronal STIR FSE
1 x 1.8 x 2.5 mm

*Not yet CE marked. Not available for sale in all regions.
**Compared to previous workflows without AIR Touch™.

It all links up to a simply better MR experience

What really sets our AIR™ family of products apart is the way they all work together. It started with an engineering breakthrough that led to the industry's first truly lightweight coil design and laid the groundwork for intelligent workflow applications and an all-new reconstruction algorithm. Each one builds off of the potential of the rest of the family, creating a chain of innovation that all links together to transform the entire MR experience.



*Not yet CE marked. Not available for sale in all regions.


AIR™
Simply better

For more information, visit gehealthcare.com/AIR
or contact your GE Healthcare Sales Representative.

GE Healthcare is a leading global medical technology and digital solutions innovator. GE Healthcare enables clinicians to make faster, more informed decisions through intelligent devices, data analytics, applications and services, supported by its Edison intelligence platform. With over 100 years of healthcare industry experience and around 50,000 employees globally, the company operates at the center of an ecosystem working toward precision health, digitizing healthcare, helping drive productivity and improve outcomes for patients, providers, health systems and researchers around the world. Follow us on Facebook, LinkedIn, Twitter and Insights, or visit our website www.gehealthcare.com for more information.

Images courtesy of Asan Medical Center, Korea; Hospital for Special Surgery, NY;
Centre Cardiologique du Nord, Paris; University of Yamanashi, Japan; Haeundae Paik Hospital, Korea.

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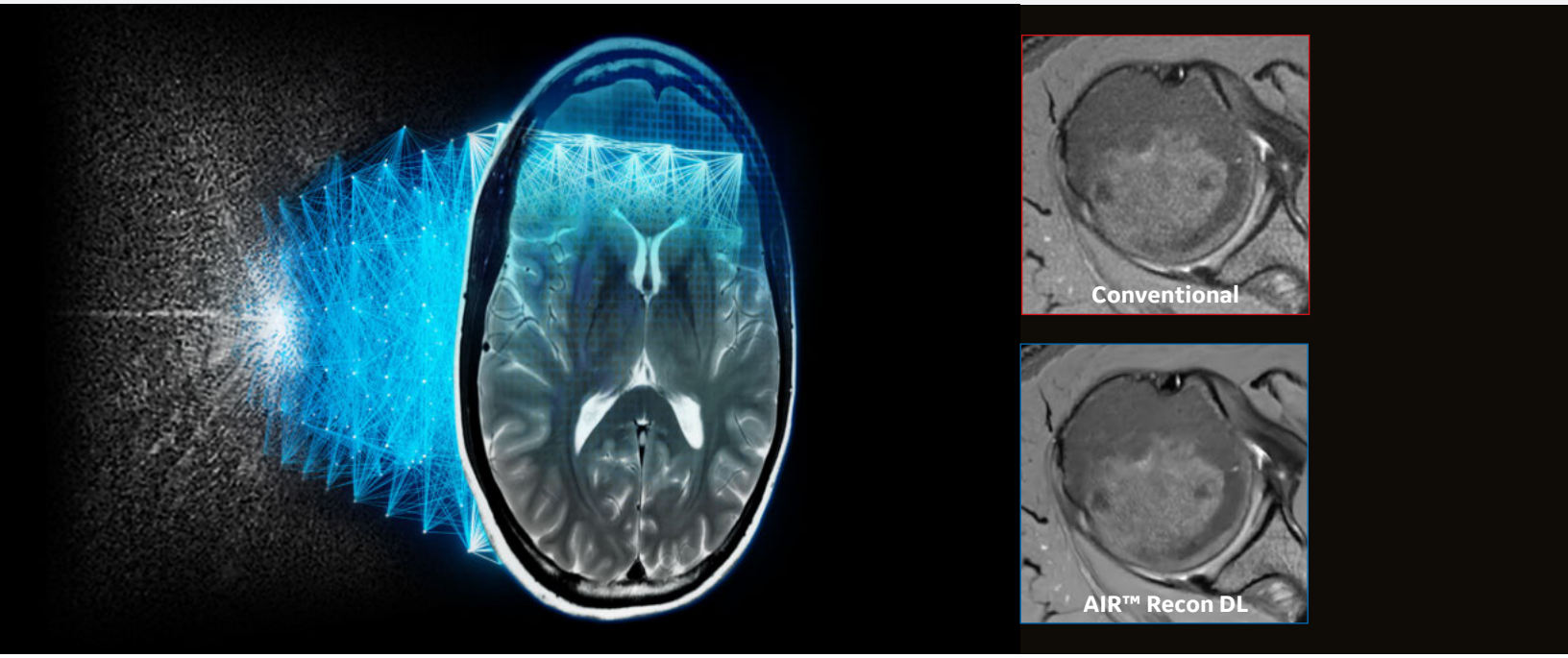
TOMORROW TODAY

Simply better image quality

AIR™ Recon DL



AIR™ Recon DL[‡] is a pioneering, deep-learning based reconstruction software that will change the way you think about MR imaging. Part of GE Healthcare's AIR™ family of products, which includes lightweight coil design and intelligent workflow applications, this software challenges the inherent trade-off between SNR, scan time and image resolution.

AIR™ Recon DL is not a filter or a post-processing technique. It improves image quality at the foundational level because it's embedded directly in the reconstruction pipeline and is applied to raw data to remove noise and ringing artifacts.

> I can have the best of both worlds. I don't have to choose between improving the quality of the exam and shortening the exam time.

Pascal Roux, radiologist
Centre Cardiologique du Nord, Paris

gehealthcare.com/AIR

AIR™ RECON DL AT A GLANCE

- Increases productivity by enabling shorter scan times
- Removes image noise and ringing by leveraging raw image data
- Delivers sharper and clearer TrueFidelity™ MR images
- Enables you to set your preferred SNR improvement level
- Real-time image review at the console
- Compatible with all anatomies

Simply better than conventional technology.

[‡]Not yet CE marked for 1.5T. Not available for sale in all regions.

MEETING DEMAND REQUIRES BETTER PRODUCTIVITY

31% increase in MR scans 2007-2018[1]

20% of all MR exams require a repeated sequence[2]

10% additional time required for repeats[2]

6% of appointments are no shows[3]

[1] IMV 2018 MR Market Outlook report

[2] Andre et al J Am Coll Radiol 2015;12:689-695

[3] H Benjamin Harvey et al JACR October 2017 Volume 14 (10) Pages 1303–1309

AIR™ Image Quality

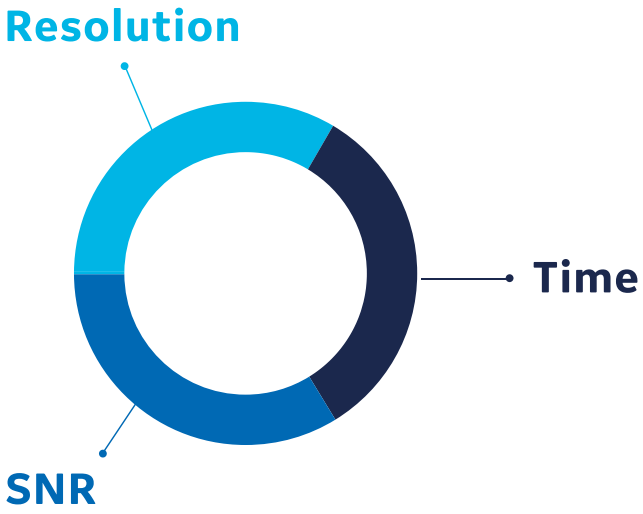
THE POWER OF DEEP-LEARNING COMES TO IMAGE RECONSTRUCTION

AIR™ Recon DL is part of the SIGNA™Works AIR™ IQ Edition** software, and it builds on state-of-the-art features included in our 2019 launch of AIR™ Edition Software. The 2019 release included AIR x™ and AIR Touch™, which delivered consistency and productivity, and AIR™ Recon, an image reconstruction method that improved SNR and reduced background noise and artifacts.

Customers who have been using our SIGNA™Works AIR™ Edition software agree that AIR™ was simply better, and now they'll be even more impressed. The SIGNA™Works AIR™ IQ Edition revolutionizes MR by bringing the power of deep-learning to image reconstruction, in the form of AIR™ Recon DL to redefine what MR image quality means. Are you ready to level up?

THE SNR, RESOLUTION, AND SCAN TIME DILEMMA

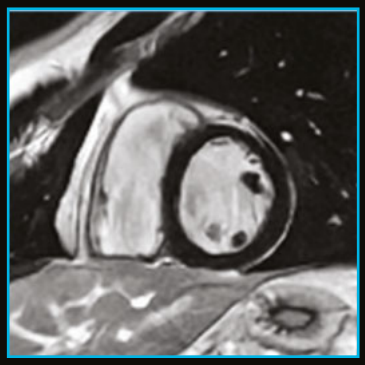
MR radiologists and technologists have long known that there is an inherent tradeoff between resolution, SNR and scan time. Simply put, the longer the scan time, the better the SNR, but unfortunately that model doesn't align well with reality. Radiologists and technologists have to meet demanding schedules and balance the added variability of patient shape, size and cooperation. The end result can be unsatisfying because when practitioners spend more time on patient setup, less time is left for the actual scan. Shorter scan times result in decreased SNR and poor image quality, and that can lead to patient call-backs and re-scans.



**SIGNA™Works AIR™ IQ Edition (MR29) is not available on all systems. Please contact your local GE representative for more information.

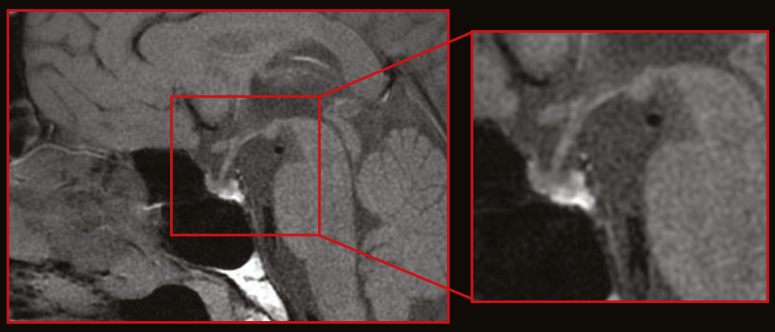
Increases SNR

Conventional

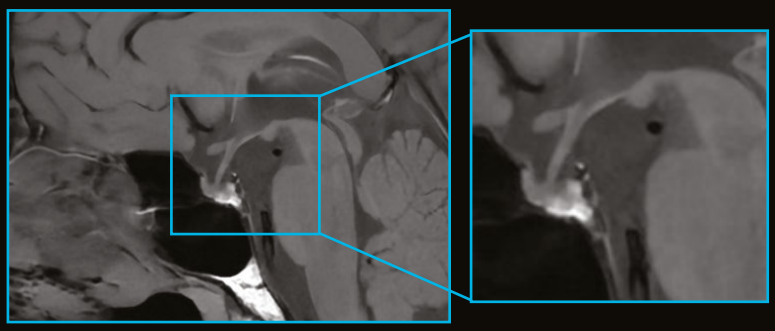


AIR™ Recon DL

Delivers sharper and clearer images



Conventional



AIR™ Recon DL

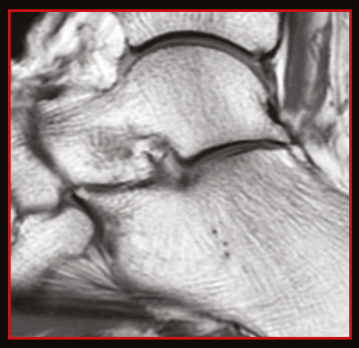
Reduces scan time

Conventional
256 x 180 (1 NEX)
1:10 min

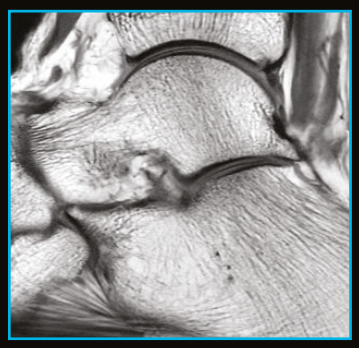
AIR™ Recon DL
256 x 180 (1 NEX)
1:10 min

Conventional
512 x 352 (2 NEX)
4:09 min

Enables higher resolution, with shorter scan time



Conventional
352 x 256
1:59 min



AIR™ Recon DL
640 x 384
1:18 min

HOW DOES AIR™ RECON DL WORK?

AIR™ Recon DL is a deep learning-based convolutional neural network designed to intelligently reconstruct a final MR image with high SNR and improved image sharpness. AIR™ Recon DL is not a filter or post-processing technique but rather is embedded directly in the reconstruction pipeline, where the neural network model is applied to input data to remove noise and ringing artifacts prior to final image formation. This means AIR™ Recon DL can access the full set of acquired source data to generate an image, compared to post DICOM image conversion where important information has already been lost.

AIR™ Recon DL's neural network is trained on over 10,000 images using GE's Edison AI Platform. The trained network employs a cascade of over 100,000 unique pattern recognitions for noise and low resolution to reconstruct only the ideal object image. The network includes a tunable SNR improvement level to suit the user's preference and an innovative ringing suppression technology that recognizes common artifacts like Gibbs ringing and truncation and recasts it into improved image detail. The result is an image with high SNR and spatial resolution that is virtually free of artifacts.

With AIR™ Recon DL, radiologists can have higher consistency and quality in the images they interpret. And technologists can acquire higher SNR without a time penalty. Scan time may also be reduced without compromising detail or SNR. No more compromises or tradeoffs.

Powered By
Edison

WHAT EARLY USERS ARE SAYING

21 radiologists from 11 different sites and 6 different countries were asked about their experience using AIR™ Recon DL.

100% said:

- Images are sharper and more detailed
- Can enable prescription changes to shorten scan time
- Images display less noise

95% said:

- Improves lesion conspicuity
- Improves diagnostic confidence
- May help reduce the number of repeat series

90% said:

- May allow for prescription changes to increase spatial resolution
- Images are easier to read, can be read quicker and lead to reduced eye fatigue

4 out of 5 radiologists agree:

AIR™ Recon DL will reduce variability across different patients and technologists

To see how AIR™ Recon DL works, visit:
https://youtu.be/oW6kTByRk7s

REFERENCE MATERIALS

The following articles in *SIGNA™ Pulse of MR* magazine provide more information on AIR™ Recon DL:

- Autumn 2019 – *A new era of deep-learning image reconstruction*
- Autumn 2019 – *Abstracts accepted at RSNA 2019*
- Spring 2020 – *Deep-learning-based MR reconstruction designed to address compromise between SNR, scan time and resolution*
- Spring 2020 – *AIR Recon DL abstracts accepted for ISMRM 2020*

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