For more than 100 years, healthcare providers worldwide have relied on GE Medical Systems for medical technology, services and productivity solutions.

So no matter what challenges your healthcare system faces – you can always count on GE to help you deliver the highest quality healthcare.

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EXCITE™
TECHNOLOGY FOR SIGNA® INFINITY



MRI at the Speed of Life

GE Medical Systems

gemedical.com

M R I

RE-ENERGIZ

"The breakthrough is in the way EXCITE combines image quality and temporal advantages synergistically. I don't see an end to the possibilities."

Emanuel Kanal, M.D., FACR

Professor and Director of MR Services, Dept. of Radiology, University of Pittsburgh Medical Center



In 1985 GE Medical Systems revolutionized magnetic resonance imaging with Signa® high-field technology. With the introduction of EXCITE™ technology, we redefine the MRI performance standards once again.

Infused with EXCITE technology, the Signa Infinity product line will give you the power to take MRI further than ever before. Imagine having four times the scanning speed, four times the resolution, or nearly double the SNR at your command.

Leapfrog technology … and no one gets left behind.

Simply put, EXCITE is the industry's first radical redesign of the MRI data pipeline. The first integrated approach to moving information more rapidly from the patient's body to the physician's eyes. The first end-to-end solution that optimizes each and every component in the imaging chain.

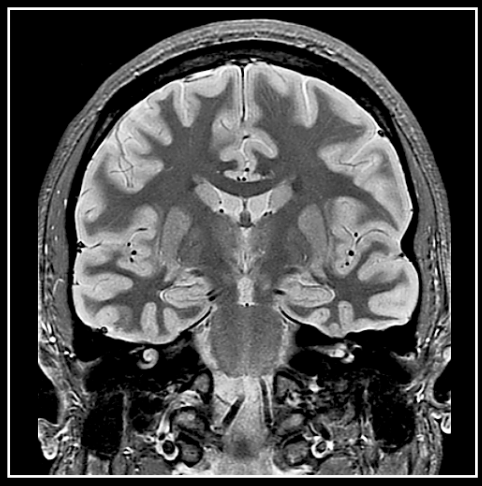
The only convention that we didn't break with EXCITE is the GE Continuum™. Revolutionary yet evolutionary, this technology is available on new or installed scanners across the Signa family.

EXCITE

T E C H N O L O G Y

ED

High resolution coronal image demonstrating exquisite contrast acquired with EXCITE and the 8 channel brain coil



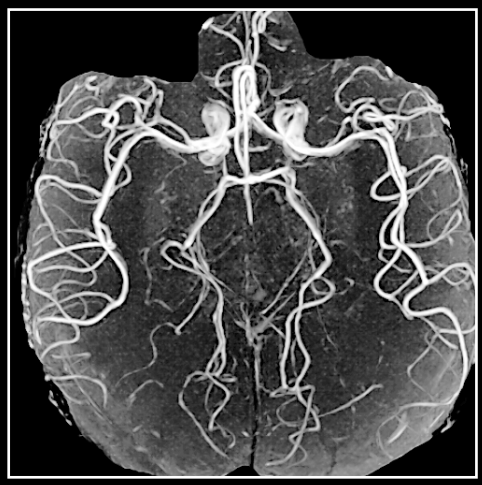
Where EXCITE will lead is up to you. That's the point.

This technology is designed to give you unprecedented clinical flexibility, with deep reserves of speed, resolution and SNR to apply as you wish to enhance current MRI applications and develop new ones. EXCITE is also rewarding from a business perspective, enabling higher productivity and greater revenue opportunities.

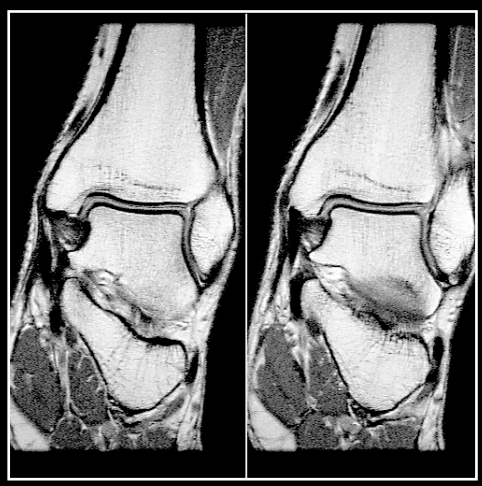
Remember how you felt when you saw your first high-field MR image?

Well, get ready – the excitement is back.

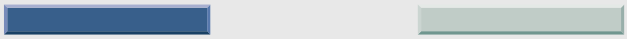
High resolution intracranial TOF MRA with 0.8mm slice thickness utilizing EXCITE with the 8 channel brain coil



EXCITE provides 1024 resolution in this 14cm FOV coronal image



EXCITE Productivity Comparison



Scan Time* *No contrast brain exam*

		Gains
With EXCITE	10 min.	6.5 min. 39%
Without EXCITE	16.5 min.	

Number of Brain Exams *(In equivalent time)*

		Gains
With EXCITE	4	1 exam 33%
Without EXCITE	3	

EXCITE enables significant improvements in clinical productivity. Initial studies show that in brain exams, for example, scan times are reduced by nearly 40%. This allows you to scan four patients in the time it used to take to scan three.

** does not include patient handling*

*4D renal MRA using ASSETx4 resulting in 2 sec. temporal resolution**



** works in progress*



MRI RE-ENGINEERED

"EXCITE is a major advance in MRI. It overcomes the speed bumps in pulse programming … accelerates download times and image recon … and provides huge advantages for parallel imaging."

Robert R. Edelman, M.D.
Chairman, Dept. of Radiology,
Evanston Northwestern Healthcare,
Professor of Radiology,
Northwestern University Medical School



EXCITE is the industry's first *comprehensive* technical solution to improving speed in MRI from image acquisition to final image presentation. In re-engineering the MRI data pipeline, we optimized every component in the imaging chain, from signal (pulse sequence) transmission to data processing.

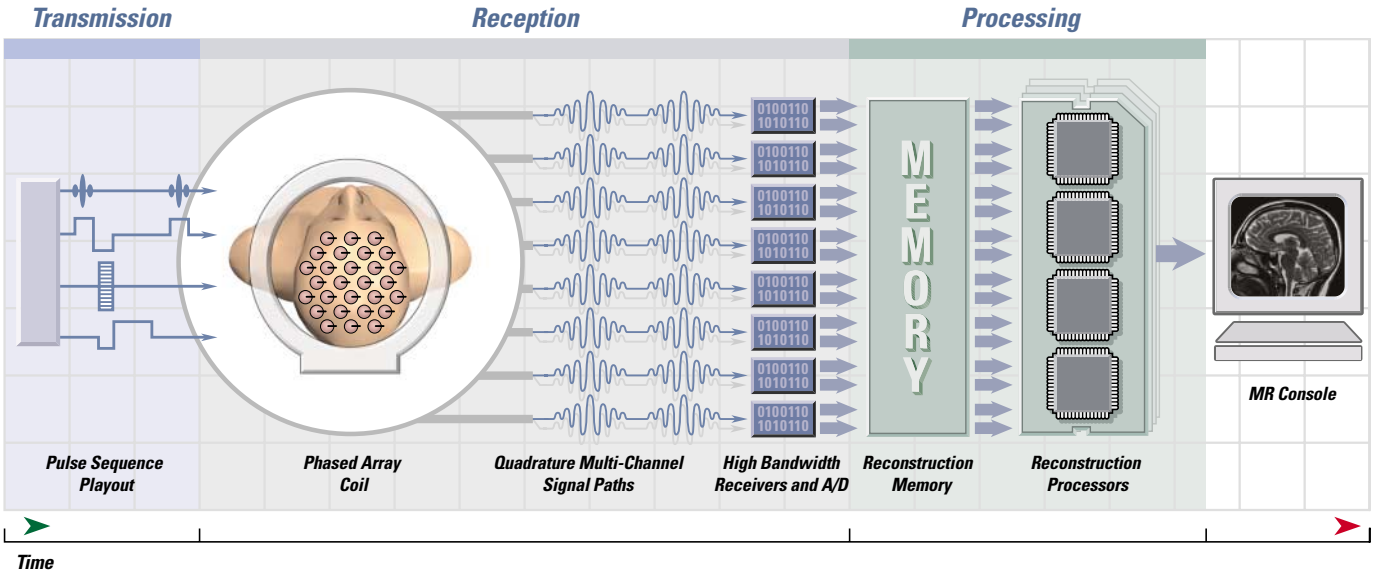
The effect? Let's say your PC normally downloads information via a dial-up modem. Then you switch to a broadband connection. The quantum leap in access speed and richness of content is analogous to the performance boost you'll experience with EXCITE.

And here's how we achieved it.



EXCITE
TECHNOLOGY

EXCITE optimizes every component in the imaging chain.



Transmission

Lightning-fast pulse sequences.

EXCITE delivers the shortest pulse sequence parameters currently available, thanks to advanced microprocessor technology. Shorter TRs, TEs, and EPI echo spacings translate to faster acquisition, higher SNR, and significantly better image quality.

"There's a ton of signal to noise. And the images come up extremely fast. I see this system as a way to attack my patient backlog."

Alfio Pennisi, M.D.

Chief, Section, Neuroradiology,

South Jersey Radiology Associates

Reception

16 quadrature (8 independent), expandable channels with coils to match.

EXCITE has superior acquisition and digitization capabilities, including:

- The industry's largest choice of multi-channel coils optimized for parallel imaging techniques. This growing family of coils will enhance brain, neck, spine, cardiac, vascular, abdominal, and orthopedic procedures.
- High-bandwidth (1 MHz sampled) independent receivers, essential for today's short echo-spacing echo planar and short TR/fast gradient echo sequences.
- Quadrature receiver channels expandable from 8 to 16 … and ultimately to 64* as your needs evolve. The modular expandability of the EXCITE technology positions it well not only for today's parallel imaging techniques, but also for tomorrow's acquisition strategies.

* Works-in-progress.

Processing

The power and speed to eliminate bottlenecks.

Increasing the bandwidth and number of channels receiving data is only half the equation. You need a processing engine that is robust and fast enough to deal with this flood of information.

The EXCITE Vector Array Processor can easily handle 16 or more quadrature channels of image information being digitized at millions of data points per second. No matter how data-intensive the procedure, there are no slow-downs and no bottlenecks in the pipeline. With EXCITE, the interval between acquiring the data and seeing the image has been virtually erased.

- Reconstruction at up to 400 images/second (256^2 FFT) – the fastest recon rate in MRI.
- 2 GB of memory – twice that of our closest competitor.
- Complete simultaneity so acquisition and processing proceed in parallel – no waiting for the machine to catch up to you.

MRI
at the Speed of Life

Speed has long been the #1 challenge in MRI. How can you acquire information fast enough to overcome – or to capture – the movement of the human body?

EXCITE technology provides the revolutionary solution. In effect, EXCITE expands MRI from a three-dimensional modality to a true four-dimensional tool that utilizes time as an ally in the diagnostic process. Its quantum leap in acquisition speed and image quality has the potential to impact every application and every patient … and open the door to new applications.

Imagine the possibilities as it becomes clinically practical to:

- Reduce a 16 second breath-held abdominal exam to an easily tolerated 4-5 second free-breathing exam.
- Acquire MRA at 0.2 mm resolution – approaching conventional angio resolution.
- Boost EPI studies from 10 images to 18 images/sec.
- Conduct DWI, DTI, fMRI, and abdominal EPI studies without the usual artifact associated with EPI studies.
- Perform time-resolved 3D imaging to gain 4-dimensional information.

Imagine how the benefits of MRI could be extended to more patients, particularly geriatric, pediatric, and trauma cases.

Think of the possibilities for stroke, AVM, and assessment of tumor vascularity … cardiac studies … spectroscopy … and body applications.

Imagine how patients will feel when they can breathe freely – and breathe easier with shorter exams.

And consider the effect on patient care, throughput and revenue opportunities.

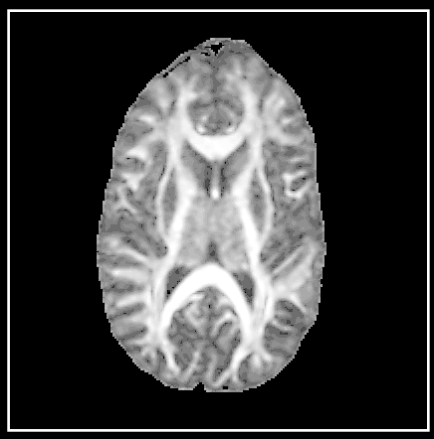
It's time to get excited about the future of MRI.

EXCITE technology may well represent the biggest breakthrough in MRI since the introduction of high-field MRI in 1985. Clinicians who have worked with it tell us that this is the future of MRI … that someday all systems will perform like this.

If that's true – and the images, protocols, and acquisition times on these pages are your best indication of that – then the future of MRI is available to you. Today.

To learn more about EXCITE technology for the Signa Infinity family, please talk to your GE representative or visit us at gemedical.com.

SNR



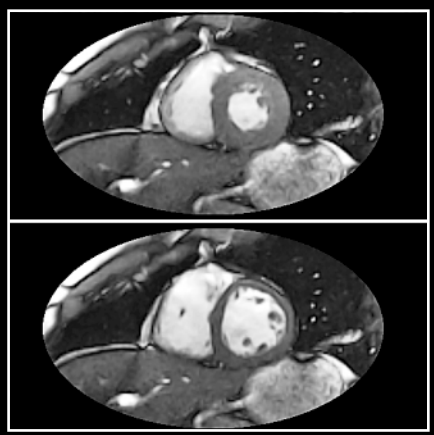
EXCITE Diffusion Tensor Imaging demonstrating high resolution with ASSETx2

Resolution



1024 high resolution T1 weighted image demonstrating cerebellar details and inferior sagittal sinus

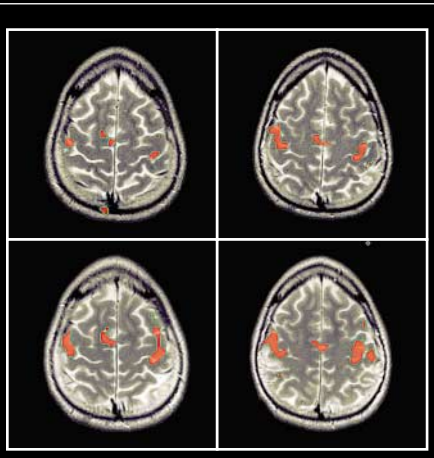
Speed



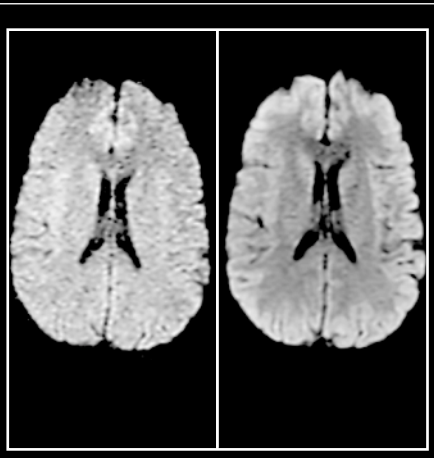
7 second cardiac acquisition: 20 phase double oblique FIESTA with ASSETx2

EXCITE

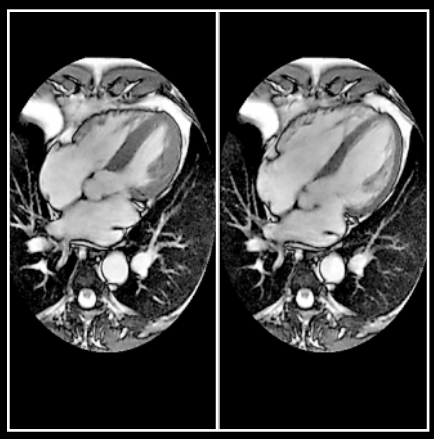
TECHNOLOGY



A conventional 1 channel head coil (top) versus an EXCITE 8 channel brain coil (bottom) demonstrating a larger BOLD activation region in the EXCITE images



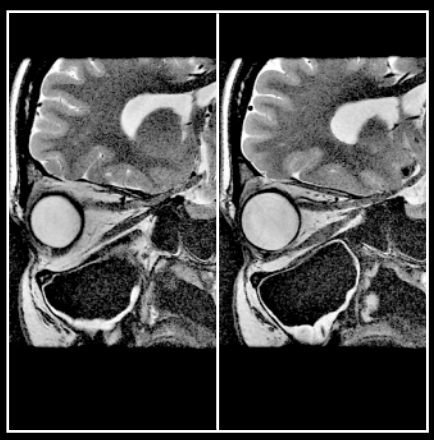
Comparison of a DW-EPI acquired with a single channel quadrature transmit/receive head coil (left) and an 8 channel EXCITE brain coil (right)



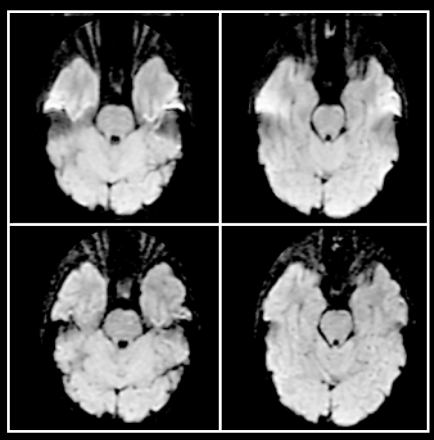
*High resolution FIESTA long axis acquired with the 8 channel EXCITE cardiac coil**



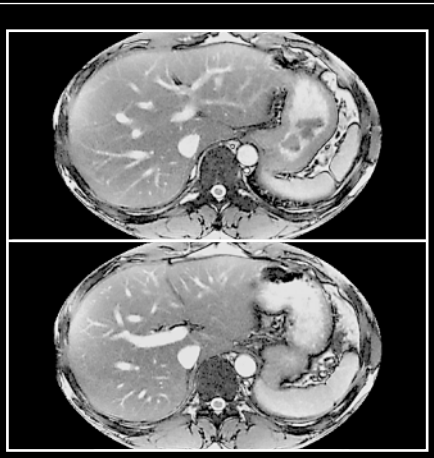
2mm high resolution T1 weighted wrist with an 8cm FOV



Optic nerve with an in-plane acquired resolution of 0.3mm x 0.46mm



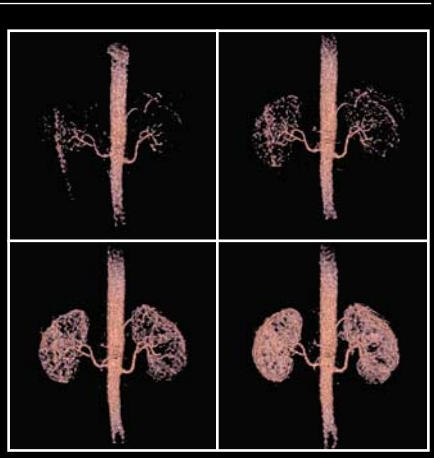
DW-EPI Susceptibility Artifact Reduction – Top: Conventional 1 channel, Bottom: EXCITE 8 channel with ASSETx2



EXCITE enables free breathing abdominal imaging as in this FIESTA acquisition



4D MRA with 4 sec. temporal resolution using ASSETx2 demonstrating intracranial circulation



*4D renal MRA using ASSETx4 resulting in 2 sec. temporal resolution**

** works in progress*