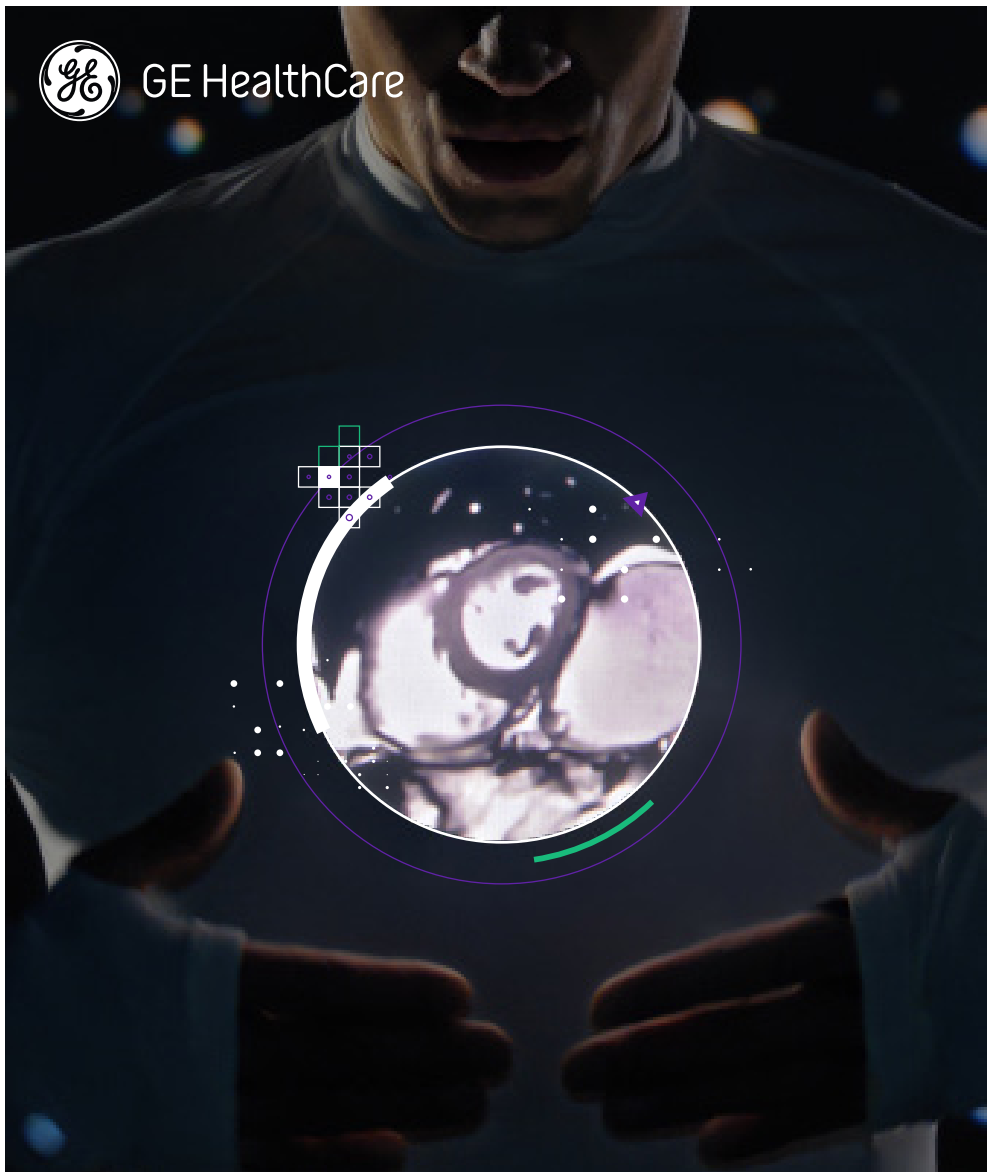# Sonic DL™
## Life-speed imaging

Sonic DL™

Our most rapid acceleration technique yet

GE HealthCare's first pioneering, deep-learning reconstruction technology AIR™ Recon DL has revolutionized MR. Now, we have harnessed the power of deep learning and applied it to speeding up scan times with Sonic DL™ – our most rapid acceleration technique yet, offering CT-like scan times with unmatched MR quality, turning minutes into seconds.
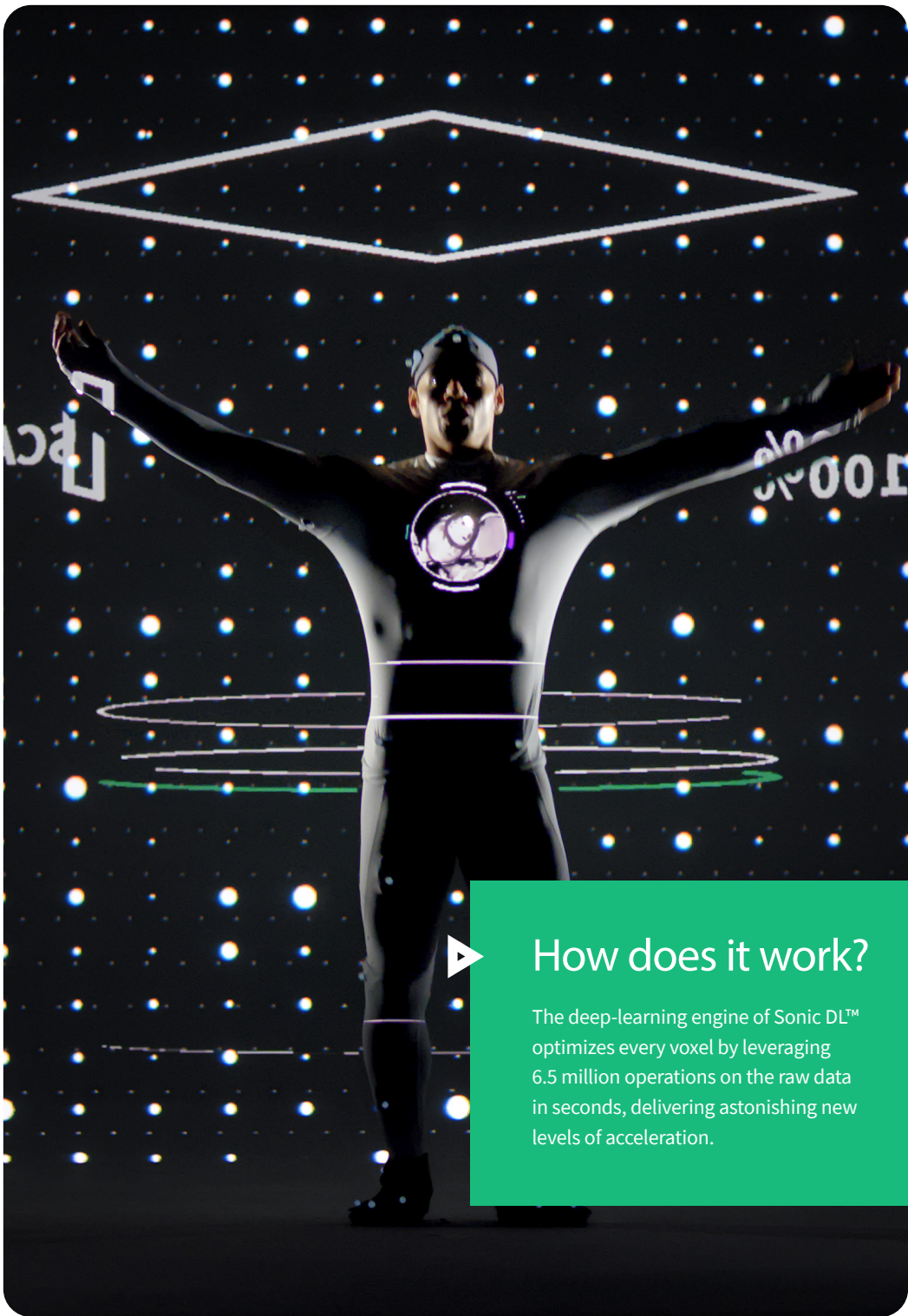
How does it work?

The deep-learning engine of Sonic DL™ optimizes every voxel by leveraging 6.5 million operations on the raw data in seconds, delivering astonishing new levels of acceleration.

'Scans literally only take a few seconds.'

Dr. Matthias G. Friedrich
Professor of Medicine,
McGill University Health Center

Innovation in a flash

Sonic DL™ is just part of our ongoing mission to revolutionize MR with deep learning

In MR, long scan times mean imaging is compromised by the body's movement. Until now, acceleration with Sonic DL™ equips your scanner with the ability to match the speed of the human body, enabling image acquisitions that were previously not possible.

▶ ## Life-speed imaging with Sonic DL™ means you can:

- Speed up scan time dramatically vs current acceleration techniques
- Increase patient throughput with fast scans that do not impact SNR or diagnostic value

Productivity in a beat

Reach the apex between swiftness and diagnostic quality with Sonic DL™ acceleration

Watch productivity soar with scans fast enough to match the rhythm of your departments' workflows. Sonic DL™ slashes scan time by up to 83%, without impacting SNR or diagnostic values, so you can increase patient throughput.

▶ Sonic DL™ offers up to **12X acceleration**, helping users capture rapidly moving anatomies, like heart valves, easily and accurately.
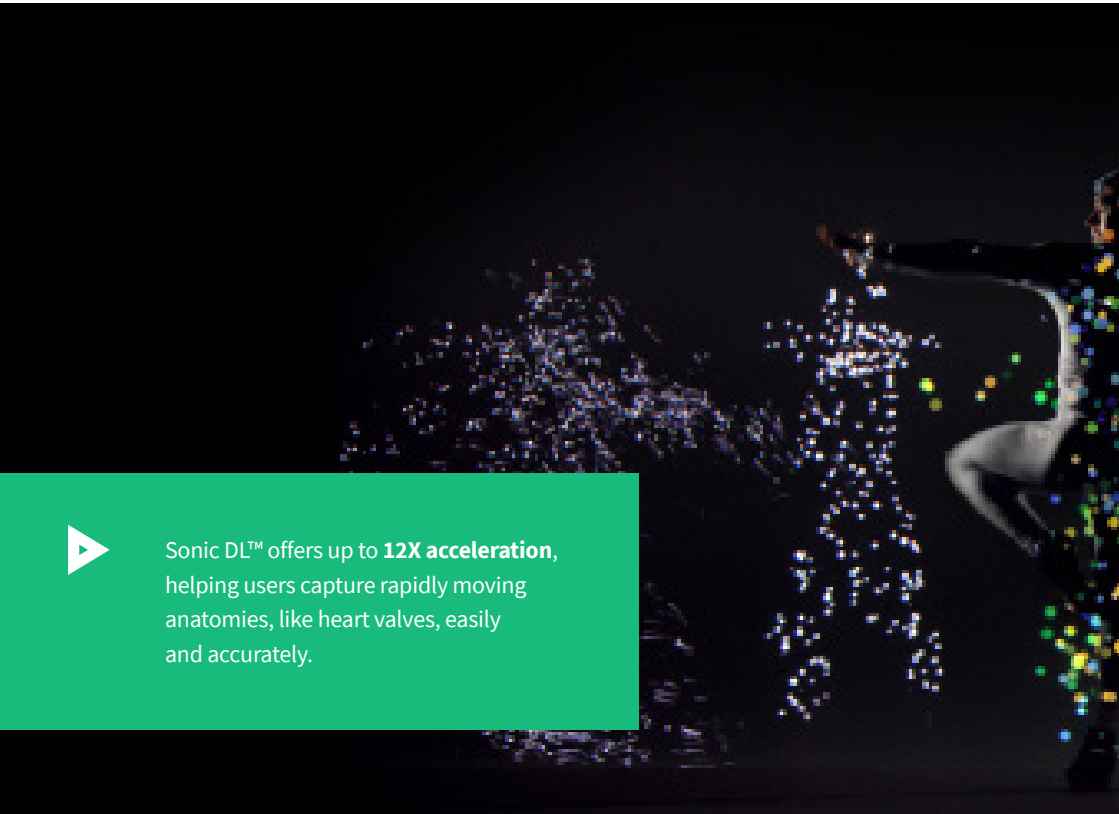
Where simplicity meets swiftness

Sonic DL™ is available for 1.5T and 3.0T systems, for both new and legacy devices

Not every MR facility can scan cardiac patients due to a lack of tools, limited expertise, complex setups, and difficulty managing uncooperative patients. Sonic DL™ helps alleviate all these, meaning it's easier to scan patients who couldn't be effectively scanned before, extremely quickly, without compromising clinical outcomes.
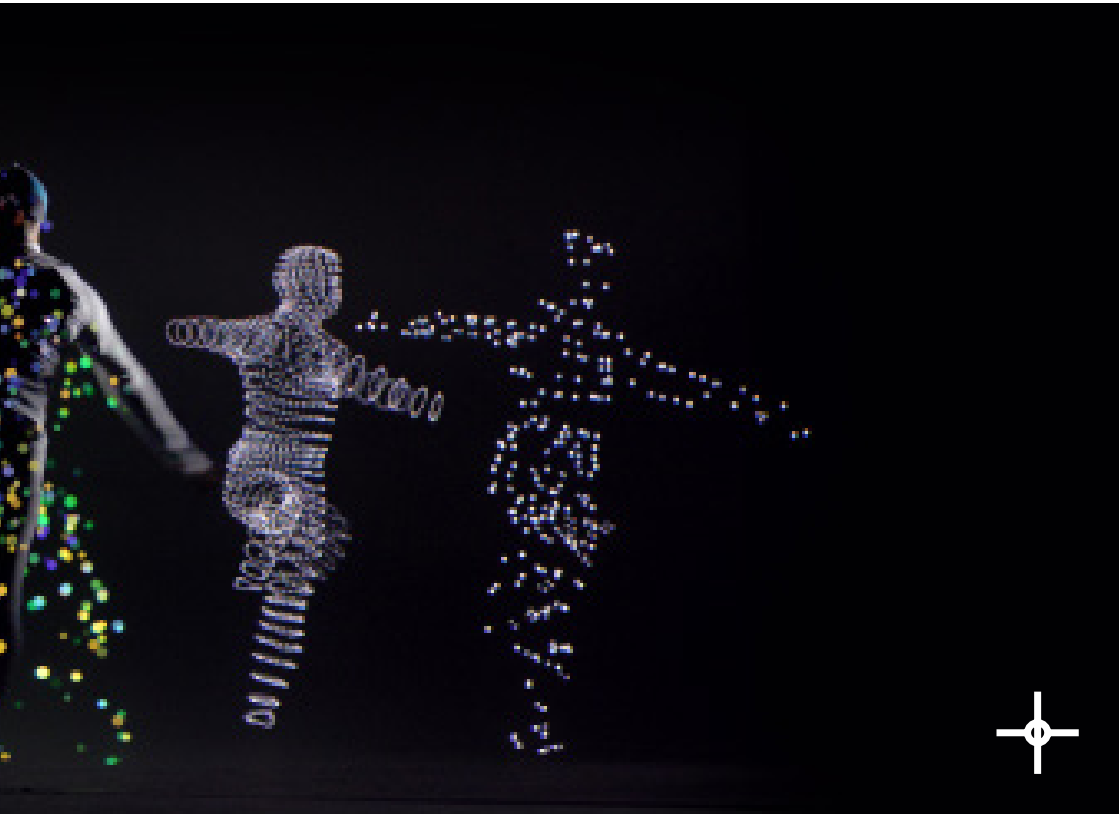
Paced for patients

With Sonic DL™, even sick and uncooperative patients can be scanned within seconds

Sonic DL™ enables departments to do the impossible: accurately scan patients who could not be effectively scanned before. By minimizing the chances of degraded image quality, the need for rescans is significantly reduced. This means it's easier to gain accurate results the first time around, even in complex cases.

▶ Speed where life needs it

We can track physiology and motion in real time, matching our acquisition to the speed of patients' anatomies, and carry out acquisitions that weren't possible before, such as for patients with arrhythmia. With single-heartbeat scans, patients no longer need to hold their breath, creating a more comfortable scanning experience.

'It keeps pace
with the movement
of the heart
and respiratory
motion'

Dr. Frandics P. Chan
Associate Professor of Radiology,
Stanford University

Harness deep learning

for acceleration and diagnostic value with Sonic DL™

Cutting-edge technology

Leveraging our expertise in deep learning to enhance scanning speed

Unprecedented image acquisition

Achieve single heartbeat and free-breathing scans effortlessly

Speed for all

For new and upgraded 1.5T and 3.0T MR systems

Rapid results

Up to 12X acceleration with up to 83% scan time reduction

$$M_\perp(\vec{r},0)e^{-t/T_2^*}$$

$$M_\perp(\vec{r},t)=M_\perp(\vec{r},0)e^{-t/T_2^*}$$

$$\omega_0=\gamma_i B_0$$

$$\vec{\nabla}\cdot\vec{B}=0$$

$$M_\perp(\vec{r},t)=M_\perp(\vec{r},0)e^{-t/T_2^*}$$

$$\vec{\nabla}\cdot\vec{B}=0$$

$$\omega_{0i}=\gamma_i B_0$$

$$\vec{\nabla}\cdot\vec{B}=0$$

$$\vec{\nabla}\cdot\vec{B}=0$$

$$M_\perp(\vec{r},t)=M_\perp(\vec{r},0)$$

$$M_\perp(\vec{r},t)=M_\perp(\vec{r},0)$$

$$\vec{\nabla}\times\vec{E}+\frac{\partial\vec{B}}{\partial t}=0$$

$$\oint\vec{E}\cdot d\vec{\ell}=-\frac{d}{dt}\left(\int\vec{B}\cdot d\vec{S}\right)$$

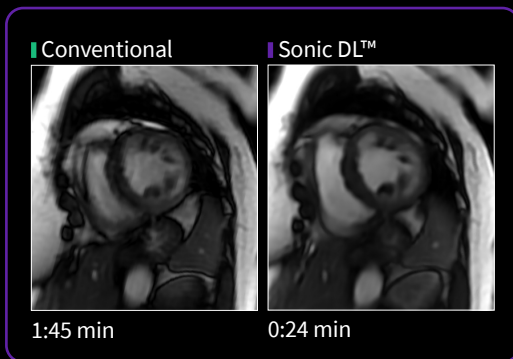$$\oint\vec{E}\cdot d\vec{\ell}=-\frac{d}{dt}\left(\int\right.$$

$$\omega_{0i}=\gamma_i B_0$$

$$\vec{M}_\perp$$

Rapid image acquisition with Sonic DL™

1. Eliminating artifacts due to severe arrythmia

Conventional	Sonic DL™
1:45 min	0:24 min

Short Axis FIESTA Cine Conventional
With multiple breath-holds |
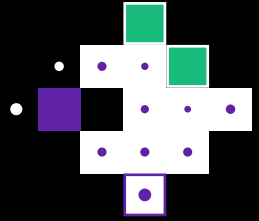2 x 2.3 x 8 mm |
1:45 min | Whole Heart Coverage

Short Axis FIESTA Cine Sonic DL™
With single breath-hold |
2.2 x 2.2 x 8 mm |
0:24 min | Whole Heart Coverage

2. Rapid imaging reduces motion artifacts

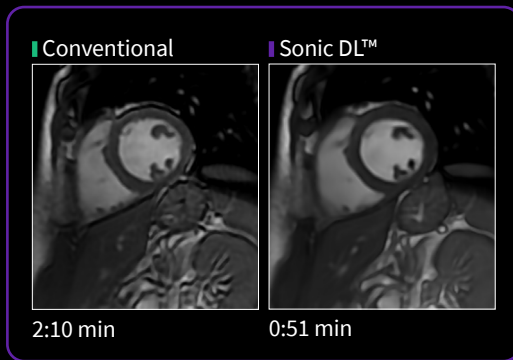| Conventional	Sonic DL™
1:42 min	0:59 min
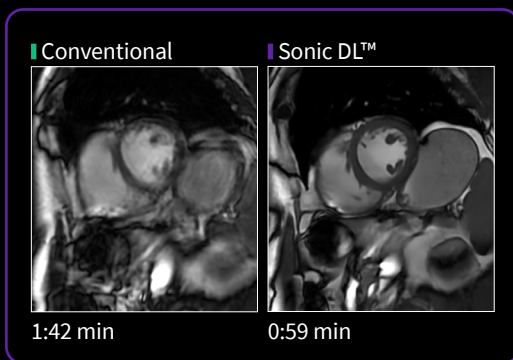
Short Axis FIESTA Cine Conventional
2.1 x 2.1 x 8 mm |
1:42 min | Whole Heart Coverage

Short Axis FIESTA Cine Sonic DL™
1.8 x 1.6 x 8 mm |
00:59 | Whole Heart Coverage

3. Accommodating patient challenges with free breathing

Conventional	Sonic DL™
2:10 min	0:51 min

Short Axis FIESTA Cine Conventional
With multiple breath-holds |
2 x 2 x 8 mm |
2:10 min | Whole Heart Coverage

Short Axis FIESTA Cine Sonic DL™
In free breathing with Respiratory
(Triggering) Gating | 2 x 2.2 x 8 mm |
0:51 min | Whole Heart Coverage

4. Enabling higher spatial resolution in a shorter scan time
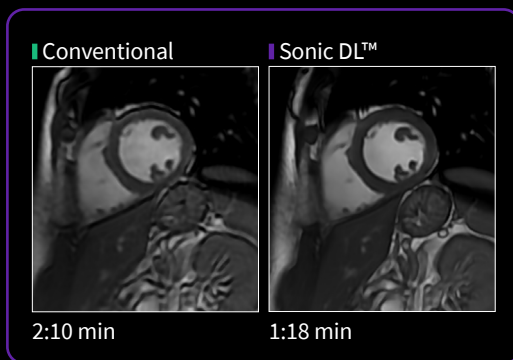
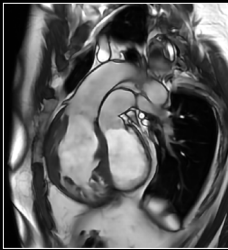| Conventional	Sonic DL™
2:10 min	1:18 min

Short Axis FIESTA Cine Conventional
With Multiple breath-holds |
2 x 2 x 8 mm |
2:10 min | Whole Heart Coverage

Short Axis FIESTA Cine Sonic DL™
Fewer breath-holds |
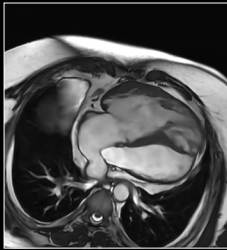1.8 x 1.2 x 8 mm |
1:18 min | Whole Heart Coverage
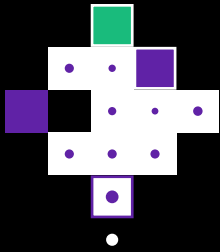
5. Enabling improved temporal sharpness and spatial resolutions with a high number of frames

Sonic DL™ | **Sonic DL™**

0:07 min | 0:07 min

Outlet view FIESTA Cine Sonic DL™
1.4 x 1.4 x 8 mm | 7 sec | 1 Slice |
60 Cardiac Phases
23 ms Temporal Resolution
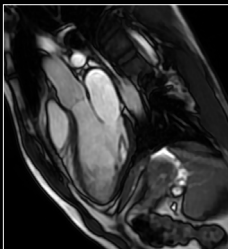
4 Chambers FIESTA Cine Sonic DL™
1.4 x 1.4 x 8 mm | 7 sec | 1 Slice |
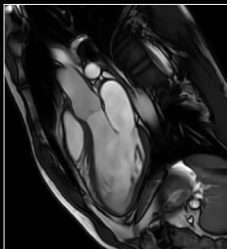60 Cardiac Phases
23 ms Temporal Resolution

6. Enabling improved temporal sharpness and spatial resolution with a high number of frames

Conventional | **Sonic DL™**

0:10 min | 0:07 min

3 Chambers FIESTA Cine Conventional
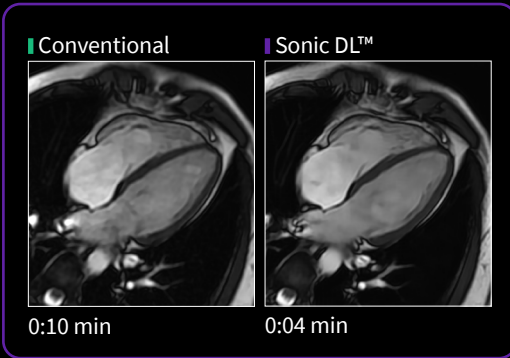1.8 x 1.8 x 8 mm | 10 sec | 1 Slice |
30 Cardiac Phases

3 Chambers FIESTA Cine Sonic DL™
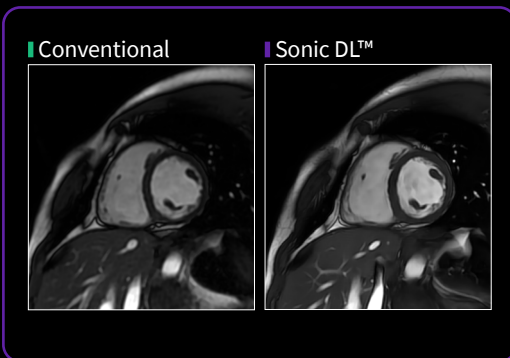1.6 x 1.6 x 8 mm | 7 sec | 1 Slice |
58 Cardiac Phases

7. Enabling higher spatial resolution in a shorter scan time

Conventional

Sonic DL™

0:10 min

0:04 min

4 Chambers FIESTA Cine Conventional
2 x 2 x 8 mm | 10 sec | 1 Slice

4 Chambers FIESTA Cine Sonic DL™
1.6 x 1.6 x 8 mm | 4 sec | 1 Slice

8. Enabling higher spatial resolution

Conventional

Sonic DL™

Short Axis FIESTA Cine Conventional
With breath-holds | 2 x 2 x 8 mm

Short Axis FIESTA Cine Sonic DL™
With breath-holds | 1.2 x 1.2 x 8 mm

GE HealthCare

Want to accelerate scans with life-speed imaging and transform your department?

Visit our product page or contact us to find out more.