

**PHILIPS**

Magnetic  
Resonance

BlueSeal



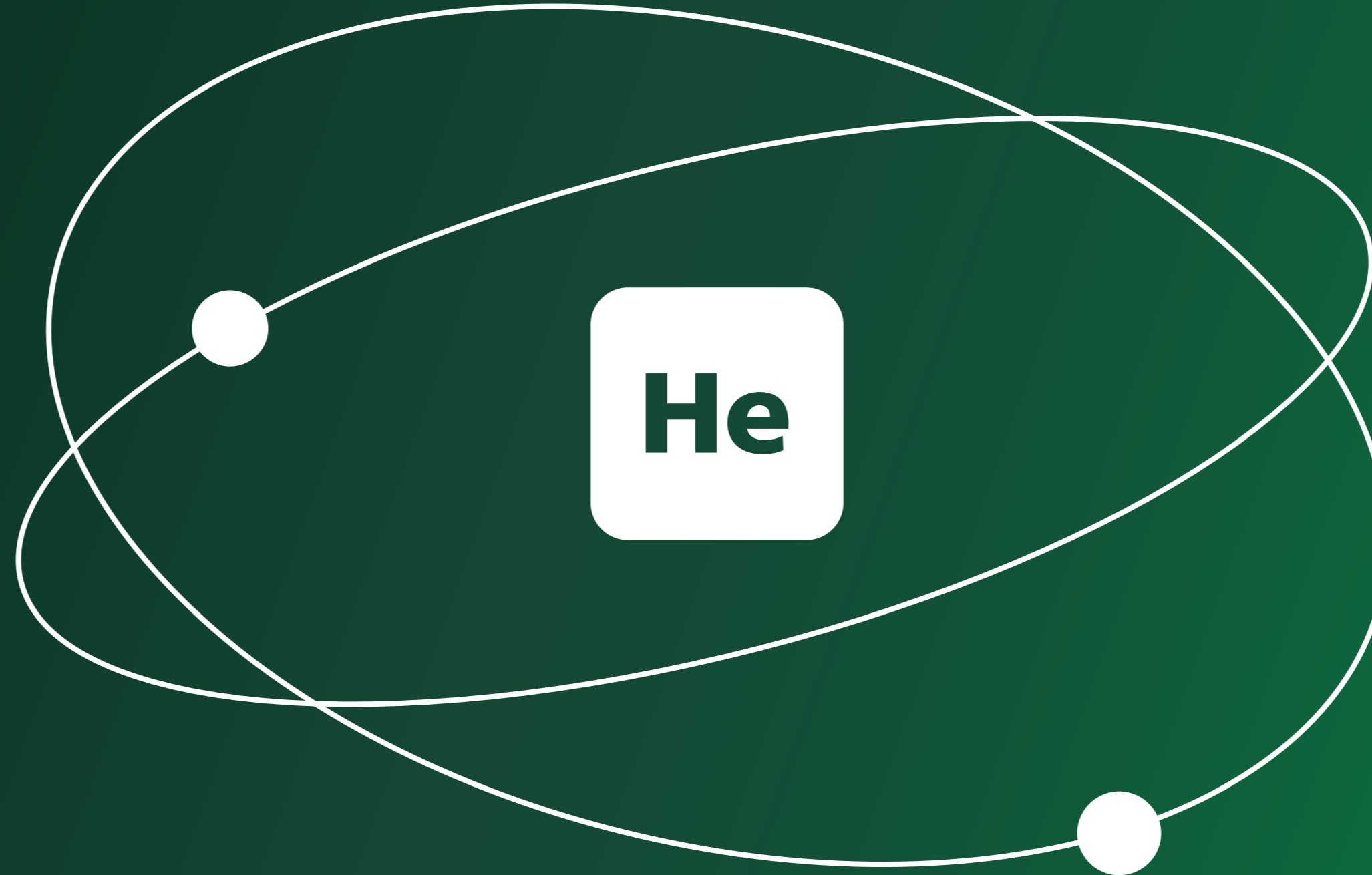
# The new reality in MR

Next level scans with  
helium-free MR operations

# Rethinking helium use in MR

Helium is a non-renewable resource, and its prices have increased in recent years for most users due to its scarcity.<sup>1</sup> MRI scanners are the largest consumers of helium in the world.<sup>2</sup> This valuable resource can be lost unexpectedly and quickly during a conventional MRI system quench. With roughly 50,000<sup>3</sup> mostly conventional helium-cooled MRI scanners in use around the world today, the continued use of large quantities of helium is unsustainable. Therefore, responsible management of this finite resource has been a trend over the last few years in the healthcare industry.

The question is whether there's a way to reduce our need for precious resources in the first place: **How can we keep these MRI machines going—and even increase access to care for more people in more places—while reducing our environmental demands on the planet?**



## Did you know?

Helium is a non-renewable resource; price levels increased by

**50-100%**

due to shortage<sup>1</sup>

MR scanners are the world's biggest consumer of helium, accounting for

**32%**

of global use<sup>2</sup>

Most of the MR operators have experienced

**long and unexpected down time**

due to emergency quench

A quench can cost up to

**100K**

euros of global use

# We address the helium scarcity through **innovation**

Based on a decade of innovation, Philips BlueSeal magnet is a revolutionary solution designed to overcome issues related to helium dependent MR operations, while providing clinical excellence for your department.



## **Reduce** consumption of scarce helium

- Operates with only 7 liters of liquid helium, less than 0.5% of today's standard volume<sup>4</sup>
- Safeguards the small amount of liquid helium needed for cooling
- Eliminates the hassle of helium refills and helps you to avoid helium related unexpected costs



## **Manage** risk and avoid downtime

- Allows for de-energizing and re-energizing from the console via an AI-based Easy Switch functionality
- Decreases downtime during emergency situations



## **Improve** image quality and speed

- Delivers high clinical performance with a leading homogeneous field-of-view and B0 stability.
- Scans up to 3 times faster<sup>5</sup> with an AI-based SmartSpeed
- Increases resolution up to 65% with SmartSpeed<sup>5</sup>



## **Unlock** new siting options

- Allows flexible siting via its lighter weight.
- Eliminates the need for a vent pipe<sup>6</sup> and reduces installation limitations

# First and only 1.5T MR portfolio with helium free operations

Our complete 1.5T portfolio benefits from:

Leading helium-free MR operations | Automated patient-centric workflow | SmartSpeed, powered by



## Ingenia Ambition 1.5T X

High performance system delivers superb image quality even for challenging patients.



## Ingenia Ambition 1.5T S

Versatile system supports high volume departments with fast exams for all anatomies in both 2D and 3D.



## MR 5300 1.5T

Efficient system with ultralight adaptable coils allows for exceptional ROI for general MRI exams.



## BlueSeal Mobile 1.5T <sup>7</sup>

Mobile MR system delivers fast, patient-centric MRI services where and when you need it.

Since its introduction, the innovative BlueSeal sealed magnet technology has completely transformed the MRI operating landscape, setting a new industry trend—and its growing installed base confirms this. As we believe this is the future, we are working on developing 3T BlueSeal systems.

# +1111

BlueSeal MR systems installed

North America

Asia

Africa

South America

Australia

# ~1.9m

Liters of liquid helium saved\*

# Reduce consumption of scarce helium

Conventional 1.5T MRI systems use approximately 1500 liters of helium for cooling and keeping magnets at extremely low temperatures, close to absolute zero. Liquid helium is essential for reaching these temperatures and preserving the stability of the magnetic field, preventing fluctuations that could impact image quality.

These conventional systems may experience helium losses and they are susceptible to quenches, during which a significant portion of helium is discharged through the vent pipe—creating a need for a helium refill before the magnet becomes clinically operational again.

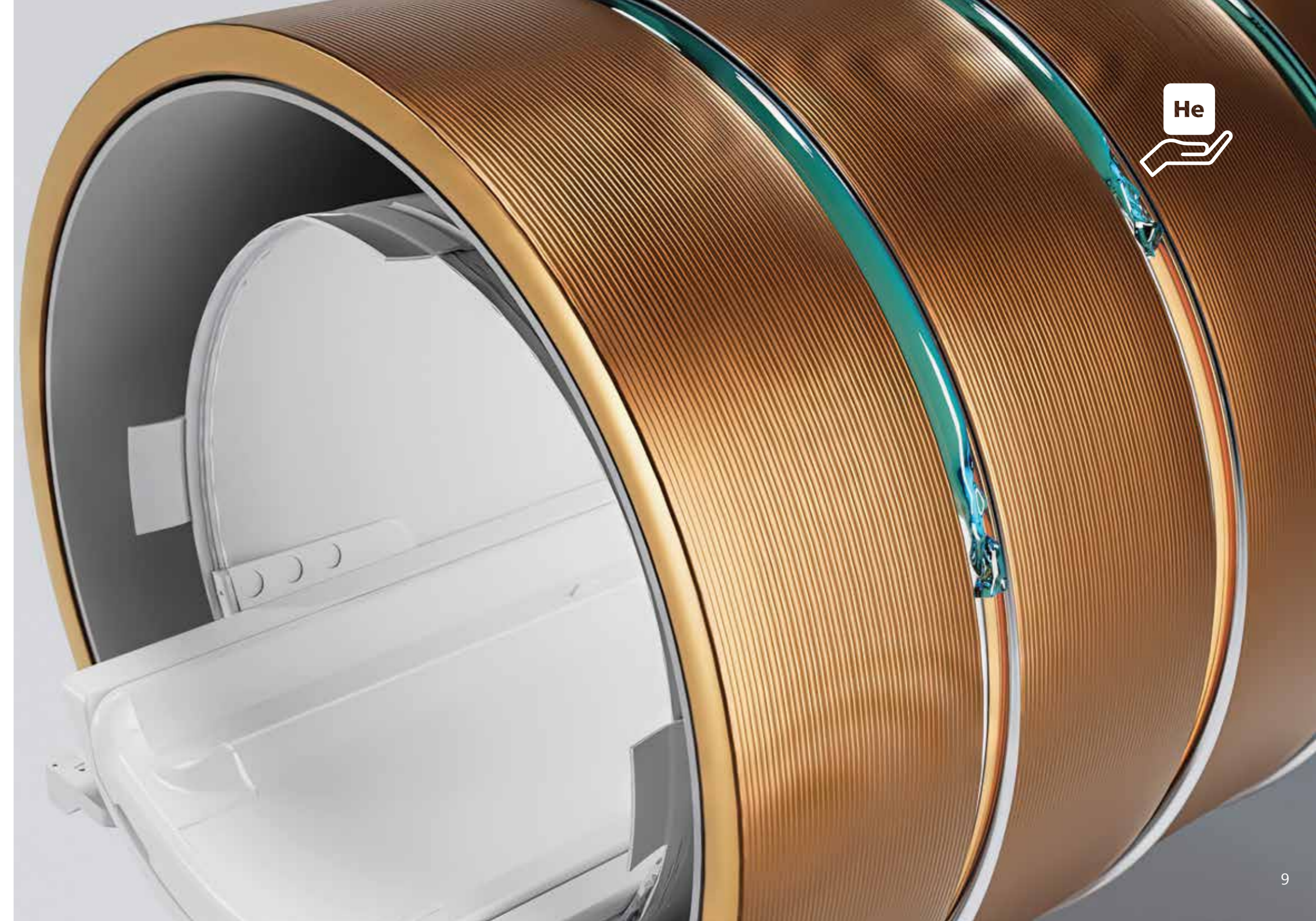
**Philips BlueSeal uses highly efficient micro-cooling technology that requires only a negligible amount of liquid helium** for cooling and ensuring a consistent and uniform magnetic field. This very small amount of liquid helium is placed in the magnet during manufacturing and sealed in the bore.

**This sealing process encloses the precious coolant for the rest of its life**, avoiding any cryogenic work on the magnet at your facility. Moreover, it eliminates the cost and hassle associated with helium and removes your radiology department's dependency on scarce helium supply.



“ We won't have any problems of refilling during the machine's lifetime and we can forget about the helium. This will save us money and help us be more environmentally friendly”

**Dr. María del Mar Travieso**  
Head of Radiology Department, Hospitales San Roque, Spain



# Manage risk and avoid downtime

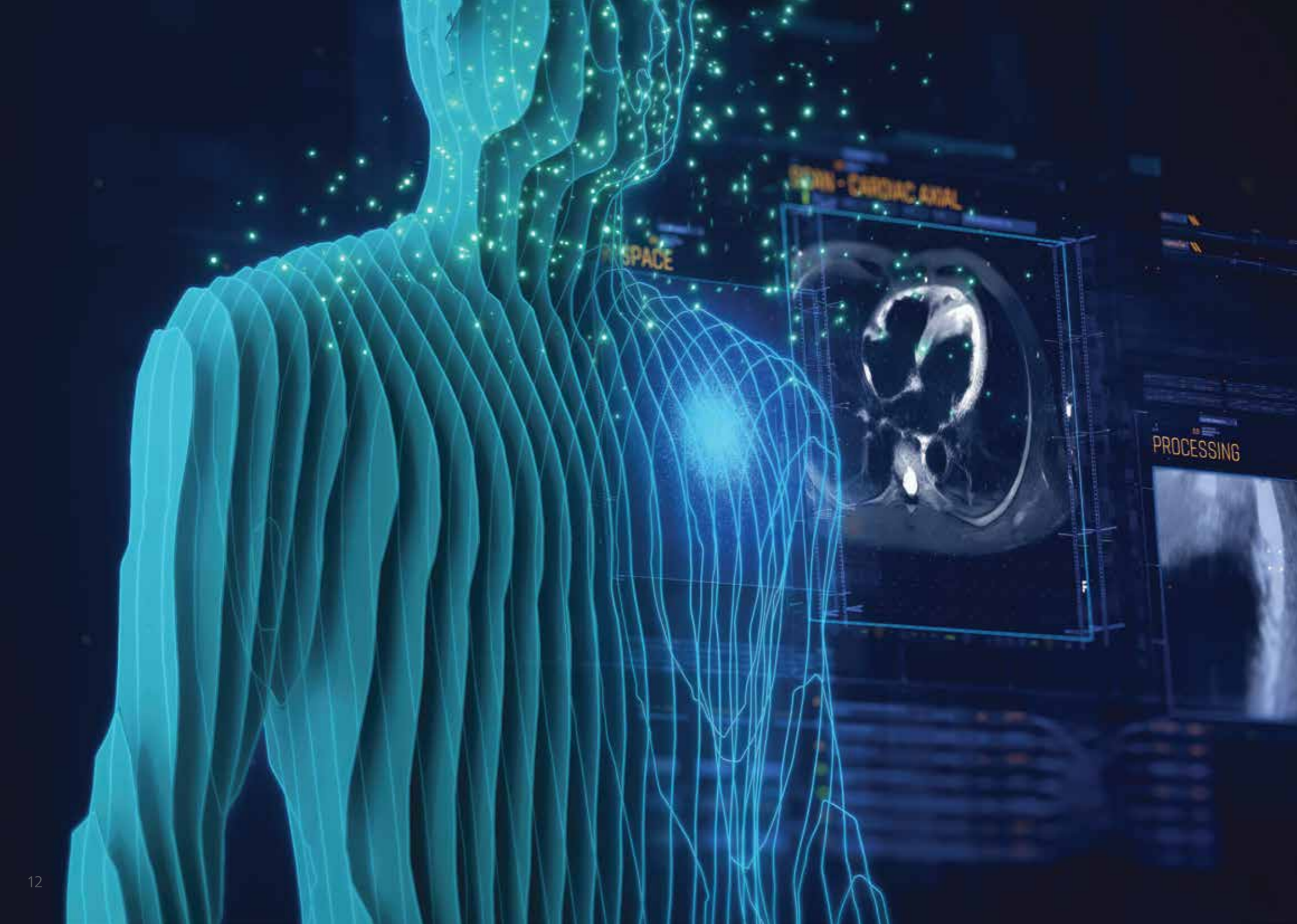
Despite the extreme caution exercised by MR users, most of imaging facilities experienced one or two magnetic items becoming attached to the MRI magnets<sup>3</sup>. With classic MR systems, when a magnetic item becomes stuck in the magnet, you need to call the service engineer to ramp down the magnet or perform a voluntary quench. Almost 30% of users report their MR machine is still not operational after 3 days<sup>3</sup>. In addition to the downtime of the MR system, the required refill of helium is very expensive. It's a huge waste of a vital resource, and an even bigger waste of time. **The BlueSeal magnet helps you resolve small incidents and be prepared for emergency situations.**

It is the next step towards uninterrupted, more productive daily MRI operations. **The EasySwitch function** is designed to minimize unexpected downtime. It allows the BlueSeal magnet to be discharged and from behind the MRI console, without a helium loss. It is driven by AI to support a set of unique service functionalities. By using the EasySwitch function, small incidents can be resolved in less than 6 hours<sup>8</sup>, without causing massive revenue loss and significant disruptions to the facility's MRI services. It also allows your BlueSeal magnet to be proactively discharged without service support to prepare for a natural disasters.

“ I have applied the EasySwitch, magnet come out field, I was able to remove the wheelchair, then was just a waiting game, the temperature and pressures stabilized. Then, I went ahead and ramped it back up, this customer was completely blown away with the speed of the ramping up the system”

**Timothy Harper**  
Field service Engineer USA





# Improve image quality and speed



BlueSeal magnet would not be such a game-changer if it only revolutionized MR operations. Simultaneously, we dedicated significant effort to create a magnet design that delivers excellent clinical performance. Thanks to its highly efficient cooling properties, it does not compromise in performance specifications for homogeneity. The BlueSeal magnet has a leading homogeneous field-of-view of 55 cm for a 1.5T 70 cm system and B0-stability over time. **The resulting magnet performance is all you need from an MRI system.**

**Combining the BlueSeal magnet with the AI-driven SmartSpeed application can push the limits of image quality even further.** This combination delivers all you need from an MR system. You can experience a remarkable acceleration in scanning speed—up to three times faster<sup>5</sup>—leading to a substantial boost in productivity and elevate your diagnostic confidence with up to 65% higher resolution<sup>5</sup>.

By tailoring technology and clinical capabilities to meet your needs, BlueSeal helps you respond to demanding requirements

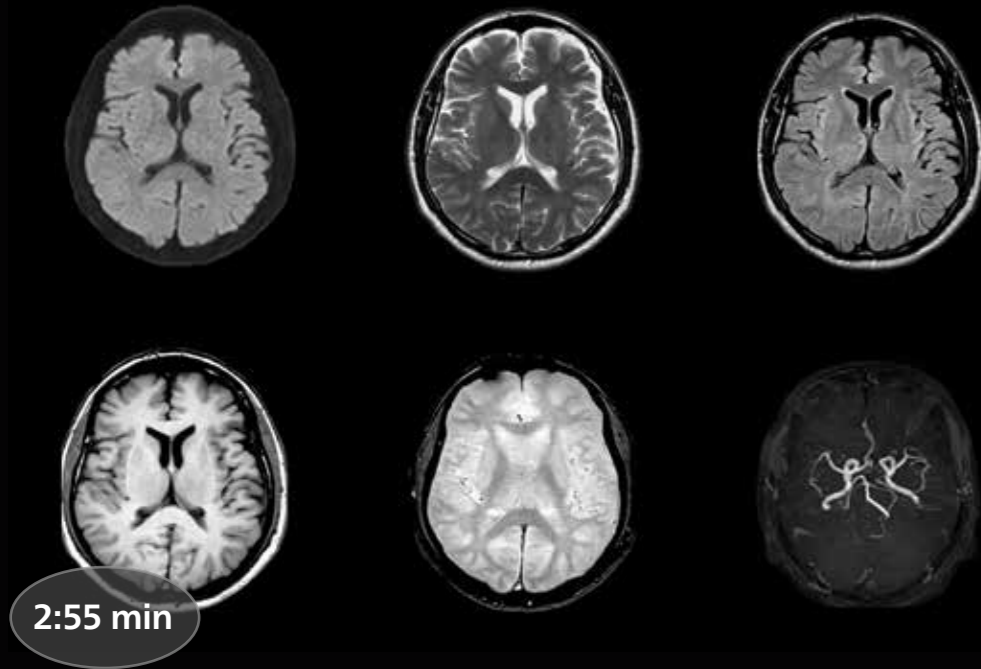


“ In selecting an MRI machine, we wanted state-of-the-art technology that was easy to install, easy to use, and that would be easy on the patient. But most definitely, it had to give us high quality images. That’s how we how we settled on the BlueSeal magnet”

**Constantino Peña, MD**

Interventional Radiologist, Miami Cardiac and Vascular Institute, Miami, Florida

# Smart Productivity with AI



2:55 min

SmartSpeed		
Ax DWI b1000	0.9 x 0.9 x 5.0 mm	0:14 min
Ax T2w TSE	0.8 x 1.1 x 5.0 mm	0:17 min
Ax T2w FLAIR	0.9 x 1.3 x 5.0 mm	0:42 min
Ax T1w FFE	0.9 x 0.9 x 5.0 mm	0:18 min
Ax T2* FFE	0.9 x 1.2 x 5.0 mm	0:23 min
MRA Inflow	0.6 x 1.1 x 0.7 mm	1:01 min



3:03 min

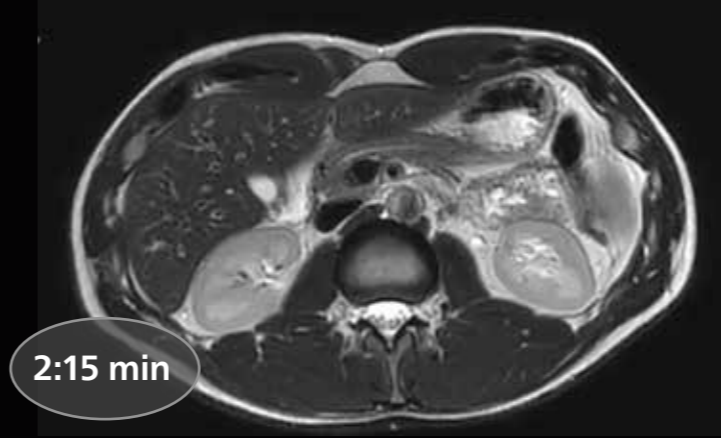
**Conventional**  
Sagittal 2D T2w TSE  
0.8 x 1.0 x 4.0 mm

0:59 min

**SmartSpeed**  
Sagittal 2D T2w TSE  
0.8 x 1.0 x 4.0 mm

 Up to **3X** faster scans<sup>5</sup>

# High Clinical Confidence with AI



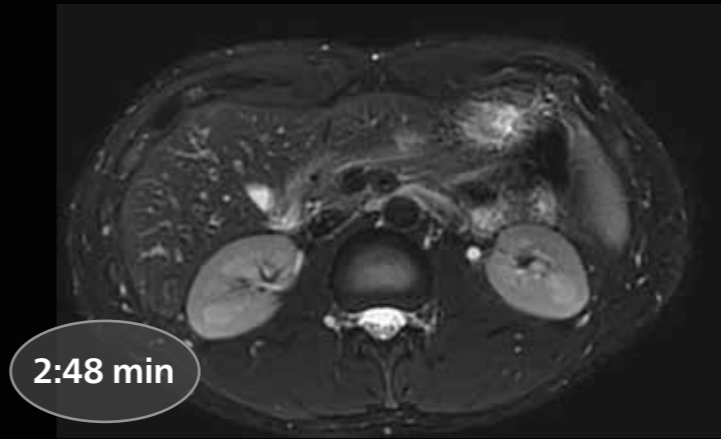
2:15 min

**SmartSpeed Motion Free**  
Axial T2w TSE  
0.4 x 0.4 x 5.0 mm



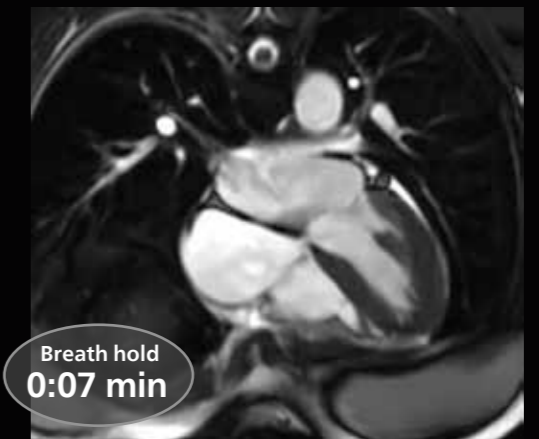
Breath hold  
0:06 min

**SmartSpeed**  
Cineshort axis bTFE  
1.0 x 1.0 x 8.0 mm



2:48 min

**SmartSpeed Motion Free**  
Axial T2w TSE FatSat  
0.4 x 0.4 x 5.0 mm



Breath hold  
0:07 min

**SmartSpeed**  
Cine 4-chamber bTFE  
1.2 x 1.2 x 8.0 mm





### Conventional

*Vent pipe is needed for cryogenic safety  
Extra construction cost*

### BlueSeal

*No vent pipe is needed  
No need for extra construction*

# Unlock new siting options



On a conventional magnet with large amounts of liquid helium, long vent pipes must be installed to meet safety requirements and to direct helium to an outside vent in case of a magnet quench.

With the BlueSeal magnet, no helium can escape. **It removes the necessity for a vent pipe<sup>6</sup>**, along with the associated expenses and installation limitations it involves.

Thanks to this unique advantage, **the BlueSeal magnet can be installed on places where it was previously very difficult**, including commercial or mixed-use buildings, densely populated urban hospitals with concerns regarding cryogenic risks.

BlueSeal magnet is also the logical choice for remote areas, islands and places where it is difficult to supply helium because it can operate effectively without refills.



“ We wanted to set up the MRI in a basement. This building is surrounded by the city, not having a quench pipe was very important, also very good for the financial risk because we don't have to refill helium”.

**Hiroyuki SUGAYA, MD**

President, Tokyo Sports & Orthopedic Clinic, Tokyo, Japan



# Unlock new siting options

## BlueSeal, the lightest MR magnet in the Philips portfolio.

Besides, not needing a vent pipe, BlueSeal magnet is 900kg lighter<sup>4</sup>. The system's weight plays a significant role in facilitating access and installation into new and challenging locations.

It offers greater flexibility for setting it up on elevated floors or indoor sites with construction limitations, reducing floor adaptations and potentially lowering construction cost



**Conventional**  
*Too heavy to be installed on upper floors*



**BlueSeal**  
*Possibility to install on upper floors and mixed buildings*



“ At our new “Pacifica Salud” location in the East Coast Town Center, we needed cutting-edge patient-centered technology. Achieving a 900 kg weight reduction and eliminating the need for a ventilation pipe, we were able to install the MR system on the upper level of Panama’s premier shopping mall on the East Coast.”

**Eduardo I. Onodera Y. MD**  
Pacifica Salud, East Coast Town Center, Panama

# Experience the benefits of BlueSeal

BlueSeal magnet design		BlueSeal micro-cooling system		BlueSeal adaptive-intelligence	
Field strength	1.5T	Type of cryogen	Liquid helium (-7 liters)	Type of magnet controller	Digital, AI
Magnet design	Ultra compact, lightweight and sealed	Micro-cooling technology	Yes	Self ramp-up unit	Yes, digital
Magnet weight (with cryogen)	2,300 kg (5,071 lbs)	Cryogen boil-off rate	Not applicable, fully sealed	Self ramp-down unit	Yes, digital
Minimum siting limitation	3,700 kg (8,157 lbs)	Cryogen refill interval	Not applicable, fully sealed	BlueSeal EasySwitch	Yes, AI
Open bore diameter	70 cm (incl. shim, gradient & QBC)	Vent-pipe requirements	Not applicable, fully sealed	EasySwitch innovations	Yes, magnet UPS, air-cooled compressor and 24/7 monitored e-Alert
Maximum FOV	55cm x 55cm x 50cm				



**Reduce** consumption of scarce helium



**Improve** image quality and speed



**Manage** risk and avoid downtime



**Unlock** new siting options



“ I don't think there is a better MR system. In so many ways the flexibility of a Philips system is such that our decision was a no-brainer.”

**Raja Muthupillai , MD**  
Texas Medical Center, Houston, Texas



# References

\*The amount of liquid helium saved is a calculation compared to a classic magnet with 1500 liters of helium

1. January 2022 onwards <https://www.innovationnewsnetwork.com/helium-shortage-4-0-what-caused-it-and-when-will-it-end/29255/>
2. Statista, Distribution of helium consumption worldwide, 2021
3. Marketch June 2017 study (across vendors)
4. Compared to the Ingenia 1.5T zero boil-off magnet
5. Compared to Philips SENSE imaging
6. Due to closed magnet system
7. BlueSeal Mobile is not yet CE marked and not yet available for sale outside the USA.
8. Can vary based on system and site conditions
9. Improve speed via SmartSpeed, compared to Philips SENSE imaging

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