

Siemens Healthineers

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Game-changing magnet technology unveiled

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The 7 Tesla (7T) magnet designed and built by a team from Siemens Magnet Technology (SMT), is half the weight of the previous leading 7T magnet. This new, cutting-edge technology pushes the frontiers of research in science, engineering and healthcare, particularly in brain imaging, neuroimaging and musculoskeletal imaging.

It enables researchers and clinicians to generate highly detailed images, offering exciting new possibilities to image the structure, function and biochemistry of the human body. The lighter weight of the magnet also means that, for the first time, 7T scanners can safely be housed within hospitals for patient use.

The extraordinary efforts of the SMT team and its groundbreaking magnet haven't gone unnoticed. In fact, the team has today been announced as one of three finalists for the prestigious MacRobert Award, one of the highest accolades in the field of engineering. The winner will be announced at an awards ceremony in June.

"The MacRobert Award is the Oscar in the engineering world," explained Craig.

"Winning it would be the icing on the cake. We've been in the magnet business for

35 years, assembling a global team, and this could emphasise that we are the very best there is in this field. It would be a privilege and a pleasure to pick this award up.”

MacRobert Award judge, Professor David Delpy CBE FREng FRS FMedSci, said: “The Siemens Magnet Technology team made a radical change from conventional wisdom in the development of the 7T and have achieved a step change in the manufacturability, reliability, performance and cost of MRI magnets, confirming their role as the world’s leader in this field. The result is a technology with the potential to save millions of lives through improved diagnostics and research techniques.”

From an environmental perspective, the lower weight of the magnet also means it can be transported via cold airfreight, rather than by ship, thereby dramatically reducing transportation and installation time, as well as helium usage.

The magnet was four years in the making, two of which were spent in scientific research, getting to grips with the material properties and finding new and innovative ways of harnessing them. From there, the magnet was designed and then built onsite at the SMT factory.

“The way we’ve achieved such a low-weight magnet is by having a deep understanding of the materials and ensuring that the engineering embodiment is as close as we can make it to the scientific limits,” explained Craig Marshall, Managing Director at SMT.

“It’s very like aircraft technology – aircrafts can’t fly unless they’re very much closer to the scientific limits – and we’ve adopted some of that aerospace technology in order to make this magnet fly. It’s like nothing else on the market. It truly is groundbreaking.”

Critical to the project’s success was the team who saw it through from conception to finished product. Project Manager Matthew Longfield led the core team, alongside Simon Calvert, Director of Research & Development, Graham Hutton, Principal Magnet Engineer, and John Laister, Head of Manufacturing.

Such was the confidentiality around the magnet’s development the team members

were forced to keep it a secret from their colleagues, family and friends. “Other 7T magnets existed but we knew that this was something completely different,” John Laister commented.

One logistical challenge of keeping the magnet under wraps and building it onsite in Oxford was testing it. This had to be done overnight when normal production at the factory had stopped. The team also had to rope off the road around the factory, as the stray magnetic field on the experimental coils they tested were so large.

Another challenge was producing a magnet that had to go straight to market. “This meant the pressure was really on us to deliver and get it right first time,” explained Matthew Longfield. “

Thankfully the team managed to meet and exceeded their target, creating a first-of-its-kind technology. Once completed in April 2015, the magnet was shipped to Germany and fitted into an MRI scanner, produced by colleagues in Siemens MR. The working MRI scanner is now being used for research in the University of Erlangen.

A second magnet and MRI scanner has also been made and is housed at the University of Cambridge. More magnets are currently in production at SMT for use in research and clinically in hospitals.

“7T is the flagship. It’s the way we’re going to push the frontiers of MRI,” said Craig. “It will open up opportunities for pharmaceutical businesses to bring new therapies into neurology and oncology, and possibly even cardiology.”

Find out more about the MacRobert Award here: www.raeng.org.uk/macrobot

Siemens Healthineers is one of the UK’s largest suppliers of medical imaging, laboratory diagnostics and medical information technology, offering innovative products, solutions and services across the spectrum of patient care. It is the most experienced Managed Equipment Services provider in the UK, working in partnership with healthcare organisations to drive efficiencies. Its strong UK R&D presence includes Siemens Magnet Technology in Oxford, responsible for technology used in over a third of MRI scanners. Siemens Healthcare Diagnostics in

Llanberis and Sudbury designs and assembles specialist diagnostic and pathology instrumentation for laboratories and hospitals worldwide.

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Picture caption: The Siemens Magnet Technology team behind the the groundbreaking, new 7 Tesla (7T) ultra high-field magnet for use in MRI scanners.





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