



The Milestone dedication event is being hosted by Siemens Magnet Systems. It is sponsored by the IEEE Life Members Fund through donations from the nearly 40,000 Life members across the world, and the IEEE Council on Superconductivity.

The unveiling was originally planned for 1 May 2020 but due to the Covid-19 pandemic was delayed until 17 June 2022.

The Milestone program is organised by the IEEE History Center, based at the Stevens Institute of Technology in Hoboken, New Jersey. Nominations for the award of a Milestone plaque are reviewed for approval by the IEEE History Committee. The subject of the nomination must relate to work done at least 25 years ago.

The IEEE History Milestone program has commemorated about 200 notable achievements in electro-technology around the world. Eighteen of these are located in various parts of the United Kingdom and Ireland Section, including Bletchley Park, GCHQ, Abbey Road Studios, Glasgow, and Shannon, Ireland.

The Milestone plaque being unveiled in Eynsham will be followed on 21 June by two at Manchester University. Several more being prepared for approval include the EMI Computer-Assisted Tomography (CAT) X-Ray Scanner, the Cavity Magnetron, and the LEO Computer.

Further details about the complete list of Milestones can be found on the IEEE History Center website at:

[ethw.org/Milestones:IEEE\\_Milestones\\_Program](http://ethw.org/Milestones:IEEE_Milestones_Program)



[ieee-ukandireland.org](http://ieee-ukandireland.org)  
[ieee.org](http://ieee.org)



IEEE History Milestone

# Active Shielding of Superconducting Magnets



Friday 17 June 2019

IEEE Milestone Plaque Unveiling Ceremony

Siemens Magnet Systems/Technology  
Wharf Road, Eynsham, Oxfordshire OX29 4BP

# The application of active shielding to the reduction of stray magnetic fields in MRI systems

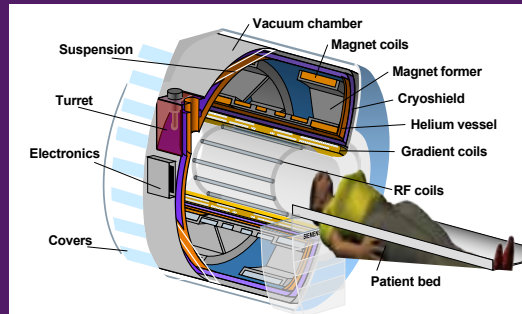
The invention of the superconducting magnet (1961) by Martin Wood enabled the generation of very strong magnetic fields far beyond the reach of copper wire solenoids, which suffer from the heating effect of currents flowing in normal conductors.

However, it is in the nature of magnetic fields that they cannot readily be contained within the large-volume work space needed to accommodate the human body, for example. In special environments, such as industrial laboratories, hospitals, etc. where magnetic fields above



Above: Oxford Magnet Technology in Osney Mead, 1982

Below: Siemens' dedicated facility in Eynsham.



1 Tesla (10,000 Gauss) may be used, the 'stray' fields can be problematic and need to be severely reduced, typically to a level of a few Gauss. Passive shielding is feasible for moderately large field strengths, using ferromagnetic materials, but this adds considerable bulk and weight, and loses its shielding property at the highest fields needed in Magnetic Resonance Imaging (MRI) applications.

Active shielding solved these problems by the addition of superconducting coils that reduce the stray fields to acceptable levels, without requiring the use of the heavy and bulky structures needed for passive shielding.

Over the past 60 years, the original conception of the superconducting magnet by Oxford Instruments and its successor companies evolved to the point where MRI applications became commercially viable (1980). Active shielding was seen to be essential to satisfy floor loading and space limitations, without significant structural work being needed in hospitals.

The Siemens Magnet Technology Company (1984) assumed responsibility for the development of more advanced designs, using higher magnetic fields, that met these challenges and reduced stray fields to acceptable levels.

The IEEE Milestone Award recognises the outstanding engineering achievement by Siemens of the commercially successful superconducting magnet system that has transformed the science of medical imaging, building on the heritage rooted in the fertile environment in Oxford in the 1960s.

## Agenda

**11.00** Unveiling of the IEEE Milestone Plaque

Arrival of guests

Welcome

Simon Calvert (*Head of Manufacturing at Siemens Magnet Systems*)

Introduction of this Milestone and the IEEE guests

Professor Rod Muttram (*IEEE Life Member Committee of the United Kingdom and Ireland Section*)

Welcome and description of the IEEE

Stephen Welby (*IEEE Executive Director & COO*)

The IEEE Milestone Program

Professor José M.F. Moura (*2019 IEEE President*)

Unveiling of the plaque

José M.F. Moura and Simon Calvert

**12.00** Buffet lunch

**13.00** Tours of the Eynsham facility

**14.00** Technical presentations

The Council and current status of superconductor technology

Dr Bruce Strauss (*Chair, IEEE Council on Superconductivity*)

The history of and current developments in Superconducting Magnets

Simon Calvert

**15.00** Conclusion