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2019

ASG SUPERCONDUCTORS Company Profile

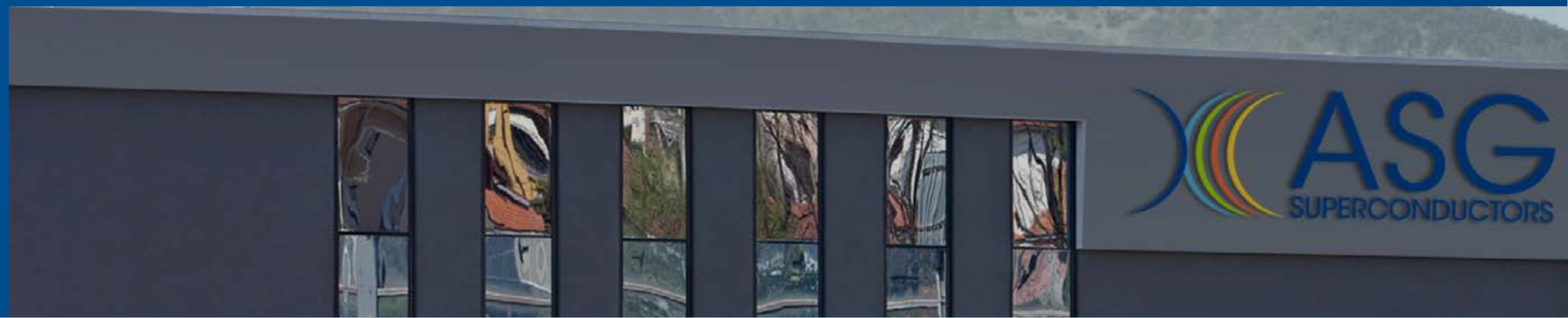
ASG SUPERCONDUCTORS

INDEX

THE COMPANY IN BRIEF

The ASG Superconductors group of companies has recently undergone re-organization to incorporate all elements of our activity into a single structure.
The aim is to bring together the capabilities within the three units to secure and improve our position as a world-class Italian company, already a worldwide leader in the production of magnets both for scientific research and for the industrial sector and to develop more effectively the magnesium diboride (MgB_2) wire and MRI businesses.

Competence, knowledge and the ability to work with cutting edge technologies and hi-tech materials remain at the core of our organization. Managers, technicians and all the people who work for ASG Superconductors renew every day their commitment to increase our technological capabilities and productivity, collaborating worldwide with the main scientific research institutes and with the sector's market leaders.



ASG SUPERCONDUCTORS

MISSION

Leading Superconducting Technology

Improving everyday life and creating real value for the world of research and industry by designing and developing magnets, applications and innovative superconducting systems.

ASG SUPERCONDUCTORS

VISION

Since the beginning of our history we have been working at the technological frontier in the field of superconductivity.

Cooperation with research institutes and industries aimed at solving scientific and technological challenges is deep within our DNA, along with well-established industrial processes to ensure compliance with customers' needs with regard to time, costs and technical sustainability.

We have contributed to the achievement of important goals in scientific research, such as the discovery of the **Higgs Boson** – ASG has provided magnets for the Large Hadron Collider at CERN - **and to the progress of studies in the nuclear fusion sector cooperating with the most important projects in the world like ITER and JT-60SA**.

We believe that our challenge for the future is to continue supporting research activity worldwide with magnets and systems providing the technological advantages of superconductivity and at the same time extending its numerous applications to the industrial world and to everyday life.This is why we work every day to innovate services and processes in the energy and medical sectors, through the study and development of new superconducting magnets, high temperature superconducting wires and innovative materials like MgB_2.

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magnets & systems unit

MAGNETS & SYSTEMS UNIT

FROM RESEARCH TO INDUSTRIAL APPLICATIONS

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magnets & systems unit

Research, nuclear fusion, particle physics, industrial applications for energy and med tech including MRI and systems: **thanks to experience accumulated through participation in the main superconductivity technology research projects around the world ASG's skills go from design to production to the complete test of systems and magnets**.

The ASG Superconductors Magnets & Systems Unit has acquired industry-leading knowhow in the design, development, production, installation and testing of superconductive and resistive magnets, cryogenic systems, resonance cavities, superconducting solenoids and coils, magnets for cyclotrons and components for made-to-measure applications.

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magnets & systems unit

8

MAGNETS FOR FUSION

Working for the energy of the future

The production of clean energy through nuclear fusion, which promises to reconcile the energy needs of the modern world while safeguarding the environment, is a challenge which researchers and industries have long been striving to meet. The quality of ASG's nuclear fusion offering is the result of unequalled expertise in high-technology design and manufacture. ASG magnets have been used in all the main fusion experiments undertaken so far in Europe. ASG plays a leading role - as a supplier of magnets - in ITER (Europe) and JT-60SA (Japan), the two principal research projects which aim to study the feasibility of producing clean energy by replicating the process that takes place in the sun and stars.

For nuclear fusion ASG produces:

- superconducting and resistive toroidal coils
- superconducting and resistive poloidal coils
- coils for divertors
- central SC and resistive solenoid coils
- ELM coils
- stellarator coils
- gyrotron system coils

ASG also undertakes prototyping and research and development activities for evaluating the feasibility of using new materials and production processes.

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magnets & systems unit

MAGNETS FOR HIGH ENERGY PHYSICS

Understanding the past and the future

ASG is currently the largest European producer of magnets for particle accelerators and for basic research in high-energy physics, from solenoids, dipoles and cyclotrons to the CMS and ATLAS detectors at Geneva's CERN as well as magnetic systems for the Katrin project.
The magnets designed and produced by ASG are testimony to the company's ability to meet precisely the needs of the research world, contributing to reaching important scientific goals, like - for example - the discovery of the Higgs Boson in 2012.

Thanks also to its continuous dialog with the main institutes and research centres - including ENEA, CNR, KIT, IPP, ITER and Fusion4Energy - ASG is able to offer support, both in designing magnets starting from the requested field specifications and in the optimization and industrialization of existing designs and can provide:

- dipolar cos σ magnets
- dipolar "steering" magnets, both superconducting and copper
- superconducting and copper multipolar magnets for focusing particle beams
- detector magnets
- particle beams with characteristics specific to the experiment being considered

ASG also carries out installation, on-site commissioning of built magnets and systems and provides personnel training, offering its clients a complete service which ranges all the way from defining the specifications of the magnets to their operation and maintenance.

MAGNETS FOR MEDICAL APPLICATIONS

Knowledge for improving everyday life

Superconducting technologies and magnets are increasingly finding application in medical diagnostics and therapies. Capitalizing on skills and experience derived from industrial collaborations, ASG is able to design and build the following types of magnets for medical diagnostics:

- magnets for "whole body" or dedicated scanner systems
- standard and open sky magnets
- "zero-boil-off" or "cryogen-free" magnets
- LTS and HTS technology magnets
- magnets for resonance systems with magnetic field values ranging from Tesla fractions to ultra-high field
- LTS and HTS magnets with persistent functionality
- actively and/or passively shielded magnets

Furthermore, also for medical diagnostics, ASG designs and builds the following "whole body" superconducting magnet systems:

- cryogen free – gantry mounted - magnets able to rotate around an isocentre in order to deliver IMPT/IMRT

In the medical therapy sector ASG designs and builds superconducting or resistive magnets for hadron therapy accelerators:

- high, medium- and low-energy beamline magnets for synchrotrons
- superconducting, cryogen-free or helium cooled magnets, using either LTS or HTS technology for cyclotrons and synchrocyclotrons
- gantry mounted bending magnets for the delivery of particle beams

Furthermore, ASG supports its clients in the definition and development of products through assistance in designing, prototyping and optimizing the magnet system.

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magnets & systems unit

SYSTEMS FOR ENERGY

Power quality for industrial applications

ASG designs and manufactures cryogen-free or liquid helium-cooled magnetic systems for Fault Current Limiters (FCL and SFCL). ASG - both directly and indirectly through its subsidiary ASG Power Systems LTD in the UK - is active in the design and production of fault current limiters used in the electricity supply industry for the protection and stabilization of electrical grids. ASG Superconductors' FCL can use superconducting (LTC, MgB_2, BSSCO) and standard technologies, depending on the specific needs of the grid or client.

ASG designs and builds magnetic systems for Superconducting Magnetic Energy Storage (SMES) used to stabilize load fluctuations in electricity grids or to guarantee power quality in specific grid situations or in industrial applications. ASG can provide SMES systems autonomously or in partnership, depending on the specific needs of the client.

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columbus mgb2 unit

COLUMBUS MGB2 UNIT

MgB_2: THE MOST FLEXIBLE HTS WIRE SOLUTION

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columbus mgb2 unit

High Temperature Superconductivity (HTS) was usually coming at a price

With the greater flexibility of the unique MgB_2 wire ex-situ process, we have succeeded in designing and developing solutions optimized for products ranging from power cables to magnets for the medical and energy sectors.
With our unique manufacturing process, ex-situ MgB_2 wires are now available with electrical performance, mechanical properties, and single piece lengths that allow for the "react & wind" approach to be used, minimizing the number of joints and making HTS device manufacturing one step closer to the well-established NbTi technology, while keeping the advantage of the higher operating temperature.

MgB_2 WIRES FOR CABLES

Cabling the future of energy

Transmission and distribution of electrical power either on a large or on a local scale may be envisaged with MgB_2 superconducting cables particularly if the electrical current intensity is very high and particularly where DC can be used.

Indeed, the virtually lossless transmission of elevated currents (e.g. 100,000A) brings a paradigm shift in the dimensioning of power cables, potentially offering drastically new solutions. CERN has recently demonstrated MgB_2 DC cable technology with the aim of powering LHC magnets with the Hi-Lumi upgrade.

Various projects including the EU-funded Best Paths, are demonstrating that MgB_2 cables can constitute the best solution for energy transmission problems in the electricity grid, industrial plants and connecting renewable generation.

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MgB_2 WIRES FOR MAGNETS

The shortcut to Helium-free magnets

Superconducting magnets need a cryogenic environment to operate. Liquid helium has been the choice for many decades, but rising cost, complexity and energy inefficiency all favour alternative cooling methods. With the advent of industrial cryocoolers, dry superconducting magnets are becoming increasingly attractive and realistic. MgB_2 allows for a more straightforward development of helium-free magnets thanks to its operating temperature of about 20 Kelvin, higher than for Nb-alloy superconductors. We currently produce two MgB_2 wire solutions which fit the requirements of both the low-to-medium field range (up to 2 Tesla) and the medium-to high field range (above 2 Tesla). Our wires can be provided with a copper fraction and with electrical insulation appropriate for the application.

THE MgB_2 APPLICATION MATRIX

MgB_2	CABLES	ROTATING MACHINES (Motors/Generators)	MAGNETS	FAULT CURRENT LIMITERS	ENERGY STORAGE DEVICES
MEDICAL			●		
ELECTRICITY/ GRID	●			●	●
INDUSTRIAL	●		●		●
AIRCRAFT/ AEROSPACE	●	●			
ENERGY GENERATION		●			
NAVAL		●		●	

ASG SUPERCONDUCTORS

paramed mri unit

PARAMED MRI UNIT

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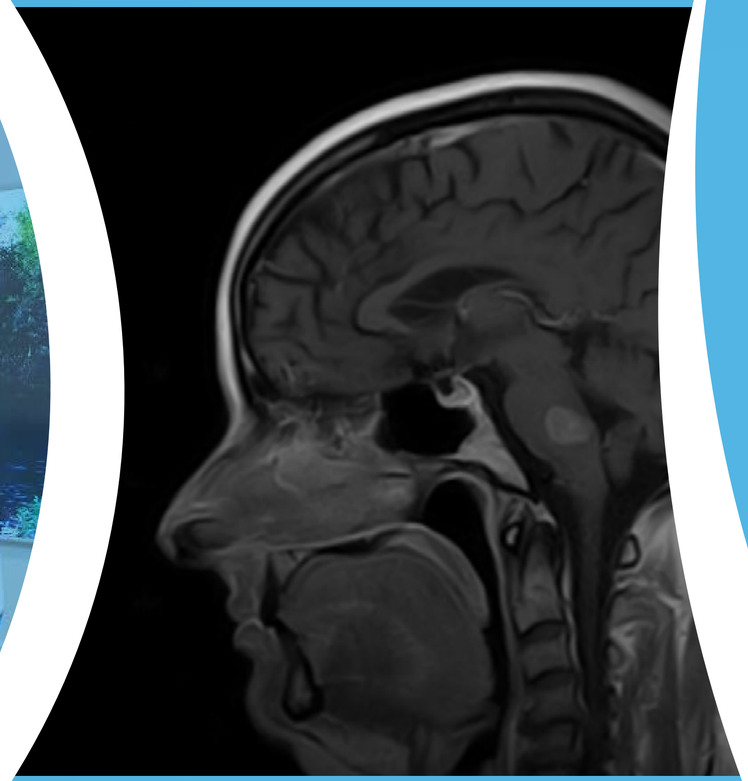
Paramed MRI Unit is committed to elevating the standard of care in detection, diagnosis and follow-up, thus improving patient outcomes

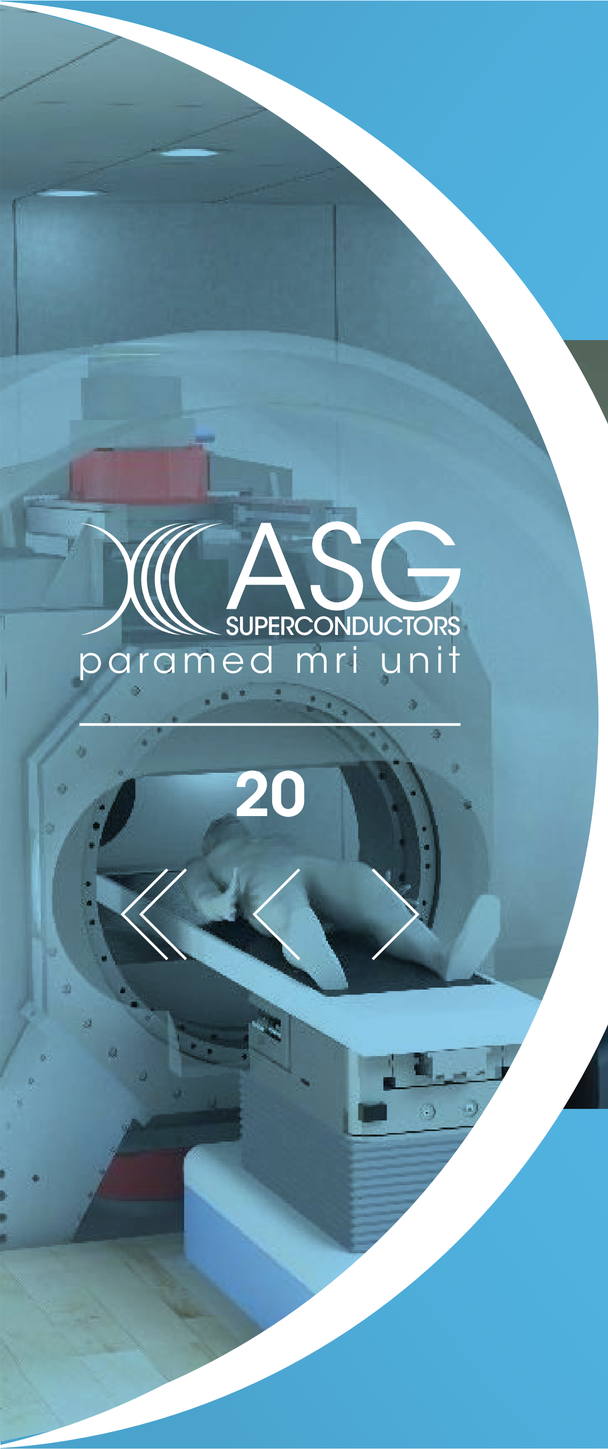
Paramed MRI Unit designs and produces OPEN MRI systems with unique features and benefits, providing outstanding performance and unparalleled patient comfort. Merging design innovation with leading-edge medical technology, ASG Superconductors Paramed MRI Unit provides advanced solutions in diagnostic imaging, delivering exceptional value to the global community of Healthcare Providers.

The MROpen is the only superconductive MRI with a "totally open" magnet design, that allows Multi-position imaging including advanced weight-bearing and functional studies, besides providing the highest comfort for patients.



Opening the horizon of Imaging

By combining novel technology with design innovation, ASG Paramed MRI Unit brings Open MRI to a new standard.
With anatomy specific dedicated coils, intuitive operator interface, and a state-of-the-art set of MRI Pulse sequences, ASG's Open MRI systems provide optimized solutions for Neuro, Spine and Musculoskeletal MR imaging combining the highest patient comfort.
The additional information from the Upright and Multi-position imaging opens up new scenarios in the detection, diagnosis and treatment of pathologies.



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paramed mri unit

MRI FOR RESEARCH

Technology makes ideas feasible

ASG Paramed MRI Unit supplies the MROpen scanner to Universities worldwide involved in different research projects. The Alberta Cross Cancer Institute of Edmonton University for MR guided radiotherapy and the Sir Peter Mansfield Imaging Centre of Nottingham University for the study of the lung using hyperpolarized gases are two examples of how the MROpen's capabilities offer new possibilities in MR studies.

ASG SUPERCONDUCTORS
paramed mri unit

SOFTWARE & SERVICE

At the heart of the image

Software

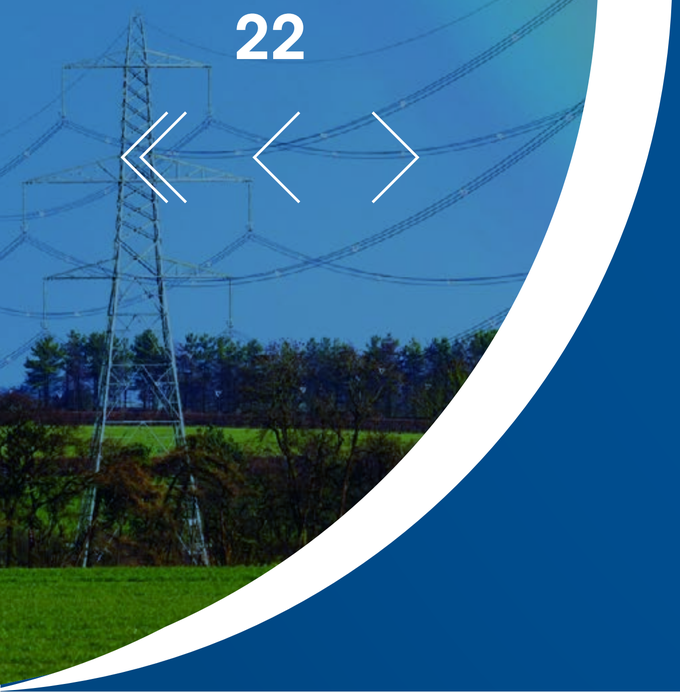
All our MR scanners are based on our own software platform, MR-GUI Pro. This aspect means total control of software capabilities and continuous development of new features to answer to our customers' needs.

Customer Service

We take pride in supporting your team through continual and proactive maintenance.

Our experts are here to make sure that your equipment is functioning optimally. We are committed to maintaining your MR scanner and acting quickly to get your system up and running should you experience a problem. Through the remote Diagnosis & Repair approach, we minimize the impact of a failure on your daily routine by reacting quickly when an unexpected event occurs, increasing the equipment stability and reliability.

Realtime interaction between clinical staff and clinical application experts, whenever a support need arises, provides immediate and secure access to clinical application expertise and ensures the usage of the clinical application's full potential.



SUBSIDIARIES - ASG POWER SYSTEMS LTD

ASG Power Systems has been active in the UK since 2014 in the design and production of fault current limiters for the protection and stabilization of electrical grids.
The Company designs and manufactures cryogen-free or liquid helium-cooled magnetic systems for Fault Current Limiters (FCL and SFCL), Our FCLs can use both superconducting (LTC, MgB_2, BSSCO) and standard technologies,depending on the specific needs of the grid or client.

SUBSIDIARIES - PARAMED MEDICAL SYSTEMS INC

Paramed Medical Systems Inc. has been active in North America since 2007. Specializing in the Sales, Installation and Service of the Group MRI Applications, Paramed Medical Systems brings to North America the only "open-sky", cryogen-free, superconductive MRI system available on the market, matching superior patient experience together with the benefit of weight-bearing and multi-positional imaging.

Thanks to its innovative and proprietary technology and with a customer base ranging from Orthopaedic Practices, to private Imaging Centres to leading University and Research Institutions in both US and Canada, Paramed Medical Systems is the only company in North America capable of providing Cryogen-Free Superconductive MRI Systems.

QUALITY

Quality, Environment and Safety considerations are central in ASG Superconductors' operating policy and are involved in every aspect of the company's activities, from organization to design and manufacturing.

To maintain the highest standard of services and production quality, ASG Superconductors invests constantly in professional training and re-qualification of its employees.

It is corporate policy to hold regular qualification and certification courses for the personnel, with particular reference to CAD, project and activity management and information systems.

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