

## Technology Offer

# Method and apparatus for monitoring the personal exposure to static or quasi static magnetic fields offered for license agreement

## Summary

*An Italian university team of researchers active in the field of physics applied to medicine has developed a system for monitoring the exposure of one or more subjects to a magnetic field in an environment, where surveillance is necessary for human protection. The team is looking for an industrial partner for license agreement and for further technical cooperation in developing/adapting the technology also through co-financed research.*

<b>Creation Date</b>	14 April 2017
<b>Last Update</b>	21 July 2017
<b>Expiration Date</b>	21 July 2018
<b>Reference</b>	TOIT20170414001

## Details

### Description

The inventors of this innovative technology are a research group who focused their activity research in physics applied in the field of medical imaging and tomography. Nowadays, personal magnetic field dosimetry is considered necessary in many national legislations in case of workers exposition to high static magnetic fields (i.e. EU directive 2013/35).

In advanced countries the law puts limits on one or more of the following parameters: (i) the maximum magnetic field exposition of different body parts, (ii) the duration of the exposition, (iii) the induced body currents related to magnetic flux time variations (due to magnetic field variations in time and/or body movements in a static but non-uniform magnetic field).

The present invention refers to an apparatus and a method for making an automatic "environmental" dosimeter, for environments characterized by the need for surveillance for purposes of protection of staff or visitors being admitted thereto, due to the presence of static or quasi-static magnetic fields. In case of static magnetic fields, of greater interest for the present invention, laws generally require staff personnel having access to controlled areas to comply with preset magnetic field exposure limits above described.

Remarkably, regulations generally provide distinct limits for the various anatomical districts, specifying distinct threshold values at least in the case of head, torso and limbs. The innovative step proposed by the present invention is given by the feature of 'extracting' the magnetic field exposure from the position measurement, therefore by realizing a magnetic field exposure control with improved performances for all surveilled body districts.

The applications of this invention are:

1. Hospitals and diagnostic centres with high field MRI scanners.
2. Research facilities with magnets that generate high magnetic fields.
3. Industrial activities that involve high magnetic fields and/or high DC currents that generate high magnetic fields

The university is looking for industrial partners for the license agreement. At the present, the stage of development of the invention is a working prototype.

Technical partnership for co-financed research and common further development/adaptation of technology is also possible.

## Advantages and Innovations

Environmental surveillance that prevents the possibility to avoid surveillance because the wearable personal dosimeter has been forgotten. Active even during a MRI scan since it is not based on portable electronic devices but only on video cameras located along the perimeter of the controlled area. This allows to monitor personnel that remains in the scanner room to assist special patients (elder people, infants). Allows the determination of the magnetic field for each body district and not only for the location of the wearable personal dosimeter. No limitations about sensitivity, measurement rate and dynamic range as it is for any ordinary gauss meter. Real-time evaluation of induced currents in the body for each body district. The real-time surveillance can provide warnings as soon as any of the controlled parameters exceeds a threshold value. Readily extendable to all cases where changes in the main current of the electromagnet generates temporal variations of the magnetic field strength with a fixed spatial pattern. The system can be used outside the controlled area to reconstruct a "virtual controlled area" and safely train the staff to avoid movements that, in the real working environment, could exceed the threshold values.

## Technical Specification or Expertise Sought

The magnetic field dosimetry is performed using modern 3D image analysis techniques. The invention is based on the possibility to combine the information provided by a set of video cameras to detect several humans inside a controlled area and spatially localize them by means of a simplified human body model (the "stick model").

The innovative step is to combine the above technology, already developed for different purposes, with a spatial map of the magnetic field in the controlled area (to be acquired once during the system installation procedure) so to extract the magnetic field exposure from the position measurement. It can be done for each body district relevant for monitoring the exposition to intense magnetic fields: head, trunk, limbs.

With the knowledge of the magnetic field pattern and the body position it is possible to realize a magnetic field exposure control with improved performances if compared to commercially existing devices based on wearable gauss meters.

## Stage of Development

Prototype available for demonstration

## IPR Status

Patent(s) applied for but not yet granted, Patents granted

## Comment Regarding IPR status

Italian patent granted. European patent extension pending.

## Profile Origin

Private (in-house) research

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## Keywords

### Technology

01002006

Magnetic and superconductor materials/devices

01003023 Environmental and Biometrics Sensors, Actuators  
01004001 Applications for Health  
01004017 Work Hygiene and Safety Management  
06005001 Safety & systems

## Market

03007002 Other measuring devices  
05002 Medical imaging  
05002004 Nuclear imaging  
05007004 Monitoring equipment  
06006002 Metering and monitoring

## NACE

P.85.4 Higher education  
P.85.4.2 Tertiary education

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## Network Contact

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### Issuing Partner

AZIENDA SPECIALE AGENZIA DI SVILUPPO DELLA CAMERA DI COMMERCIO DI CHIETI

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**Open for EOI :**    **Yes**

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## Client

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### Type and Size of Organisation Behind the Profile

University

### Year Established

Ref: TOIT20170414001

1952

## Turnover

20 - 50M

## Already Engaged in Trans-National Cooperation

No.

## Experience Comments

The Italian university is a public teaching and research institution offering a full range of academic programmes including biotechnologies, sciences, economics, engineering, education, humanities, medicine, psychology, and sport sciences. With 7 departments, the university offers, to its over 18.000 enrolled students, 65 degree courses (divided between first and second level degrees), 8 research doctorate programmes, specialisation schools, specializing-master courses and vocational courses. Many members of its distinguished faculty of about 600 professors and researchers have received international recognition and are considered leaders in their fields of research.

## Certification Standards

ISO 9001:2008

## Languages Spoken

English  
Italian

## Client Country

Italy

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## Partner Sought

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### Type and Role of Partner Sought

Type of partner sought: SME, MNE

Specific area of activity of the partner:

Producers of magnetic field monitoring devices (e.g. gaussmeters) and/or of monitoring devices (e.g. radiations. etc.) willing to enter into a new market segment.

Task to be performed by the partner sought:

- In the case of licensing agreement: acquiring a license.

- In the case of technical cooperation agreement: joint further development and adaptation of the offered technology for acquiring a patent license.

### Type of Partnership Considered

License agreement  
Technical cooperation agreement

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## Attachments

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