

News Release

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Contacts:

Romea Wallnoefer
Hitachi Medical Systems Europe Holding AG
r.wallnoefer@hitachi-medical-systems.com

Hitachi to launch “ECHELON Smart”, a 1.5T superconductive MRI, featuring superior image quality and a patient-friendly examination environment



ECHELON Smart

Vienna, March 2, 2017 -- Hitachi, Ltd. today announced the launch of the ECHELON Smart, a 1.5T superconductive MRI system providing high quality imaging together with a patient-friendly examination environment.

The ECHELON Smart delivers not only high resolution imaging, but combined with Hitachi's silent scanning technology, offers the patient a relaxed examination setting. New design functions assist system operation and reduce the need for repeat examinations caused by patient movement, thereby enhancing workflow and minimizing examination time which help decrease patient stress. In addition, the ECHELON Smart delivers a reduced energy consumption compared to conventional Hitachi MRI systems, contributing to the operational efficiency.

CT and PET*¹ has the disadvantage of exposing the patient to radiation, whereas MRI is minimally invasive and also provides morphological information together with functional information. MRI examinations are essential, especially in obtaining contrast

resolution of soft tissue which has a high moisture content as in the brain and spinal cord. On the other hand there are negative aspects, such as a prolonged examination time when the MRI system acquires multiple images, or the loud acoustic noise emission which can cause increased anxiety or discomfort for the patient.

The concept of ECHELON Smart is “Quality”, “Speed”, and “Comfort”, offering high quality imaging, the most important factor for diagnosis, whilst incorporating silent scanning technologies together with other applications supporting both the operator and the patient whilst creating a comfortable examination environment. Furthermore, the ECHELON Smart power management enables the MRI system to reduce its running costs and improve operational efficiency.

Hitachi is contributing to the development of healthcare by the enhancement of silent scanning technology and clinical applications in combination with economic efficiency and simplified installation measures.

The ECHELON Smart is to be exhibited at the ECR (European Congress of Radiology) held in Vienna, Republic of Austria, from 2-5 March 2017.

■ New Product Features

1. Silent Scan Technology with Minimal Effect of Image Quality and Examination Time: Smart Comfort

The loud acoustic noise experienced during an MRI examination is caused by the vibration of the gradient coil which occurs due to electromagnetic power which is caused when electricity is applied to the gradient coil. Hitachi’s “Smart Comfort” technique re-examined waveform of the gradient pulse and the modified parameters reducing the sound pressure by up to 94%² without affecting the examination time, contrast, image SNR and spatial resolution. This technique can also be applied to routine examinations to acquire images such as T1WI³, T2WI⁴, MRA⁴ which are important in MRI examinations.

2. Low Energy Consumption Function: Smart Eco

A superconductive MRI system is an electromagnet made from coils of superconducting wire which must be cooled to cryogenic temperatures during operation using liquid helium. The cooling process needs to be operated continuously to prevent the liquid helium evaporating. The Smart Eco function can reduce electricity consumption without causing the liquid helium to evaporate and thereby can reduce the running costs significantly when compared to a conventional system.

3. AD System and Optimum Image Synthesizing Technology Delivering High Quality Imaging: Smart Engine

The conventional MRI system converts the frequency of the signals obtained from the receiver coil using the analog circuit for image reconstruction. However there is a negative effect on the image quality caused by the noise contamination when using an analog circuit. The ECHELON Smart is powered by a High-speed AD converter (Analog to Digital Converter). By directly digitalizing the high frequency signal, noise suppression can be applied to obtain high quality imaging. The ECHELON Smart is also preinstalled with an optimum image synthesizing technique together with the high sensitivity 16 channel RF receiver system which helps deliver clear imaging results.

4. Application to Improve Workflow and Reduce Image Deterioration Caused by Patient Movement

The ECHELON Smart has applications including AutoPose which supports scan plane setting and RADAR (RADial Acquisition Regime) which reduces image deterioration caused by body movement (Motion Artifact). The AutoPose reduces the operator's workload in the scan setting for brain examinations and possibility of repeat examination. Meanwhile, the RADAR reduces not only the motion artifact but also the number of repeat examinations and examination time. The RADAR has great effect on cerebral and abdominal examinations which are affected by involuntary movements such as blood flow and breathing. The RADAR is also compatible with the silent scanning technique which improves the examination environment for patients with an aversion to MRI examinations.

*1 PET(Positron Emission Tomography): A scan using an injection of a special radioactive tracer which detects radiation internally to create an image. Often used for cancer examinations.

*2 May differ according to conditions of use and examination

*3 T1 Weighted Image: A type of image obtained from an MRI. Usually water is extracted dark with a low signal in which the anatomical structure can easily be visualized perceived.

*4 T2 Weighted Image: A type of image obtained from an MRI. Usually water and nidus are extracted white with a high signal which can be useful allowing easy detection of the lesion

*5 MRA Image: MR Angiographic Image. A method emphasizing blood flow within the vessels in order to obtain images of neuro and circulatory lesions without using contrast media.

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, delivers innovations that answer society's challenges. The company's consolidated revenues for fiscal 2015 (ended March 31, 2016) totaled 10,034.3 billion yen (\$88.8 billion). The Hitachi Group is a global leader in the Social Innovation Business, and it has approximately 335,000 employees worldwide. Through collaborative creation, Hitachi is providing solutions to customers in a broad range of sectors, including Power / Energy, Industry / Distribution / Water, Urban Development, and Finance / Government & Public / Healthcare. For more information on Hitachi, please visit the company's website at <http://www.hitachi.com>.

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