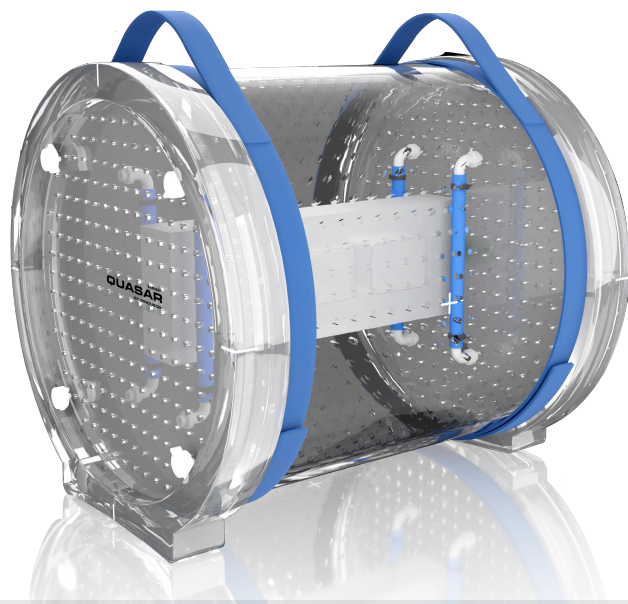


MRID^{3D} QUASAR BY MODUSQA

The **Best Way** to **QUANTIFY**
MRI GEOMETRIC
DISTORTION IN 3D!



工作流程效率

使用更轻、更大、更快的分析系统，只需 10 分钟即可快速设置、扫描和量化几何失真测量。



几何精度

大 FOV 模体设计遵循 NEMA/ITC MS-12 和 IEC 62464-1 的建议，即使在失真较高且供应商校正关闭的情况下也能实现最高精度。



尺寸稳定性

集成膨胀管（正在申请专利）可补偿因温度和压力变化而引起的液体体积变化，确保模型尺寸稳定。



谐波分析

采用 MRI B0 匀场和梯度线圈设计中常用的分析技术。

QUASAR™ MRID3D 是一种更轻、更大、更高效的测量技术，它利用谐波分析来量化 3D 中的 MRI 几何失真。

谐波分析是一种成熟的数学工具，用于解决具有明确边界条件（包括 MRI 梯度线圈设计和 B0 垫片）的电磁问题。QUASAR MRID3D 几何失真分析系统通过测量边界模体封闭表面上的失真，然后使用谐波分析计算内部失真，扩展了这种方法。这允许使用更轻、更大、空心的边界模体。

3.4 厘米直径、39.1 厘米长的模体重 21 公斤，是相同体积的充满水的网格模体重量的一半。它包括用于安全携带的凹陷手柄，以及集成的 3 点接触脚和雕刻地标，方便单人设置，符合 OSHA 标准（50 磅以下）。丙烯酸模体中的基准点包含与磁化率匹配的矿物油，可快速进行高对比度 3D T1W 扫描。矿物油不具有反应性，可使塑料长时间保持尺寸稳定，而水则会导致塑料膨胀。免维护的模体无需排空或重新填充。低介电常数矿物油允许在高场强下无介电共振使用。

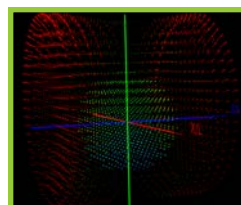
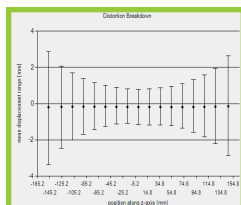
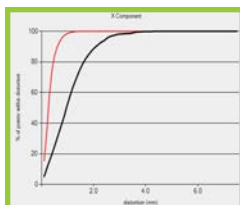
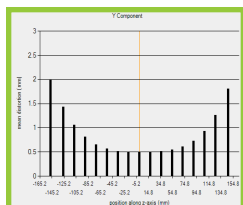
该系统包括强大、成熟、基于客户端的图像分析软件。内置的 DICOM 接收器可确保高效的文件传输。无需等待文件上传到云端，从而避免了相关的 IT 问题。控制点检测和谐波分析完全自动化；从幻像设置到结果只需 10 分钟。软件功能包括能够将主磁场不均匀性引起的失真与梯度非线性引起的失真区分开来。感兴趣区域选择器允许用户将分析重点放在目标区域，以满足 SRS 等要求更高的应用。丰富的数据呈现工具集允许在各种幻像扫描之间进行趋势分析和比较。用户可以导出可自定义的自动报告，包括完整的 DVF 电子表格。



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QUASAR MRID3D 的现代方法是常规失真评估的更好、更快、更轻便的替代方案。GRID 模体要么太小，要么太重。设计合理的失真分析系统可以量化机器引起的失真。

GRID 体模无法准确模拟患者磁化率失真。QUASAR MRID3D 体模经过精心设计，可最大程度地减少对您要测量的磁场的干扰，从而确保体模不会对测量造成偏差。

额外的新 QA 功能

- ▶ 快速铁含量检测 QA 程序
- ▶ 亚毫米激光地标对准检查
- ▶ Z 梯度非线性表征
- ▶ 模体位置和扭曲验证

MRI 数据采集建议

- ▶ 3D T1 加权快速梯度回波序列，具有1 个信号平均值、最小 TE 和 TR、小翻转角采集时间 ~10 分钟 @ 1.5T，采集时间 ~5 分钟 @ 3T
- ▶ 平面内视场 (FOV) 为 410 毫米，切片厚度方向视场为 385 毫米
- ▶ 1 mm³ 至 1.5 mm³ 各向同性 (立方体) 体素
- ▶ 带宽范围: 100 Hz / 像素至 1,000 Hz / 像素 (25 KHz 至 250 KHz)

推荐系统要求

- ▶ 操作系统: Windows 7 SP1 或更高版本
- ▶ 处理器: Intel Core™ i7 或更高版本
- ▶ 硬盘空间: 最低 10 GB (64 位)
- ▶ RAM: 8 GB 或更多
- ▶ 屏幕分辨率: 1920 x 1080 像素
- ▶ 显卡: Intel HD 集成显卡或 Nvidia GeForce GTX 750或更高版本

产品规格

- ▶ 模体材料: 丙烯酸
- 密度: 1.18 g/cm
- 重量: 21 kg
- 体积磁化率: $\chi_v = -9.01 \times 10^{-6}$ @ 20° C造影剂: 5 升高 T1 对比石蜡
- ▶ 矿物油体积磁化率: $\chi_v = -9.24 \times 10^{-6}$ @ 20° C密度: 0.83 g/cm , T1= ~300ms @1.5T, 介电常数 $\epsilon_r < 3$

产品尺寸

- ▶ 物理尺寸: 直径 39.4 厘米 x 长 39.4 厘米
- ▶ 成像尺寸: 直径 36.8 厘米 x 长 32.1 厘米
- ▶ 内部空心体积: 25 升 = 与传统网格模型相比, 重量减轻 25 公斤

订购信息

100-1018 QUASAR™ MRID3D 几何失真分析系统包括:

- ▶ 1-软件许可证
- ▶ 1-模体
- ▶ 用户指南

101-5040 附加软件许可证

500-5042 年度维护合同 (含延长硬件保修) 500-5043 无限制软件许可证



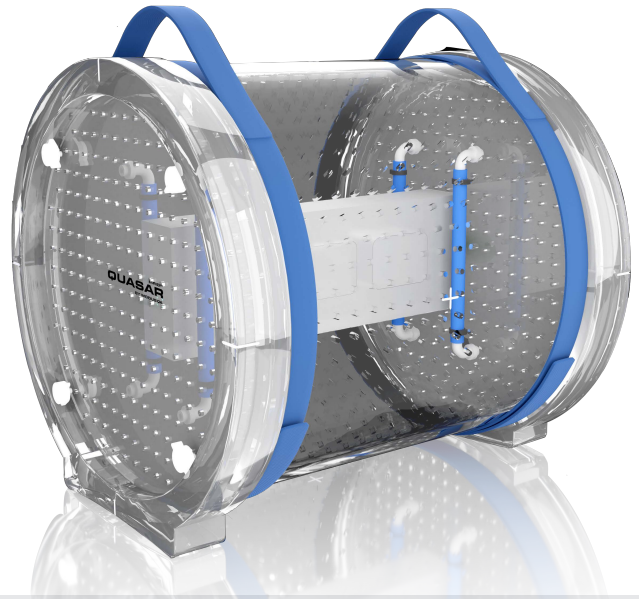
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WORKFLOW EFFICIENCY

Quickly setup, scan and quantify geometric distortion measurements in as little as 10 minutes with a lighter, larger and faster analysis system.



GEOMETRIC ACCURACY

Large FOV phantom design follows recommendations from NEMA/ MITA MS-12 and IEC 62464-1 for highest accuracy even when distortion is high and vendor correction is off.



DIMENSIONAL STABILITY

Integrated expansion tubes (patent pending) compensate for changes in liquid volume, caused by changes in temperature and pressure, ensuring the phantom is dimensionally stable.



HARMONIC ANALYSIS

Adapts analytical techniques that are routinely used in MRI B0 shimming and gradient coil design.

QUASAR[™] MRID^{3D} is a lighter, larger and more efficient measurement technique that leverages harmonic analysis to quantify MRI geometric distortion in 3D.

Harmonic analysis is a well-established mathematical tool used to solve electromagnetism problems with well-defined boundary conditions including MRI gradient coil design and B0 shimming. The QUASAR MRID^{3D} Geometric Distortion Analysis System extends this approach by measuring distortions on the closed surface of a boundary phantom and then uses harmonic analysis to calculate the distortions inside. This permits the use of a lighter, larger, hollow boundary phantom.

At 21 kg, the 39.4 cm diameter by 39.1 cm long phantom is half the weight of a water-filled grid phantom of the same volume. It includes recessed handles for safe carrying plus integrated 3 point contact feet and engraved landmarks for convenient OSHA compliant (under 50 lbs.) one person set-up. Fiducials in the acrylic phantom contain susceptibility matched mineral oil for fast high contrast 3D T1W scanning. Mineral oil is non-reactive and allows plastics to remain dimensionally stable over time unlike water which causes plastics to swell. The maintenance free phantom never has to be drained or refilled. The low dielectric constant mineral oil permits dielectric-resonance-free use at high field strengths.

The system includes robust, mature, client-based image analysis software. The built-in DICOM receiver ensures efficient file transfer. There is no waiting for files to upload to the cloud thus avoiding associated IT issues. Control point detection and harmonic analysis are fully automated; from phantom setup to results in as little as 10 minutes. Software features include the

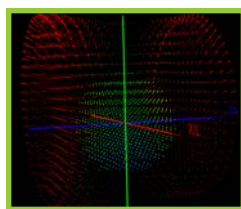
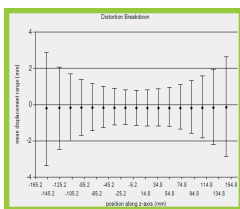
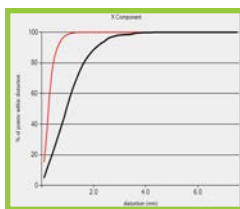
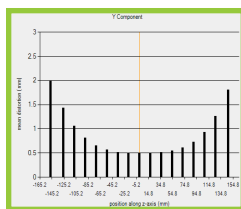


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ability to separate distortions caused by main magnetic field inhomogeneities from those caused by gradient non-linearities. A region of interest selector allows users to focus their analysis on targeted regions for more demanding applications such as SRS. A rich set of data presentation tools allows trending and comparison amongst a diverse selection of phantom scans. Users can export customizable automated reports including full DVF spreadsheets.



The modern approach of QUASAR MRID^{3D} is a better, faster and lighter alternative for routine distortion assessment. GRID phantoms are either too small or too heavy. A properly designed distortion analysis system quantifies machine

induced distortions. GRID phantoms do not accurately simulate patient susceptibility distortion. The QUASAR MRID^{3D} phantom is carefully designed to minimize perturbations to the magnetic fields you are trying to measure, thus ensuring that the phantom does not bias the measurement.

ADDITIONAL NEW QA CAPABILITIES

- ▶ Rapid Ferrous Content Detection QA Procedure
- ▶ Submillimeter Laser Landmark Alignment Check
- ▶ Characterization of Z Gradient Non-linearity
- ▶ Phantom Position and Twist Verification

MRI DATA ACQUISITION RECOMMENDATIONS

- ▶ 3D T1 weighted fast gradient echo sequence with 1 signal average, minimum TE and TR, small flip angle ~10 minute acquisition time @ 1.5T, ~5 minute acquisition time @ 3T
- ▶ 410 mm field of view (FOV) in-plane with 385 mm FOV in-slice thickness direction
- ▶ 1 mm³ to 1.5 mm³ Isotropic (cubic) voxels
- ▶ Bandwidth Range: 100 Hz / Pixel to 1,000 Hz / Pixel (25 KHz to 250 KHz)

RECOMMENDED SYSTEM REQUIREMENTS

- ▶ **Operating System:** Windows 7 SP1 or higher
- ▶ **Processor:** Intel Core™ i7 or better
- ▶ **Hard Disk Space:** 10 GB minimum (64-bit)
- ▶ **RAM:** 8 gigabyte (GB) or more
- ▶ **Screen Resolution:** 1920 x 1080 pixels
- ▶ **Graphics Card:** Intel HD Integrated Graphics or Nvidia GeForce GTX 750 or better

PRODUCT SPECIFICATIONS

- ▶ **Phantom Material:** Acrylic
Density: 1.18 g/cm³
Weight: 21 kg
Volume Susceptibility: $\chi_v = -9.01 \times 10^{-6}$ @ 20°C
- ▶ **Contrast Media:** 5 liters of high T1 contrast Paraffinic Mineral Oil
Volume Susceptibility: $\chi_v = -9.24 \times 10^{-6}$ @ 20°C
Density: 0.83 g/cm³, T1 = ~300ms @ 1.5T, Dielectric Constant $\epsilon_r < 3$

PRODUCT DIMENSIONS

- ▶ **Physical:** 39.4 cm diameter x 39.4 cm long
- ▶ **Imaging:** 36.8 cm diameter x 32.1 cm long
- ▶ **Internal Hollow Volume:** 25 liters = 25 kg weight reduction compared to conventional grid phantoms

ORDERING INFORMATION

100-1018	QUASAR™ MRID ^{3D} Geometric Distortion Analysis System Includes:
	▶ 1-Software License
	▶ 1-Phantom
	▶ User's Guide
500-5040	Additional Software License
500-5042	Annual Maintenance Contract with Extended Hardware Warranty
500-5043	Unlimited Software License

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