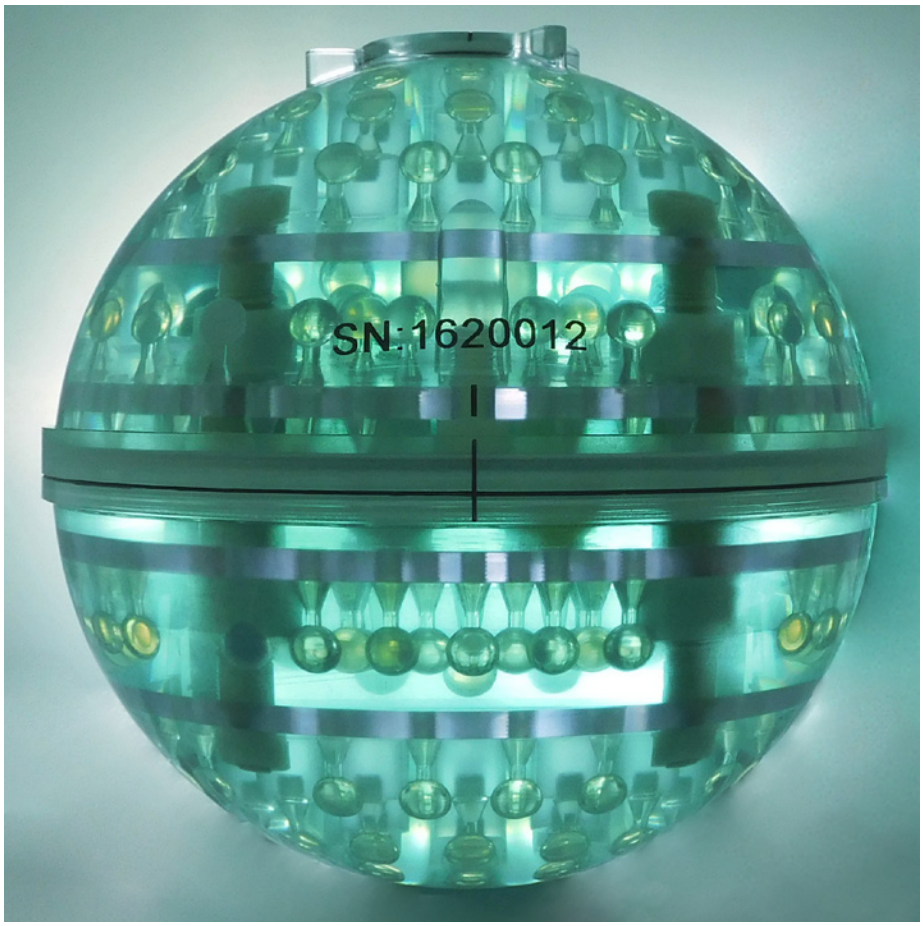
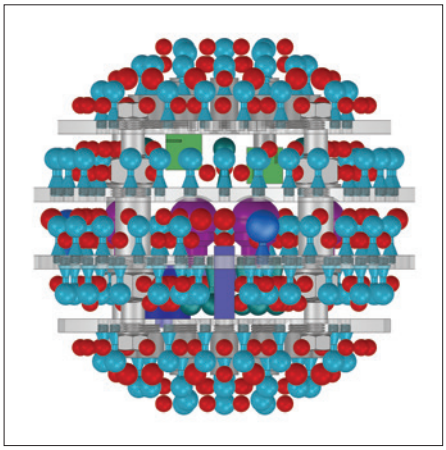
MR Imaging QA
Designed for
Quantitative Imaging

Magphan®
S162



A multi-purpose MRI systems phantom with high-precision, 3D geometric distortion measurements.



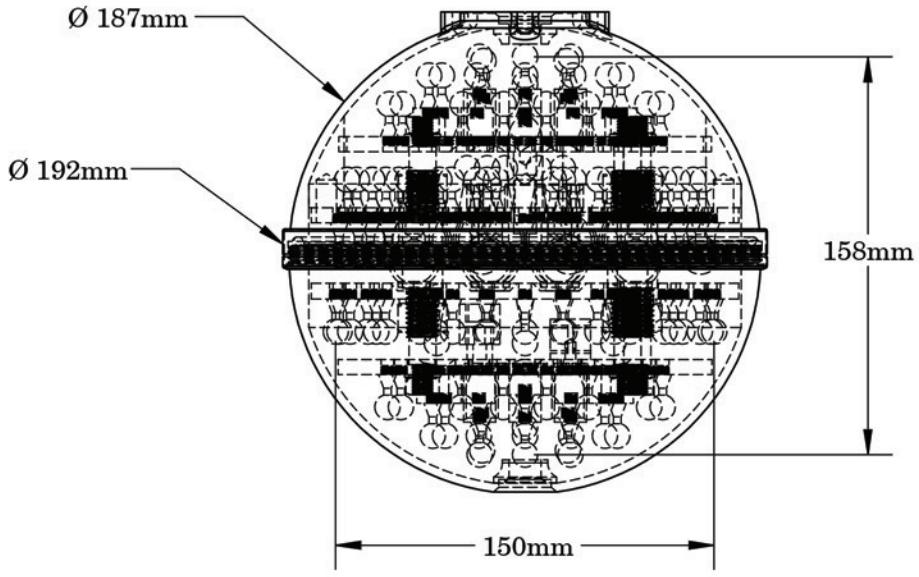
phantomlab

Magphan S162 has been designed to meet the specific QA needs for MRI scanners used in quantitative imaging, particularly in applications where geometric distortion can have critical impacts.

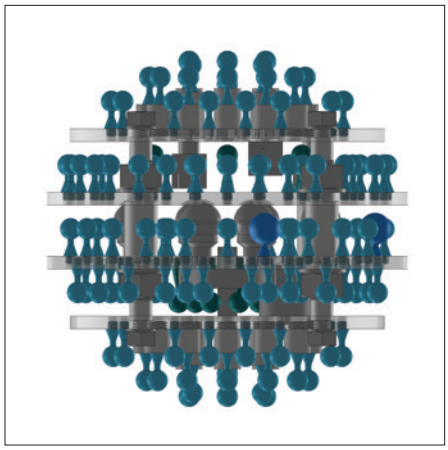
Magphan® S162

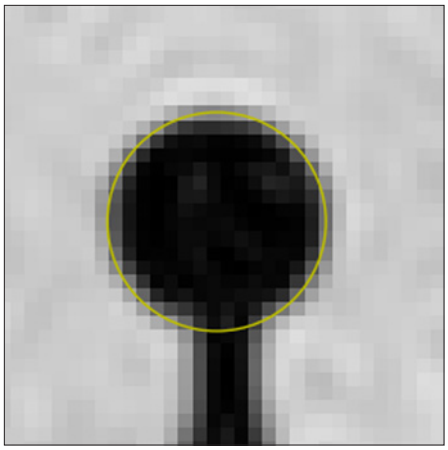
Phantom Design

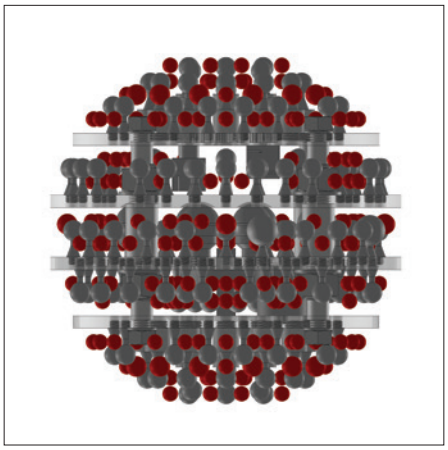
Magphan S162 has a 19 cm OD housing and measures distortion and uniformity throughout the 150 mm by 158 mm spheroidal volume. Along with 209 distortion measurement spheres the phantom contains 12 spheres filled with solutions to cover a range of T1 and T2 values seen in many important quantitative clinical applications. Using our patent-pending technique, signal uniformity is also measured throughout the full 3D phantom volume.



Phantom Analysis







Geometric Distortion

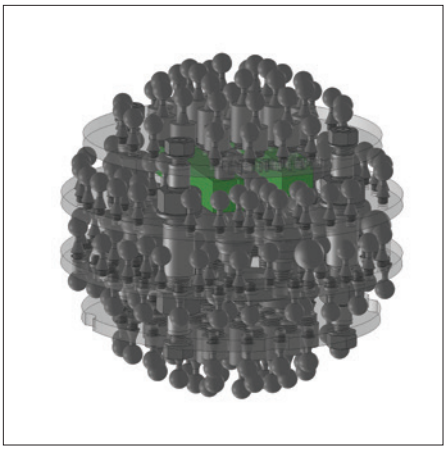
The locations of several hundred 1 cm sphere fiducials are measured across the volume of the phantom. These measured locations are compared to known locations to generate a 3D distortion map. Beyond producing a distortion map, the system tracks several key indicators such as maximum and mean high 10% distortion along the cardinal axes. Analysis of optimized gradient rescaling factors for different objectives is included.

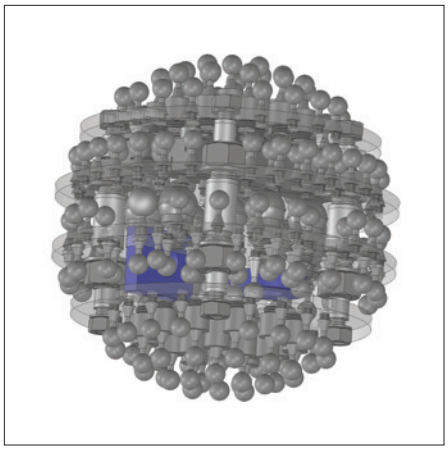
The Magphan S162 measures distortion at sample locations with accuracies far better than a voxel dimension using a high-precision fiducial marker. The markers are one-centimeter-diameter spheres, which, due to their size and symmetry, enable use of a wide range of actual clinical sequences of varying resolution, contrast, and scan plane orientation. Furthermore, in the presence of noise in any image, larger markers such as these offer superior performance due to the averaging effects of the larger edge region of the sphere.

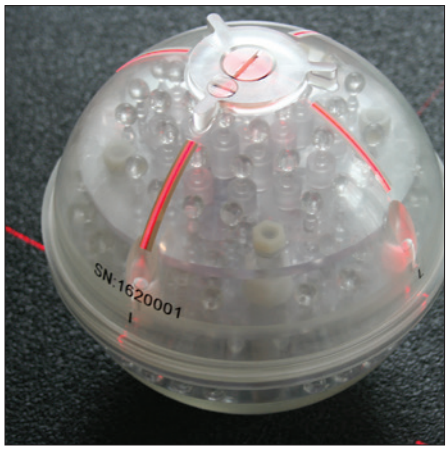
Uniformity

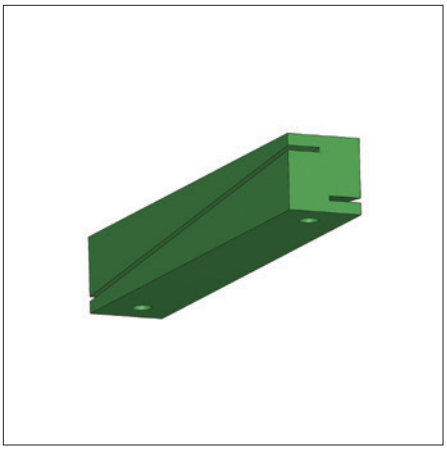
Uniformity is an important image quality metric, and can also be a useful detector of phased-array coil element failures. Using our patent-pending technique, uniformity is measured over a full 3D volume, not just a single slice.

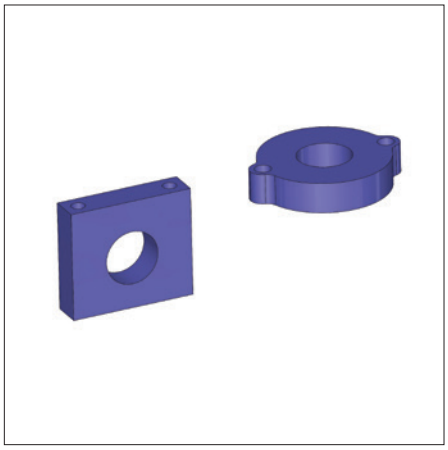
Phantom Analysis, continued











Laser Alignment

The phantom contains markers for alignment with positioning lasers. The analysis provides data on translation and rotation of the phantom in all three cardinal axes. The result is a precise comparison between the scanner's laser alignment lights and the coordinate system of the MR image to detect relative offsets.

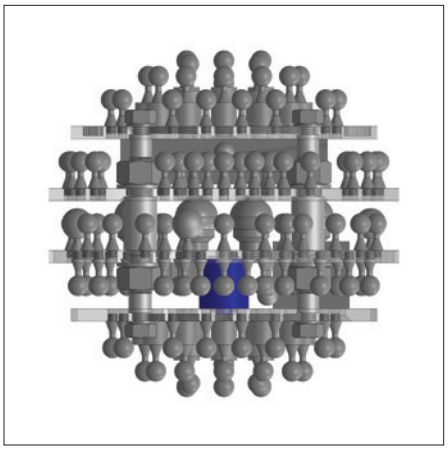
Slice Thickness

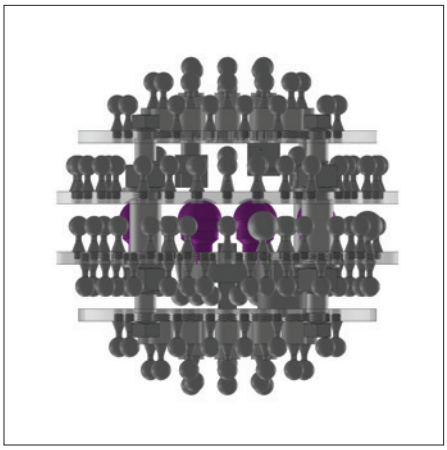
We provide slice thickness ramps to allow for an objective measurement of slice thickness on two orthogonal axes. The automated routine provides high-quality measurements on slices with thickness 1-3 mm.

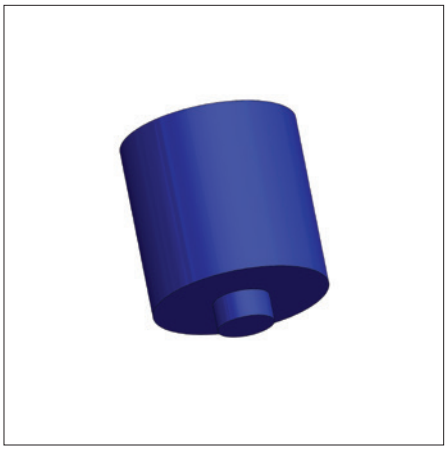
Resolution

The Maphan S162 system measures the Point Spread Function, Edge Spread Function, and Modulation Transfer Function of the MR scanner using circular features within the image plane.

Phantom Analysis, continued







Signal-to-Noise Ratio

Using a noise measurement from a zero-signal region of the phantom, the Signal-to-Noise ratio is calculated to provide longitudinal tracking of an important QC metric in an MR scanner. SNR is often an early warning sign of RF coil failures.

T1 and T2 Targets

We provide an array of 12 spheres with known T1 and T2 values for quantitative monitoring of pulse sequence contrast.

Magphan S162 is Head Coil compatible

The spherical shaped phantom housing has been designed to fit into the new tighter head coils and measures distortion over a capsule shaped volume of 158 mm x 150 mm.

The phantom is supplied with a maple storage case. The case is machined on top to hold the top hemisphere of the phantom if disassembly is required.

Smári Analysis Service

The automated analysis is hosted by Smári and is included in the purchase price for 2 years. The service provides the following benefits:

Complete Automation

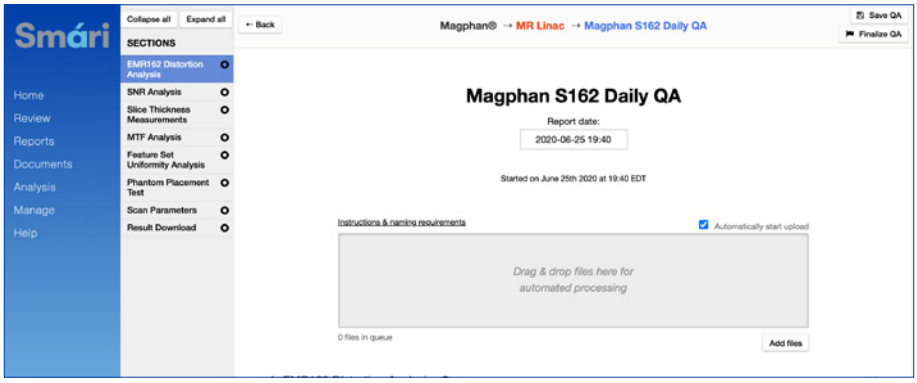
Simply upload the complete DICOM scan series of the phantom. The service automatically identifies the features, performs the analysis and prepares a comprehensive report. Analysis results are saved in a cloud-based database for longitudinal studies, process control, and inter-machine comparisons.

No Installation or Manual Updates Required

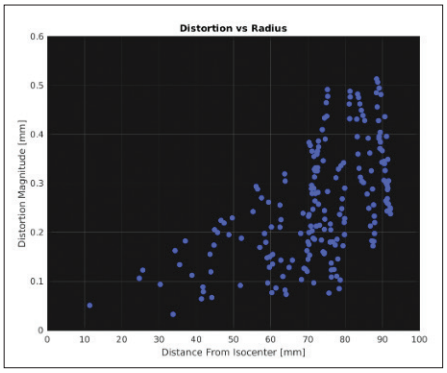
The service is accessible from any web-enabled device and requires no local installation. Updates to the service are automatic and require no user actions.

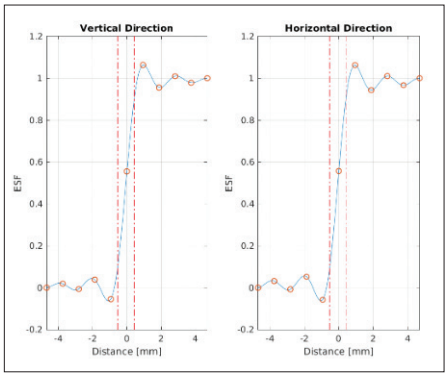
API Available

Smári for Magphan S162 service includes an API that allows users to extend the system with custom analyses or interfaces.



Smári Analysis Service, continued

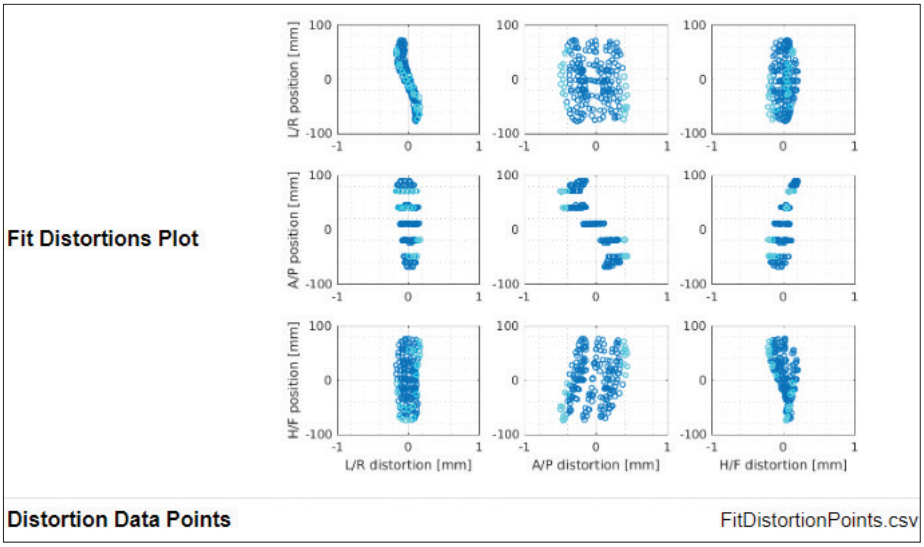


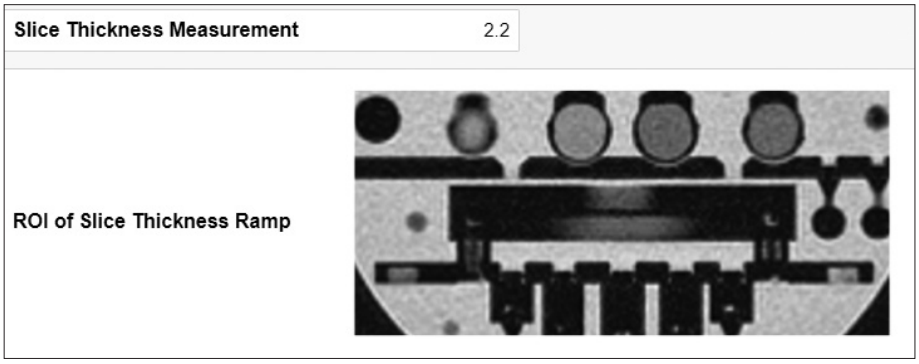


Reporting, Trending and Data Analysis included

The Smári service provides an informative report, tracks all parameters over time and provides comparative analysis tools between machines.

For more information on the flexible Smári service, its database features and flexible report configurations is available at: www.phantomlab.com/smari-image-analysis





For more information on Magphan S162, contact

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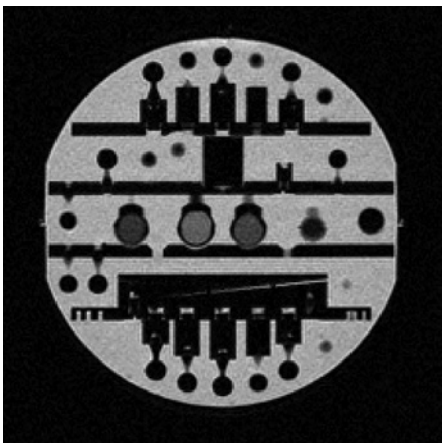

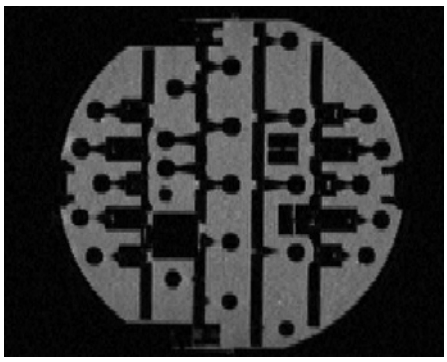

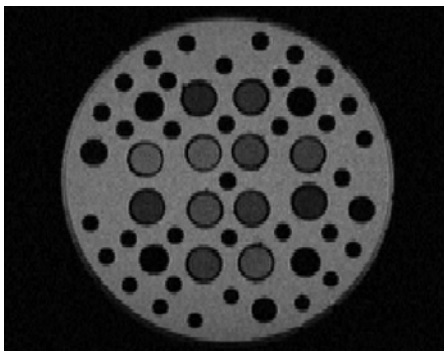

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