Distortion Check

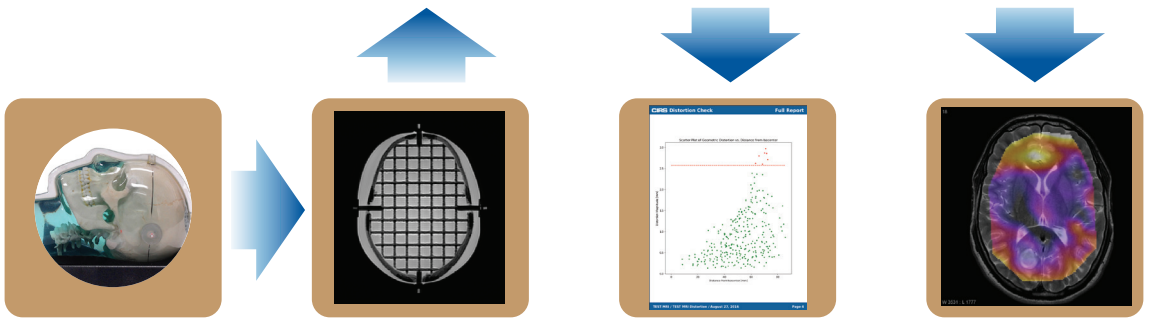
Automated Analysis of Distortion in MRgRT

Model 603S

The fast, user friendly, cloud based solution.

distortion check

SOFTWARE FOR EVALUATION OF IMAGE DISTORTION



SCAN | **UPLOAD IMAGES** | **REVIEW REPORTS & TREND ANALYSIS** | **EXPORT DICOM OVERLAYS TO TPS**

Distortion Check is a new, cloud-based solution designed to quickly and automatically quantify distortion in MRI images. Used in conjunction with CIRS MRI Grid phantoms, the software provides the capability to quickly and accurately measure distortion through out the entire image volume.

After detecting all grid intersections, the software registers either a CAD or CT scan ground truth to these MR detected control points. An interpolation is then performed to generate the 3D distortion vector fields.

Results can be reported in a variety of output formats including scatter plots, contour plots, box and whisker plots for trending and DICOM overlays that can be imported to TPS or other 3rd party software. The software algorithms will work with any grid configuration and CIRS employs proprietary 3D printing techniques that enable easy modification of grid phantoms to meet customer requirements.

Features

- Quickly & automatically analyze complete MR data sets
- Unique grid phantoms provide physical control points through out entire 3D image volume
- Density of control points optimized to bring interpolation close to linearity
- CIRS materials simulate distortion due to susceptibility and chemical shifts typical to clinical patient scans
- Cloud based solution frees user of operating system and hardware constraints
- Online deployment facilitates collaboration and easy review and portability of results

CIRS

900 Asbury Ave • Norfolk, Virginia 23513 • USA • Tel: 757-855-2765 • **WWW.CIRSINC.COM**

Large Field Grid Phantom

Assess MR image distortion in large bore MRI

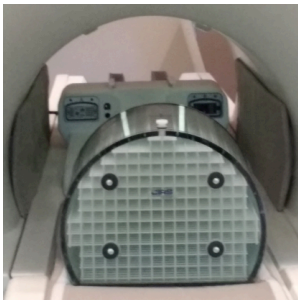
The Large Field MRI Distortion Phantom, Model 604-GS is designed for assessment of magnetic resonance imaging distortion. The phantom's large volume 3D grid with equal spacing in all three orthogonal dimensions makes it suitable for whole body MR distortion QA. The phantom can be filled with various signal-generating solutions. When empty, the grid-air interface provides good contrast under CT. The phantom images well with all CT techniques and MRI sequences tested to date, including T1 weighted, T2 weighted, 3D Time of Flight, MPRAGE and CISS sequences.

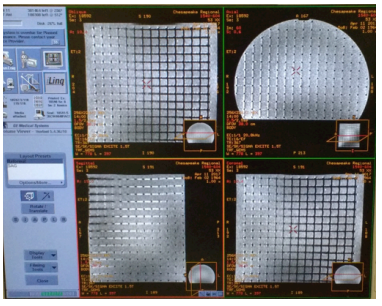
The phantom is comprised of a leak-proof PMMA cylinder and measures 330 mm in diameter by 300 mm long. The entire volume is filled with a unique orthogonal 3D grid of 3 mm diameter rods to provide complete geometric data throughout the imaging volume. The phantom is marked for ease of alignment to positioning lasers and is designed for use with both curved and flat gantry tables.

Patient induced magnetic inhomogeneity occurs when a patient is placed in the scanner due to magnetic susceptibility, which causes the tendency of a material to magnetize in the presence of a magnetic field. Regions of abrupt change in tissue density or voids between tissue and air are prone to high magnetic susceptibility which disturbs the magnetic field. Distortions due to susceptibility and smaller distortions due to chemical shifts are better qualified by a phantom that presents such distortions caused throughout the entire field of view (FOV).

Phantoms with MR signals suspended in foam, PMMA or other plastics or phantoms with MR signals only at the phantom's outer boundaries mainly characterize only B0 and Gradient Inhomogeneity related distortions. Such distortions are typically addressed by manufacturer correction algorithms.

CIRS phantoms are filled entirely with 3D orthogonal girds surrounded by background signal generating liquids to mimic distortions due to susceptibility and chemical shifts that are most likely to occur when a patient is scanned. All the components of distortion are thereby observed in MRI images and taken into account

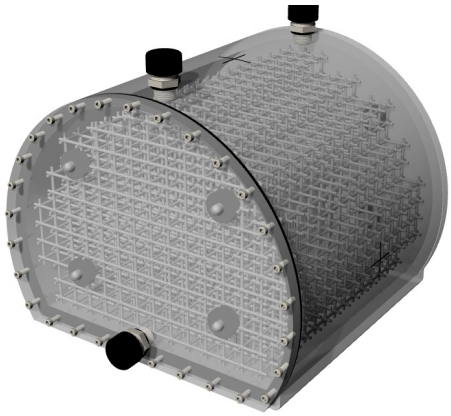




MODEL 604-GS INCLUDES

QTY	COMPONENT DESCRIPTION
1	Large Field MRI Distortion Phantom
1	3/4" garden hose filling tube (USA)
1	Complimentary 90 day license for 5 successful analyzed scans using Distortion Check Software
1	User Guide
1	Foam-Lined Carry Case
-	60-Month Warranty

OVERALL DIMENSIONS	300 mm (L), 276 mm (H) , 330 mm (DIA)
WEIGHT (DRY)	17 lb. (7.7 kg)
WEIGHT (FILLED)	62 lb. (28.1 kg)



MODEL 604-GS

Features

- Works with Distortion Check Software
- Large FOV distortion evaluation
- Unique orthogonal grid with equal 3D spacing
- Leak-proof design
- Sub-millimeter grid precision
- Easy integration and laser alignment
- Ground truth files for grid available in various digital formats
- 2152 Control Points

distortion check compatible

SOFTWARE OPTIONS

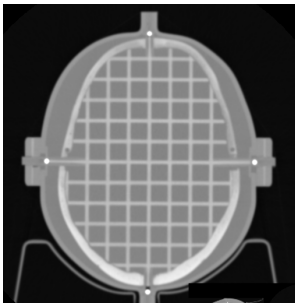
PART NO.	DESCRIPTION
603S-25	Distortion Check software (license for 2 years or 25 successfully analyzed scans, whichever expires first) Phantom Serial Number Required
603S-50	Distortion Check software (license for 2 years or 50 successfully analyzed scans, whichever expires first) Phantom Serial Number Required
603S-100	Distortion Check software (license for 2 years or 100 successfully analyzed scans, whichever expires first) Phantom Serial Number Required
603S-200	Distortion Check software (license for 2 years or 200 successfully analyzed scans, whichever expires first) Phantom Serial Number Required
603S-500	Distortion Check software (license for 2 years or 500 successfully analyzed scans, whichever expires first) Phantom Serial Number Required

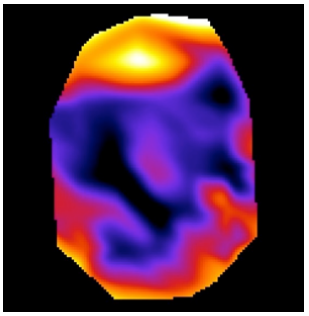
SRS Grid Phantom

Assess MR image distortion in Stereotactic Radiosurgery Planning

The CIRS Model 603A phantom is designed for the assessment of MR image distortion in Stereotactic Radiosurgery Planning. The tissue equivalent, anthropomorphic design provides the closest conditions to a clinical imaging scenario. The phantom can be imaged using X-ray, Computed Tomography and Magnetic Resonance. It images well with all MRI sequences tested to date, including T1 weighted, T2 weighted, MPRAGE and CISS. The phantom is also suitable for frame less SRS QA.

The entire inter-cranial portion of the skull volume is filled with an orthogonal 3D grid of 3mm diameter rods spaced 15mm apart. Five extended axis-rods intersect at the reference origin of the grid. The end of each extended axis is fitted with CT/MR markers allowing for accurate positioning with lasers and co-registration of CT and MR image sets. The 603A can also be utilized in CT/ MR image fusion studies.





MODEL 603A

Features

- Works with Distortion Check Software
- Provides a realistic anthropomorphic scenario for CT and MR imaging
- Unique inter-cranial 3D grid design allows assessment of spatial distortion
- Special pads enable use with all fixation frames
- CT/MR markers facilitate positioning and image registration
- 335 Control Points

distortion check compatible

MODEL 603A INCLUDES

MODEL	QTY	COMPONENT DESCRIPTION
-	1	3D Anthropomorphic Skull Phantom
-	1	ABS Cradle
	1	Complimentary 90 day license for 5 successful analyzed scans using Distortion Check Software
-	1	Custom Carry Case
-	1	User Guide
-	-	60-Month Warranty
038-20	1	SRS Frame Support Cups (set of 4)

OVERALL DIMENSIONS	32 cm x 24 cm x 18 cm
WEIGHT	12 lbs (5.5 kg)

SOFTWARE OPTIONS

PART NO.	DESCRIPTION
603S-25	Distortion Check software (license for 2 years or 25 successfully analyzed scans, whichever expires first) Phantom Serial Number Required
603S-50	Distortion Check software (license for 2 years or 50 successfully analyzed scans, whichever expires first) Phantom Serial Number Required
603S-100	Distortion Check software (license for 2 years or 100 successfully analyzed scans, whichever expires first) Phantom Serial Number Required
603S-200	Distortion Check software (license for 2 years or 200 successfully analyzed scans, whichever expires first) Phantom Serial Number Required
603S-500	Distortion Check software (license for 2 years or 500 successfully analyzed scans, whichever expires first) Phantom Serial Number Required

Distortion Check Software

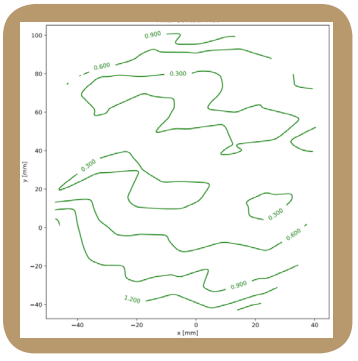
Automatically analyze complete MR data sets

distortion check
SOFTWARE FOR EVALUATION OF IMAGE DISTORTION

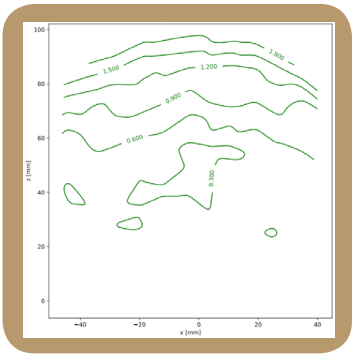
Distortion Check is cloud-based solution designed to quickly and automatically quantify distortion in MRI images. Used in conjunction with CIRS MRI Grid phantoms, the software provides the capability to quickly and accurately measure distortion through out the entire image volume.

Features

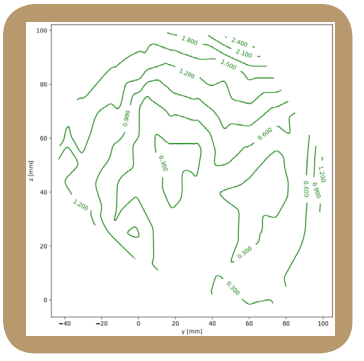
- Simple, user friendly web interface
- Detect physical control points thru out the 3D image volume
- Web based pdf report in summary or detailed format to NEMA MS 12 standard recommendations.
- Output raw data or DICOM overlay files for use with 3rd party software
- Establish multiple user accounts with different permissions
- Easily analyze and track multiple machines, imaging sequences and phantoms
- Establish distortion tolerance thresholds specific to different imaging sequences
- Re-compute any scans acquired for different tolerance thresholds



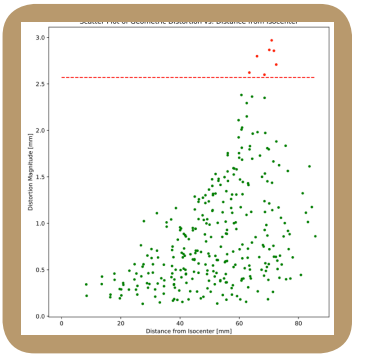
Axial Contour Plot



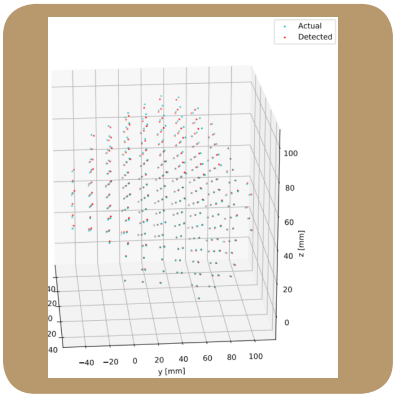
Sagittal Contour Plot



Coronal Contour Plot

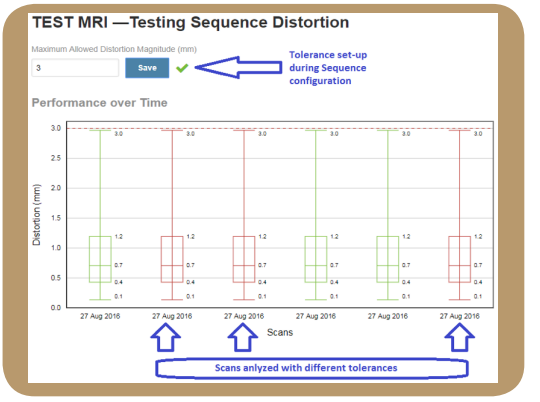


Scatter Plot



3D Scatter Plot, all points, Control vs. Reference

Grid intersections Detected vs. Reference



Trend Analysis

Publication: MRI Distortion Check Software DS 072619

Computerized Imaging Reference Systems, Inc. has been Registered by Underwriters Laboratories Inc. to the International Organization for Standardization **(ISO) 13485:2016**. Registration No. 10000905-MP2016