Distortion Check

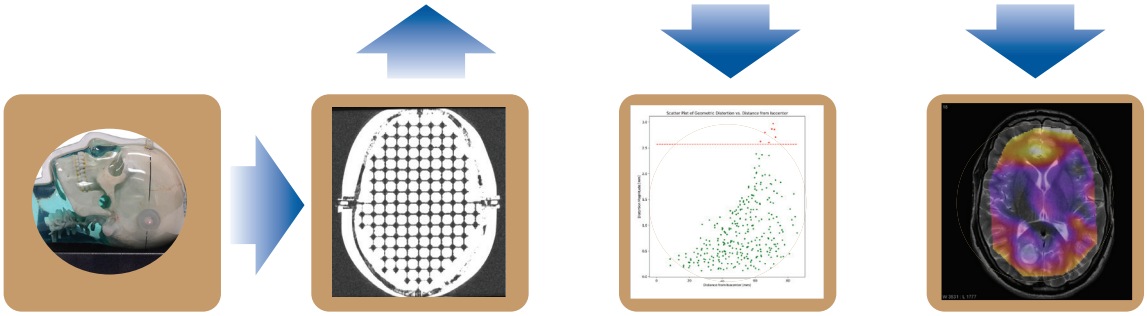
Automated Analysis of Distortion in MRgRT

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**

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 throughout 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 or 3rd party software, such as a DICOM viewer or image fusion 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 throughout 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

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Large Field MR Image Distortion Phantom

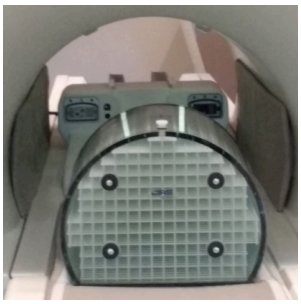
Assess MR image distortion in a tissue like medium

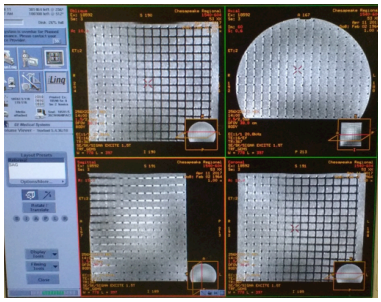
The Model 604-GS provides a tissue-like imaging environment for assessing geometric distortion in whole-body MRI scanners. The 604-GS is designed to assess image distortion caused by B_0 inhomogeneity and nonlinearity of the magnetic gradients. Unlike other air-filled phantoms, the liquid-filled 604-GS is also sensitive to chemical shifts and susceptibility artifacts, additional causes of distortion found when encountering density differences in diagnostic MRI and radiation therapy treatment planning.

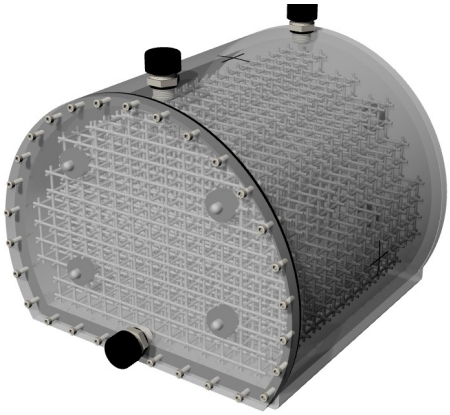
The phantom features a unique orthogonal 3D grid that provides complete geometric data throughout the imaging volume. Users can fill the phantom with the AAPM TG 100 recommended solution, or with specialized solutions for high-field MRI or unique scan sequences. Ground-truth measurements of grid locations can be obtained through CT scanning of the phantom.

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).

The phantom is marked for ease of alignment to position lasers and is designed for use with both curved and flat gantry tables.







MODEL 604-GS

Features

- With a tissue-like MRI signal, assess image distortion due to:
  - B_0 field inhomogeneities
  - Gradient nonlinearity
  - Chemical shifts
  - Susceptibility artifacts
- Works with Distortion Check software
- Submillimeter control point detection
- Optimized 3D grid spacing fills entire volume
- 2152 control points
- Easy integration and laser alignment
- Ground truth files for grid available

distortion check compatible

MODEL 604-GS INCLUDES

QTY	COMPONENT DESCRIPTION
1	Large Field MR Image Distortion Phantom
1	Filling Funnel
10	Extra plastic screws
1	Harness
1	Plastic tray
-	Unlimited scans using MRI Distortion Check Software for initial 2 year period. For instructions on how to create your account, go to https://www.cirsinc.com/software/distortion-check/
2	User Guides (604-GS & 603S Distortion Check)
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)

SOFTWARE OPTIONS

PART NO.	DESCRIPTION
603S	Distortion Check software 2 year renewal license

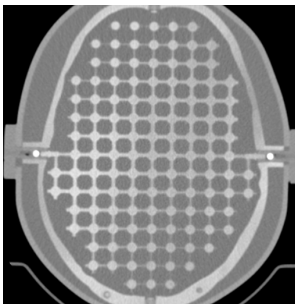
MR Image Distortion & Image Fusion **Head** Phantom

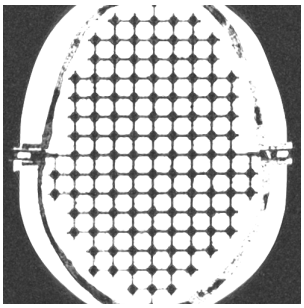
Assess MR distortion & Image Fusion in Stereotactic Radiosurgery Plannin

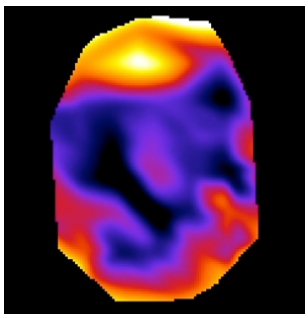
CIRS Model 603-GS was designed to assess MR image distortion in Stereotactic Radiosurgery Planning. It's also a useful tool for verifying image fusion and deformable image registration algorithms used in various treatment planning systems. The tissue equivalent, anthropomorphic design closely matches 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, 3D Time of Flight, MPRAGE and CISS.

The entire inter-cranial portion of the skull volume is filled with an orthogonal 3D grid of 2.5mm diameter cross-like shaped rods spaced 10mm (I-S), 10.5mm (AP) and 11mm (L-R). Extra material added in the grid intersections increase grid signal. 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.

MODEL 603-GS







Features

- Works with Distortion Check Software
- Provides a realistic anthropomorphic scenario for CT and MR imaging
- Presents simulated bony anatomy as rigid landmarks for image fusion
- Unique inter-cranial 3D grid design used to assess spatial distortion
- Special pads compatible with all fixation frames
- CT/MR markers facilitate positioning and image registration
- 859 Control Points

distortion check compatible

MODEL 603-GS INCLUDES

MODEL	QTY	COMPONENT DESCRIPTION
-	1	MR Distortion & Image Fusion Head Phantom
-	1	ABS Cradle
	-	Unlimited scans using MRI Distortion Check Software for initial 2 year period. For instructions on how to create your account, go to https://www.cirsinc.com/software/distortion-check/
-	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	Distortion Check software 2 year renewal license

Distortion Check Software

Automatically analyze complete MR data sets

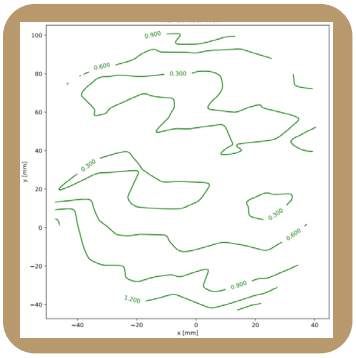
distortion check

SOFTWARE FOR EVALUATION OF IMAGE DISTORTION

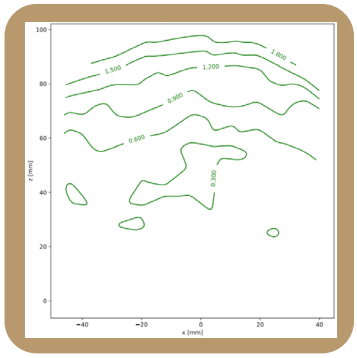
Distortion Check is cloud-based solution designed to quickly and automatically quantify distortion in MRI images. Used in conjunction with CIRS MRI Grid phantoms, the software provides the capability to quickly and accurately measure distortion throughout the entire image volume.

Features

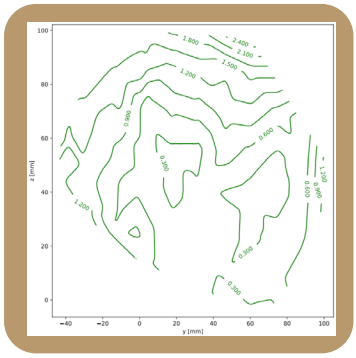
- Simple, user friendly web interface
- Detect physical control points throughout the 3D image volume
- Web based pdf report in summary or detailed format to NEMA MS 12 standard recommendations.
- Output raw data or DICOM overlay files for use with 3rd party software
- Establish multiple user accounts 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



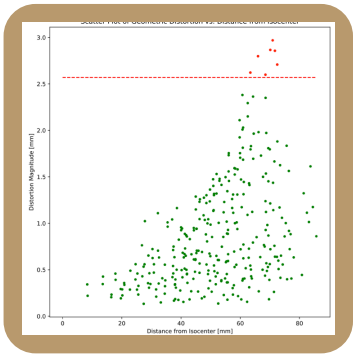
Axial Contour Plot



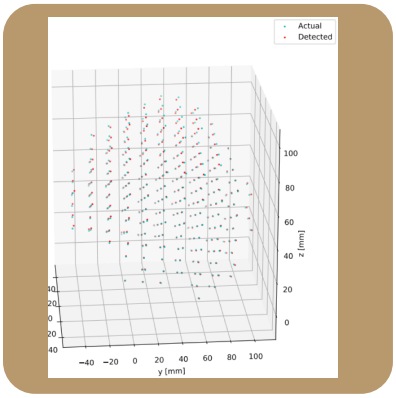
Sagittal Contour Plot



Coronal Contour Plot

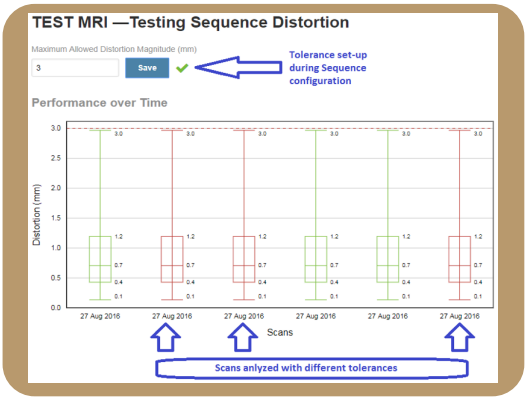


Scatter Plot



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

Grid intersections Detected vs. Reference



Trend Analysis

Publication: MRI Distortion Check Software DS 101821

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