skope

DATA SHEET: **NeuroCam™**

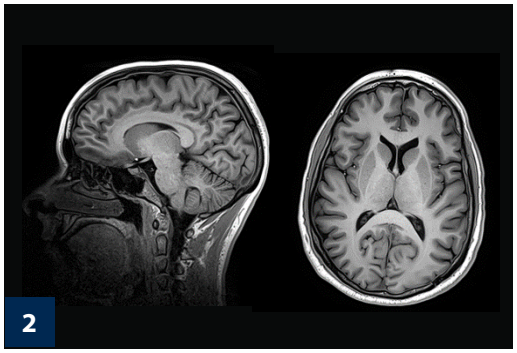
Neuroscientists

BRAIN COIL ARRAY WITH FIELD MONITORING

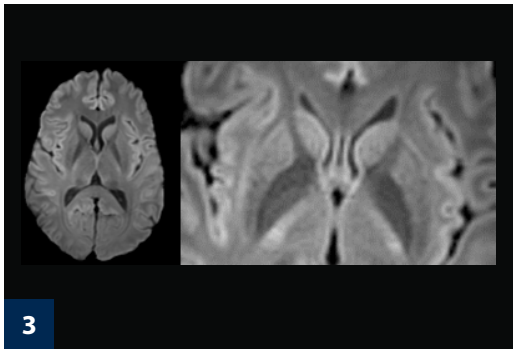
Your Partner in Scientific MR Imaging

Robust neuro-imaging with speed, sensitivity and ease

- Improve imaging with field monitoring – without disturbing your workflow
- Acquire excellent whole-brain SNR and parallel imaging performance
- Enable advanced diffusion methods for your research



T1 MPRAGE images acquired with the NeuroCam
0.75 mm x 0.75 mm x 1.5 mm



Diffusion images acquired with the NeuroCam and reconstructed with skope-i, b=1000, 1.2 mm x 1.2 mm x 4 mm

1 Improve imaging with field monitoring – without disturbing your workflow

Acquire images without limitations in geometric accuracy and SNR imposed by inaccurate image encoding. The NeuroCam integrates field monitoring capabilities into a brain coil array optimized for neurologic scanning. The open design of the NeuroCam maximizes subject comfort and allows you to design experiments using motion or eye-tracking hardware.

2 Acquire excellent whole-brain SNR and parallel imaging performance

The NeuroCam's integrated MR receiver array is optimized for neuro-imaging. It fits closely to the subject, intrinsically improving SNR while the receive coil geometry improves parallel imaging performance.

3 Enable advanced diffusion methods for your research

Advanced diffusion methods (quantitative parameters, q-space) are limited by inaccuracies in image encoding. Integrating field monitoring using the NeuroCam into advanced diffusion workflows allows you to avoid image artifacts by directly measuring and accounting for encoding fields (including disruptions from eddy currents) in reconstruction.

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NeuroCam for 3T

Physical dimensions

Housing (w x d x h), incl. base	60 cm x 46 cm x 30 cm
Head fit	> 95% of adult population
Full face access	open view and possibility to use eye tracking tools

Dynamic field measurement

Measurable variable	Magnetic field magnitude
Temporal resolution	1 µs
intrinsic k_{max}	± 9580 rad/m

Spatial field expansion

Basis	Real-valued spherical harmonics up to 3rd order
Output terms for image correction	Generalized k-space (16 terms: $k_0 – k_{15}$) - 3D k-space (k_1- k_3) - Dynamic B_0 perturbation (k_0) - 2nd order perturbations (k_4 - k_8) - 3rd order perturbations (k_9 - k_{15})

Camera Acquisition System

The NeuroCam communicates with the 16 Channel Skope Camera Acquisition System to automatically acquire and process field dynamic data. These data can be displayed in skope-fx or piped directly into reconstruction solutions such as skope-dm and skope-i.

skope™-i, image production software

The image production software complements the NeuroCam and takes into account

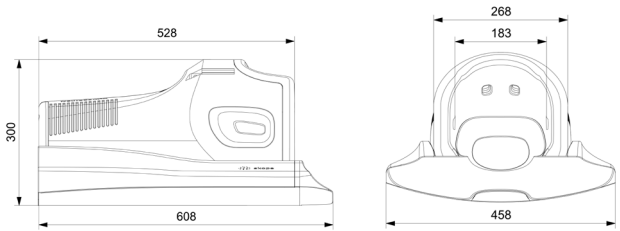
- Measured/simulated gradient encoding
- Coil sensitivity information (SENSE)
- Static B_0 maps
- Higher order field evolution

skope™-dm

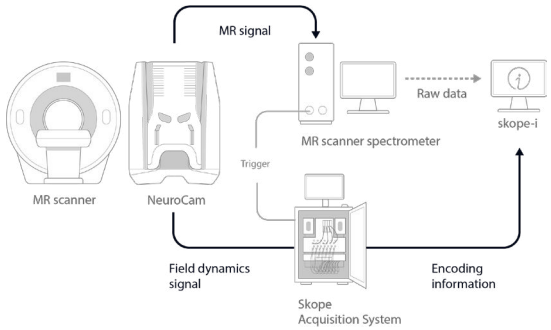
The data managing software provides the means for an optimized workflow which comprises

- Reception of streamed MR data via the ISMRMRD protocol
- Online processing of camera data
- On-the-fly combination of scanner and camera data
- Streaming of the merged data to a file or another ISMRMRD-compatible client

Technical illustration

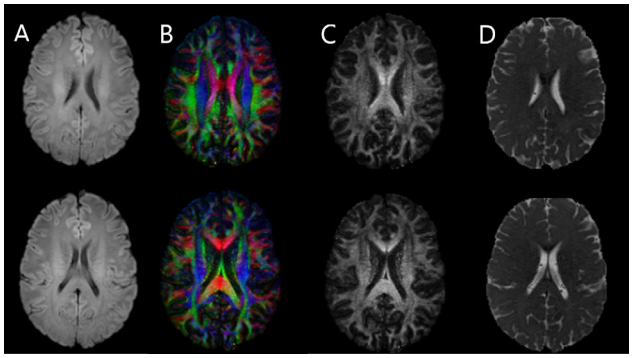


Integration into MRI set-up



Anatomical accuracy with the NeuroCam

T1 MPRAGE acquired with the NeuroCam and reconstructed with skope-i



A) Mean diffusion image
B) Color FA map
C) FA map
D) ADC map

All images acquired with the NeuroCam and reconstructed in skope-i.

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