NEURAL NAVIGATOR

Precision makes Perfection

Navigated TMS motor mapping

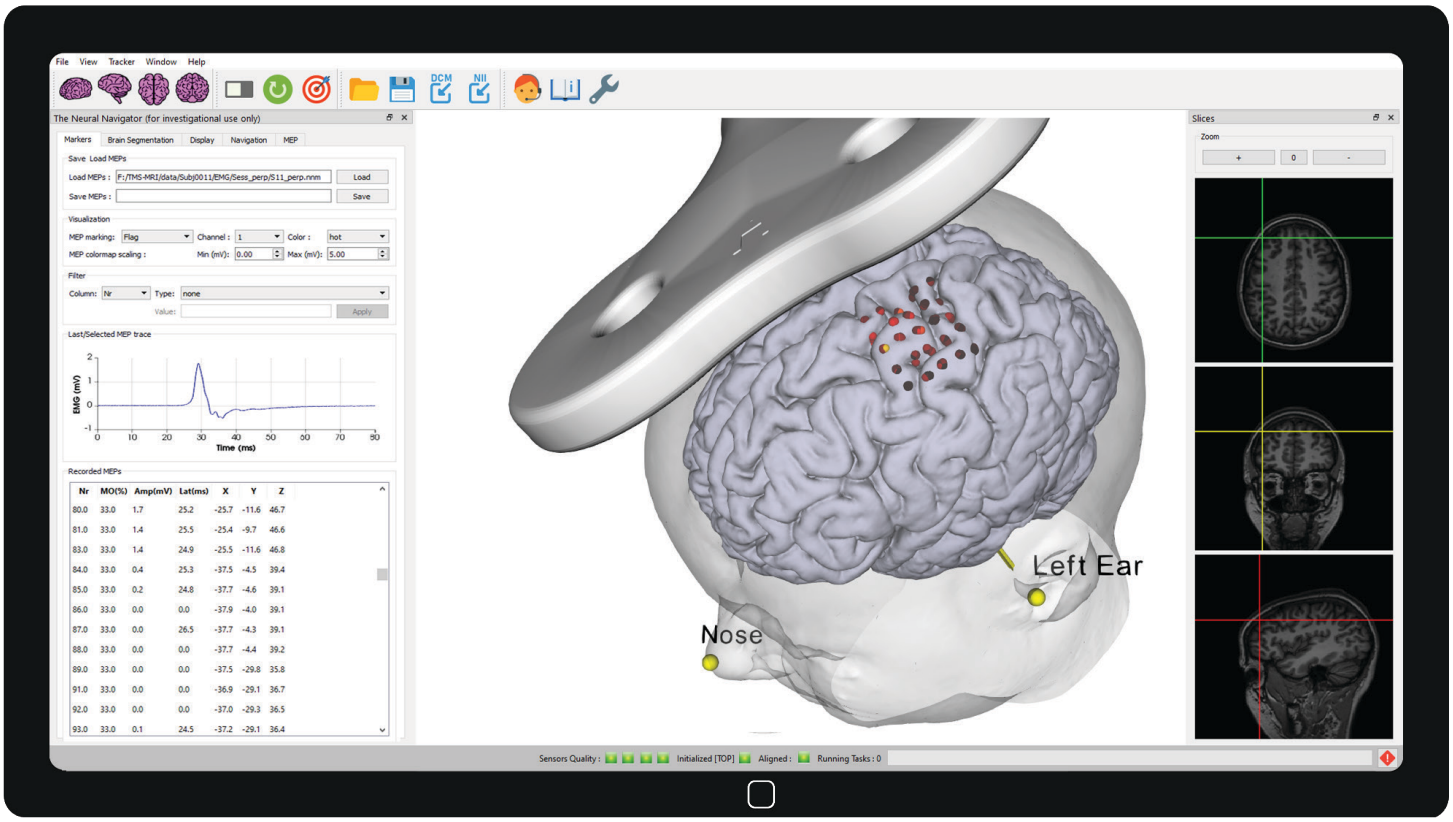
- MRI-guided mapping of motor-evoked potentials
- Automatic marker placement
- Built-in segmentation

MRI-guided mapping of motor-evoked potentials

The Neural Navigator Navigated MEP (NavMEP) integrates the powerful features of Neurosoft's NeuroMEP with the high precision navigation system of the Neural Navigator. The Neural Navigator NavMEP is designed to map the functional motor area onto the brain surface, using MRI-guided neuronavigation, monophasic Transcranial Magnetic Stimulation (TMS) and simultaneous electromyography (EMG) recordings. The functional motor maps can be used for presurgical planning or monitoring of neural changes during stroke rehabilitation.

The Neural Navigator NavMEP records the stimulated brain region, the stimulation intensity and the features of the motor-evoked potential. It integrates this information and presents it as an intuitive functional motor map onto the brain surface.

The Neural Navigator NavMEP offers high precision neuronavigation integrated with focal monophasic TMS and high quality EMG recordings. The software contains a built-in segmentation algorithm in order to obtain the brain surface from raw MRI images. The neuronavigation device allows uninterupted tracking of both the TMS coil and the head.



MAIN COMPONENTS

Magnetic position tracking

The position of the TMS coil and the patient's head is tracked using a magnetic position tracking device built into the Neural Navigator. It uses magnetic induction tracking with a weak pulsed DC magnetic field. This technique is hardly sensitive to electromagnetic distortions, for example the presence of a normal TMS coil does not distort the measurements.

Monophasic TMS: NeuroMS

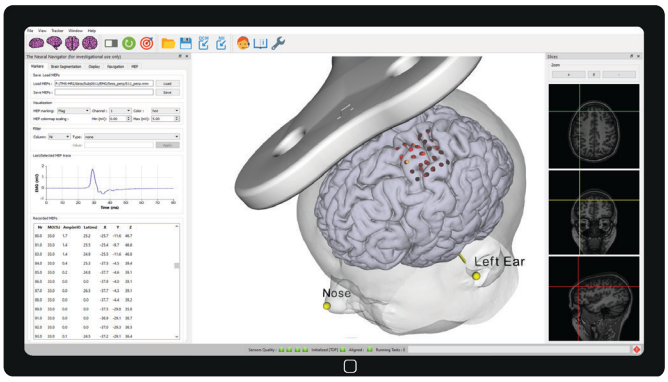
The NeuroMS can induce a strong monophasic electrical field with very low electromagnetic interference even during charge and discharge, which makes it ideal for the recording of motor-evoked potentials using electromyography (EMG).

EMG: Neuro-EMG

The Neuro-EMG device records EMG signals
sampling frequency of 20000 Hz, allowing v
rate quantification of motor-evoked potent
acteristics.

The Neural Navigator NavMEP software

The Neural Navigator software is a comprehensive software suite with several workflows for image processing, visualization and real time navigation. It allows visualization of recorded motorevoked potentials onto the brain surface, which can be customized to your liking.



Full solution

We also offer a full neuronavigated TMS setup, including the Neural Navigator NavMEP and a TMS setup from one of our partners.

ACCESSORIES (optional)

TMS Treatment Chair

This reclining chair is especially designed for use during navigated rTMS treatment. The materials in the chair are chosen such that magnetic tracking is undisturbed, which was rigorously tested. This product is CE certified (class I) for clinical use.

SPECIFICATIONS

The Neural Navigator can target brain areas indicated on an MRI scan with a precision of 4 mm or better. It can load and visualize individual MRI scans and fMRI activation maps. The Neural Navigator supports automatic identification of facial markers and popular treatment targets and allows semi-automatic brain segmentation. One can navigate the TMS coil to the target in the brain in real time while looking at the screen. On the screen a 3D rendering of the TMS coil and brain are shown exactly at the position and orientation where they currently are.
A yellow beam is shown at the center of the TMS pulse, extending into the brain. This allows one to see exactly which area is targeted. Pre-set neuroanatomical target markers can be pinpointed accurately. The virtual camera can also be linked to the TMS coil center to obtain a birds-eye view of the brain as if you are looking down along the TMS pulse, with a crosshair to aid targeting of the brain region of interest. Furthermore, The Neural Navigator contains tools to judge navigation accuracy, make suggestions how to improve it based on real-time simulations, test the 3D digitizing hardware, and many more.

Supported MRI data types
The Neural Navigator is fully compatible with the most commonly used DICOM and Nifti data formats. Nifti files, appearing with .nii and .img/.hdr extensions, are the standard data format used in SPM8 and SPM12. The software can also read the older Analyze format used in SPM9 and SPM2. The software also reads Nifti data from more recent AFNI, FSL and Brainvoyager versions.

Position tracking hardware
The BrainTRAK™ position tracking device digitizes 3D position and orientation of the hand held pointer and the TMS coil at a rate of 100Hz. It adopts a weak pulsed DC magnetic field generated by a small emitter, and measures magnetic induction in in the sensors located inside the pointer and TMS coil socket to determine location and orientation. The spatial accuracy is better than 1 mm within a range of ~70cm from the transmitter. The tracking hardware operates in a stand-alone case, with its own power supply, and connects to the PC or laptop through a USB port. The system can be used in combination with a laptop, greatly increasing mobility. The complete navigation setup fits in a regular sized suitcase, which makes it ideal for bed-side investigations.

Technical
Electrical: Power line 100 - 240V ~ 50/60 Hz; input power 50 VA. Type: Class I Device with Type B Applied Part (probes). Installation class 2, Safety class 1. Operation environment: temperature 5°C to 40°C; between 10% and 90% non-condensing humidity; Maximum allowed height 2000m, maximum air pressure 79.4 kPa. Storage/transportation conditions: ambient air temperature between -40 °C and 70 °C in environments with a relative humidity between 5% and 95%. IP class: IP20. MDD Device class: IIa

Regulatory
The Neural Navigator NavMEP is for research use only. The Neural Navigator.

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