

# Neuroscience

Non-invasive brain  
stimulation and brain  
imaging

Take your research to a new level





## Technologies for neuroscience: reliable, multimodal, closed loop, target engagement

neurocare is advancing mental health and performance through personalized therapy following comprehensive assessments in a global network of clinics. With our two technology brands, **neuroConn** and **MAG & More**, we deliver best-in-class solutions for practise, as well as intricate system designs for research endeavors. Our offerings include **MAG & More TMS and TMS Navigation** systems, the **neuroConn DC-STIMULATOR series for tDCS, tACS, tRNS**, our **NEURO PRAX® full-band EEG products** and **customizable closed-loop solutions**. We combine unparalleled precision with user-friendliness to meet diverse needs.

With the integration of cutting-edge technologies, neurocare and our partners are dedicated to enhancing the effectiveness of non-invasive brain stimulation techniques. We focus on advancements in neuronavigation (with Rogue Research), precise target engagement (with Brainclinics), closed-loop systems (with MAG & More), and interference stimulation methods. These innovations aim to improve the outcomes and impact of NIBS.

neurocare solutions for neurostimulation combined with neuroimaging:

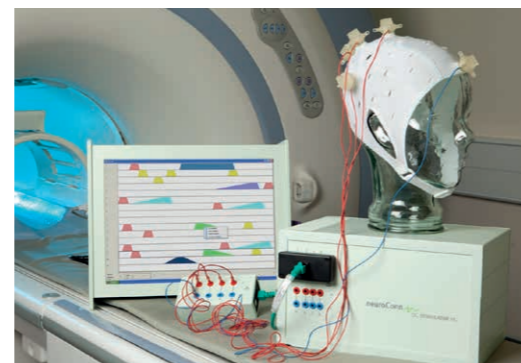
- EEG-tES, MEG-tES, EEG-TMS
- fMRI-tES, MRS-tDCS, fMRI-EEG
- navigated / controllable TMS, fNIRS-tDCS

neurocare state-dependent & closed-loop solutions:

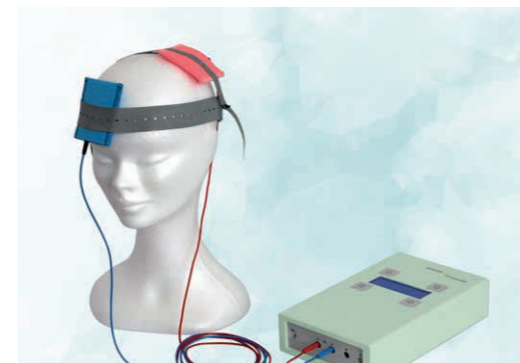
- dual tES-Stimulation based on LOOP-IT
- neuro-cardiac guided rTMS

## Pioneers and experts in NIBS Non-Invasive Brain Stimulation

### transcranial Electrical Stimulation (tES) tDCS / tACS / tRNS



DC-STIMULATOR MC - multi channel and MRI compatible



DC-STIMULATOR PLUS - tDCS / tACS / tRNS

Non-invasive transcranial electrical stimulation (tES) is known to modulate or entrain brain activity in both healthy subjects and patients with neurological or psychiatric disorders. Physiological and functional effects can be demonstrated by using brain stimulation techniques under certain tasks or in combination with neuroimaging methods, such as EEG, MEG and fMRI. Novel concentric ring setups enable more focal stimulation on the target areas in and outside the MR scanner.

neuroConn, our tES-technology brand, provides a highly sophisticated and unique range of transcranial electrical stimulators covering all requirements for neuroscience and clinical research. The devices and their applications allow users maximum flexibility and research validity, guaranteeing the highest safety standards in the medical electrical device industry for over 20 years.

With neuroConn we are pioneers in the field of tACS, tRNS, tDCS-fMRI, EEG-tDCS, and EEG-tACS/tRNS technologies. We have developed these innovative techniques in close collaboration with leading tES researchers in Germany and worldwide. And we are proud that the neuroConn DC-STIMULATOR devices are utilized in 80% of all publications related to tES and play a vital role in the largest depression and stroke trials globally.

#### Our longstanding partnerships for neuroscience, collaboration and education:

- Deymed DuoMAG MP-Dual, QPS
- controllable TMS and Brainsight® TMS-Navigation from Rogue Research
- Brainbox Initiative

**neuroConn**  
part of  neurocare group AG



### Transcranial Magnetic Stimulation (TMS) and TMS-Neuronavigation



PowerMAG Stimulators - TMS for Research



neurocardiac-guided TMS

Transcranial Magnetic Stimulation (TMS) is a pivotal technique in neuroscience, offering specific insights into brain functions. By generating magnetic pulses, TMS can selectively activate or inhibit precise brain regions, unveiling their roles in cognition, emotion, and motor control. TMS paired with neuroimaging techniques enables causal inference about brain networks, enriching our understanding of intricate neural connections. Beyond research, TMS holds potential for therapeutic interventions in neuropsychiatric disorders by modulating aberrant brain activity.

Our devices for TMS and TMS neuronavigation are designed to expand the options for research. With precision and versatility, they open up new avenues for investigating neural pathways, brain connectivity, and potential therapeutic applications.

The MAG & More PowerMAG Research series surpasses every expectation placed on a highly developed medical device and belong to the top class of magnetic stimulators for experimental setups.

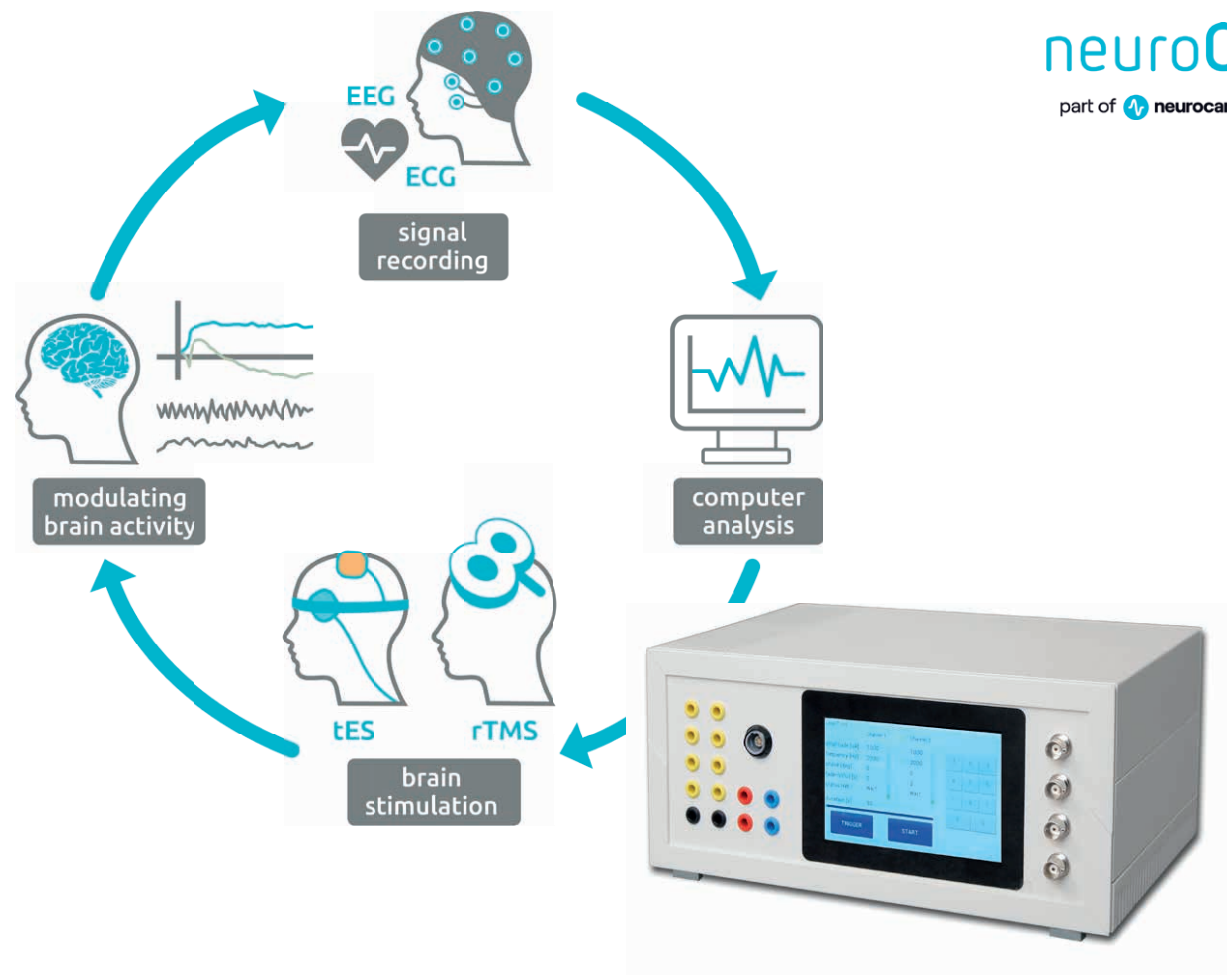
**MAG & more**  
part of  neurocare group AG



**MAG & More**  
TMS systems:

PowerMAG

PowerMAG View!  
Neuronavigation



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# LOOP-IT: precise, ultra fast, modular, easy to use

## Generic hardware platform for versatile experiments

Simultaneous non-invasive brain stimulation (NIBS) and EEG paved the way for a better understanding of NIBS-induced local and network effects as well as the functional role of brain oscillations. Individual parameters, such as intensity, frequency and phase can influence NIBS outcomes. Brain state-dependent NIBS enables researchers to manipulate those parameters and to influence brain activity with high temporal and spectral precision.

LOOP-IT by neuroConn is a generic hardware platform designed for scientific closed-loop experiments and multichannel stimulation. It provides minimized constant delay of 1 ms between data acquisition, analysis and deriving parameters for actuators.

The closed loop device supports a number of state-of-the-art features, including tES, temporal interference stimulation, neuromuscular electrical stimulation by our new constant current sources, synchronized electrically independent modules with different functionalities in combination, such as EEG / EP / ECG / EMG biosignal acquisition, multichannel digital I/O for tES and TMS, interface for active electrodes, sensor interface for non-electrical biosignals.

neurocare

## LOOP-IT: all-in-one solution that sets new standards in neuroscience lab equipment

### Real-time system for physiological oscillation phase-dependent stimulation

We provide a system enabling state dependent and closed-loop controlled experiments in a stable time regimen with 1 - 3 ms turn-around time:

- data acquisition of ExG (EEG, ECG, EMG), 3-axis acceleration 24 bit / 1 kHz
- data analysis of amplitude, frequency, latency, phase
- modulation via control / trigger of tES / NMES / TMS

### New current source modules for transcranial and peripheral stimulation

Electrical stimulation parameters for electrophysiology modulation recently widened significantly. Our new current source modules enable:

- transcranial stimulation up to  $\pm 5$  mA /  $< 5$  kHz with low 1/f noise suitable for combined tES and electrophysiological measurements,
- peripheral stimulation with high power intensities up to  $\pm 40$  mA at high speed, for pulse length up to 1 ms and up to  $\pm 15$  mA in constant current applications.

Synchronization between transcranial and peripheral stimulation in one unit allows pairing of current sources.

### Conventional applications on TMS

- Collecting EMG for MEP investigations during TMS for read out on M1
- Collecting ECG for HR investigations during TMS for read out on DLPFC
- Collecting EEG for TEPP investigations during TMS for read out on the whole brain

### EEG & NIBS (8x EEG, 1x DIO)

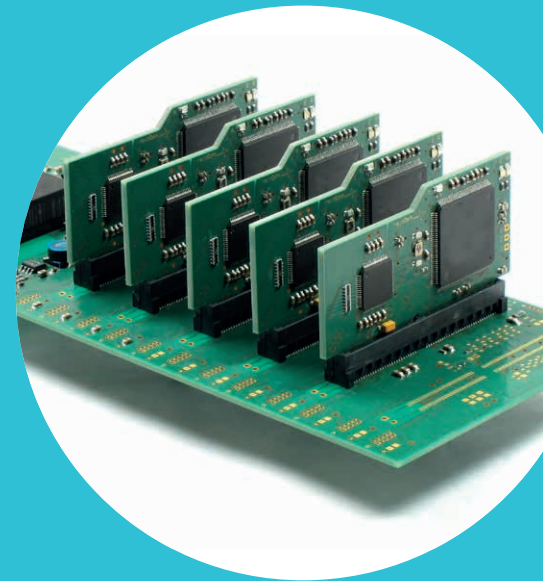
- towards personalised therapeutic brain-state dependent therapies in rehabilitation and psychiatry

### NIBS (2x tES)

- Temporal interference stimulation for enabling targeted structures deep inside the brain by steering the electric fields of maximum amplitude modulation

### NIBS & NMES (1x tES, 1x NMES)

- Phase-dependent modulation of human corticospinal plasticity by associative pairing of transcranial and neuromuscular stimulation (tES & NMES)



**Get in touch** – Our highly experienced engineers are available to discuss your research or lab requirements for closed-loop, neurostimulation and multimodal neuromodulation solutions.

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