Case Study:

ANT Neuro and NDI Partnership Provides Enhanced Reliability and Accuracy for Neuronavigated Brain Stimulation

Prepared By:
NDI (Northern Digital Inc.)

visor2™

Complete solutions for navigated rTMS,
functional mapping and EEG / EMG

ANT Neuro partners with NDI to bring high-quality tracking to the **vi**sor2™ neuronavigation solution

ANT Neuro specializes in being a single-source provider of high-performance products within neuroscience research and neurodiagnostics. Applications include electroencephalogram (EEG), electromyography (EMG), transcranial magnetic stimulation (TMS), and magnetoencephalography (MEG) technology.

Using ANT Neuro products, functional brain information is fused with anatomical scans to gain insight into the working mechanisms of cognition and a variety of brain disorders. ANT's technology offers a wide range of applications in cognitive neuroscience, neurology, and psychiatry.

ANT Neuro **vi**sor2 is the neuronavigation solution for the most advanced neuroscience research and accurate clinical therapy with non-invasive TMS in which NDI's compact optical tracker, the Polaris Vicra®, is incorporated to bring in tracking precision.

Why TMS requires neuronavigation?

TMS is a noninvasive brain stimulation technique that uses electromagnetic pulses to stimulate specific areas of the cortex to treat a variety of neurological and mental health conditions such as major depressive disorder (MDD), obsessive-compulsive disorder (OCD), post-traumatic stress disorder (PTSD), anxiety, dementia, chronic pain, addiction treatment or Alzheimer disease. First developed in the early 1990s, TMS was approved by the FDA in 2008.

TMS works using the following principle: An electric pulse generator, or TMS stimulator, is connected to a stimulation coil, which in turn is positioned on the patient's head. The TMS stimulator drives a changing electric current within the coil which creates a magnetic field; this field then induces a weak electrical current within the brain itself, producing the firing of groups of nerve cells. When TMS is applied repeatedly, it will progressively change brain activity.

TMS has several advantages, but this treatment method also has limits regarding the targeting of specific brain areas and the reproducibility of treatment over multiple sessions.
This is where the cooperation of ANT Neuro and NDI adds a special benefit through the combination of MRI-guided neuronavigation and ultra-precise optical tracking.

Revolutionizing TMS Therapy: ANT Neuro Partners with NDI to Improve TMS Accuracy

ANT Neuro's **vi**sor2 is the complete neuronavigation solution for a navigated TMS (nTMS) lab. It allows clinicians to accurately identify brain areas to be stimulated and reproduce this stimulation across multiple sessions and operators. nTMS can also accurately map the functional organization of different brain functions, such as motor movement or language without invasion.

The NDI Polaris Vicra® optical tracker, as part of the **vi**sor2 solution, allows clinicians to easily co-register the patient to their individual MRI data providing accurate real-time 3D information about the position of the TMS coil on the patient's head, relative to the underlying cortical anatomy. This enables personalized TMS therapy with MRI-based neuronavigation to improve outcome and remission rate[1].

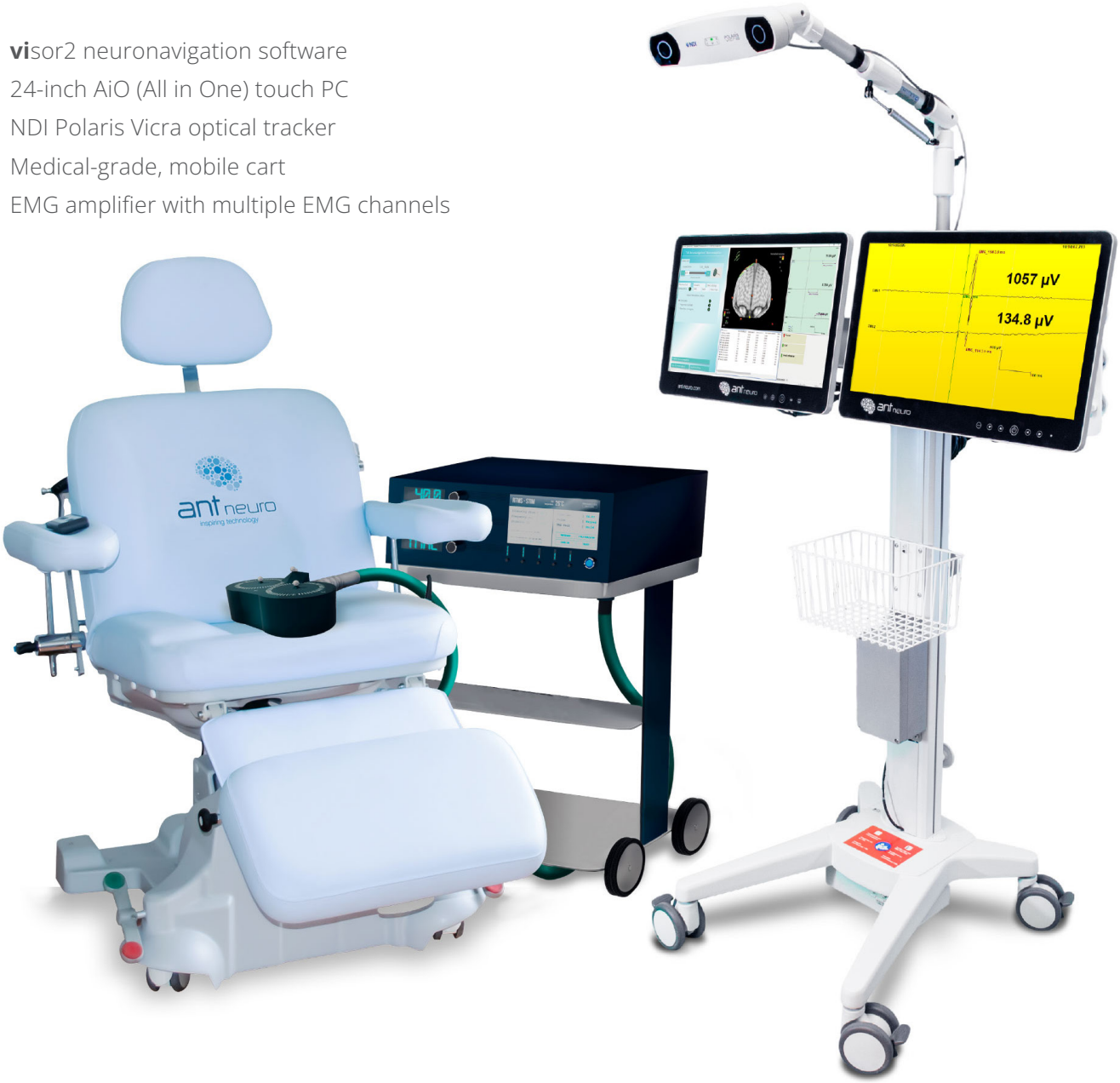
visor2 guides users with intuitive step-by-step workflows throughout the entire navigated TMS treatment session from patient data management to precise and reproducible targeting of the cortical treatment site throughout multiple treatment sessions. The TMS coil's position, orientation, and rotation are important to ensure the energy from the TMS coil arrives at the right angle in the patient's cortex. The **vi**sor2 neuronavigation solution allows clinicians to control and optimize for all these factors and provide the required precision and reproducibility.

Recently, ANT Neuro enhanced the **vi**sor2 solution with a new and modern robotized TMS Neuronavigation solution. It allows for ultra-precise, automatic TMS coil positioning with active head movement compensation. This adds another layer of accuracy and ease of use to nTMS applications in combination with NDI optical tracking technology.

1 Fitzgerald, Paul & Hoy, Kate & McQueen, Susan & Maller, Jerome & Herring, Sally & Segrave, Rebecca & Bailey, Michael & Been, Greg & Kulkarni, Jayashri & Daskalakis, Zafiris. (2009). A Randomized Trial of rTMS Targeted with MRI Based Neuro-Navigation in Treatment-Resistant Depression. Neuropsychopharmacology: official publication of the American College of Neuropsychopharmacology. 34. 1255-62. 10.1038/npp.2008.233.

ANT **vi**sor2 - Neuronavigation for every application[2]

- **vi**sor2 neuronavigation software
- 24-inch AiO (All in One) touch PC
- NDI Polaris Vicra optical tracker
- Medical-grade, mobile cart
- EMG amplifier with multiple EMG channels



2 visor2 system is CE marked as a medical device in the EU, according to MDD 93/42/EEC, class lla, and has FDA clearance under 510(k) in the USA. Medical Device License (MDL) issued by Health Canada. Compliant with the Australian TG(MD)R and registered in the ARTG. Manufactured by eemagine GmbH, Berlin, Germany, ISO 13485 certified. ANT Neuro and eemagine are part of the neuromotion group. For the regulatory status of visor2 outside of Australia, Canada, the EU, and the USA, please contact your local distributor or ANT representation. EEG-TMS, language mapping, and dual-coil navigation with visor2 is intended for research and educational use only.

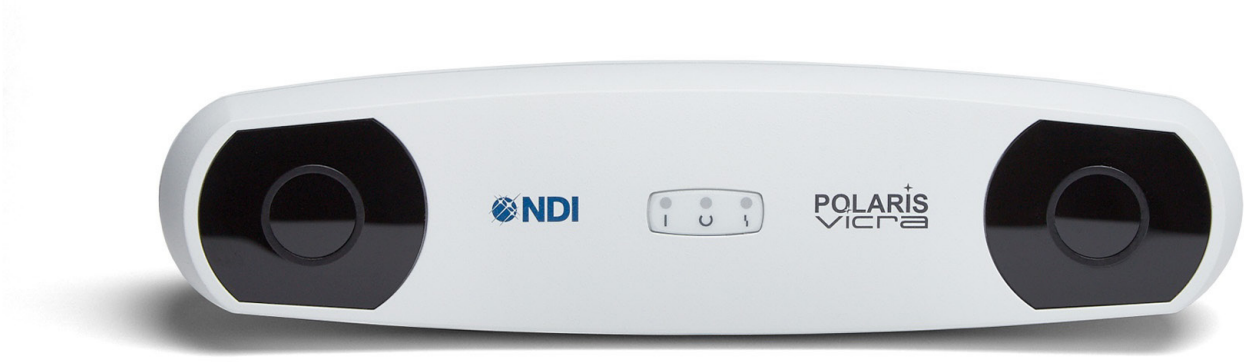
NDI's Integration Team Accelerates visor2 Development with Seamless Integration

NDI supports the OEM partner throughout the development process with their extensive knowledge of system compatibility requirements, product configurations, best design practices, and real-world applications. The NDI Integration Team collaborated closely with the team at ANT Neuro to ensure the optical navigation system was the right solution for the application's requirements. Besides the optical camera, NDI also offers tools and software to facilitate and accelerate the testing and development phases of the project.

Many aspects of NDI's hardware components and tools are customizable, ensuring the development, integration, and final application, best meet the OEM's product requirements, processes, and timelines.

> *The NDI Polaris Vicra® is easy to set up and operate, but most importantly, with NDI optical navigation, we are confident in the quality and accuracy of* ***vi****sor2™ TMS Neuronavigation solution that we provide to our customers.*

Sebastian Carstens,
Head of Product Management



Want to learn more about NDI optical navigation and the new Polaris Lyra®?
Visit www.ndigital.com or contact us today at info@ndigital.com.

About ANT Neuro

ANT Neuro (www.ant-neuro.com) is a leading worldwide provider of devices, solutions, and services for the study of human brain function as well as diagnostic and therapeutic applications. Founded in 1997 by Dr. Frank Zanow as a spin-off from the University of Twente in the Netherlands, ANT Neuro currently has offices in Germany, the Netherlands, the United States, the UK, Hong Kong, and Australia.

About NDI

NDI is a global authority in optical and electromagnetic (EM) navigation technology for the medical device market. Backed by over 40 years of industry expertise and innovation, our solutions are designed with ease and speed of integration in mind, boasting flexible customization options to meet your most challenging navigation requirements. NDI is the partner of choice to help bring your tracking applications—and industry breakthroughs—to market.

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