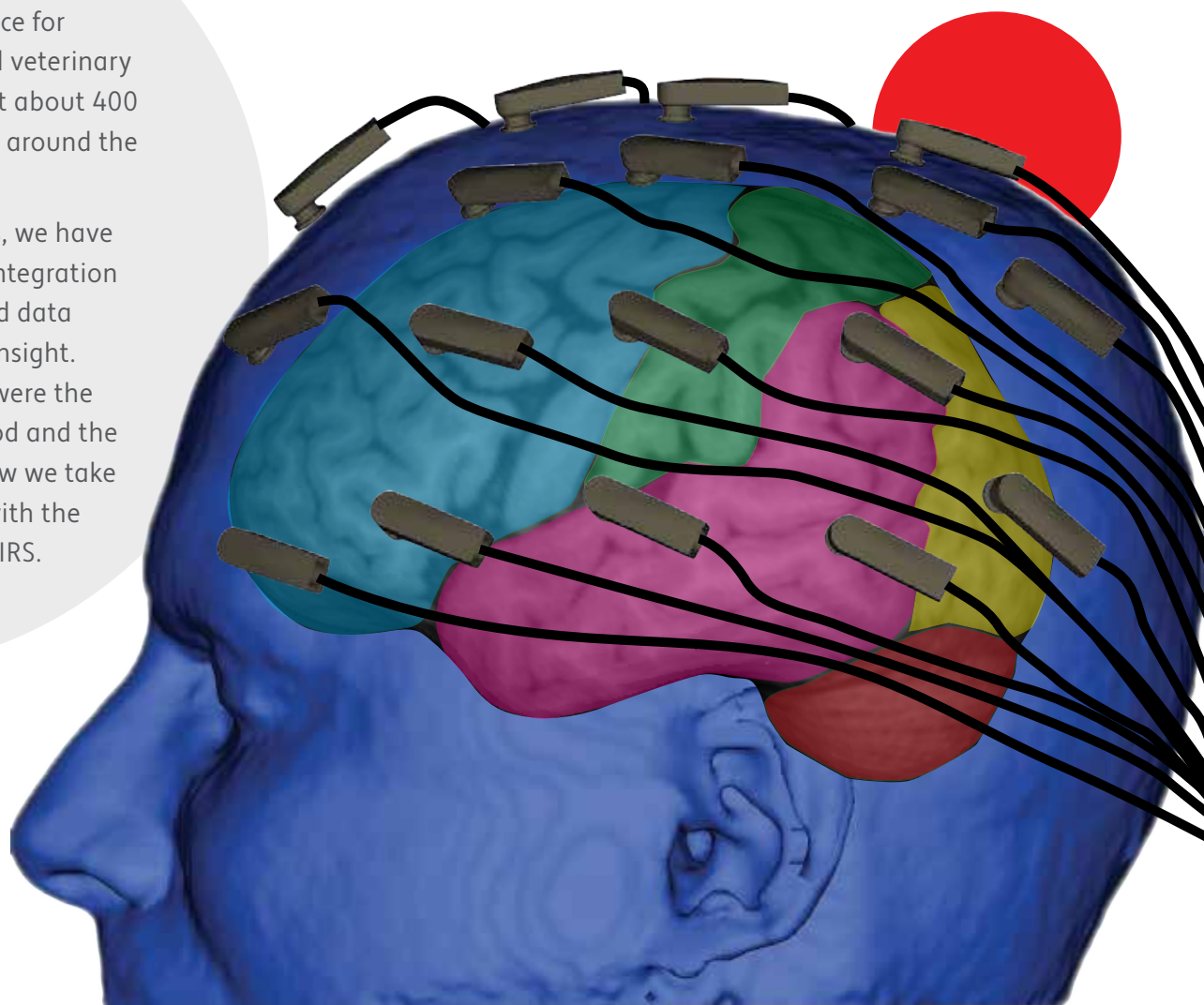# Brainsight®

NIRS

For more than 10 years, Brainsight® has been the neuronavigator of choice for image-guided TMS and veterinary neurosurgery. We count about 400 users as our customers around the world.

Over the last few years, we have been focusing on the integration of neuronavigation and data acquisition within Brainsight. Our first installments were the addition of our EMG pod and the NEUROPRAX® EEG. Now we take a large step forward with the release of Brainsight NIRS.

ROGUE RESEARCH Inc.

ROGUERESOLUTIONS
INTEGRATED SOLUTIONS FOR NEUROSCIENCE

Brainsight®

NIRS

THE **NEWEST ADDITION TO**

THE NEUROSCIENCE HUB

Brainsight® Neuronavigator

Brainsight NIRS starts off with the Brainsight neuronavigation system. For over 10 years, Brainsight has been setting the standard for functionality and ease of use for TMS localization and veterinary neurosurgery.

In addition to the standard features of Brainsight, Brainsight NIRS includes all the device controls and a montage manager to define your common NIRS and EEG configurations for quick recall at the start of a NIRS session. Co-register the optodes to the MR images and you are ready to go.

Easily perform NIRS with TMS and the NEUROPRAX® EEG. Brainsight takes care of recording all your data in one place, synchronized to the stimulus event.
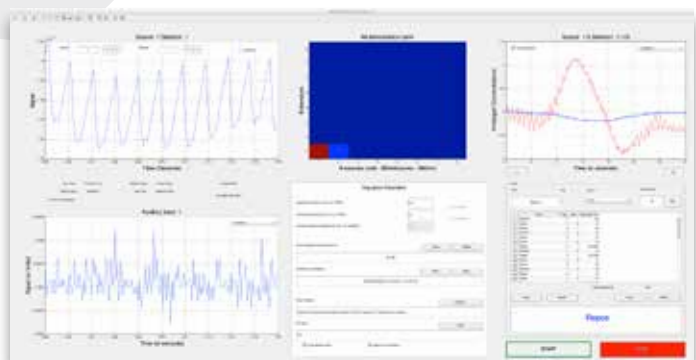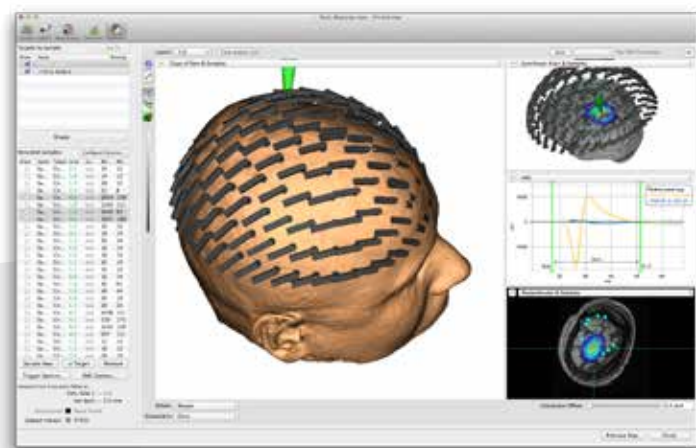
Brainsight® NIRS Hardware

When we set out to design our NIRS system, we did not want to just do what others have done. We set out to make a unique device that is simpler to use and reflects current trends in NIRS imaging. The interface on the device itself is just enough to connect to the Brainsight neuronavigator where all the interaction occurs, removing the need for a redundant screen and keyboard. The result is a device that can be placed exactly where it needs to be to access the subject. You operate the device using the already familiar and easy to use Brainsight workflow-based user interface. The control computer can be next to it or in the next room if needed. All data is acquired and stored within the Brainsight project file where everything is mapped to the subject's anatomical MR images. Since we are using Brainsight, we can also store TMS coil information and simultaneous EEG data for truly integrated multi-modality acquisition. The system supports 8-32 channels that can be upgraded in 8-channel increments. In addition to 4 sources and 8 "cortical" signal detectors (per 8-channel module), our system includes 4-16 additional dedicated source proximity detectors allowing you to sample scalp-dominated signals without sacrificing the cortical detectors. We can sample up to 100 Hz for the NIRS channels and up to 8 kHz for our 8 auxiliary channels which are ideal for experiment state information and/or physiology information (e.g. cardiac or respiratory).

Brainsight® 8-32 Channel Unit

Brainsight® NIRS-8

Designed for Multi-Modal Use

One of the most challenging aspects of NIRS is the cap. Since Brainsight is designed with multi-modality in mind, the design of the cap and optodes are even more important. We have focused our efforts on a flexible optode design that can be simply used with other modalities including EEG, TMS and MEG.

The optode itself has a low profile (7mm) and the fibre is parallel to the head (90˚ to the optode surface). This allows a TMS coil to be placed relatively close to the head for simultanious TMS and NIRS. The angled fibres also make it possible to apply the optodes to a subject lying down (e.g. MEG, fMRI).

The last piece of the puzzle is the cap. Our optode design allows us the flexibilty to seek the best cap solution for your particular needs. Our elastomer cap allows easy access to the hair, holds the optodes on the scalp and can be adapted to combine NIRS and EEG. We can design and build various configurations to meet your needs, or use rapid prototyping to construct adapters to fit the optodes to your own caps.

Brainsight®

NIRS — Specifications

Feature	Brainsight NIRS (8-32 ch. Model)	Brainsight NIRS-8
Number of detectors	8-32	8
Number of detectors dedicated to proximity measurements	4-16	4
Detector type	Si APD (cortical detectors) Si photodiode (proximity detectors)	Si APD (cortical detectors) Si photodiode (proximity detectors)
Emitter type	Laser diode (Class 3B)	Laser diode (Class 3B)
Number of source optodes	4-16 (could do 24)	4 (could do 6)
Typical number of channels (source-detector pairs)	72	18
Number of wavelengths per optode	2-3	2-3
Supported wavelengths	685nm 830nm ∗ Other configurations available on demand	685nm 830nm ∗ Other configurations available on demand
Sensitivity	< 0.5pW (cortical detectors) < 1pW (proximity detectors)	< 0.5pW (cortical detectors) < 1pW (proximity detectors)
Dynamic range	> 100dB @20Hz (cortical detectors) > 90dB @20Hz (proximity detectors) ∗ Extra 37dB with gain adjustment.	> 100dB @20Hz (cortical detectors) > 90dB @20Hz (proximity detectors) ∗ Extra 37dB with gain adjustment.
Modulation	FDMA	FDMA
Real time data display	Yes	Yes
Maximum power	10mW / wavelength (mean)	10mW / wavelength (mean)
Sampling rate	1-100Hz (up to 64 pairs, 128 pairs @50Hz)	1-100Hz (up to 64 pairs, 128 pairs @50Hz)
Host connection	Ethernet (possibility of multiple clients)	Ethernet (possibility of multiple clients)
Interlock	Yes	Yes
Exported file format	.nirs (HomER)	.nirs (HomER)
Number of auxiliary channels	8 (TTL or analog inputs).	8 (TTL or analog inputs).
Trigger out.	1	1
Auxiliary sampling rate	1-8000Hz	1-8000Hz
Optode height	~7mm	~7mm
Optical fibre length	3m standard ∗ Custom length on demand.	3m standard ∗ Custom length on demand.

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