NIRSport System Description

NIRSport is a portable, multi-channel, modular functional near-infrared spectroscopy (fNIRS) platform which measures hemodynamic neuroactivation via oxy-, deoxy-, and total hemoglobin changes in the cerebral cortex.

NIRSport platform combines lightweight LED sources and active detectors with innovative strain-relief hardware to create a truly wearable brain imaging solution ready for use in any ‘portable lab’, or movement-related study.

A Wearable System Solution

NIRSport comes in 8-source/8-detector (64 data channels) and 16-source/16-detector (128 data channels) configurations, with a diverse array of available headgear and probes to fit any subject and neuroscience application.

Freely-configurable probe arrays easily integrate with EEG and tDCS within a single NIRx NIRScap. Concurrent fNIRS + fMRI and fNIRS + TMS may be done with NIRSport’s low-profile fiber-optic probes. NIRSport can measure both topographic and tomographic NIRS data from the entire cortex, yielding 3-D depth-discriminating neuroactivation.

This system uses precise event marker triggering.
A real-time data streaming option is available for BCI/neurofeedback applications.

Applications

- BCI/Neurofeedback
- Cognitive Disorders
- Developmental Disorders
- hyperscanning (multi-subject measurements)
- Movement/Balance
- Infant Monitoring
- Neuropathology
- Neuropsychiatry
- Social Interaction
- Speech/Language
- Stroke and Rehabilitation
- Traumatic Brain Injury

Multi-modal Integration: fNIRS + EEG
fMRI
TMS
tDCS

NIRx instrument systems and software are not FDA approved and not intended to support clinical diagnostic-treatment decisions. Instead, our products are designed to support scientific investigative studies that have been IRB approved.
NIRStar
NIRS Acquisition Software by NIRx

NIRScout includes the NIRStar software package, which provides a user-friendly GUI for system control including: quick automated calibration and diagnostics; signal quality checks (similar to EEG ‘impedance check’); clear subject monitoring; and real-time data streams, block averages, and 2D, 3D and MNI activation displays.

NIRStar
Software Features

- Real-time multi-event block average views
- Activation shown in 2D, 3D, and MNI displays
- Includes built-in presentation software: NIRStim
- Automated hardware diagnostics
- BCI/Neurofeedback - real-time processing
- Create and load flexible sensor configurations
- Online signal-quality monitoring
- 3D optode position registration
- Programmable source-illumination pattern
- Hyperscanning: Multi-subject experiments
- Easy export to nirsLAB
- Open data format
# NIRSport Technical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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<tbody>
<tr>
<td><strong>Maximum Sources</strong></td>
<td>8 (up to 16 in tandem configuration)</td>
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<tr>
<td><strong>Maximum Detectors</strong></td>
<td>8 (up to 16 in tandem configuration)</td>
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<tr>
<td><strong>Maximum Data Channel Streams</strong></td>
<td>64 (up to 128 in tandem configuration)</td>
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<tr>
<td><strong>Sampling Rate</strong></td>
<td>2.5Hz - 62.5Hz</td>
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<tr>
<td><strong>Source Illumination Type</strong></td>
<td>LED</td>
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<tr>
<td><strong>Source Wavelengths</strong></td>
<td>760nm &amp; 850nm</td>
</tr>
<tr>
<td><strong>Key Measurement Features</strong></td>
<td>Time multiplexing and 10^5 dynamic gain state switching</td>
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<tr>
<td><strong>Detector Dynamic Range &amp; Sensitivity</strong></td>
<td>60 dBopt; &lt;1 pW</td>
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<tr>
<td><strong>Detection Sensor</strong></td>
<td>Si Photodiode</td>
</tr>
<tr>
<td><strong>Trigger/Event Connection</strong></td>
<td>4-bit TTL Input</td>
</tr>
<tr>
<td><strong>Data Acquisition Software</strong></td>
<td>NIRStar (Included)</td>
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<tr>
<td><strong>Topography Software</strong></td>
<td>nirsLAB (Included)</td>
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<tr>
<td><strong>Tomography Software</strong></td>
<td>NAVI (Included)</td>
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<tr>
<td><strong>Headgear</strong></td>
<td>NIRScaps: Fully-customizable, fits all age ranges. Multi-modal (Included)</td>
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<tr>
<td><strong>BCI/Neurofeedback</strong></td>
<td>Optional Module for NIRStar</td>
</tr>
<tr>
<td><strong>Multi-modal Compatibility</strong></td>
<td>EEG, tDCS, Eye-tracking, Motion-tracking w/ module: fMRI, TMS</td>
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<tr>
<td><strong>Included Accessories</strong></td>
<td>NIRScaps, Backpack, Carrying Case, Trigger Cable, Tablet PC, System/Tablet Baseplate</td>
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<tr>
<td><strong>Optional Accessories</strong></td>
<td>Remote-Control Trigger, Active Trigger Splitter, fMRI/TMS Modules, Flat-Tipped Probes, Blunt-Tipped Probes, Animal NIRS Module, BCI/Neurofeedback Module</td>
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<tr>
<td><strong>Hyperscanning Configuration</strong></td>
<td>Up to 2 separate bi-lateral 8-source/8-detector arrays for two subjects</td>
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<tr>
<td><strong>Multi-distance/Short-distance Probe Arrays</strong></td>
<td>Yes</td>
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<tr>
<td><strong>3D Depth Discrimination?</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Phase and Spectroscopic Technique</strong></td>
<td>Single Phase, Continuous Wave</td>
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<tr>
<td><strong>Temperature Range</strong></td>
<td>10C to 40C (Operating), -15C to 70C (Storage)</td>
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<tr>
<td><strong>Humidity</strong></td>
<td>20% - 80% Relative Humidity Non-condensing</td>
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<tr>
<td><strong>Power Voltage and Consumption</strong></td>
<td>15 - 21 VAC (50 - 60Hz); 39VA Max Consumption</td>
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<tr>
<td><strong>Dimensions (WxHxL) and Weight</strong></td>
<td>105mm x 170mm x 40mm; 660g</td>
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