



## simplifying **Neurosurgery**

### SERVICES AVAILABLE

#### **Stereotactic & Functional Neurosurgery**

Global leaders for innovative and dependable microelectrode recording systems

#### **Research Applications**

Advance neuroscience research without sacrificing clinical efficiency

#### **Medical Consumables**

Microelectrodes, cannulae, & electrode input cables for any MER system

#### **Technical Support**

On-site and remote case support, training, maintenance and more

## A letter from the President



**Imad Younis**  
President

Since our inception in 1993, Alpha Omega has played an important role in fostering innovation and development in two main areas - neuroscience research and functional neurosurgery. Over the last two decades, we have pioneered leading edge technology in both fields and humbly received international recognition from numerous global experts. In 2013, we introduced the latest innovation in neuroscience technology and the new gold-standard in MER: The Neuro Omega. Alongside this novel MER solution are many more updates to our current neurosurgery suite designed to fit your needs and exceed your expectations, day after day, with the utmost precision and reliability in the operating room.

One of the most important aspects of Alpha Omega's success is based on the unique and personal relationships we have maintained with our customers. In today's fast-paced world of evolving technology, smart decisions are critical for innovation to bring results of improved patient outcomes. We are here to serve you, and are glad to welcome you into the Alpha Omega family of satisfied clients!

## Mission & Values

*Improve the quality of patient care in the areas of neurology and neurosurgery, by developing superior technological solutions*

*Provide state-of-the-art tools for those who work to reveal the mystery of the brain and find cures for neurological disorders.*

*Relentlessly endeavor for the highest standards of reliability and quality in our products*

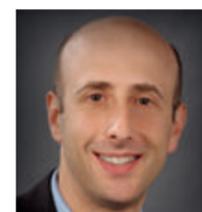
*Be identified as a company of dedication, honesty, integrity, and outstanding customer support*

## Don't take it from us... here's what some of our customers have to say



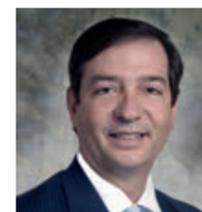
Alpha Omega is the world's best company for producing technologically sophisticated, versatile, and highly usable physiological recording equipment. The devices are highly robust and functional. In the clinical setting, this translates into excellent and reliable recordings which result in optimal localization and maximum benefit for the patient. In the research setting the same qualities allow the scientist to focus on the experiments and the resulting data and not on trouble-shooting the system. The company is instantly responsive and willing to modify their products to suit the needs of each individual user. They are without question the best in the field.

**Emad Eskandar**, MD Boston MA.



I have used Alpha Omega equipment for 7 years, after having used equipment from a number of other vendors in the past. I have found the Alpha Omega equipment to be the most reliable, with by far the best noise reduction hardware and software available, as well as easy-to-use and powerful data analysis tools. Furthermore, the company's support staff is without peer.

**Alon Y. Mogilner**, MD, PhD, NYU Langone Medical Center



"I have worked with and used Alpha Omega equipment since 2001. I have also used most every other microelectrode recording system available and have found that in a large 1600+ bed facility the Alpha Omega system is second to none. The equipment is highly robust and functionally easy to use and interpret with respect to both hardware and software components. The recordings are consistently reliable and results in optimal localization and maximum benefit for every patient in my busy practice. The service and support I receive from the company is superb and they constantly strive to make the system better with each upgrade taking into consideration our specific needs and recommendations. With no doubt I feel they are the leaders in the field."

**B.V. Gallo**, M.D., University of Miami, School of Medicine

## Why MER?

- Microelectrode Recording (MER) remains the gold standard for optimal localization of DBS targets
- Assessment of electrophysiological activity confirms the structural location
- Real-time feedback to account for inaccuracies during planning stage
- Critical research tool for exploration of DBS targets

"Ultimate spatial localization of the DBS electrode should be based on the electrophysiological properties of the tissue, ie, the underlying neuronal activity, rather than the anatomically defined location."

Abosch, Aviva, et al. "An assessment of current brain targets for deep brain stimulation surgery with susceptibility-weighted imaging at 7 tesla." *Neurosurgery* 67.6 (2010): 1745.

"Functional imaging and neuroelectrophysiological data will be essential to the development of targets, trials, and unbiased assessment of clinical response."

Lyons, Mark K. "Deep brain stimulation: current and future clinical applications." *Mayo Clinic Proceedings*. Vol. 86. No. 7. Elsevier, 2011.

"Factors that call for physiological mapping to refine electrode location following initial anatomical targeting include imaging inaccuracy or distortion (particularly MRI); the need to refine target selection related in part to incomplete understanding of the relationship of anatomy, physiology, and clinical outcome; inaccuracy of frame- or frameless-guided navigation; and/or brain shift due to positioning, loss of cerebrospinal fluid, pressure shifts, and/or pneumocephalus"

Gross, Robert E., et al. "Electrophysiological mapping for the implantation of deep brain stimulators for Parkinson's disease and tremor." *Movement disorders* 21.S14 (2006): S259-S283.

"...a relatively inaccurate anatomical placement can be refined (and presumably improved) based on intraoperative physiological or neurological data."

Starr, Philip A., et al. "Subthalamic nucleus deep brain stimulator placement using high-field interventional magnetic resonance imaging and a skull-mounted aiming device: technique and application accuracy." *Journal of neurosurgery* 112.3 (2010): 479.

"Despite improvements in anatomic imaging of the basal ganglia, microelectrode recording is still an invaluable tool in locating appropriate targets for neurosurgical intervention."

Lozano, Andres M., et al. "Basal ganglia physiology and deep brain stimulation." *Movement Disorders* 25.S1 (2010): S71-S75.

"We therefore suggest that optimization of DBS outcome in patients with Parkinson's disease could be achieved by intraoperative analysis of STN beta oscillations by microelectrode (as in this study) or macroelectrode (Chenet al., 2006) recording."

Zaidel, Adam, et al. "Subthalamic span of oscillations predicts deep brain stimulation efficacy for patients with Parkinson's disease." *Brain* 133.7 (2010): 2007-2021.

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## NeuroNav

Compact MER solution for simplicity in the OR

Streamlined setup  
Compact  
Cost-effective



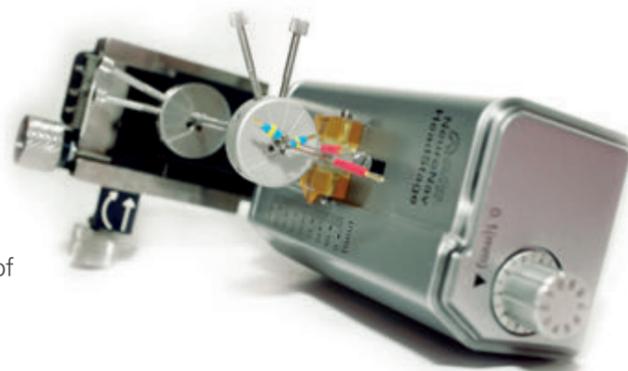
The NeuroNav is a state-of-the-art MER system used clinically in the localization of surgical targets for the implantation of Deep Brain Stimulation (DBS) electrodes or ablation of target structures, in the treatment of neurological and psychiatric diseases. The NeuroNav allows for safe and accurate introduction of electrodes into the brain, while recording neural activity, stimulating neural tissue, and guiding the user to the optimal target. This system is ideal for all DBS centers and community hospitals interested in flexible usability, affordability, and compact size.

### Key Qualities

- > Quick set-up with user friendly interface & seamless operation capabilities
- > Handheld remote allows completely independent operation from within sterile field
- > Straightforward software interface specifically designed to streamline the MER procedure
- > Single cable exits sterile field for electrode positioning, recording and stimulation, which minimizes risk of contamination
- > Minimize impact of MER on O.R. time
- > Optimal signal clarity due to direct connection of electrodes to system amplifiers
- > Available for rental or fee-per-use

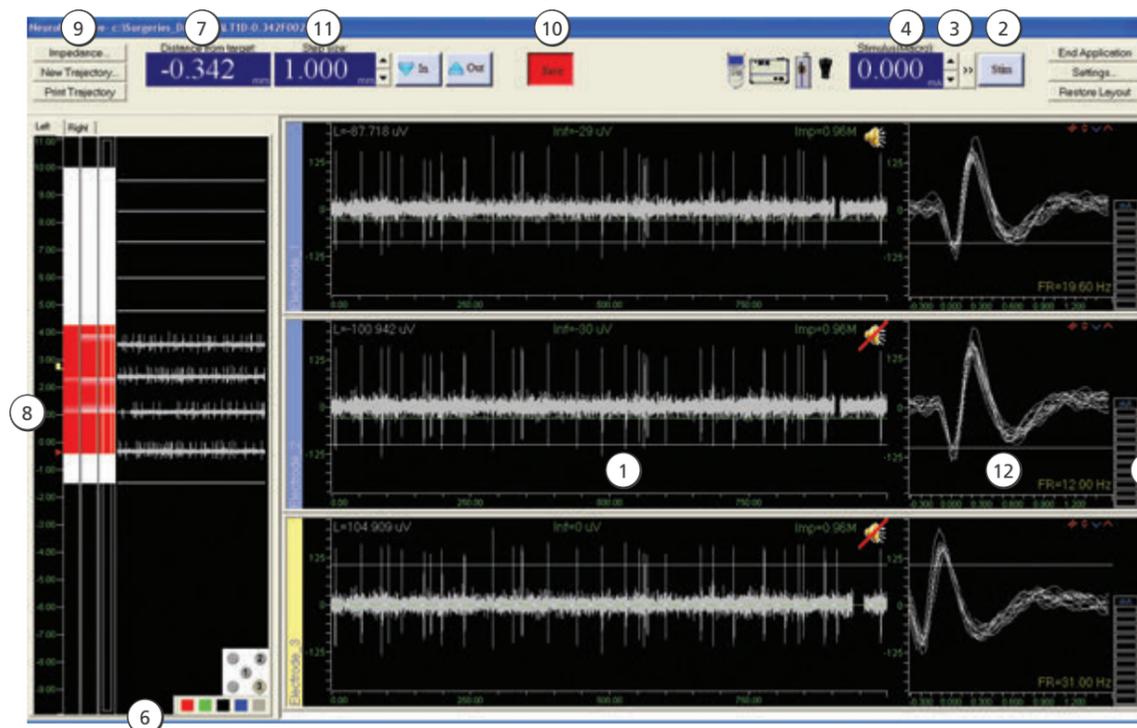
## NeuroNav Headstage

- > Pre-assembled microdrive for quick and easy setup in the sterile field
- > Built in capability for recording and stimulation
- > Lightweight, low impact on frameless or frame based procedure
- > XY stage and 5-hole bungen allows trajectory adjustments without frame manipulation
- > Direct implantation of DBS electrode without backing up drive or removing cannulae
- > Fully compatible with all stereotactic frames
- > Precision movement with an electronic drive
- > Automatic or manual microdrive capabilities



### User interface

- 1 Multi-channel recording capabilities.**  
A total of up to 10 recording channels: up to 5 for spike activity measured from electrode micro contact and up to 5 for local field potentials (LFP) measured at the macro contact
- 2 Wide stimulation range** for micro and macro threshold stimulation tests
- 3 Switch from recording to stimulation** with the push of a button
- 4 Gradual increase and decrease of stimulation current** during stimulation for added safety
- 5 Current feedback** system ensures accurate delivery of stimulation current
- 6 Clear on-screen trajectory view**, automatically builds electrophysiological map as the electrode advances in the brain
- 7 Electrode depth and distance from target** are both clearly displayed on screen, with easy reference to macro and micro tip locations
- 8 Proprietary On-line Pattern Recognition Algorithm** for optimal localization of increased neural activity
- 9 Measure the impedance of all micro contacts simultaneously** to ensure recording integrity
- 10 Save** data for post-case analysis in **MATLAB** or other formats
- 11 Pre-set Step Size** option to maximize precision of the microdrive and improve safety and control
- 12 Adjustable threshold** for spike detection
- 13 User-friendly, handheld remote control** allows direction of all system functions from a simple key pad from inside or outside the sterile field



## Neuro Omega

The new gold-standard in MER and the latest innovation in neuroscience technology

*Integrated research platform*  
*Closed loop and 3D stimulation possibilities*

*Expandable channel count*

The Neuro Omega is the latest technological breakthrough in MER. Innovative software and hardware implemented in the Neuro Omega make this all-encompassing system ideal for both clinical MER applications and advanced research needs. MER users gain total experimental control while benefiting from Alpha Omega's highest performance, quality and clinical efficacy.

### Key Qualities

- > Expandable up to 122 channels
- > Online data streaming to MATLAB and C++
- > Closed loop stimulation control through data streaming or direct-to-processor scripting
- > Unparalleled stimulation capabilities including conditional stimulation, programmable stimulation, and arbitrary wave definition
- > Multi-source, multi-polar stimulation allows for 3D stimulation control
- > Single cable exiting the sterile field for electrode positioning, recording and stimulation
- > Online statistics including evoked potentials
- > Unique dual screen display and customizable workspace
- > Integrated analog and digital inputs and outputs
- > Built in capability for recording and stimulation
- > Lightweight, low impact on frameless or frame based procedure
- > XY stage and 5-hole bungen allows trajectory adjustments without frame manipulation
- > Direct implantation of DBS electrode without backing up drive or removing cannulae
- > Fully compatible with all stereotactic frames
- > Precision movement with an electronic drive
- > Automatic or manual microdrive capabilities

### Neuro Omega Drive

- > High amplifier input range allows non-stimulating channels to record throughout stimulation
- > Pre-assembled microdrive for quick and easy setup in the sterile field



neuro  
omega

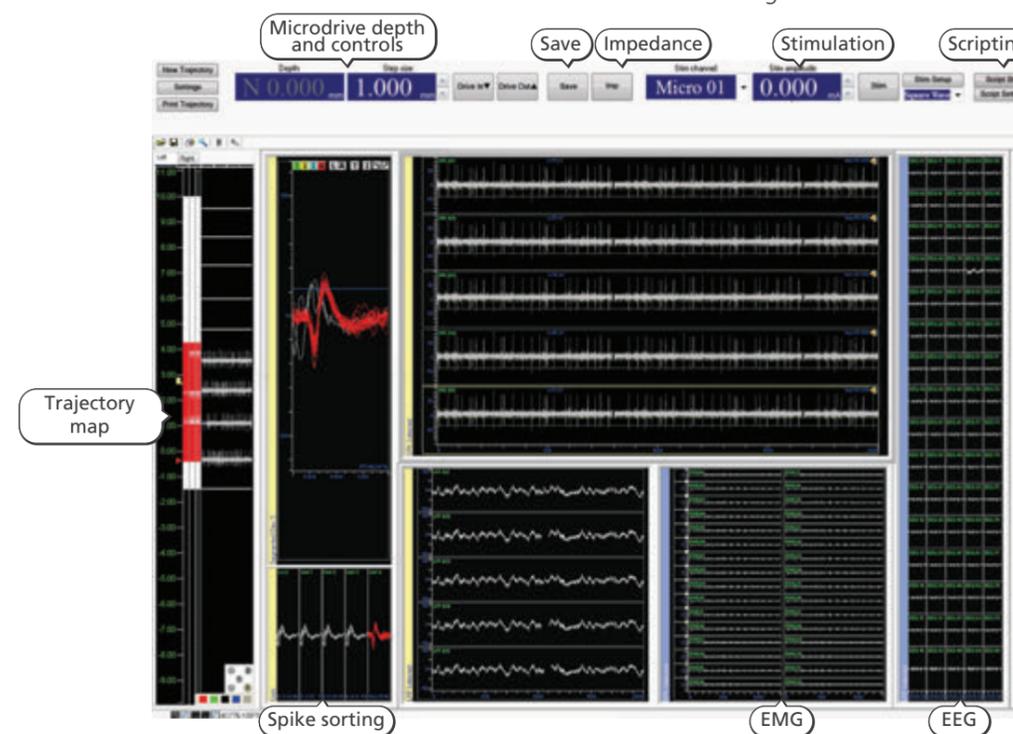
### Headbox Module

- > Up to 7 additional modules
- > 16 channel module with referential and differential recording for EEG, EMG, & ECoG
- > Portable and compact
- > Advanced multi-source stimulation capabilities for peripheral nerve and ECoG
- > Medical grade, industry standard touch proof connectors



### User interface

- > **Trajectory view** with pattern recognition for increased neural activity
- > **10 channels built into the microdrive** for recording and stimulation with micro and macro spike and LFP recordings
- > **Configurable with up to 122 channels** integrated all in one system:
  - > Micro and Macro electrodes
  - > LFP
  - > EEG
  - > EMG
  - > ECoG
- > One click **impedance check** for all channels and electrode types
- > **Flexible stimulation** current ranges for microelectrode test stimulations, peripheral nerve stimulation and other stimulation research requirements
- > Complete **stimulation control** on the basic stimulation parameters and the ability to create unique waveforms
- > **Save** data for post-case analysis in **MATLAB** or other formats
- > User-defined **Events** allow for easy marking and commenting onto data file



# MicroGuide

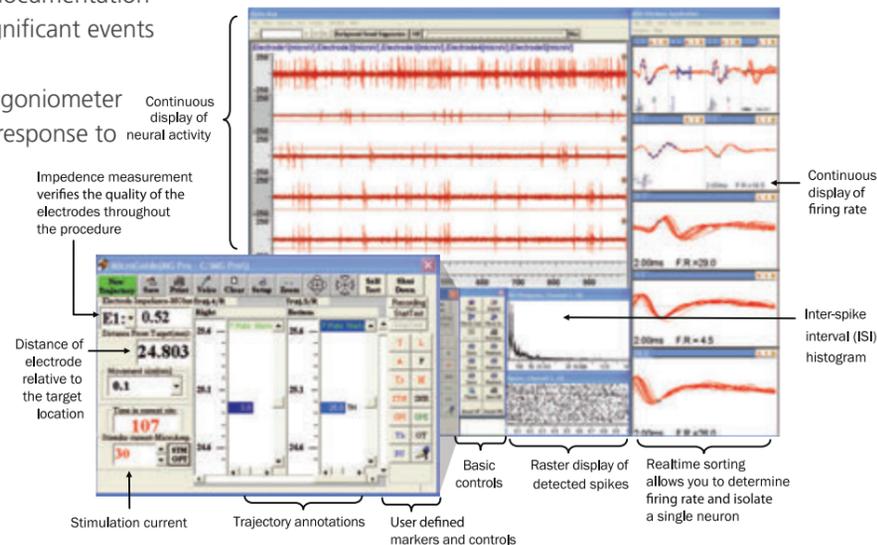
Classic MER system with research functionality

- ▮ *MER-Specific Applications*
- ▮ *Customizable*
- ▮ *β-Oscillation Guiding System*

The MicroGuide Pro is present globally in the world's best hospitals, and has continually served top doctors and researchers in achieving their research objectives while maintaining clinical efficiency.

## System Highlights

- Multi-channel recording and integrated stimulation for up to 8 channels
- Easy to assemble 5-electrode NeuroDrive
- Sophisticated, easy-to-use software offering several research capabilities
- Easy access to controls from handheld remote
- Trajectory map construction and documentation allowing annotations to reflect significant events and anatomical brain structures
- Recording synchronization with a goniometer signal, to easily identify neuronal response to passive movement
- β-Oscillation Detection Algorithm for providing feedback to aid in identifying the motor area of the STN for the optimal location for implantation



# Application Support

Alpha Omega prides itself on the extraordinary level of service and personal attention we dedicate to each and every one of our clients:

- ▮ *Remote & On-site Case Support*
- ▮ *Rentals and fee-per-use plans*
- ▮ *Service Contracts*
- ▮ *Performance Maintenance*
- ▮ *System Refurbishment Plans*
- ▮ *System Upgrades*
- ▮ *Installation Packages*
- ▮ *In-Service Training for OR Staff*

# Medical Consumables

Alpha Omega manufactures a large selection of electrodes, guide tubes, and electrode input cables of the highest quality and performance. The diverse selection can be further customized and is compatible with all drives and MER systems. Our consumables are now offered pre-sterilized to save time, cost, and hassle in the OR.

## Key Qualities

- Customizable specifications upon request
- Compatible with any drive
- Compatible with any MER system
- Superior recording quality, impedance consistency
- Variety of microelectrodes in different materials
- Tapered or standard guide tubes

## Pre-Sterile Option Benefits

- Increase case efficiency by eliminating sterilization procedure
- Avoid electrode tip damage during processing
- Safer handling of the microelectrodes
- Open only the electrodes needed for the operation
- **Free samples upon request!**

**Microelectrodes – NeuroProbes** are used with MER systems to map surgical targets for Movement and Psychiatric Disorders.

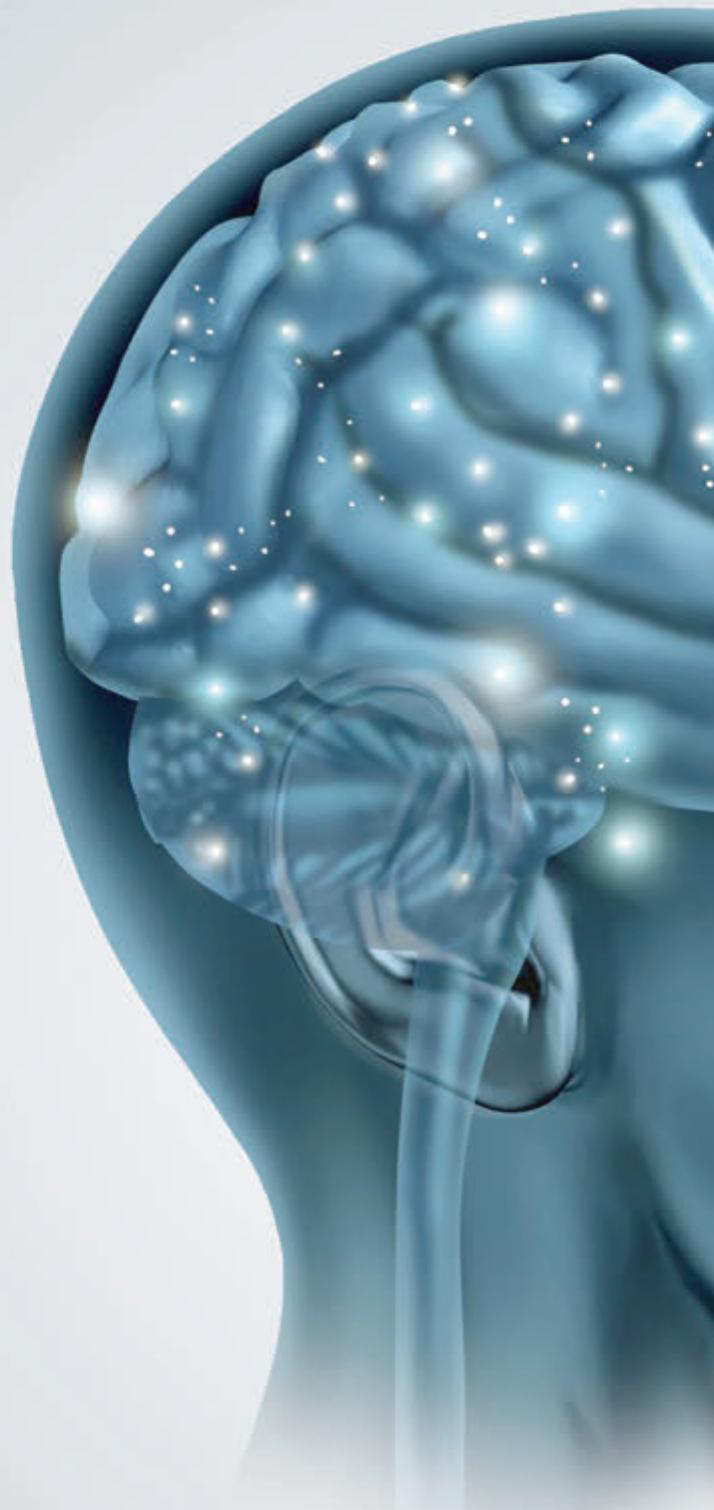


**Guide Tubes** The inner diameter of the stainless steel guide tube will accommodate shielded NeuroProbes and the DBS lead eliminating the need to switch guide tubes.



**Electrode Input Cable** This cable connects the micro and macro contacts of the electrode to the NeuroNav or the Neuro Omega Headstage.





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