



## **SPECIFICATION SHEET**

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### **SUPPLY, INSTALLATION AND STARTING-UP OF A “Wearable Optical Neuromonitor”**

**FILE NUMBER: ICFO-2026-014**

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## 1. Object of the contract

The purpose of this contract is the supply, installation, starting-up and training on the use of two (x2) “Wearable Optical Neuromonitors”, for a laboratory of The Institute of Photonic Sciences. The required equipments are two full-head coverage, wearable near-infrared spectroscopy based system for studies of brain function in realistic settings.

## 2. Needs to satisfy

The core purpose of the required systems is to be able to monitor with sufficient (>5 Hz) temporal resolution the changes in local oxy- and deoxy-hemoglobin concentrations in response to brain activity. The system should be able to simultaneously measure more four locations per cerebral hemisphere, should be able to provide adequate means to separate cerebral and extra-cerebral signals and should be wearable as in attached to the subject’s head including a means to be controlled remotely while the subject is moving around. It should provide a synchronized, multi-modal assessment of the general body physiology. Finally, two systems should be able to be synchronized for simultaneous recording from two different subjects.

## 3. Technical requirements

The specific technical requirements for the two systems are summarized below.

1. Based on near-infrared spectroscopy (NIRS) with a minimum of two wavelengths in 740-880nm range.
2. The system should be portable, lightweight, and wireless.
3. It must include at least 16 light sources/wavelength and 16 light detectors, and can be divided into other configurations with fewer channels (sources x detectors).
4. The system should be expandable to 64 sources/wavelength x 64 detectors for high-density recording.
5. The system must allow for synchronization between at least two different units for simultaneous scanning on two or more subjects for hyperscanning studies. Tandem cascading of up to 4 systems (up to 208 channels) with native hyperscanning via dedicated Hyperscan application is needed.
6. The system must include NIRS recording software that allows real-time visualization of the NIRS RAW signal, real-time averaging, and real-time 3D mapping. This software should be open source and license-free, allowing for installation on any PC as many times as needed, with free updates.
7. The system must allow data export to third-party programs such as Pythonm, Matlab, Homer2, or Homer3.
8. The system must be compatible with any stimulus presentation system such as Presentation, Eprime, Superlab, Psychopy, etc., and must allow synchronization.
9. The system must allow remote connection via another application using the "Labstreaming" language for brain-computer-interface (BCI) and neurofeedback applications.
10. The system must be compatible with standard eye-trackers and neuronavigators.
11. The system must be able to connect wirelessly via Wi-Fi and also via USB.
12. The system must include a robust short source-detector architecture for regression of extra-cerebral signals including scientifically optimal 8 mm short channels, minimum eight short channels generated from a single detector and spatially distributed short channels for robust physiological artifact correction.
13. The system must include at least two 9-axis accelerometers to co-record head movement and position during recording. Flexible accelerometer placement for head and limb motion tracking is needed.

14. The system allows for dark noise measurement during calibration to detect potential ambient noise.
15. The system must include carrying cases to allow for the equipment to be moved to other work areas.
16. The system should have specific performance metrics with sampling rate up to 160 Hz , source brightness adjustment in 0.1% increments, multi-distance measurements from 8 mm to 5 cm, high-density and tomographic recording enabled by Enhanced Frequency Encoding (EFE) and Multi-Level Illumination (MLI).
17. The system should provide unrestricted optode placement enabling whole-head coverage, occipital and posterior brain regions should be fully accessible and provide support for multiple probe types and Avalanche Photodiode (APD) detectors.
18. The system should provide access to raw voltage data (not only optical density) with 24-bit data-resolution.
19. The sources should be allowed to be controlled externally – on/off.
20. The system must include at least two peripheral measurement recording devices (ECG, respiration, EDA, SpO2, EMG, accelerometry, pulse) for co-recording with the fNIRS signal.
21. The system should have up to 5 hours battery life with operation while charging
22. It should come with 3-year standard warranty
23. It should include installation, on-site and remote training plus dedicated scientific support portal

#### 4. Transport, installation and start-up

The awarded supplier must provide transport, customs clearance, and delivery to ICFO facilities in Castelldefels. On-site installation, verification, and acceptance testing are mandatory. The supplier will also provide training sessions for ICFO personnel on the operation and maintenance of the system.

List of essential requirements:

1. The proposal should include transportation to ICFO's facilities and all export/import and customs duties.
2. The equipment should be placed in the selected locations by ICFO. Contract winner should cover all costs, organization and coordination of devices' placement.
3. Support for Installation and start-up of the system, including for system checking, functional tests and process qualification (Preferably in person)

#### 5. Warranty

**Minimum 3-year Full Warranty** on all parts and components of the system irrespective of the manufacturer. The warranty will include the replacement of any faulty or damaged part(s) upon delivery during normal use of the system, no matter the manufacturer of the component(s). It will cover any cost related with the disassembly, transportation, reparation and re-assembly of the damaged component(s), including all travelling and living costs of the required service engineer(s). An on-site repair, or a justified alternative to reduce the system down time to the minimum, will always be the first service option. A team of properly qualified and skilled service engineers will have to be available.

**Additional years of warranty will be evaluated positively as stated in the Annex núm. 2.**

## 6. CE MARKING

CE MARKING is required.

## 7. Delivery Time

Delivery time is defined as the time elapsed since the signature of the contract until the system delivery at ICFO facilities. It includes the manufacture of the system, the acceptance test at company's premises, transportation, installation and start-up.

The equipment must be delivered at ICFO within a maximum period of **60 days** from the PO issued by ICFO.

## 8. Target price

170.000,00 EUR (VAT excluded).

Castelldefels, at the date of digital signature.

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