AALBORG UNIVERSITY
DENMARK

Invitation to announcement for design of device to NeuraLoop

1. Contracting authority

The Contracting authority for this invitation to announcement is Aalborg University (hereafter AAU).

AAU is an independent institution, which is economic independent of the state of Denmark and subject to the Danish Act of Universities (Universitetsloven).

The daily management on AAU is managed by the Rector in corporation with the University Director, Prorector and the Deans. In addition, AAU have a board that consists of an independent chairman and external and inside members there represent the universities scientifically staff, the administration staff and students.

AAU consist of a central administration called "AAU Shared Services" and four academic faculties, where each consists of several institutes. In addition, AAU accommodate some Centre, cross-disciplinary projects and other units there typically works with research within specific areas or solve specific tasks within or outside the university's organization. The main part of the university is accommodated in the city of Aalborg, but also exists in the cities of Esbjerg and Copenhagen.

AAU have nearly 20.000 registered full-time students and nearly 3.000 half time students and have about 3.500 employees comprised of administrative and scientific staff, among these scientist and lecturer.

Further information about the AAU is available on www.en.aau.dk.

2. About the purchase

This announcement is in accordance with section 191 of the Danish Act on Tender Procedures as the contract has a total estimated value below the EU threshold, but is also considered to have a clear cross-border interest. The invitation to announcement is advertised at www.udbud.dk.

AAU is seeking for the design and development of a multichannel prototype unit that allows to measure biopotential signals (EMG) and to deliver electro tactile stimulation simultaneously. The design must include the following functionalities:

1) the device must be able to record and process EMG, and generate and control electrotactile stimulation in real time,
2) the device has to be configured and operated using wireless communication connected to the host computer,
3) it needs to allow for both onboard storage and online data streaming at maximum sampling frequency (2000 Hz) to a host computer, and
4) methods or circuits for removing stimulation artifacts in the EMG signals must be integrated into the device.

The purpose of the device is to conduct research activities in the fields of biomedical science and Human-Machine Interaction. To this aim, the unit must be light-weighted and self-contained in a single small case to facilitate wearing it attached to the body.

The specific requirement for the purchase is presented in section 3.

3. Requirements

General requirements

No.	Title	Description	Minimum requirement / Wish		Fulfilled (yes/no)		Description of how the minimum requirement/wish is met
			MR	W	Yes	No	
1.1	Service and support	6 months after-sales service support to assist with eventual issues or questions related to the normal operation of the device. The 6 months starts from the delivery (see requirement 1.11).	X				
1.2	Software updates	6 months firmware updates to fine tune the communication protocol between the device and the host. The 6 months starts from the delivery (see requirement 1.11).		X			
1.3	Software support	Firmware needs to be user friendly and to support adding of custom-made functions	X				

		for processing of EMG data (filtering, pattern classification and regression) and controlling of the stimulation.					
1.4	Documentation	Source code of firmware, circuit schematics and PCB design files should be included.	X				
1.5	Manual	A user manual explaining how to use and interact with the device also including a detailed specification of the communication protocol between the device and the host should be included.	X				
1.6	Power connection	Battery powered, up to 4 hours of autonomy.	X				
1.7	Date of Delivery	3-4 months from the deadline for submitting the offer.		X			
1.9	Size	Compact device easy to wear on the wrist/forearm. Maximum weight of 300 grams.	X				
1.10	Payment Terms	One payment at delivery (se requirement 1.11).		X			
1.11	Delivery	Priority shipping to the named place of destination and according to the Incoterm DAP (Delivered at place): AAU SUND Selma Lagerløfsvej 249, 12-02-058 9260 Gistrup Denmark	X				
1.12	References	The tenderer should have relevant experience in prototyping devices for biomedical applications. Please describe the references.		X			

1.13	Contract and Statement of Truth Regulation	The tenderer must accept the contract in annex 1 and the Statement of Truth Regulation in annex 2.	X				

Technical requirements

No.	Title	Description	Minimum requirement / Wish		Fulfilled (yes/no)		Description of how the minimum requirement/wish is met
			MR	W	Yes	No	
2.1	Storage	16Gb flash memory.	X				
2.2	EMG Recording	32 channels in monopolar configuration.	X				
2.3	Sampling Frequency	Up to 2000 Hz.	X				
2.4	Gain	Variable.		X			
2.5	Electrical stimulation	32 channels in monopolar configuration. Current controlled stimulation.	X				
2.6	Stimulation intensity	Up to 10mA adjustable individually for each channel in steps of < 0.01 mA.	X				
2.7	Pulse shape	Biphasic stimulation pulse with compensated charge.	X				
2.8	Pulse frequency	Up to 200 Hz adjustable in steps of 1 Hz (common for all channels).	X				
2.9	Pulse Width	Up to 1000 µs adjustable in steps of 10 µs.	X				
2.10	Pulse Generator Voltage	50 – 100V.	X				
2.11	Sensors	9 axis IMU.	X				
2.12	Microcontroller	ARM Cortex M7.	X				

2.13	Operation mode	Circuits/methods for rejection of stimulation artefacts during EMG recording to allow simultaneous EMG recording and stimulation.	X				
2.14	Communication	Serial communication with host PC including wireless online streaming of the recorded EMG signals at max. sampling frequency.	X				
2.15	Connectivity and ports	1x USB C, Bluetooth 5.2.	X				
2.16	Command interface	The device needs to receive and execute online commands sent by the host PC to control recording and stimulation (parameter setup, start and stop, status reading, etc.).	X				

4. Evaluation

The assessment will focus on both the offered price in section 7 and the offered quality as described for the wishes in the requirements in section 3. Tenderers are therefore urged to provide a detailed description of each wish.

5. Questions and general conditions

Any questions to the announcement should be submitted via e-mail to anneka@adm.aau.dk. Tenderers are requested to submit these as soon as possible **and no later than 30th May, 2023**.

The submitted offer and all communication during the invitation period and the contract term must be in English or Danish.

The tenderers must observe strict confidentiality in relation to unauthorised third parties concerning information which may come into the tenderer's possession in connection with this announcement.

6. Submitting an offer

The Tenderer must fill out the requirements in section 3 with the following information:

- Fill in either “Yes” or “No” in the column asking fulfilled? (Yes or No).
- Fill in a complete description of whether the ”MR”, “W” or “Option” is satisfied/not satisfied where requested.
- Provide a full description of why the tendered product satisfies or does not satisfy the requirements.

The Tenderer must also fill out the tender price in section 7. The price must be in DKK excluding VAT.

The offer must be sent via e-mail to anneka@adm.aau.dk no **later than 6th June, 2023.** Relevant enclosures must be attached.
AAU will reply to the offer the week of 12th June where the contract is expected to be signed.

7. Tender price

The Tenderer offers the following tender price in DKK (exclusive VAT): _____ DKK