Requirements / Specification Document

National Institute of Standards and Technology
U.S. Department of Commerce

TITLE: Biometric Suite for Improved Virtual Reality Studies

Requesting Laboratory / Division / Group:

Communications Technology Laboratory
Public Safety Communications Research Division
Advanced Communications Research Group (671.02)

General Statement of Need:

The National Institute of Standards and Technology (NIST) Public Safety Communications Research (PSCR) program requires virtual reality (VR) and wearable sensor technology to support research and development for public safety applications. This acquisition includes a VR headset with integrated physiological sensors and additional wearable devices. The system requires specialized software for data analysis of Electroencephalogram (EEG), Electrooculography (EOG), Electromyography (EMG), and Heart Rate Variability (HRV) metrics. This equipment will be used to evaluate user interface and physiological responses in simulated public safety environments.

The Public Safety Communications Research (PSCR) program, located within the Communications Technology Laboratory (CTL), drives research and advances technologies to improve public safety communications. CTL promotes the development and deployment of advanced communications technologies by providing the measurement science, standards, and testbeds required for innovative wireless and wired networking. This purchase directly supports the User Experience (UX) Group by providing high-fidelity measurement tools necessary to evaluate how first responders interact with emerging technologies. The data captured by these sensors—specifically EEG, EOG, and HRV—allows for objective assessment of cognitive load and stress during critical tasks.

Item Specifications and Quantities:

Item 1:	Embedded Sensor Suite for use with Virtual Reality	
Quantity:	1 Unit	
Specifications:	1.1	Include embedded sensors for Electroencephalogram (EEG), Electrooculography (EOG), and Heart Rate Variability (HRV).
	1.2	Capable of providing EEG readings for theta/beta and alpha/theta ratios, and EEG Phase Locking Value (PLV).
	1.3	Provide EOG metrics, including dwell time and blink rate.

	1.4	A standalone system may be proposed for use with an existing VR headset owned by our lab. System must not interfere with the performance or general user experience of the VR headset. Current lab equipment includes Varjo XR-3, Quest 3, HTC Vive Vision, and Apple Vision Pro headsets. If none of these devices are supported, the contractor should propose an integrated solution that contains a new VR headset.
Item 2:	Wearable Physiological Sensors	
Quantity:	1 Unit	
Specifications:	2.1	Sensors capable of measuring: Heart rate (HR) Heart rate variability (HRV) Galvanic skin response (GSR). Sensors may include a mixture of chest, arm, and wrist straps.
	2.2	Includes wireless Surface Electromyography (sEMG) sensors. These sensors shall be
	2.2.1	non-invasive and allow for free movement during simulations (e.g., gait analysis and physical tasks).
	2.2.2	Provide sufficient sEMG (e.g., 4-pack, 8-pack) to track the actions (e.g., walking, running, jumping) of participants.
Item 3:	Software License	
Quantity:	1 EACH	
Specifications:	3.1	Support all hardware provided in Items 1 and 2. The software only needs to record biometric sensor data for one participant at a time.
		Licensing shall be provided as either a perpetual license or a 3-year subscription.

Vendor Requirements

1. Possess at time of award/contracting an Export Control Classification Number (ECCN).

2. Possess at time of award/contracting a Unique Entity Identification Number (UEI) which registration is listed as "Active" on the GSA System for Award Management (SAM.gov).

Procurement Support Information and Ancillary Services:

[Provide input for each section Below or Mark Not Applicable (N/A)]

Section	Requirements/Specifications
Planning Considerations ☒ N/A	☐ List any visits required to allow potential vendors to see site specific constraints. [Explain Requirements.] ☐ US citizen required on-site (foreign nationals require pre-registration 30 days prior to visit.) ☐ Vendor Representative On-Site more than three (3) days. ☐ Other Considerations: [List other considerations to ensure an accurate quote.]
Shipping & Delivery ☐ N/A	Shipping Address: ☒ NIST-Boulder ATTN: Scott Ledgerwood Mail Stop: 671.02 325 Broadway Boulder, CO 80305 ☐ NIST-Gaithersburg ATTN: Mail Stop: 100 Bureau Dr Gaithersburg MD 20899 ☐ [Alternate Shipping Address] Shipping Criteria: ☐ Partial Delivery Acceptable ☐ [Enter Shipping and Delivery information by item.] ☐ Direct Delivery to OU Building Required [Explain Need for Requirement] Building /Room Number: [Enter Building/Room Number]

☐ Building has Loading Dock

Containerization Preference: [Enter Container Type]

Other Requirements:

[List Any Other Requirement]

Delivery Date Criteria:

☒ Delivery Shall Be Competed No Later Than:
30 Days After Award

☐ Delivery Shall Be Made No Earlier Than:
Click or tap to enter a date.

☐ Scheduled Deliveries:

Item Number	Due Date

☐ Other:

[List Other Shipping, Delivery or Special Requirements.]

Electronic Media

☐ N/A

[Enter Electronic Media Requirements by Item.]

☒ Software

☒ Electronic Manuals

☒ License Key

☐ Other:

[List Any Other Electronic Media Requirements]

☒ US Government Email Address for Software Delivery:
scott.ledgerwood@nist.gov

Installation

☒ N/A

[Enter Installation Requirements by Item]

☐ Vendor Technician on Site

☐ Rigging

☐ Uncrating / Unpackaging

☐ Removal of Packaging Material

☐ Equipment Set Up

☐ Start-Up Services

☐ Turnkey Installation

☐ Other:

[Enter Details]

NOTE: TPOC shall be the coordination POC.

Facility / Utility Considerations

☒ N/A

[List Site Specific Utility Considerations by Item]

☐ OFPM Work Order Numbers

[List Work Order Numbers]

☐ Power Available

Voltage: [Enter voltage] (V)

Maximum Current: [Enter max current draw] (A)

Phase: [Choose Phase]

Frequency: [Typically 60Hz] (Hz)

NEMA Plug Type: [Enter Plug Type] (i.e.: NEMA L5-20P)

Environment: [Choose Environment]

Other Power Considerations:

[List Any Other Power Considerations.]

☐ Utility Connections:

[List Relevant Available Utilities, Pressure(s) and Flowrate(s).]

☐ Other Considerations:

[List Other Considerations to Ensure an Accurate Quote.]

Inspection and Acceptance

☐ N/A

[Inspection Requirements Per Item (Who, When, What, Where)]

☐ On-Site

☒ Acceptance Not Expected to Exceed 7 Business Days

☐ Acceptance Expected to Exceed 7 Business Days:

[Duration]

☒ Inspection and Acceptance Plan:

Upon delivery, the NIST SME will perform a visual inspection to identify defects, damage, or nonconformities. The Government shall have sole discretion to reject, require repair, or require replacement of such items at no cost to the Government. Ownership of the equipment shall transfer to NIST upon

acceptance by NIST. Acceptance will be confirmed by the NIST SME within 1 week (7 business days).

☐ Other:

[Enter Other Requirements]

Training

☐ N/A

Training Requirements (Who, When, What, Where)

☒ Number of Trainees: 5

☐ On-Site

☐ Off-Site Location: [Enter Location(s)]

Is Trainee Travel Required: [Choose Answer]

Scope of Training

☒ Operation ☐ Maintenance ☐ Troubleshooting

☐ Safety ☐ Other

[Enter Other Scope of Training Requirements]

☐ Training Materials to be Provided by Government:

[Describe Materials]

☐ Training Materials to be Provided by Vendor:

Training and operating manuals

☒ Other

2-4 Hours of remote training for end-users

NOTE: SME shall be coordination POC.

Warranty

☐ N/A

Base Manufacturer Warranty is acceptable

Warranty Length: [i.e. 3 - Years]

What is included?

☐ Labor ☐ Parts ☐ Travel

☐ Cost and Liability for Returns

☐ Other

[Enter Other Requirements]

☐ 1 Option Period

☐ 2 Option Periods

☐ 3 Option Periods

☐ 4 Option Periods (Maximum)

Calibration ☒ N/A	[Describe Calibration Requirements Per Item] Calibration Plan Length: [i.e. 3 - Years] What is Included? ☐ Labor ☐ Spare Parts ☐ Consumables ☐ Travel ☐ Cost and Liability for Shipment ☐ Software Updates ☐ Manuals ☐ Other [Enter Other Requirements] ☐ Requirements: [Enter Requirements] (i.e.: On-Site Within 72 hours, etc.) ☐ 1 Option Period Length: [i.e. 1 – Year / 6 - Months] ☐ 2 Option Periods ☐ 3 Option Periods ☐ 4 Option Periods (Maximum)
Maintenance ☒ N/A	[Describe Maintenance Requirements Per Item] Maintenance Plan Length: [i.e. 3 - Years] What is Included? ☐ Labor ☐ Spare Parts ☐ Consumables ☐ Travel ☐ Cost and Liability for Shipment ☐ Software Updates ☐ Manuals ☐ Other [Enter Other Requirements] ☐ Requirements: [Enter Requirements] (i.e.: On-Site Within 72 hours, etc.) ☐ 1 Option Period Length: [i.e. 1 – Year / 6 - Months] ☐ 2 Option Periods ☐ 3 Option Periods ☐ 4 Option Periods (Maximum)

Government Furnished Material / Equipment ☒ N/A	List Any Government Furnished Material / Equipment Per Item] ☐ Samples for Testing ☐ Equipment which will leave Government Site Description: [Enter Description] Serial Number: [Enter Serial Number] NIST Property Number: [Enter NIST Property Number] ☐ Other: [Enter Other Details]
Travel ☒ N/A	[Describe any Travel Requirements Per Item] ☐ Explain: [Enter Justification / Requirement] ☐ Other: [Enter Other Requirements] NOTE TO VENDOR: To the maximum extent possible, include travel requirement estimates as part of pertinent sections above (Installation, Maintenance, Repair, etc.). Otherwise, Travel will be a separate line item, reimbursable per the Federal Travel Regulation.