

## \*\*COMPLETE THIS FORM TO INITIATE SUPPLIER SCOUTING\*\*

### MEPNN Supplier Scouting Opportunity Synopsis

- \*The submitting organization (ex. MEP Center, requesting company, federal/state agency) agrees to notify NIST MEP of the status of actions taken as a result of this scouting instance within 30 days after receiving a results report. Notification should be via email to [scouting@nist.gov](mailto:scouting@nist.gov), indicating the following:
- Contact with matches identified in report complete and supply contract awarded, process complete
  - Contact with matches identified in report complete and no supply contract awarded, process complete
  - Contact with matches identified in report complete and supply negotiations underway, process in progress
  - Contact with matches identified in report underway; supply negotiations not yet begun; process in progress
  - Contact with matches identified in report not yet begun, process in progress
  - Contact with matches identified in report will not occur within the next 6-months, process complete

Scanning Electron Microscope

Item to be Scouted

15 days

**Opportunities will be posted for 30 days unless specified**

Please describe the item application/ the end use of item.\* Provide the item number if applicable: (N95 Mask vs Protective Mask).

A focused ion beam/scanning electron microscope system is used to image specimens at the nanometer scale. Additionally, it is used to prepare specimens for transmission electron microscopy.

2022-077

Supplier Scouting Number (NIST MEP use)

Scouting customer/product [NAICS Code](#), if known

<b>TECHNICAL INFORMATION:</b>	<b>1. Supplier Information</b>	<b>a. Type of supplier being sought*</b>
		<input checked="" type="checkbox"/> <b>Manufacturer</b> <input type="checkbox"/> <b>Contract Manufacturer</b> <input type="checkbox"/> <b>Distributor</b> <input type="checkbox"/> <b>Other</b> _____
	<b>2. Summary of Technical Specifications and Performance Requirements:</b>	<b>b. Reason for scouting submission*</b>
		<input type="checkbox"/> <b>2<sup>nd</sup> Supplier</b> <input checked="" type="checkbox"/> <b>Price</b> <input checked="" type="checkbox"/> <b>Re-shore</b> <input type="checkbox"/> <b>Past supplier no longer available</b> <input type="checkbox"/> <b>New Product Startup</b> <input type="checkbox"/> <b>Other</b> _____
		<b>a. Describe the manufacturing processes (elaborate to provide as much detail as possible).*</b>
		A vacuum chamber is manufactured and accessories (electron microscope column, ion column, deposition needles, micromanipulators) are attached and integrated with a single software application.
<b>b. Provide dimensions / size / tolerances / performance specifications for the item.*</b>		
Instrument should be equipped with a scanning electron microscope column (1.0 nm resolution, or better), a focused ion beam column (65 nA or better beam current), software-integrated micromanipulator, platinum deposition needle, and carbon deposition needle.		
<b>c. List required materials needed to make the product, including materials of product components.*</b>		
The vacuum chamber is probably aluminum. I'm not sure what the other accessories/components are made of.		

BUSINESS INFORMATION:	2. Summary of Technical Specifications and Performance Requirements cont:	d. Are there applicable certification requirements? * <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Please explain
		e. Are there applicable regulations? * <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Please explain
		f. Are there any other standards, requirements, etc.? * <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Please explain
		g. Additional Comments: Is there other information that would impact the item's performance or usefulness? Please explain.
		All of the items/accessories attached to the microscope should be integrated with a singular software application. Additionally, the software application should provide a scripting back end with a number of pre-written automation applications to increase workflow. We will not accept a one-off product, and the contractor should have a record of producing/selling at least 50 units of a similar product.
BUSINESS INFORMATION:	3. Volume and Pricing	3a. Estimated potential business volume (i.e., # Units Per Day, Month, Year) *:
		One unit.
	4. Delivery Requirements:	b. Estimated target price / unit cost information (if unavailable explain) *:
		550,000, including one year warranty, and one additional year extended warranty.
		a. When is it needed by? (Immediate, 30 Days, 6 months, etc.)*
		ASAP, following procurement.
		b. Describe packaging requirements (i.e., individually/group packaging)*
5. Additional Comments:	In a crate, installed by qualified contractor at NIST in Boulder, CO.	
	c. Where will this item be shipped? *	
	Boulder, CO	
		Is there other information you would like to include?
		I have attached a statement of work for a current procurement along with this document. We are seeking a US manufacturer for this product, as all known manufacturers are outside of the US.

## STATEMENT OF WORK

### **TITLE: Procurement of a Dual Beam Focused Ion Beam / Scanning Electron Microscope System**

#### **I. BACKGROUND INFORMATION**

The Applied Chemicals and Materials Division (ACMD) within the Materials Measurement Laboratory is involved in the characterization of metals, semiconductors, and other materials in support of multiple division projects. Materials characterization allows NIST scientists to make direct correlations between material processing, (micro)structure, and properties. This work involves imaging material structures and microstructures in a scanning electron microscope, as well as preparing specimens to be examined via transmission electron microscopy and atom probe tomography. A dual beam focused ion beam scanning electron microscope (dual-beam FIB/SEM) is an instrument which can be used to examine materials at the nanoscale via scanning electron microscopy and can prepare small-scale specimens for examination using other microscopy methods (including transmission electron microscopy, or TEM). Additionally, the dual-beam FIB/SEM system can be used to examine materials in three dimensions using a technique called serial sectioning. A modern dual-beam FIB/SEM also has an integrated micromanipulator (to pick up and manipulate specimens) and gas injection needs (which allow for deposition of protective surface layers).

#### **II. SCOPE OF WORK**

The contractor shall deliver and install one dual-beam FIB/SEM instrument with features as defined in the “Hardware Requirements” section. Control and support computers should also be included, as well as all software as defined in the “Hardware Requirements” section. Training will be provided for up to four NIST personnel and the system will be covered under warranty for at least one year to include all parts, labor, and travel.

#### **III. SPECIFICATIONS**

The Contractor shall provide one (1) dual-beam FIB/SEM system that meets the following minimum technical requirements. The Contractor shall install the instrument and provide training as described below.

##### **Hardware Requirements:**

###### *Electron and Ion Beams:*

- Scanning electron microscope column capable of achieving secondary electron resolution of 1.0 nm or better
- Scanning electron microscope column capable of producing a beam current of 200 nA or greater
- A suite of electron detectors that includes (at minimum) an Everhart-Thornley secondary electron detector, an in-lens electron detector, and a retractable segmented backscatter electron detector

- Vendors providing proposals are encouraged to include additional detectors as line-item options so the proposal can be customized to meet budget considerations
- A gallium-based focused ion beam column with a resolution of 3.0 nm or better
- A gallium-based focused ion beam column capable of accelerating voltages from 500 V to 30 kV
- A gallium-based focused ion beam column with a maximum current of no less than 60 nA

*Specimen Stage:*

- An X/Y-axis range of at least 100 mm
- A Z-axis range of at least 60 mm
- Ability to rotate 360 degrees
- Tilt to greater than 70 degrees
- Can accommodate a specimen greater than 80 mm in height to the eucentric point
- An infrared camera to allow real-time viewing of the specimen chamber

*Specimen Chamber*

- An oil-free vacuum pumping system
- An infrared camera to allow real-time viewing of the specimen chamber
- Vacuum ports to accommodate typical commercially available energy dispersive spectroscopy and electron backscatter diffraction detectors
- An integrated plasma cleaner

*Computers and Software*

- Control and support computers with an operating system of Windows 7, 10, or 11.
- FIB/SEM control software
- FIB/SEM manual control interface (hand panel)
- FIB/SEM scan controller that allows for patterning of the electron and ion beam to include rectangles, lines, circles, polygons, bitmaps, and arrays.

*Gas Injection System(s)*

- Gas injection system/needle that allows for the deposition of platinum via the electron or ion beam
- Gas injection system/needle that allows for the deposition of carbon via the electron or ion beam

*Micromanipulator*

- Computer-controlled micromanipulator that can be controlled in X, Y, Z, and rotation axes

*Automation Software*

- Software to automatically collect tessellated images over large areas
- Software to allow for automated production of lamella for examination in the transmission electron microscope
- Software to allow for 3D data collection via serial sectioning
- An integrated scripting language to allow for custom automations

### *Support Equipment*

- An air-cooled water chiller

### *Warranty and Service*

- One (1) year warranty (to cover parts, labor, and travel) is to be included with the base instrument specification
- An extended warranty or service agreement with a term of one (1) additional year should be included in the quotation for the instrument
- To clarify, the total warranty included should be one (1) year of standard warranty and one (1) year of extended warranty (or service agreement) to cover a total of two (2) years following installation.

### **Options:**

The contractor should provide pricing quotations (outside of the requirements in the Specifications section) to allow for optional purchasing of the following items:

- Consumable items, including:
  - Liquid metal ion source and associated parts used in the replacement of an ion source
  - Ion aperture strips and associated parts used in the replacement of an aperture strip
- Installation support equipment which may be required, including:
  - A connection interface box to ensure that electrical power, water, and support gas is routed correctly to the instrument (if not included with the base specification)
  - A power conditioner to ensure that electrical power provided to the instrument is free of interference (if not included with the base specification)

### **Installation:**

The Contractor shall install the instrument in Building 81, Room 1E105, at NIST Boulder, CO. Installation shall include, at a minimum, uncrating/unpacking of all equipment, set-up and hook-up of all equipment, start-up, demonstration of specifications, and removal of all trash. Instrument will operate to manufacturer's specifications upon installation. Installation will take place during normal business hours, between 8:30 am and 5:00 pm Eastern Time, Monday through Friday except Federal Holidays, and will be coordinated with the NIST Technical Point of Contact (TPOC). Installation is to occur prior to January 1, 2023.

### **Training:**

Include training at NIST for up to 4 NIST personnel covering normal operation, troubleshooting, and routine maintenance. Training will be provided during normal business hours, between 8:30am and 5:00pm Eastern Time, Monday through Friday, except Federal Holidays, and will be coordinated with the NIST Technical Point of Contact (TPOC) to ensure maximum availability of NIST personnel. Training is to occur within 30 days of installation. The training may be completed on-site at NIST immediately after installation and demonstration of specifications.

## **IV. PERIOD OF PERFORMANCE**

The period of performance shall be six months from award of this requirement.

## V. PLACE OF PERFORMANCE

All work shall be completed at the Contractor's facility. Installation of the instrument and training shall be accomplished at NIST, Boulder, Colorado. Normal duty hours are Monday through Friday, 8:30 a.m. to 5:00 p.m. with the exception of Federal holidays.

## VI. GOVERNMENT FURNISHED PROPERTY

No government property will be furnished.

## VII. DELIVERABLES

<i>Description</i>	<i>Quantity</i>	<i>Due Date</i>
Dual beam FIB/SEM instrument and all accessories	One (1)	Prior to January 1, 2023
Installation of the analytical instrument	Once	Prior to January 1, 2023
Operations and maintenance manual for the analytical instrument	One (1)	Prior to January 1, 2023
Training of NIST personnel at NIST, Boulder, CO	Amount defined by vendor proposal	90 days after installation

## VIII. ACCEPTANCE CRITERIA

The Contractor shall demonstrate that all performance specifications are met based on the contractor's standard acceptance testing criteria.

## IX. GENERAL INFORMATION

**Safety:** The Contractor employee shall be responsible for knowing and complying with commercial installation safety prevention regulations. Such regulations include, but are not limited to, general safety, fire prevention, and waste disposal.

**Security:** NIST is a restricted campus. An identification badge is required for access for entry into buildings and also is shown to the armed Security Police when entering the campus.

**Identification Badges:** Contractor employees shall comply with NIST identification and access requirements. The Contractor shall provide the name and citizenship information of employees for on-site visits to the NIST Technical Point of Contact (TPOC) prior to arrival. The TPOC will submit the name(s) and citizenship information to the NIST Office of Security in order for a given Contractor employee to enter the NIST campus. The Contractor employee is responsible for absences due to missing or expired identification and access documents. Each Contractor employee shall wear a visible identification badge provided by the NIST Security Office.

**Vehicle Registration:** All Contractor employees must register their vehicles with the NIST Security Office to gain access to the campus. A valid driver's license, Government-furnished civilian ID (which in most cases can be a valid driver's license), proof of insurance and current registration must be presented to the NIST Security Office.