Statement of Work
Requirement: Manual Probe Station
Requesting Laboratory: National Institute of Standards & Technology (NIST) Physical Measurements Lab (PML), Quantum Nanoelectronics Group (683.14)

I. Background

The National Institute of Standards and Technology (NIST) requires a manual probe system with reliable, accurate positioners for tabletop electronic measurements through direct probing of samples. The system shall provide precise motion control for single probe micropositioners, allowing stable electrical contact to small device features such as lithography defined bonding pads. It will be used to screen devices and diagnose possible leakage paths, shorts, or contact issues by room temperature DC measurements before committing time and resources to more advanced measurements. It will also be used to do room temperature RF measurements for testing fabricated RF resonators. The probe system shall have both DC and RF capable micro positioners and probes or equivalent, providing the probing precision, and DC and RF measurement capability required for our applications.

II. Scope

The contractor shall deliver a quantity of one (1) 200 mm Manual Probe Station with both DC and RF capable micropositioners and probes, inclusive of FOB Destination delivery terms (or equivalent terms, such as INCOTERMS Delivered Duties Paid) and warranty.

III. Minimum Requirements

The contractor shall submit a firm fixed price quotation for equipment which must meet or exceed the minimum requirements identified below. All items must be new. Used or remanufactured equipment will not be considered for award. Experimental, prototype, or custom items will not be considered. The use of "gray market" components is not acceptable. All line items shall be shipped in the original manufacturer's packaging and include all original documentation and software, when applicable.

Line Item 0001:
Description: 200 mm Manual Probe Station with both DC and RF capable micropositioners Quantity: One (1)

A. Technical specifications.

1. **The system shall have the following components:**
    a. **a platen where micropositioners sit**
    b. **an optical microscope**
    c. **a camera for the microscope**
    d. **a RF capable chuck to hold the test sample**
    e. **QTY(4) four micropositioners with probes for DC measurement**
    f. **QTY(2) two micropositioners with probes for RF measurement.**
2. **The probe station shall be designed for RF, DC, and high-power testing applications and shall support multiple probe configurations on a common platen. The platen shall be at least 400 mm x 600 mm in size and support at least a configuration of 2 RF + 4 DC probes.**
3. **The system shall come with a vacuum sample chuck with capability to accommodate sample sizes greater than or equal to 200 mm.**

4. **The chuck shall provide vacuum holding capability with selectable vacuum zones or equivalent vacuum hole patterns suitable for holding different sample sizes.**
5. **The system shall provide a chuck XY stage with travel range larger than or equal to 200 mm in both X and Y directions.**
6. **The system shall provide a chuck XY stage with a fine travel resolution better than or equal to 0.001 mm.**
7. **The chuck stage shall provide theta rotation of 360° with chuck fine rotation and locking capability.**
8. **The system shall include a chuck-to-platen quick lift function to separate the probes from the test sample during sample loading, unloading, or alignment. The quick lift separation shall be at least 9 mm and a fine adjustment separation shall be at least 38 mm.**
9. **The probe platen shall be a steel platen compatible with RF and DC micropositioners using magnetic, vacuum, or bolt-down mounting as applicable.**
10. **The probe station shall provide contact repeatability better than or equal to 1 µm by manual control.**
11. **The system shall include an optical microscope mounted on a manual microscope stage. The microscope stage shall provide at least 50 mm × 50 mm movement range and independent X and Y control.**
12. **The system shall include a microscope camera compatible with the optical microscope for viewing and documenting probe contact to device pads.**
13. **The optical microscope shall have 2X, 10X and 20X objectives.**
14. **The optical microscope shall have a magnification greater than or equal to 400X.**
15. **The optical microscope shall have a port for a CCD camera.**
16. **The optical microscope shall have illumination.**
17. **The system shall have a Digital Camera with at least 8 MP resolution with USB and HDMI outputs.**
18. **The system shall have a flat panel display at least 21” in dimension for the camera readout.**
19. **The system shall include four high precision DC micropositioners.**
20. **Each DC micropositioner shall provide micrometer-driven three-axis linear motion in X, Y, and Z.**
21. **Each DC micropositioner shall provide a travel range greater than or equal to 12.5 mm in X, Y, and Z.**
22. **Each DC micropositioner shall provide feature resolution better than or equal to 0.5 µm.**
23. **Each DC micropositioner shall be compatible with vacuum or magnetic mounting.**
24. **The DC probe holders shall be compatible with replaceable probe tips. Probe tip options shall include tungsten or equivalent conductive probe tips with tip diameters suitable for probing micron-scale pads.**
25. **The DC probe configuration shall support a minimum pad size of 25 µm × 25 µm.**
26. **The system shall include two RF micropositioners.**

a. **Each RF micropositioner shall be compatible with RF probe heads and suitable for RF probing from DC up to at least 110 GHz.**
b. **Each RF micropositioner shall provide travel range greater than or equal to 25 mm in X, Y, and Z.**
c. **Each RF micropositioner shall provide feature resolution better than or equal to 2 µm.**
d. **Each RF micropositioner shall include probe-head planarization adjustment with a planarization range of at least ±7.5° and resolution of 0.1° or better.**

27. **The system shall include two RF probe heads with suitable for DC to 40 GHz measurements.**
28. **The RF probe and cable set shall support low-loss RF measurement. For a DC to 40 GHz RF probe interface, insertion loss shall be less than 0.8 dB, and return loss shall be greater than 18 dB, or equivalent.**
29. **The system shall include all mechanical adapters, probe arms, probe holders, mounting hardware, and cables required to operate the requested configuration.**
30. **The system shall come with a quiet vacuum pump with a sound level of lower than or equal to 40 dB max @ 1 meter.**

IV. Deliverables

Description	*Quantity or Format*	*Due Date*
Probe station	One (1)	Sixteen (10) weeks ARO

VII. Delivery

Delivery shall be FOB Destination (or equivalent terms, such as INCOTERMS Delivered Duties Paid) are required and shall occur not later than (NLT) ten (10) weeks ARO.

FOB Destination means: The contractor shall pack and mark the shipment in conformance with carrier requirements, deliver the shipment in good order and condition to the point of delivery specified in the purchase order, be responsible for any loss of and/or damage to the goods occurring before receipt and acceptance of the shipment by the consignee at the delivery point specified in the purchase order; and pay all charges to the specified point of delivery. The contractor shall deliver all Line Items to:

The National Institute of Standards and Technology
100 Bureau Drive, Building 216/E121
Gaithersburg, MD 20899

VIII. Inspection and Acceptance

In addition to the inspection and acceptance terms articulated in 52.212-4, the Government reserves the right to perform such performance tests and evaluations as defined below to verify specified system performance. Such tests and evaluations, if performed, shall be conducted

within the environment that the system is to be operated. The Contractor has the right to be present during the tests and evaluations, if performed, at the Contractor's expense.

Performance Tests:

1. The Probe Station System shall be tested for operation.

NIST may choose at its discretion to forego this part of acceptance testing.

A visual inspection of the equipment will be performed by the NIST TPOC to identify surface defects or any form of indication that any equipment was damaged during transport to NIST. The Government shall have sole discretion to require repair or replacement of damaged and/or nonconforming supplies at no cost to the Government. The Government at any time prior to acceptance shall reject the equipment due to defects and/or nonconformance. The vendor is responsible for latent defects discovered any time after final inspection. However, the extent of its liability shall be prorated over the useful life of the equipment.

Ownership of the equipment shall transfer to NIST upon acceptance by the Government.

The Government will test, inspect, and accept or reject the equipment within 7 days of the receipt of the equipment unless otherwise indicated above. The Government reserves the right to conduct quality assurance testing to confirm that a given instrument(s) meets the manufacturer's and/or the Government's performance specifications. It is anticipated that the equipment will meet all manufacturer's specifications and/or the Government's performance specifications identified in the most recent operations and maintenance manual for each piece of equipment and/or in this document.

IX. Warranty

The contractor shall warrant the entire system for a period of a minimum of one (1) year after receipt of the equipment and shall be in accordance with terms in FAR 52.212-4

X. Payment Schedule

Advance payment is not authorized. The Contractor must invoice in arrears according to the payment schedule. The Contractor shall be paid, in accordance with Net 30-day payment terms, upon receipt and acceptance of a proper invoice. An invoice will not be accepted if submitted prior the Government's acceptance of the product unless the Contracting Officer has accepted an alternate payment schedule.

NOTE: Partial shipments and partial invoices will not be accepted, unless otherwise requested and accepted by the Contracting Officer prior to award offer. Proposed payment schedules shall be submitted with vendor's response to the RFQ for consideration.