COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

REQUEST FOR PROPOSAL
Electro-Optic Probe Station for Testing

Title: **Fully Automated Electro-Optic Probe Station for Testing 300mm Silicon Photonic Wafers**

RFP Issue Date: **October 8th 2021**

Due Date for RFP Submission: **October 22nd 2021**

Location: **Bids must be addressed to:**

Attention: **Michael Reich**
Columbia University
Procurement Services
615 West 131st Street, 3rd Floor
New York, New York 10027
mmr62@columbia.edu

Columbia Primary Contact:

Name:	**Michael Reich**
Title:	**Director for Lab and Medical Sourcing**
Phone:	1212-854-2337
E-mail:	mmr62@columbia.edu

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INFORMATION AND INSTRUCTIONS TO BIDDERS

Section 1

General Information to Bidders

Introduction:

Subject to the conditions set forth in this Request for Proposal, Columbia University is requesting **sealed** Bids for the following project:

Bid Name: **Fully Automated Electro-Optic Probe Station for Testing 300mm Silicon Photonic Wafers**

Bid Deadline: 5 PM EDT October 22nd 2021

Submission of Bids:

Att: Michael Reich
Director for Lab & Medical Sourcing
Columbia University Procurement Services
615 West 131st Street, 3rd Floor
New York, NY 10027
Mmr62@columbia.edu

Bidders may submit their Bids in accordance to instructions provided on page 6, Submission of Bids of this RFP document**.**

Definitions

Except as otherwise specifically provided, definitions are set forth as follows:

Columbia— Refers to Columbia University.

Request for Proposal (RFP) - Refers to the document named Columbia's Request for Proposal of _____.

Addenda — Refers to the written or graphic instruments issued by the Columbia Representative prior to the Bid Deadline, which modifies or interprets the RFP by additions, deletions, clarifications, or corrections.

Bidder – Refers to the firm that is interested in and/or responds to the RFP.

Bid - Refers to all documents that the Bidder must submit to the Columbia Representative prior to the Bid Deadline.

Bid Deadline - Refers to the time and date indicated in the RFP as the latest date and time that a Bid will be accepted.

Contract – Refers to the final agreement reached between the successful Bidder and Columbia.

Contractor - The term Contractor shall mean the successful Bidder awarded the Contract.

Subcontractor — The term Subcontractor shall mean any individual, company, or corporation to whom the Contractor assigns any part of the Contract or Award.

Code of Conduct and Fair Competition

It is the responsibility of the Bidder to notify the Columbia Representatives in writing of any possible conflict of interest as set forth below. Columbia will investigate the matter and determine if an actual conflict of interest exists.

A conflict of interest arises when a Columbia employee, officer or agent involved in the RFP process or Contract has a financial or any other interest in a Bidder. If a conflict of interest exists, the Bidder may not submit a Bid.

Columbia employees, officers and agents may neither solicit nor accept gratuities, favors, or anything of monetary value from Bidders, Contractors, or parties to sub-agreements. Any such actions must be reported to the Columbia Representatives immediately.

Columbia reserves the right to cancel the award if, in its sole discretion, it determines that any interest

disclosed from any source could give the appearance of a conflict or cause speculation as to the objectivity of the program to be developed by the Bidder. Columbia's determination regarding any questions of conflict of interest shall be final.

Compliance with Federal, State and Local Laws

Bidder warrants in submitting a Bid and in the performance of an award as a result of the Bid, that Bidder has complied with, or will comply with, all applicable federal, state, University, and local laws, ordinances and all lawful orders, rules and regulations hereunder. The Bidder, by submitting the Bid or performance that results from an award by Columbia, agrees not to discriminate against any employee or applicant based on an individual's race, color, religion, religious creed, ancestry, national origin, age (except minors), sex, sexual orientation, marital status, medical condition (cancer-related) and disability, and otherwise as required or permitted by law. Bidder further agrees that any sub-contract will contain a provision requiring non-discrimination in employment as specified above. Any breach of this provision may be regarded as material breach of contract and cause for cancellation.

Limitation of Liability

Columbia makes no representations, warranties, or guarantees that the information contained herein is accurate, complete, timely, or that such information accurately represents the conditions that would be encountered in pursuing the work or at the site(s) of work now or in the future. The furnishing of such information by Columbia shall not create or be deemed to create any obligation or liability upon it for any reason whatsoever and each Bidder, by submitting its Bid, expressly agrees that it has not relied upon the foregoing information, and that it shall not hold Columbia liable or responsible therefore in any manner whatsoever. Accordingly, nothing contained herein and no representation, statement or promise, of Columbia, its directors, officers, agents, representatives, or employees, oral or in writing, shall impair or limit the effect of the warranties of the Bidder required by this Request for Bid and that it shall not hold Columbia liable or responsible therefore in any manner whatsoever.

Neither the Trustees of Columbia, nor any officer, agent, or employee thereof shall be charged personally with any liability by a Bidder or another or held liable to a Bidder or another under any term or provision of this RFP or any statements made herein or because of the submission or attempted submission of a response hereto or otherwise.

Qualification of Bidder

Bidder must possess the potential ability to deliver and install the equipment as specified and provide support services per the terms and conditions set forth in the RFP. Consideration shall be given to such matters as Bidder integrity; record of past performance; and financial and technical resources.

Columbia shall make such investigations as deemed necessary to determine the ability of a Bidder to provide the specified equipment and perform professional services.

Columbia reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy Columbia that said Bidder is properly qualified to carry out the obligations of the final Contract.

Section 2
Submission of Bids

Preparation of Bid

By submission of its Bid, the Bidder agrees that the Bid is predicated upon the acceptance of all the terms and conditions stated in the Request for Proposal, unless specifically excluded by the Bidder in its Bid. Part or all of the RFP and the successful Bid may be incorporated into the Contract or Purchase Order Award.

Each Bidder shall furnish the information and documents required by the RFP. Failure to submit all required information may deem a Bid as non-responsive. Columbia is exempt from Federal Excise Taxes and is also exempt from New York State and local sales or use taxes. All costs associated with the proposal and bid must be stated in U.S currency. By submitting a Bid, Bidder certifies that the prices proposed have been arrived at independently, without consultation, communication or agreement for the purpose of restricting competition as to any matter relating to such prices with any other Bidder or competitor. Bidders are cautioned to write all descriptions and prices clearly so there is no doubt as to the intent and scope of the Bid.

A person who is legally authorized to bind Bidder to a Contract shall sign the Bid. A Bid submitted by an agent shall have a current Power of Attorney attached, which evidences the agent's authority to bind Bidder. The person signing the Bid shall initial erasures or other changes.

Unnecessarily elaborate Bids beyond what is sufficient to present a complete and effective Bid are not desired and may be construed as an indication of the Bidder's lack of cost consciousness. Elaborate artwork, expensive paper and bindings are neither necessary nor desired. The cost incurred for the preparation of the Bid is the sole responsibility of the Bidder. Columbia does not assume any liability for any pre-contract activity and/or cost incurred by Bidders responding to this RFP.

Bid information is not considered confidential or proprietary. Trade secrets and other proprietary data contained in Bids may be held confidential if the Bidder requests, in writing, that Columbia does so, and if Columbia agrees, in writing, to do so. Material considered confidential by the Bidder must be clearly identified. Such confidential/proprietary information must be easily separable from the non-confidential sections of the Bid. Marking the entire Bid as proprietary will be neither accepted nor honored. Notwithstanding any of the foregoing, Columbia reserves the right to use any of the ideas presented in any reply, Bid, discussion, negotiations or presentation related to the RFP.

If a Bidder intends to use subcontractor(s), the Bidder must identify in its Bid the names of the subcontractors and the portions of the work the subcontractors will perform.

Communications Regarding the RFP

Requests for clarification and interpretations of the RFP must be made in writing via email during the period of October 8th 2021 - October 14th 2021. All questions regarding the RFP shall be directed to the Columbia Representatives in writing by e-mail. Two types of questions generally arise. One may be answered by directing the questioner to a specific section of the RFP. Other questions may be more complex and may require a written amendment to the RFP. The Columbia Representatives will make that determination.

The Columbia Representatives shall make clarifications, interpretations, corrections, and changes to the RFP by written Addenda as specified below. **Questions will not be answered and clarification will not be given after October 19th 2021.**

Addenda to RFP

Addenda to the RFP will be issued in writing and will be communicated to all Bidders by e-mail and shall become part of the RFP. If the RFP is amended, all terms and conditions that are not modified by the Addenda remain unchanged and in effect as written. If an addendum is issued after Bids have been received and/or after a short list has been developed, the addendum may be provided only to those who submitted Bids or only to those on the short list, in the sole discretion of Columbia.

Each Bidder shall be responsible for making sure it has received all issued Addenda prior to submitting a Bid. **Addenda may be issued through October 19th 2021.**

Columbia reserves the right to change the RFP schedule and to issue addenda at it's sole discretion. Columbia also reserves the right to cancel, reissue, or to make corrections or amendments to the RFP due to errors or changes identified by Columbia or suggested by a Bidder, and to otherwise modify the terms of the RFP at any time in its sole discretion.

Submission of Bids

Bids are to be received in the designated office on or before the date and time specified as the Bid Deadline in the RFP. **Oral, telephone or facsimile Bids will not be considered**. All bids must be sent via email and should be sent to the Columbia Representative coordinating this RFP: Michael Reich at mmr62@columbia.edu.

In the event it is required for physical bid proposals to be provided, bids shall be submitted in a sealed envelope or package as follows:

1 Addressed to the address specified on the cover page of this RFP,
Show the Bid Name, "**Fully Automated Electro-Optic Probe Station for Testing 300mm Silicon Photonic Wafers"**

2 Give the Bidder's name, primary contacts address, email and telephone number.

3 Show the date and time of the Bid Deadline & Submission as specified in this RFP

Please be sure to include one hard copy and one electronic copies of the Bid Proposal in any physical submission.

Columbia, or any Columbia representatives, officers, or employees, will not be held responsible for the pre-opening of, post-opening of, or the failure to open a Bid not properly addressed and identified.

Alternate or Substitute Bids

Bidders may submit more than one Bid. Alternate or substitute Bids must comply with the terms and conditions of the RFP and must contain all required documents as specified in the RFP.

Columbia is seeking Bids that meet its **minimum** requirements & specifications as outlined in the Scope of Work / Specifications. If more than one method of meeting these requirements is proposed, each should be labeled primary, secondary, etc., submitted separately, and they will be evaluated in the specific priorities.

Late Submissions, Modifications, and Withdrawals of Bids

Late Bids: Bids received after the specified Bid Deadline will not be considered and shall be returned to the Bidder unopened.

Bid Modifications: Prior to the Bid Deadline, a submitted Bid may be modified by written notice, signed by a duly authorized person on behalf of the Bidder, to the Columbia Representative. The written notice shall be worded as not to reveal the amount of the original Bid.

Bid Modifications must contain all required documents as specified in the RFP. Failure to submit all required information can deem the Bid Modification as non-compliant and the contents of the Bid Modification will not be considered.

A previously submitted Bid will not be returned, unless written notice, signed by a duly authorized person, from the Bidding Company is received by the Columbia Representative.

Bid Withdrawal Notifications: Prior to the Bid Deadline, a submitted Bid may be withdrawn by written notice to the Columbia Representative up until the Bid Deadline. Written requests to withdraw must be signed by a duly authorized person on behalf of the Bidder and shall not reveal the amount of the Bid. Bids may not be modified, or withdrawn after the Bid Deadline.

A withdrawn Bid may be resubmitted prior to the Bid Deadline. All resubmitted Bids must fully comply with the RFP. Columbia will only consider the latest version of the Bid.

Section 3
Evaluation of Bids

Opening of Bids:

The assigned Columbia Representative will not accept Bids after the specified date and time. Bid services and pricing will not be publicly announced. Bids will be reviewed and evaluated by Columbia. At any time, and from time to time after the opening of the Bids, Columbia may give oral or written notice to one or more Bidders to furnish additional information relating to its Bid and/or qualifications to perform the services contained in the RFP, or to meet with designated representatives of Columbia. The giving of such notice shall not be construed as an acceptance of a Bidder's Proposal.

All materials submitted in response to this RFP become the property of Columbia. Selection or rejection of a response does not affect this right. All copyright of materials produced under any contract or subcontract awarded as a result of this RFP shall be retained by Columbia. All forms of documents and data generated as a result of this contract are owned by and shall be delivered to Columbia at the direction of the Columbia Representative. During the period of performance, the information may not be disclosed by the Bidder to third parties, except as expressly provided in the Contract, without the written permission of the Executive Director of Purchasing.

Postponement of Bid Opening

If an emergency or unanticipated event interrupts normal University processes to cause the postponement of the scheduled Bid opening or the issuance of an addenda, the Columbia Representative will issue, in writing, to all Bidders, the new timeline and process.

Bid Evaluation and Selection Criteria

Evaluation Criteria

This public RFP is being conducted pursuant to the federal funding source for the respective project as outlined in the scope of work/specifications section of the RFP.

Selection

The selection of the awarded purchase order shall be based on the following selection criteria: meeting specifications and technical requirements/specifications (50%), overall cost (20%), delivery time (20%), customer support(10%)

Rejection of Bids

Columbia has the right to reject any and all Bids at its sole discretion.

Notification of Award

The Columbia Representative will issue "Notification of Award" letter(s) or issue a Purchase Order once a selection has been made.

Section 4.

University Background Information

General Project Information

Columbia University is an independent, privately supported, non-sectarian institution of higher education and research. One of the country's leading research universities, it seeks to make significant original contributions to the development of knowledge, to preserve and interpret humanity's intellectual and moral heritage, and to transmit that heritage to future generations of students. It pursues these missions through research and educational programs in a wide range of disciplines in the humanities, social sciences, the natural, biomedical and applied sciences, and various professions, and through cooperative agreements with other educational institutions, research centers and hospitals in the greater New York region, throughout the country and abroad.

The Lightwave Research Laboratory Columbia University School of Engineering CNI studies optical communications using integrated photonic devices, it aims to investigate the realization of dynamic optical data routing in transparent optical interconnection networks, developing potentially disruptive technology solutions with ultra-high throughput, minimal access latencies, and low power dissipation that remains independent of data capacity, ultimately capitalizing on the enormous bandwidth advantage enabled by dense wavelength division multiplexing. One of the most important parts of our research is testing photonic ICs and taking measurements on them. Labs across the world use automated electro-optic probing stations to increase the accuracy and overall quality of their testing process. Packaging for testing a single chip usually costs about 10k per design, and our group usually needs packaging for around 10 designs every year. In order to continue achieving our research and development the lab requires a 300 mm Automated Photonic/Electronic Probe Station capable of testing both singular dies as well as 300 mm wafers.

This RFP is conducted pursuant to two Federal awards titled: ARPA-E Enlitened and DARPA PIPES which are intended to facilitate new insights utilizing an integrated multidisciplinary effort to leverage photonic/system architecture and software expertise to develop new photonic enabled Exascale systems designs and drive emerging integrated photonic interconnected technologies. The 300mm Automated Photonic/Electronic Probe Station which is the subject of this RFP is intended to allow for the Characterization of novel and high speed integrated optical devices.

BIDDER'S DECLARATION

This Bid is in response to Columbia's request for a Bid ("RFP") for a Fully Automated Electro-Optic Probe Station for Testing 300mm Silicon Photonic Wafers

This Bid consists of:

Information & Instructions for Bidders
Bid Part I - Bidder's Declaration
Bid Part II - Bidder Questionnaire
Bid Part III - Scope of Work & Specifications ("SOW")
Bid Part IV - Exceptions to Columbia Terms & Conditions and
Appendix A

Bidder agrees to submit a bid and deliver and install in accordance with all provisions of the RFP documents, proposal submitted and purchase order that may be issued to awarded bidder as well as any addenda thereto, except as may be specifically stated in this Bid, at the prices set forth therein.

Bidder agrees that this Bid is a firm offer to Columbia which cannot be withdrawn for 120 calendar days from and after the Bid due date.

Bidder certifies that it has thoroughly examined and fully understands all of the provisions of the RFP and the conditions of the contract documents attached thereto, as well as any addenda issued prior to the due date; that it has carefully reviewed and fully supports the accuracy of its Bid; has satisfied itself as to the nature and location of all work, the technical, general, and local conditions to be encountered in the performance of any work, the requirements of the Contract and all other matters which may in any way affect performance or the cost thereof; and that Columbia shall not be responsible for any errors or omissions on the part of the undersigned in preparing this Bid.

If awarded a Contract, Bidder agrees to execute the Contract and deliver it to Columbia within 15 calendar days, of such award, along with any required certificates of insurance.

_____	_____
Authorized Signatory	Title
_____	_____
Company Name	Date

_____

Company Address

_____	_____
Telephone Number	Federal Taxpayer I.D. Number
_____	_____
Email Address	DUNS Number

BIDDER QUESTIONNAIRE

A. Bidder Business Structure

1. Provide your company's name and address, and the primary RFP contact's name, phone number, e-mail address and fax number.

2. Please provide relevant summary information of your firm's capabilities and experience with respect to manufacturing, supplying and supporting equipment and technology that are the subject matter of the RFP, i.e. Fully Automated Electro-Optic Probe Station for Testing 300mm Silicon Photonic Wafers

3. Is Bidder incorporated? If so, in what state and as what type of corporation?

B. Bidder Financial Information

1. Please provide your Dun and Bradstreet (DUNS) Number, if any.

2. Please provide your current DUNS rating:

3. Please describe any subcontractor relationships that would be involved in the support of any Columbia's delivered products or services. (use of any subcontractor requires Columbia approval in advance. Failure to do so may result in termination of contract.)

C. Business Information

1. List any material claim asserted or threatened against Bidder that may have a significantly adverse effect on Bidder or adversely affect Bidder's ability to provide the goods and/or services required by this RFP.

2. List any business issue currently confronted by Bidder that may have a significantly adverse effect on Bidder or adversely affect Bidder's ability to provide the goods or services required by this RFP.

3. Has your company or any individual in your company ever been debarred, suspended or presented on the OFAC list relevant to any activities contemplated with the US Federal Government?

SPECIFICATIONS – SCOPE OF WORK

Columbia University School of Engineering and Applied Science: CNI – Columbia Nano Initiative, Lightwave Research Laboratory has been awarded Federal funding which requires an Automated Photonic/Electronic Probe Stations (APEPS). The selected vendor must be responsible for the manufacture, delivery and installation as well as user training of APEPS. Vendor must also provide full service and applications team support.

The APEPS must test both singular dies as well as 300 mm wafers. It will support wavelengths from 1500-1600 nm and will support both single fiber array inputs. The APEPS will automatically detect wafers and can be used programmatically to test and measure customer devices. Bidders are requested to submit a proposal to deliver and install APEPS with following minimum specifications:

Devices/Systems Under Test:

- Modulators with both electro-optic (25 GHz RF, GS) and thermo-optic tuning (DC, GS)
- Optical filters with thermo-optic tuning
- Passive optical splitters/combiners
- Passive optical filters
- Edge and vertical grating couplers
- Photodetectors (25 GHz RF, GS)
- Simple optical link (modulator --> photodiode)

Required Measurements:

- Tuning efficiency measurements for thermo-optic devices (sweep a tunable laser to get an initial spectrum, then step DC voltage/current while sweeping the tunable laser at each step to record the changes in the spectrum)
- Power
- Reflection
- Optical Spectrum
- Optical Insertion Loss
- S-parameters (S21) for modulators and photodiodes up to 25 GHz

Required Compatibility with Existing Lab Equipment:

Note: All listed instruments have a Python API.

- Keysight Lightwave Measurement System (https://www.keysight.com/us/en/product/8164B/lightwave-measurement-system.html)
- Keysight Detectors (https://www.keysight.com/us/en/product/N7744A/optical-multiportpower-meter-4-sensor-ports.html)
- Keysight LCA (https://www.keysight.com/us/en/product/N4372E/110ghz-lightwavecomponent-analyzer.html)
- Anritsu Signal Quality Analyzer (https://www.anritsu.com/en-us/testmeasurement/products/mp1900a)

• Qontrol DACs/SMUs (https://qontrol.co.uk/product/q8iv/) [This is the only somewhat non-standard instrument, and it's simply controlled through Python scripts so it should be straightforward to integrate. It plugs directly into our DC probe header pins.]

Miscellaneous Testing/Measurement Requirements:

• Testing for both singulated die and 300 mm wafers
• 1500-1600 nm wavelength support
• Single fiber (cleaved SMF and lensed) and v-groove fiber array support

Required Hardware:

Probe Station:

• Platen to support RF positioners – north and south positioners
• Platen to be able to support east west optical positioners
• Probe station shall have built in anti-vibration mechanism for optics work and highly stable optical grade platen. This is especially needed due to location and proximity to subways, trains and truck traffic in building upper floor.
• Vacuum management system.
• Cable management system with integrated cabinet for optical aligner and computer electronics.
• Instrument Shelf for Network Analyzer.
• Dual monitor support mechanics.
• Supports probe card holder – probe card holder does not have to be quoted at this time but should be available.
• 30 mm Z stroke or more.
• High Stability Microscope Mount (no boom stand or pole mount).
• Supports ice-free or frost-free probing when used with optional -40 C thermal chuck. Thermal Chuck not included in quote at this procurement time.

Microscope:

• Microscope: Zoom video microscope with long working distance objective.
• Programmable Z lens Drive in Microscope – 4mm Z.
• Video Resolution: 6.55 MP or more.
• Automated lens detection.
• 40 x zoom (digital and optical).
• 5x objective lens included for 3.94 x 3.94 mm FOV.
• Integrated with prober software to allow for capturing and saving the high-resolution image
• Microscope features that need to be supported by the software: multi-touch operated zoom-in and out, point-and-shoot navigation, pan, and flick gestures
• Programmable Microscope Transport – Minimum Movement: 50 mm x, 50 mm y, 140 mm z.

Chuck and Aux chucks:

- Chuck must support a single die vacuum zone down to 4 mm x 4 mm in the front of the chuck
- System should have automatic wafer size detection for vacuum zones for wafer protection
- Chuck should be 300 mm in size with multiple vacuum zones (at least 5) to accommodate wafers from 75 mm, 150 mm, 200 mm, and 300 mm zones and 4 mm x 4 mm wafer shards.
- Two ceramic aux chucks that are thermally isolated from the main chuck should be provided to hold industry standard RF calibration substrates, cleaning substrates, and contact substrate.
- The probe station vendor shall have an easy to install thermal chuck and service loop for future temperature control system that will not involve a probe station reshipment (or replacement) or adding a new housing around the prober. The upgrade option should be able to support -40 C to 200 C optical probing in an open environment (without a cover) and maintain a frost-free environment.
- BNC Bias Connection for room temperature non thermal chuck

Single Die Holder:

- Single die holder for SiPh edge coupling devices
- Supports die size up to 24 mm
- Supports die thickness from 0.7 mm to 2 mm

Stage Movement:

- Probe Station shall be capable of fully positioning the wafer under the microscope optical center - x-y travel shall accommodate full view of wafer
- The stage movement shall be fully programmable in x, y, z, and theta. Movements shall be controlled by software code and pattern recognition for final positioning
- The chuck and prober shall be designed so that the wafer can be hand loaded directly onto the chuck through an easy to load front access door. This is because the prober will be used in analytical applications where wafers or shards will be hand loaded with vacuum pickup wand or tweezers
- The probe station stage should not roll-out for wafer loading. This is to eliminate alignment time on the wafer and aux chucks and excessive maintenance
- The stage should be able to move the chuck to a load position. This is so that the wafer can be safely loaded without hitting fiber aligners or fiber optics. Loading should be done through front because loading should not disturb fiber alignment position or risk damage to fiber or fiber array
- The stage should be able to be moved under program control from an excel file, supplied test executive, wafer map or with a finger movement on a touch screen where you select the die with a gloved hand and the prober moves to it. This is because optical wafers are usually loaded with gloved hands so a touch screen is required.

Test Executive:

- The Test Executive shall be supplied to remotely automate and control the test instruments above. It shall support the brands listed above in the test equipment including brands such as Keysight, Keithley SMU's, Anritsu, R & S, EXFO and Santec. The test executive shall support the tests listed above in the measurement section.
- A test executive should be supplied to drive the specified instrument set and sample scripts. The prober software can engage optical measurement equipment, can be embedded to trigger the actual measurement such as IL or PDL measurements.
- Equipped with prober control software driver
- Supports GPIB, TCPIP, RS232
- Supports sequences with loops and conditions
- Graphical data visualization in spreadsheet and diagrams
- Test steps programmable in Python
- Exports to Excel and CSV

Prober Control Software Must Include:

- Single window GUI
- SiPh related software functionality integrated in a single window probe station control software, no additional software required
- Motion control for Chuck in x, y, z and theta
- Chuck Hover Control or Virtual Platen Lift with software feedback and 1 um accuracy and visualization of the platen lift inside the prober control
- Microscope Stage Control
- Wafer map, sub die support, automatic alignment, topography compensation, thermal compensation, single die stepping, autofocus, vacuum control, microscope stage control, camera control, stage lock to prevent accidental movement, interface to the test executive
- Support Touch Screen and Joystick or motion control buttons
- Touch Screen Wafer Alignment and Positioning
- Wafer Load and Unload
- Chuck Speed
- Chuck Separation and Height Control
- Pattern Recognition for precise wafer positioning
- An offline (virtual) version of the software shall be supplied to allow for remote off prober program development and for off prober training prior to probe station delivery with Python scripting examples
- Full Control of programmable Fiber Aligners and programmable positioners
- Software to prevent fiber optic probe crashing/interference, probe to chuck and probe to probe crash prevention

RF Calibration Software:

- This prober will be used to measure S parameters with Ground Signal Ground microwave probes—software needs to be supplied to control the RF probe calibration and verify
- RF calibration software should include TMRR, NIST mTR calibration methods and statistical integration

Computer and Interfaces:

- A Windows Computer with keyboard Shall be supplied with this system.
- The system shall be equipped with a 21" Monitors - monitor shall be touchscreen and worked with latex gloved hands.
- GB-IB Interface
- TCP/IP
- USB

RF Positioners:

- North South – Qty 2 Planarizing positioners shall be supplied for large multi-contact DC and RF probes with planarization control. Positioners have enough resolution to support positioning on 35 micron square pad
- Large knobs for very accurate and sensitive XY navigation
- 13 mm travel or more range in XYZ
- 500 µm high screw resolution in XY, 300 µm in Z
- Magnetic base with strong holding force

Optical Positioners:

- 6 Axis positioning is required with automation for highly stable probing
- Aligner software must be incorporated into prober control software for one unified system
- Auto Align
- It needs to support grating array, v groove, and edge coupling
- A digital motion controller must be supplied to drive alignment system that supports capacitance sensors or lensed fibers for automatic Z sensing
- Single sided or double-sided alignment system equivalent to PI Hexapod or better with the following specifications based on device under test:
- Programmable Axis 6, X, Y, Z and Theta of X,Y,Z
- X, Y, Z Movement: ±6.5, ±16, ±8.5 mm
- X,Y, Z Theta in Degrees: 14.5, ±10 , ±10
- Minimum Fine Resolution 0.1 microns
- Programmable Coarse Positioning on 3 Axis
- Fine Control for x, y and z: closed loop 2.5 nm
- Alignment Time for 100-micron square area scan: under 1 second
- Alignment time gradient search, randomized with ±5 µm: < .3s
- Closed-loop travel in X, Y, Z 100 µm
- Linearity error, for the entire travel range: 2 %
- Repeatability (bidirectional) 10% travel range: 2 nm

Fiber Holders:

- Qty 1 probe arm fiber holder for supplied nano positioner
- Qty 1 single fiber arm – 6 to 17 degrees- to be specified at time of order- 250 µm fibers with 1.25 mm diameter metal ferrule
- Qty 1 array fiber arm – 24 channels, 127-micron pitch

Capacitive Displacement Control System:

- This is used to avoid fiber crashing, setting fiber height off the surface of the device under test so optical measurements can be repeated. The distance from fiber to device under test is critical for optical testing because it changes the illumination pattern and size
- A calibration unit shall be supplied to aid in optical fiber alignment
- Single channel- 40 nm resolution with 1000 um range – Output – 0 to 10 volts and ethernet to drive the surrounding equipment
- Single sided

Training, Installation, Warranty and Software Upgrades:

- Installation and minimum three days of operational training must shall be provided onsite at Columbia University in New York, NY
- Prober software: free upgrades, and user upgradable
- Demo software available in advance of probe station delivery: with 95% or more of probe station functionality to start developing software
- Company must have a full-time designated U.S. service and applications team
- Warranty - 12 months from date of installation or 15 months minimum from date of delivery – whichever comes first

NO-BID FORM

RFP TITLE: _____

RFP # : _____

Bidders choosing not to bid are requested to complete the portion of the form below:

It is our intention not to submit a proposal for the following reason(s):

_____ we do not provide the requested services

_____ we do not provide the requested goods

_____ we are unable to meet the minimum qualifications

_____ due to other engagements we would be unable to support this proposal

_____ due to a conflict of interest we are unable to submit a proposal

_____ other *(please provide additional rationale below)*

_____

_____

_____

Signature: _____

Name: _____

Title: _____

RFP ACKNOWLEDMENT

DATE: October ___, 2021

FROM: Vendor Name
Address

TO: Columbia University in the City of New York

RE: PROPOSAL/BID DESCRIPTION
Project Description
Quotation #

Please be advised that we have carefully read the enclosed in the package. We acknowledge that if we are ultimately awarded the contract we will deliver the equipment as specified pursuant to a form purchase order issued by Columbia University per specifications and accepted final bid. We understand that there will be no negotiation of the terms and conditions of the Purchas Order terms and conditions upon award.

(Please note any contract exceptions in the space below or provide an attachment with appropriate signature. Type NONE if you do not have any exceptions.)

Note Exceptions:

Signature: _____

Name: _____

Title: _____