



### **Request for Quote and Specifications of Probe-Stations for Semiconductor Wafer Characterization**

- The GEECI (Gallium Nitride Ecosystem Enabling Centre and Incubator) at SID-Indian Institute of Science is seeking bids from qualified industries for this tool as per the specifications below.
- Companies need to submit two bids, a technical bid and a commercial bid, in **two separate** sealed envelopes. The bids should be submitted no later than 30 days from the date of posting of this tender, as listed on the website date/time stamp, and by 5 pm on the 30<sup>th</sup> day or next weekday in case the 30<sup>th</sup> day falls on a weekend or a national holiday.
- Both technical and commercial bids should be addressed to “The Chief Executive, SID, IISc, Bangalore 560012, GST # 29AAATS5333E1ZJ.”
- All quotations should be CIF Bangalore.
- Cost of last mile transportation, including any insurance, from port of shipment to IISc has to be quoted as an option.
- In case of courier shipments maximum permissible weight would be 70kgs.
- The envelopes should be addressed to “Prof. Srinivasan Raghavan, CeNSE, IISc, Bangalore, 560012” and submitted to the office at CeNSE, IISc in Room No. GF 15 between 9 am and 5 pm.
- All questions regarding this tender should be addressed to Prof. Srinivasan Raghavan at the email address [sraghavan@iisc.ac.in](mailto:sraghavan@iisc.ac.in)
- Post such submission all vendors should send an email to [sraghavan@iisc.ac.in](mailto:sraghavan@iisc.ac.in) with the subject line: “GEECI\_Bidder’s name\_Tool Name” to intimate him of the submission within one day.
- Deviations from the technical specifications requested are allowed. Such deviations must be highlighted and justified. Their acceptance or rejection will be left to the discretion of the technical committee.
- The equipment sought will be placed at the Centre for Nano Science and Engineering (CeNSE), Indian Institute of Science (IISc). IISc is India’s No. 1 institution on higher learning and the Center for Nano Science and Engineering is home to one of the best academic fabs in the world.
- The technical and commercial response, corresponding to the tool being offered, should be in the form of a compliance table with at least 5 columns. Serial number in column 1. Each of the items below, **technical and non-technical**, should be addressed in a separate row of the table in column 2. Compliance to this requirement, in Yes/No, deviation from it and justification should be provided in the neighbouring columns 3-5. Post the opening of a hard copy of the technical bid the committee will request for a soft copy of the files for further processing. Companies should **NOT** mail soft copies of the files unless specifically requested for.
- A compliance table for the terms and conditions mentioned at the end of the RFQ should also be included in all bids.
- Detailed technical specifications of the tool being offered should be included.
- Any additional capabilities or technical details, that you would like to bring to the attention of the purchase committee, can be listed at the end of the technical table.
- If multiple systems can fulfill the requirements, vendors can submit multiple bids.
- Vendors are encouraged to highlight the advantages of their tools over comparable tools from the competitors.
- The commercial bid should be broken up to the maximum extent possible into separate items with a cost against each to enable better comparison of price for various configurations across the bidders. As an option, please provide itemized cost for any *suggested* accessories/add-ons that may

enhance the usability, capability, accuracy or reliability of the tool. Vendors are encouraged to quote for as many add-ons as their tool portfolio permits.

## I. Semiautomated Probe Station

### Technical Specifications

So. No.	Description	Qty
1	<p><b>Semi-automated Probe Station:</b> Vacuum Chuck (6" diameter or higher) with coaxial (or better) stage</p> <ul style="list-style-type: none"> <li>i. Motorized X-Y Travel: Equal to or greater than chuck diameter. Chuck should have full X-Y movement (equal to or greater than chuck diameter) under manual as well as automated modes.</li> <li>ii. X-Y motion control: 4 axis stepper motor under automated mode. To move stage under manual mode it should come with X-Y-Z knobs and joystick.</li> <li>iii. X-Y resolution 1<math>\mu</math>m (one micro-meter) or better. Should have equivalent closed-loop feedback system.</li> <li>iv. X-Y repeatability less than 3<math>\mu</math>m (three micro-meter) or better.</li> <li>v. X-Y accuracy less than 3<math>\mu</math>m (three micro-meter) or better.</li> <li>vi. X-Y speed &gt;25mm/sec (1" per second) or better.</li> <li>vii. Z travel: 4 mm or higher</li> <li>viii. Z resolution 1<math>\mu</math>m (one micro-meter) or better. Should have equivalent closed-loop feedback system.</li> <li>ix. Z repeatability less than 1<math>\mu</math>m (one micro-meter) or better.</li> <li>x. Z accuracy less than 2<math>\mu</math>m (three micro-meter) or better.</li> <li>xi. Theta Stage: +/- 5 degrees</li> <li>xii. Repeatability, resolution and accuracy better than Z.</li> <li>xiii. Joystick and control panel to control the stage</li> <li>xiv. Chuck/Stage controller: High Performance Probe Station Controller</li> </ul>	1 SET
2	<p><b>Should have a micro-chamber with</b></p> <ul style="list-style-type: none"> <li>i. Integrated safety enclosure (Wafer protection &amp; loading access)</li> <li>ii. &gt; 20dB EMI shielding</li> <li>iii. As low as possible noise floor (please specify)</li> <li>iv. Complete dark chamber around chuck (light attenuation &gt; 100dB)</li> <li>v. Front access door with rollout stage for user friendly wafer loading</li> <li>vi. Allows access for up-to eight probes</li> <li>vii. Allows mounting probe card if it can't be mounted over platen</li> <li>viii. Should have low volume for fast purge and easy cable access.</li> <li>ix. Frost-free measurements and high-voltage measurements (specify temperature and voltage)</li> <li>x. Should allow and provision for gas (Dry air or nitrogen) purge</li> <li>xi. Controllable purge flow rate (specify purge rate)</li> <li>xii. Purge time &lt; 20 mins.</li> <li>xiii. Should have condensation control</li> </ul> <p><b>Should have a platen with</b></p> <ul style="list-style-type: none"> <li>i. Minimum 6 DC positioners should be allowed</li> <li>ii. Steel for magnetic positioners</li> <li>iii. Should have probe card holder</li> </ul> <p><b>Should have enough triax, co-axial and SMA feedthrough (specify numbers)</b></p>	1 SET

3	<p><b>High Stability Microscope Bridge Mount (Precision 2x2" X-Y microscope transport)</b></p> <p><b>High resolution microscope</b></p> <ul style="list-style-type: none"> <li>i. Objective 10X &amp; 20X</li> <li>ii. Total Magnification offered by this setup up to 400X</li> <li>iii. Fiber Optic Coaxial light</li> <li>iv. Light intensity steeples control</li> </ul> <p><b>Digital Imaging System for use with wafer probe stations (should be well calibrated)</b></p> <ul style="list-style-type: none"> <li>i. CCD camera (5MP or better), 2.0 USB</li> <li>ii. Calibration and Imaging software</li> <li>iii. Video Processing Software</li> <li>iv. Prober Software Integration Module</li> <li>v. Digital Video PC interface card</li> </ul>	1 SET
4	<p><b>Micropositioners</b></p> <ul style="list-style-type: none"> <li>i. Linear X-Y-Z Travel 10mm-10mm-10mm (or better)</li> <li>ii. 100 Thread/Inch(Res. 0.7 micron per degree or better)</li> <li>iii. Probing inclination</li> <li>iv. ON/OFF Magnetic base</li> <li>v. Weight(&gt;1Kg) to avoid user induced vibrations</li> </ul>	4
5	<b>Triaxial Tip Holder</b>	4
6	<b>Triaxial Cable assembly for Kelvin probe setup</b>	8
7	<b>Tungsten Tip: 2, 5, 10, 20 micron diameter with 10 tips for each dia. (Enough number of spare DC probe tips should be provided.)</b>	1 SET
8	<b>Required vacuum pump to hold sample on chuck</b>	1
9	<p><b>Active Vibration isolation table</b></p> <ul style="list-style-type: none"> <li>i. Leveling leg, Active pneumatic control</li> <li>ii. Should come with low noise compressor and all piping</li> <li>iii. Specify mounting accessories</li> <li>iv. Heavy duty frame and steel tabletop</li> <li>v. Integrated leveling feet</li> <li>vi. Load capacity &gt;160kg</li> <li>vii. Ergonomic computer accessory mounting kit for Probe Station</li> <li>viii. LCD display and accessories should be mounted to the left or right side of the table frame.</li> <li>ix. Mount for LCD monitor with articulated arm for free floating placement</li> <li>x. Supports LCD monitor with VESA mount</li> <li>xi. VESA mounting plates</li> <li>xii. Mouse, Joystick and keyboard mounting platform with quick placement for easy probe station system control</li> <li>xiii. Accessory for mounting</li> </ul>	1

10.	RF Micro-positioners (North & South) with RF Probes (GSG, 150um pitch)	1 Set
11.	Thermal Chuck and Complete Thermal System	1 Set
12	<p><b>PC with automation and probe station control Software (GPIB, RS232, TCPIP Interfaces for the probe station) with following capabilities</b></p> <ul style="list-style-type: none"> <li>i. Industrial grade cabinet (19" rack mountable)</li> <li>ii. Intel Core i7 (Quad Core) based PC with single and dual monitor output</li> <li>iii. USB GPIB adapter</li> <li>iv. Windows 7 64bit Operating System and True Image software</li> <li>v. Quickly generate wafer map</li> <li>vi. Save maps</li> <li>vii. Load archived maps</li> <li>viii. Editing should allow easy die selection or skipping for regional or custom wafer testing.</li> <li>ix. Point and click navigation for quick positioning during manual testing.</li> <li>x. If possible, integrates control of test equipment for complete testing and data acquisition solution.</li> <li>xi. If possible, output should be able to map data in the format adhering to SEMI standards.</li> <li>xii. Preferably built-in control of shutter unit for blocking light during measurement</li> <li>xiii. Temperature control</li> <li>xiv. Any other accessory or cable required for efficient and proper operation of this probe station.</li> </ul> <p><b>Prober should be able to communicate with Keithley's ACS Advance software for automatic wafer level testing. In other words, Keithley's ACS advance software for fully automated wafer level testing should be able to control this probe station for automation. Besides, it should also be able to communicate with Keysight's VNA software.</b></p>	1 Set
13	<p><b>User Guides, Tools, Universal power cord kit, and accessories</b></p> <p><b>On-site system installation of the Probe Station by a Certified Service Engineer.</b></p> <ul style="list-style-type: none"> <li>i. Probe station assembly and accessory setup</li> <li>ii. Probe station system verification</li> <li>iii. Thermal Calibration</li> <li>iv. Assist with station placement</li> </ul>	

## II. Manual Probe Station with Hot Chuck

### Technical Specifications

Sr. No.	Detailed Technical Specs / Modules	Qty
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1	<b>Manual 6" Probe Station (specs same or better as listed below)</b>	1 set
	a. Chuck X-Y Travel 155mm-155mm	
	b. Chuck X-Y Fine Travel Resolution 5um	
	c. Chuck Load Stroke for Y axes 90mm	
	d. Chuck Z Height adjustment range: 10mm	
	e. Chuck Z Contact/Separation/Load Stroke 0-3mm adjustable	
	f. Chuck Theta Travel +/-8degree	
	g. Chuck surface planarity +/-3um	
	h. DUT sizes supported shards or wafers 25mm through 150mm	
	i. Platen thickness>12 mm, made of stainless steel	
	j. Platen separation lift 200um	
	k. Platen Z height adjustment range 40mm	
	l. Platen separation repeatability 1um	
	m. Platen Compatiblefor Vacuum and Magnetic manipulators	
n. Platen capable to hold up-to four DPP2xx or twelve DPP105 Positioners		
2	<b>Microscope –SlimVUE or equivalent (Should be well calibrated)</b>	1 Set
	a. Microscope adapter adjustable to 3 heights	
	b. 50mm Microscope coarse/fine focus drive	
	c. Unique SlimVUE microscope with quick objective exchange mechanism:	
	d. 3.2x manual zoom	
	e. 10x eyepieces	
	f. Trinocular photo tube with c-mount	
	g. Coaxial LED illumination	
	h. Quick lens exchange mechanism (2 objective adapters included)	
	i. 5x objective lenses included	
	<b>Digital Imaging system (Should be well calibrated)</b>	
	a. CCD camera: CMOS digital camera with imaging kit (5MP or better), USB based	
	b. CCD Adapter	
	c. Calibration and Imaging software	

3	<b>Micropositioners</b>	4 Sets
	a. Linear X-Y-Z Travel 12mm-12mm-12mm	
	b. Resolution of 1um	
	c. ON/OFF Magnetic base	
4	<b>Triaxial Tip Holder-tubular</b>	4 Sets
	a. Triaxial cable 1.5 meters long with triax plug	
	b. Highly isolated and gold-plated needle clamping	
	c. Coaxial cable 2m long with Triax connectors	
5	<b>Tungsten Tip:</b> 25 PTT probe tips with 6um tip radius	1 set
6	<b>Vacuum Pump</b> (To hold die or wafer on chuck)	1 set
7	<b>Active Vibration isolation table (Size: 1500mm x 1000mm x 800mm)</b>	1 set
	a. Air Damping System with Resonance Frequency of 2.5Hz	
	b. Automatic load levelling & Pressure Input Regulator with Gauge	
	c. Surface: SUS430 (Magnetic Substance)	
8	<b>Hot Chuck</b>	1 set
	Hot Chuck and temperature controller	

### III. Manual Probe Station

#### Technical Specifications

Sr. No.	Detailed Technical Specs / Modules	Qty
1	<b>Manual 6" Probe Station (specs same or better as listed below)</b>	1 set
	a. Chuck X-Y Travel 155mm-155mm	
	b. Chuck X-Y Fine Travel Resolution 5um	
	c. Chuck Load Stroke for Y axes 90mm	
	d. Chuck Z Height adjustment range: 10mm	
	e. Chuck Z Contact/Separation/Load Stroke 0-3mm adjustable	

	f. Chuck Theta Travel +/-8degree	
	g. Chuck surface planarity +/-3um	
	h. DUT sizes supported shards or wafers 25mm through 150mm	
	i. Platen thickness>12 mm, made of stainless steel	
	j. Platen separation lift 200um	
	k. Platen Z height adjustment range 40mm	
	l. Platen separation repeatability 1um	
	m. Platen Compatible for Vacuum and Magnetic manipulators	
	n. Platen capable to hold up-to four DPP2xx or twelve DPP105 Positioners	
	o. Accessories: Jewellers screw driver Set, Allen key set, Non Magnetic anti ESD Tweezers set	
2	<b>Motic Microscope or equivalent (Should be well calibrated)</b>	1 Set
	a. E.P. 20X	
	b. Objective 2X,10X & 20X	
	c. Total Magnification offered by this setup 20X to 400X (or better)	
	d. Fiber Optic Coaxial light	
	e. Light intensity steeples control, Fluorescent light	
	<b>Digital Imaging system (Should be well calibrated)</b>	
	a. CCD camera: CMOS digital camera with imaging kit (5MP or better), USB based	
	b. CCD Adapter	
	c. Calibration and Imaging software	
3	<b>Micropositioners</b>	4 Sets
	a. LinearX-Y-ZTravel12mm-12mm-12mm	
	b. Resolution of 1um	
	c. ON/OFF Magnetic base	
4	<b>Triaxial Tip Holder-tubular</b>	4 Sets
	a. Triaxialcable1.5meters long with triax plug	
	b. Highly isolated and gold plated needle clamping	
	c. Coaxial cable 2m long with Triax connectors	
5	<b>TungstenTip:</b> 25 PTT probe tips with 6um tip radius	1 set



6	<b>Vacuum Pump</b> -(Tohold die or wafer on chuck)	1 set
7	<b>Active Vibration isolation table</b>	1 set
	a. Air Damping System with Resonance Frequency of 2.5Hz	
	b. Automatic load leveling	
	c. Pressure Input Regulator with Gauge	
8	<b>Shielding Enclosure (with 8 triax feedthrough)</b>	1 set
	Light-tight electrically grounded and optimized design for EMC shielding	

**Note: All the items must be in a single technical and respective commercial bid.**

**All of the above mentioned technical specifications are highly desired. However, lower technical specifications may be considered if the above mentioned specifications are found to be unsuitable in financial terms. The Institute reserves the right to go for lower specifications taking into consideration its technical preferences and financial constraints. Vendors are encouraged to highlight the advantages of their tools over comparable tools from the competitors.**

**Terms and conditions:**

1. SEMI Standards (if applicable): The technical bid should include details of the SEMI standards the tool confirms to.
2. Shipping: On all systems the cost of shipping up to IISc should be included. IISc will take care of the customs clearance at Bangalore Airport. Please include your payment option. IISc would prefer to retain at least 40% of payment till instruments have been commissioned and successfully demonstrated.
3. Tool Training: Necessary training to operate the procured setup and required literature support should be provided without additional cost. In principle onsite installation should be free of cost. The amount of time / day committed by the engineer during installation must be clearly stated. The engineers must spent enough time at the installation site (at least 4 days to train all engineers/staff and students).
4. **Tool Qualification and Acceptance:** Commissioning shall involve demonstration of tool performance as per terms and conditions mutually agreed upon between the client and vendor and characterized by the client within time frames agreed upon. Given the requirements in the RFQ, details of the stage wise certification protocols to be pursued for tool acceptance should be included in the technical bid. The PO will include a mutually agreed upon set of tool qualification criteria. Please list a set of acceptance tests for on-site (vendor) inspection and after installation at IISc.
5. **Tool footprint and utilities:** A floor plan should be part of the technical bid. A list of utility requirements should be part of the technical bid. The system should be compatible with 240±10V, 50 Hz single phase or 415±20V, 50 Hz 3 phase supplies. The MINIMUM set of utility requirements needed are provided in Table 1. If there are additional utility requirements please include them in the technical bid. Please list connector types for all utilities.
6. Software upgrade, if any, must be free of cost for next 5 years.

7. The vendor must assure that there are no bugs and glitches with the integration. In case of glitches or bugs at the time of installation, vendor must fix the issues in less than three days from the start date.
8. Maintenance: The cost of an annual maintenance contract and cost of emergency technical support that may involve an engineer being on site should be quoted for in the commercial bid and addressed in the technical bid. The availability of trained engineers in India for servicing the system will be preferred and should be described in the technical bid.
9. Maintenance: On all systems a set of basic tools required (like non-standard screw or spanner head that is required for routine tool maintenance) should be provided for performing routine maintenance.
10. Maintenance: System operation, process and troubleshooting manuals and detailed drawings are a must. Their inclusion must be indicated in the technical bid.
11. **Cost of Ownership and supply of spares:** The quote should include a listing of spares that need to be replaced periodically to ensure that the system is in operation in a stable fashion – the stability parameters being defined by the vendor and agreed to by the client – the cost of such items, the ability to guarantee their availability at this cost for a period of 5 years from the time of procurement. The aim of this exercise is to compare cost of ownerships between reactors.
12. Online support: System should have the capability for online diagnostics from a remote location in case of tool problems.
13. Post sales service and Indian Presence: Bidders should provide details of after sales service and support and in particular that available in India. If not India, the nearest geographical location should be specified. Please provide details of the number of trained personnel in India who can service the machine, the number of tools sold in India and the corresponding number in the southern region or in Bangalore.
14. Payment Terms and Conditions: On all systems the payment terms should be specified in the technical and commercial proposal and is subject to negotiation. Please include your payment option. IISc would prefer to retain at least 40% of payment till instruments have been commissioned and successfully demonstrated.
15. References: Bidders should provide details of other locations in India with similar tool installations. Vendor should have installed the same or similar tool at minimum 3 other locations in India.
16. References: Bidders should provide details of at least 10 other locations globally where similar tool installations have been deployed.
17. Company financials: Bidder shall have to submit audited accounts of financial year 2017-18, 2018-19 and 2019-20. Audited statement must be signed and stamped by qualified chartered accounted. Income Tax return for assessment year – 2017-18, 2018-19 and 2019-20.
18. The following documentation should be provided. ISO9001 quality certification. CE marking confirmation.
19. Guarantee: As high as possible (at least 3 years)
20. In case of software issues, vendor should be able to provide required solution within five days.
21. The lead time for the delivery of the equipment should preferably be less than 6 weeks from the date of receipt of our purchase order. The smallest lead time will be appreciated.
22. The validity period of the quotation should be 90 days at least.
23. System/computer required to operate the tool must come with the system with all software pre-loaded.
24. Free copies of analysis software must be provided with the tool (list out numbers)

Details to be provided in addition to other utility requirements the tool may require. If not applicable mark as NA: Not applicable.

				Electric	Chilled Water	Gases																Exhaust	Thermic load
L (mm)	Tool Foot Print, (LXBXH)			Power consumption average	Cooling capacity	UHP Nitrogen	UHP Hydrogen	Dopant Silane	Pure Silane	Ammonia	Chlorine	He	Oxygen	Regular Nitrogen	CF4	CHF3	SF6	NO2	BCl3	Argon	Forming Gas		Thermic load to clean room
B (mm)			Area	kW	l/h	slpm	slpm	slpm	slpm	slpm	slpm	slpm	slpm	slpm	slpm	slpm	slpm	slpm	slpm	slpm	slpm	m <sup>3</sup> /h	kW
H (mm)				kVA																			