MINUTES OF PRE-BID MEETING FOR TENDER NO IITT/CI/2023-24/23 dated 16.02.2024)

For "Supply, Installation, Commissioning and Operation and Maintenance of ATOMIC FORCE MICROSCOPE 1nos. in IIT Tirupati."

Date & Time: 28.02.2024 at 1200 hours
Venue: Meeting held on hybrid mode via video conferencing and physically at IIT Tirupati.

Technical Evaluation Committee members:

1. Dr.Mamilla Ravi Sankar Professor & Head of the Department (ME)
2. Dr.N.N Murty Professor and Dean (Student Affairs)

Agenda: Pre-bid meeting for the tender: "Supply, Installation, Commissioning and Operation and Maintenance of ATOMIC FORCE MICROSCOPE 1nos. in IIT Tirupati " (Tender No: IITT/CI/2023-24/23 dated 16.02.2024)

The following bidders were present at the pre-bid meeting:

1. M/s Forevision instruments(India)pvt. Ltd, Hyderabad- Attended physically
2. M/s. Park Systems India Pvt. Ltd.Bangalore.-Attended physically
3. M/s. Toshniwal Brothers (SR) Pvt. Ltd.Bangalore - Attended physically
4. M/s. Edge Tech (Semi Lab) – Attended online

The pre-bid meeting was organized to address the queries raised by the bidders for the said tender. The committee has also decided that the pre-bid meeting minutes should be treated as part of the Tender conditions and shall be binding to both Technical Evaluation Committee and Bidders.

The committee clarified the queries pointwise raised by the bidders and the same is recorded. The queries received in writing by the above bidders with Tender committee remarks are placed in Annexure –I.

Based on the reply provided by the technical committee, the technical specifications has to be reviewed. Accordingly the technical committee recommended to issue necessary corrigendum to the technical specifications. The corrigendum related to the technical specifications is attached to the annexure-II

Technical Evaluation Committee members:

1. ~~Prof~~ Dr.Mamilla Ravi Sankar 2.~~Prof~~ Dr.N.N Murty

ANNEXURE-I

1.The queries/request raised by Forevision Instruments (India)pvt. Ltd, Hyderabad, are as follows: -

S.NO	Description	IIT Tirupati Specifications	Request for amendment
2	Application modes	• An overall range of 100kPa to 100GPa should be possible to measure	Request to amend as "An overall range of 100kPa to 50GPa or more should be possible to measure"
4	Stages (XYZ are completely automatic and synchronized) sample movement	• System must include a sample chuck atleast 210mm in diameter	Please amend as "System must include a sample chuck > 200mm in diameter"
5	Sample Size	• The stage must accommodate a sample size of upto 210mm dia and 35mm thickness	Please amend as "The stage must accommodate a sample size of > 200mm dia and 35mm thickness"
7	Scanners	• Each axis of motion is independently actuated using its own piezo stack and flexure stage. • The XY scanner should be separate from the z scanner to eliminate the "bowing" artefact commonly seen in piezo-tube based (XYZ scanners) AFM systems.	As flexure de-coupled scanners are prone to mechanical vibrations due to its design and weight, please allow piezo tube based scanners as well, for following reasons. – Modern piezo tube based scanners do not have bowing phenomenon. - Piezo tube based scanners also offer excellent resolution and repeatability in comparison to de-coupled scanners, especially in the context of small samples as asked by you. - Piezo tube offers very high

			speed measurements, as compared to de-coupled scanners - Piezo tube scanners are also prone to fewer failures as compared to flexure decoupled scanners as decoupled scanners are very sensitive to temperature & humidity. **• Please modify XYZ Scanner as " Flexure Decoupled / Modern Piezo Tube**
		• System must include a Z scanner with a range of atleast 12µm	Request to amend as "System must include a Z scanner with a range of >10µm"
			Also please add AFM type: "Sample / Tip scanning system"
10	Performance / Controller Electronics	• The system provides thermal tunes of the cantilever upto 7MHz	• Request to amend as "The system provides thermal tunes of the cantilever >5MHz"
11	Computer & Software	• Software must support both the thermal and sader methods for spring constant calibration at resonances upto atleast 7MHz	• Request to amend as "spring constant calibration at resonances >5MHz

2.The following queries / request were raised by M/s. Park Systems India Pvt. Ltd. Bangalore:

Tender Specification	Amendment requested	Remarks
Sl. No.3 Laser Source Detector • The instrument optical lever arm must use a low coherence laser source (a super luminescent diode) to reduce artefacts from optical interference effects. • Laser spot positioning and photodetector centering must be motorized and controlled through software. Laser spot positioning and Photodetector alignment must allow automated centering and controlled through software. Manual adjustment of photo detector is not acceptable. • The microscope must have an optical sensing detector bandwidth of at least DC to 7 MHz.	The instrument optical lever arm must use a low coherence laser source (a super luminescent diode) to reduce artefacts from optical interference effects. • Laser spot positioning and photodetector cantering must be motorized and controlled through software. **Or** Must have pre-aligned cantilevers to minimise the manual adjustment Can be DC to 5 Mz or more to accommodate all vendors	Park Systems uses pre-aligned cantilever for fast alignment of laser and cantilevers and Photodetector
Sl no. 4 • System must include a sample chuck at least 210 mm in diameter, with mechanical access for working with samples up to > 150 x 180 mm. The chuck must include wafer locating pins and vacuum rings for a variety of wafer sizes. The chuck must also include magnetic mounting points	Sl no. 4 • System must include a sample chuck at least 200 ~~210~~ mm in diameter, with mechanical access for working with samples up to 200 x 200 mm > ~~150 x 180~~ mm. The chuck must include wafer locating pins and vacuum rings for a variety of wafer sizes. The chuck must also include magnetic	210 is specific to vendor we can have standard 8inch (200 mm) sample stage with full sample coverage

for conveniently mounting samples prepared on standard 10-15 mm diameter AFM discs. • The system must include a motorized sample stage, with stage travel of at least > 150 x 180 mm, with a minimum step size of <500 nm. The maximum stage velocity must be at least 40 mm/sec.	mounting points for conveniently mounting samples prepared on standard 10-15 mm diameter AFM discs. • The system must include a motorized sample stage, with stage travel of at least 200 x 200 mm > ~~**150 x 180**~~ mm, with a minimum step size of <500 nm. The maximum stage velocity must be at least 40 mm/sec.	
Sl. No. 5 Sample Size Opaque, transparent, insulating, conducting, and biological samples will be able to image. The stage must accommodate a sample size of up to 210 mm dia and 35 mm thickness.	Opaque, transparent, insulating, conducting, and biological samples will be able to image. The stage must accommodate a sample size of up to 200 mm ~~**210**~~ mm dia and ~~**35**~~ 20 mm thickness.	
Sl. No. 8 Tip-sample viewing / System Optics • The system must include a camera and optical assembly that provides an optical field of view of the sample of at least 930 µm x 1240 µm, with an optical resolution better than 1.5µm. The optics must include an objective lens with an NA of at least 0.30. Software control of the optics must include digital pan and zoom. • The built-in optics must include software-controlled intensity, and	Sl. No. 8 Tip-sample viewing / System Optics • The system must include a camera and optical assembly that provides an optical field of view of the sample of at least ~~**930**~~ 800 µm x 600 ~~**1240**~~ µm, with an optical resolution better than **1 micron**. The optics must include an objective lens **10X** with an NA of at least 0.30. Software control of the optics must include digital pan and zoom. • The built-in optics must include	

software-controlled field and aperture diaphragms.	software-controlled intensity, and software-controlled field and aperture diaphragms.	
Sl. No. 10 Performance / Controller Electronics	To supply suitable controller for AFM control and acquisition and processing of data with required software The controller specs should be general in nature as every company has their own unique controller to control the system The system should have a 24-bit controller with Q Control for controlling the AFM system. The data acquisition system must be capable of recording individual image sizes of 4000 x 4000 ~~**8000 x 8000**~~ pixels or greater in all 16 channels	The controller specs should be general in nature as every company has their own unique controller to control the system Pixel density should be same for all imaging channels thus it is important to have no of channels with particular pixel density.

3.The following queries / request were raised by M/s. Toshniwal Brothers (SR) Pvt. Ltd.Bangalore:

S.NO	Technical Specification – Section VII	Change Requested with Justification
7	Para 1 The instrument design should allow the use of two or more scanners to cover a large area and high resolution imaging.	We recommend and offer a single scanner to cover both large area and high resolution imaging. We believe that a single scanner configuration for this purpose is also available with most current generation high end AFMs. The specifications of the scanner in bullet point 3 also asks for a single scanner therefore the requirement of a single scanner is a contradiction. We request change to the following: The instrument design should allow the use of single scanner to cover a large area and high resolution imaging.
22	OPTIONAL ITEM 1: Heating Stage: Variable temperature stage covering a range from Ambient to 300 deg C should also be offered Optionally. There should be an option to purge gas to the heating stage to minimize oxidation while heating.	Heating Stage: Variable temperature stage covering a range from Ambient to 250 deg C should also be offered Optionally. There should be an option to purge gas to the heating stage to minimize oxidation while heating.

3.The following queries / request were raised by M/s. Edge Tech (Semi Lab):

S.NO		IIT Tirupati Specifications	Request for amendment
10	Performance / Controller Electronics	The system provides thermal tunes of the cantilever upto 7MHz	Request to amend as "The system provides thermal tunes of the cantilever 2MHz"or more
22	OPTIONAL ITEM 1	Heating Stage: Variable temperature stage covering a range from Ambient to 300 deg C should also be offered Optionally. There should be an option to purge gas to the heating stage to minimize oxidation while heating	Heating Stage: Variable temperature stage covering a range from Ambient to 250 deg C should also be offered Optionally. There should be an option to purge gas to the heating stage to minimize oxidation while heating