



**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY**  
**MATERIALS MANAGEMENT DIVISION**  
Powai, Mumbai 400076

**Technical Specifications for 3-Axis Angular Motion Simulator**

**The party to provide the following in the quote:**

- a) The vendor should be an original equipment manufacturer (OEM) with direct presence in India or should be an exclusive agent of an International OEM for minimum 5 years in India. Proof of this relationship should be included along with the technical bid.
- b) Support of hardware and spare for a minimum period of 10 years after installation and commissioning.
- c) Warranty of the product for a minimum of 3 years from the date of commissioning.
- d) To provide details of installed angular motion simulators over the last 10 years of at least 5 users of similar or higher capabilities (specifically 3-axis angular motion simulators) in India (specifically in IIT's, IISc, NIT's and reputed national labs like DRDO, NAL, ISRO, HAL, etc.) or abroad from reputed institutions/organizations for getting first hand feedback from them about the product and service experience. (Details as per previous supply order format).
- e) If the simulator fails to meet the specified requirements, the vendor will be held liable to take the machine back at their own cost. IIT Bombay will not be responsible for any damage to the simulator until it is handed over to the user.
- f) The firm should be equipped with well-trained engineers to offer post warranty maintenance and service support. Number of service engineers employed in this region by manufacturer should be mentioned, along with their qualifications and experience.
- g) Details of service support in India that the firm can offer should be given along with the NABL calibration facility.
- h) Nearest service centre to Mumbai is to be mentioned.
- i) OEM (original equipment manufacturer) engineer should install the complete setup and it should not be carried out by the agent.

**Detailed specifications of the 3-axis angular motion simulator:**

1. Payloads should be mounted on the hard table top platen. A pattern of threaded holes should accept a variety of test loads. Electrical access should be provided by shielded lines with appropriate connectors for payloads accessibility.
2. **Rotational freedom:** Unlimited

3. **Payload:**

<b>Mass</b>	20 kg
<b>Height</b>	250 mm

4. **Mounting plate:**300 mm

5. **Dynamic:**

	<b>Inner axis</b>	<b>Middle axis</b>	<b>Outer axis</b>
<b>Rate range</b>	± 1000 deg/sec	± 500 deg/sec	± 300 deg/sec
<b>Acceleration (no load)</b>	15000 deg/sec <sup>2</sup>	1500 deg/sec <sup>2</sup>	300 deg/sec <sup>2</sup>
<b>Bandwidth (-3dB)</b>	>60 Hz	>20 Hz	>20 Hz

6. **Position Command:**

<b>Position resolution</b>	< 0.04 ArcSec
<b>Position Accuracy</b>	< 5 ArcSecRSS
<b>Position repeatability</b>	Better than ± 1.5 ArcSec

7. **Rate command:**

<b>Rate resolution</b>	<0.04 arcsec/sec
<b>Rate stability</b>	<0.001% of commanded rate over one revolution

8. **Interface:**Analog and digital (RS232, RS422, Ethernet)

9. Please specify the following:

9.1. Power requirements

9.2. Rotational freedom ranges in inner axis, middle axis and outer axis

9.3. Drives are all electric or not. If not, which drives are electric?

9.4. Ranges of phase lag (in deg) and gain amplification (in dB) for frequency < 10Hz.

9.5. Torque ranges in inner axis, middle axis and outer axis for Dynamic specifications mentioned in the point number 5.

9.6. Separate Slipring cost with specifications

10. The simulator software should be capable of supporting and also interfacing with PC desktop.

11. Installation and Commissioning by the supplier at no cost

12. Detailed manuals of hardware and software in English along with electronic copies.

13. Upgradation of software should be provided, which will be compatible to any higher version of windows operating system.

**Safety**

- a) At all times, the simulator facility should ensure the operator's safety. Please specify in the technical bid the safety features, precautions and capabilities of your simulator hardware and software.

**Integration of hardware plus software:**

Kindly specify:

- a) The time required for installation and commissioning
- b) The requirement of civil, electrical, plumbing work etc. to be carried out by IIT for the simulator
- c) Other, if any

**Training to laboratory personnel after installation and commissioning at IIT Bombay:**

- a) Kindly specify the training period and method of training.

AMC: Quote separately for AMC and should include the cost of 3 year annual maintenance contract (AMC) after the expiry of the warranty period of 3 years.