



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
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PR No. 1000054435

Rfx. No. 6100002980

Item Description – **Optical Motion Capture System and Accessories (Qty: 1)**

Sr. No	Item Description	Detailed Technical Specification	Technical Compliance (Yes / No)	Additional Information (if any)
1	Hardware – Optical Motion Capture Camera	<ol style="list-style-type: none">1. Motion capture system should include at least 10 optical infrared motion capture cameras2. Camera resolution should be at least 2 megapixels3. Cameras should capture at full resolution and full field of view (FOV) at 300 fps or more4. Cameras should allow an option of changing the lens to allow for different FOV, with the wide angle FOV minimum 80 x 50 degrees5. All infrared cameras should feature real-time on-board marker data processing that calculates the centre of markers and outputs 2D coordinates in real-time6. System should support both active and passive markers7. Cameras should be noiseless to avoid any disturbance to the measurement subjects8. Camera strobes should contain high-powered surface mounted invisible infrared light operating in 100% invisible infrared wavelength range9. Cameras should be equipped with LED indicator ring used for indicating camera status		

		10. Cameras should feature live video streaming mode to facilitate convenient and fast positioning of the cameras during setup and measurement for volume adjustments		
		11. All cameras should have ability to send complete grayscale marker data to the PC		
		12. Maximum camera latency should be 4ms or less		
		13. Individual cameras should be lightweight and weigh less than 750g		
		14. Number of cameras should be expandable with no limitation of adding hubs		
2.	Hardware – High Speed Video Camera	1. Motion capture system should include at least 2 high-speed video cameras for capturing colour video data		
		2. Video cameras should operate as standalone video cameras, or as an integral part of the motion capture system		
		3. Video camera resolution should be at least 2 megapixels		
		4. Cameras should capture at full resolution and full field of view (FOV) at 100 fps or more		
		5. Cameras should be able to stream video data to the main PC in real-time		
		6. Video cameras should allow calibration with the optical motion capture cameras, to align 3D data with the video image, thus producing a 3D data overlay over the streaming video		
3.	Hardware – Camera System Calibration, Connectivity, Synchronisation and Accessories	1. The system should include a calibration wand capable of calibrating all optical and video cameras simultaneously.		
		2. All optical cameras, video cameras and external hardware, such as force plates, EMG, IMU, instrumented treadmill should be		

		synchronised and integrated in the main system		
		3. The main system should also allow synchronisation of other analog devices such as pressure mats and load cells		
		4. Each camera system should be connected to the PC, directly or through a PoE switch, with a minimum cable length of 10m		
		5. All cameras should be powered through a single power source or power adaptors		
		6. The system should allow data connection and synchronisation of at least 5 inputs		
		7. Data from all hardware devices and sensors should be visualised and processed in the data acquisition and post-processing software		
		8. Cameras should be connected such that issues with an individual camera do not affect the performance / data streaming of other cameras		
		9. Accessories should include at least 100 retroreflective spherical markers of different sizes, mountable on flat bases and compatible with all optical cameras		
		10. Accessories should include super clamps and ball heads for all optical and video cameras		
		11. The system should be supplied with a high-performance workstation for operating the software with the following minimum specifications – processor: AMD Ryzen 9 or Intel i7 14th gen, RAM: 64 GB, SSD: 2x 1TB, HDD: 4 TB, GPU: Nvidia GeForce 8GB, LAN card: 2x 10GB/s, display: Full HD 27-inch, operating system: Windows 11 Pro 64-bit or its equivalent		
4.	Hardware – Force	1. Motion capture system should include at least 2 portable force		

	Plate	plates		
		2. Force plate should at least be of size 400mm x 600mm		
		3. Force plate should have a minimum load range of 8000N		
		4. Force plate should have a digital output		
		5. Force plate should have a minimum sampling frequency of 1000 Hz		
		6. Force plate should be supplied with digital amplifier		
		7. Force plate should allow precise measurements of six components – three orthogonal forces (Fx, Fy, Fz) and the moments about each axis (Mx, My, Mz)		
		8. Force plate should be supplied with data acquisition software, which enables quick and efficient data collection		
		9. Force plate data should stream in real time in the motion capture software 3D view, along with kinematic data		
		10. Force plate should integrate seamlessly with the motion analysis software		
		11. System should allow us to upgrade more force plates in future.		
5.	Software – 3D Data Acquisition Software	1. Data acquisition software should include at least four licenses to be installed on multiple workstations, enabling multiple operators to carry out simultaneous data processing		
		2. Data acquisition software should provide means for quick and intuitive hardware setup, calibration, even with some obstacles partially obstructing camera view		
		3. Data acquisition software should feature individual camera settings control and calibration of entire system, including the integrated high-speed video cameras		
		4. Data acquisition software should allow full-frame preview for optical		

		and video cameras		
		5. Data acquisition software should allow real-time streaming, capture and storage of 2D, 3D, 6DOF data, and export in post processing		
		6. Data acquisition software should have batch capture functions, allowing the user to capture a set of measurements more efficiently		
		7. Data acquisition software should allow easy manual and automatic labelling of markers, both in real-time and post-processing modes		
		8. Automatic marker labelling function should be flexible and generic enough to identify human movement, and should be able to merge data from multiple subjects to ensure scalability for different participants subjected to similar marker setups		
		9. Data acquisition software should allow simultaneous 3D or 6DOF data visualization both in real-time and post-processing mode		
		10. Data acquisition software should allow 3-D data overlay on the reference video		
		11. Data acquisition software should be capable of re-processing, gap-filling and filtering the collected motion data		
		12. Data acquisition software should allow generation of customised biomechanical models and reporting templates		
		13. Data acquisition software should sync and integrate signals from force plates and EMG, to facilitate synchronized kinematic, kinetic and EMG signal data in real-time		
		14. Data acquisition software should display and output sync data from all integrated devices		
6.	Miscellaneous – Installation, Training, Support,	1. The bidder must bid for all aspects of the system mentioned above		
		2. It is the sole responsibility of the bidder to provide the consolidated		

Maintenance, Warranty, etc	system as mentioned above, and must ensure the compatibility of all aforementioned components		
	3. Equipment should be supplied and installed on-site with all accessories and consumables		
	4. The bidder should ensure at least 3 days of training from the expert engineer from OEM		
	5. The bidder will provide online technical support from the OEM or local support from the supplier when needed and should respond within 48 hrs		
	6. An extensive library of video tutorials with printable material should be available online without a subscription charge		
	7. The bidder/OEM should have at least three similar installations at IITs/NITs/IISc or reputed autonomous public engineering institutions in India		
	8. The bidder shall furnish the letter of quality of performance from the said Indian institutions using this system		
	9. The system should adhere to international safety standards, such as European CE / US FDA / BIS or its equivalent		
	10. The system should be covered for a comprehensive warranty for three years from the manufacturer. The comprehensive warranty should cover all parts, accessories, spares and labour on site, free maintenance and service on-site at no additional cost, and regular upgradation of software. This should be clearly and explicitly specified.		