| 2 | **Specifications Required For Radiotherapy Simulator Machine** |
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| 1 - Scope | | Comply | Not Comply | Fill Your Specifications |
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| **1.1** | This specification establishes the requirement for dedicated Simulator serves the purpose of simulating and planning of teletherapy treatment of various cancer sites for the Oncology Department at RICK – Sudan | | | |
| **1.2** | The simulator is required for most accurate simulation, placement of treatment fields and marking of radiation field portals on patient's skin for radiation therapy of cancer patients. It should be latest, state-of the-art model. The simulation software should be user friendly and should ensure easy, error free and total compatibility with treatment machine, Treatment Planning System TPS and simulation workstation. If third party software is supplied, it will be sole responsibility of the vendor supplying the Simulator to run the software. The system should be able to integrate the Virtual simulation software workstation; TPS, Linear Accelerator and Cobalt 60 of the Oncology department, and this will be entirely and direct responsibility of the vendor. | | | |
| **1.3** | The equipment offered provided by a recognized supplier shall prove that the service, spares and application support is available in Sudan to maintain the system in peak operating performance. | | | |
| **1.4** | A list of users around the world where the equipment offered is currently in clinical use shall be provided, indicating the current models and equipment configuration per site. | | | |
| **1.5** | The system offered shall comply or exceed the minimum performance specifications as indicated below for the various sub-components, supported by factory-supplied product specifications / brochures. | | | |
| **1.6** | Descriptive literature, pamphlets, brochures and technical data sheets applicable to the offer (i.e. all component of the system) shall accompany with the offer. | | | |
| **1.7** | The system will be used to perform at the Oncology and Radiology departments – RICK Sudan. | | | |
| **1.8** | The supplier applying for the limited tender must be the manufacturer or the official representative agent of the manufacturer. Original documents must be provided (photocopy or computer print will not be accepted). | | | |
| **1.9** | Technical specifications and invoices must be provided by the manufacturer. Documents must be supported by original manufacturer's brochure and product catalogue (photocopy or computer print will not be accepted). | | | |
| **2- Technical Specifications** | | | | |
| **2.1** | Digital x-ray simulator and other accessories for Radiotherapy Treatment Planning and simulation. The system should have following essential features | | | |
| **2.2** | **GANTRY :** | | | |
| | Height of axis of rotation at least 120 cm above the floor. | | | |
| | • Source axis distance: 70-120cm SAD. | | | |
| | • Revolving of gantry ±360° up SAD 100 cm. | | | |
| | • Build in anti-collision system. | | | |
| | • Variable speed of gantry 0.5-7°/sec | | | |
| | • Should incorporate optical distance indicator. | | | |
| | • Build-in anti-collision systems. | | | |
| **2.3** | **DIAPHRAGM** | | | |
| | i) Automatic functions | | | |
| | - Tracking (monitoring of image intensifier) | | | |
| | - Pair (movement of wire diaphragm online blades) | | | |
| | ii) Field wires max. 40×40 cm y FAD 100 cm | | | |
| | iii) Diaphragm rotation 360° (±185°) | | | |
| | iv) Asymmetrical and symmetrical field mode | | | |
| | v) Virtual view projection | | | |
| **2.4** | **X-RAY GENERATOR** | | | |
| | High frequency x-ray generator with an output of at least 50 KW or more. Please give details. | | | |
| **2.5** | **X-RAY TUBE** | | | |
| | i) The x-ray tube should have dual focal spot (please specify the size of each focal spot). | | | |
| | ii) Maximum anode heat content 300 KHU or more. | | | |
| | iii) Tube housing, heat storage more than 1200kJ; cooling rate more than 200W/min | | | |
| | iv) Maximum operating voltage 150 kV. | | | |
| | v) Anode speed 3000/10000 RPM or more | | | |
| **2.6** | **IMAGE INTENSIFIER and CCD Camera** | | | |
| | i) 12" or more. | | | |
| | ii) Image Intensifier coverage should be not less than 70 x70 cm. | | | |
| | iii) Automatic brightness for fluoroscopy. | | | |
| | iv) Distortion correction. | | | |
| | v) Image intensifier movements: | | | |
| | **a)** Motorized movement: x, y, z axes. | | | |
| | **b)** Automatic Centering: lateral- longitudinal. | | | |
| | **c)** Controls: local and remote. | | | |
| | vi) Anti-collision integrated to machine control system. | | | |
| | vii) Anti-collision touch guard. | | | |
| | viii) CCD video Camera: Please attach full details (e.g. resolution, chip size, scanning system, processor frequency, others) | | | |
| **2.7** | **PATIENT COUCH :** | | | |
| | The scanning table should be universally flat with flat table top and should be compatible with the tables of Co-60. The table should have patient positioning index system on carbon fiber table top. It should have following features :- | | | |
| | The table should be able to bear weight up to 150 kg or more. | | | |
| | The table should have the following range: | | | |
| | Min vertical position more than 50cm | | | |
| | Max vertical position more than 150cm | | | |
| | Lateral position between -20 to 20cm | | | |
| | Longitudinal rage 170cm or more | | | |
| | Iso rotation range ±105° or more | | | |
| | Anti-collision system | | | |
| | It should be possible to move the table top from the table side and control console and hand pendant. | | | |
| | The table should have auto home facility. | | | |
| | The table should have total free floating facility. | | | |
| | All patients positioning accessories including tilt should have control both from gantry and control console | | | |
| **2.8** | **CONTROL CONSOLE** | | | |
| | It should have 18" or more (Flat panel) colour monitor for display. | | | |
| | 1024 x 1024 matrix or more. | | | |
| | Image storage of 750 GB or more (Please quote the latest configuration). | | | |
| | DVD facility for archiving must be available. | | | |
| **2.9** | **Imaging PARAMETERS :** | | | |
| | Radiographic mode: | | | |
| | i) kVp range : 40 – 150kVp | | | |

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| | ii) mA range : 0.5 – 6.0 | | | |
| | iii) Exposure time : 0.001- 6sec. | | | |
| | Fluoroscopic mode: | | | |
| | i) kVp range : 40 – 150kVp | | | |
| | ii) mA range : 0.5 - 1000 | | | |
| **2.1** | **COMPUTER SYSTEM** | | | |
| | i) High resolution flat panel colour monitor at least 18 inches. | | | |
| | ii) DVD Writer | | | |
| **2.11** | **STANDARD SOFTWARES :** | | | |
| | Should provide standard software including following features :- | | | |
| | i) Windows or Linux operating system. | | | |
| | ii) Sophisticated setting, calibration and maintenance software. | | | |
| | iii) Mouse and keyboard driven access to all control functions. | | | |
| | iv) Hand pendant control integrated to MMI. | | | |
| | v) Automatic position setting. | | | |
| | vi) DICOM RT plan import and export ready. | | | |
| | vii) MLC and microMLC collimator simulation ready. | | | |
| | viii) R&V | | | |
| **2.12** | **ESSENTIAL ACCESSORIES :** | | | |
| | All sets of patient's positioning accessories should include the following :- | | | |
| | a. Head holding positioning kit.- one | | | |
| | b. Standard supine base plate (head & neck). - one set | | | |
| | c. Lateral base plate. - one set | | | |
| | d. Carbon fiber tilting base plate (head & neck). - one set | | | |
| | e. Head and neck prone base plate. - one set | | | |
| | f. Knee crutch and arm position with hand grip. - one set | | | |
| | g. Belly board for hip and pelvis positioning and fixation -one set | | | |
| | h. Hip fix - one set | | | |
| | i. Breast board ( carbon fiber ) - one set | | | |
| | Complete mold room with an automatic cutting machine | | | |
| **2.13** | **WORKSTATION :** | | | |
| | GENERAL : | | | |
| | The workstation should have advanced simulation tools for radiation therapy treatment planning. The vendor should give a completed description of how the simulation software integrates with the TPS and verification system. All necessary calibration / quality assurance phantom / check device should also be provided, please specify. It should have complete compatibility and error-free networking with the Co-60 machine and TPS using import and export DICOM RT. | | | |
| **2.14** | **HARDWARE :** | | | |
| | i) The archiving media should be a DVD. | | | |
| | ii) Networking with TPS and verification system – All the software with licenses required should be included. | | | |
| | a. Laser Printer should be provided. | | | |
| | b. It should be possible to take printouts on this printer from any of the simulation workstation | | | |
| **2.15** | **SOFTWARE :** | | | |
| | i) Software should be Unix / Window / Silicon graphics based system. | | | |
| | ii) It should be possible to simulate all kinds of teletherapy machines in the simulation workstations. It should conform to IEC and other international standard norms and support cobalt therapy, linear accelerator of all types, and other user defined linear accelerator and compatible with multileaf collimator of all the vendors. | | | |
| | iii) System should have the possibility of having the Cone Beam Reconstruction facilities. | | | |
| **2.16** | **BEAM PLACEMENT & DEFINITION :** | | | |
| | i) If should support extensive beam shapers (shielding blocks etc) and beam definition methods. | | | |
| | ii) It should be possible to define this asymmetric collimator feature, where both the X- and Y-axis of jaws are asymmetric, in the simulation software. | | | |
| **2.17** | **DATA IMPORT / EXPORT :** | | | |
| | i) System should be able to export image, volume and plan data in DICOM 3.0 standard along with all Radiotherapy specific data and private objects, DICOM RT plans and data sets. | | | |
| | ii) System should be able to import DICOM RT data to the Co-60 and Linear accelerator of any vendor. | | | |
| | iii) Simulator system should be fully integrated with the TPS. The vendor should inspect and will be responsible for complete integration. | | | |
| | iv) All import and export licenses should be provided. | | | |
| **2.18** | **DOCUMENTATION & ARCHIVING :** | | | |
| | i) Should be on a suitable and economic printer to be supplied along with the system and DICOM print should be possible. Adobe Post Script printing should be available. | | | |
| | ii) Archiving should be on DVD in DICOM format. | | | |
| **3 – Power Supply** | | | | |
| **3.1** | Input power | | | |
| | Should be 230 ± 10% VAC, 50 Hz (single phase) / 380 V 50 Hz (three phase). Attach full details. | | | |
| **3.2** | Online UPS of suitable rating should be supplied for the complete system, with at least 30 minutes back up. | | | |
| **3.3** | Reset-table over-current breaker shall be fitted for protection | | | |
| **3.4** | Computerized control console, interfaced with a record and verify system | | | |
| **4- Electrical Safety** | | | | |
| **4.1** | Electrical safety confirms to standard for electrical safety IEC-60601 / IS-13450. | | | |
| **4.2** | Should be FAD, CE, UL or BIS approved product | | | |
| **5 – Training** | | | | |
| **5.1** | Onsite training | | | |
| | Must be given to: Radiographers, physicist, Radiation oncologists on operation and daily clinic use of the Simulator | | | |
| **5.2** | Out sit training (on the factory) | | | |
| | Must be given to: | | | |
| | One service engineer (full training for the simulator machine maintenance not less the TWO weeks). | | | |
| **5.3** | Type and cost of extra training | | | |
| | Service engineering | | | |
| 5.4 | Future training | | | |
| | Service engineering | | | |
| **6 – Warranty** | | | | |
| **6.1** | Suppliers must supply Three years warranty against poor workmanship and latent defects and parts. This must be all inclusive and include, amongst others, ALL PARTS, labour, traveling and accommodation. | | | |
| **6.2** | A fully comprehensive preventive maintenance, service and repair plan including all costs must be included in the Three years warranty. Software update and upgrades are also to be included. | | | |
| **6.3** | This Three years warranty will commence after formal acceptance and handover of the equipment. | | | |
| **6.4** | Max time of delivery & Warranty period of spare part. | | | |

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| **7 – Documentation** | | | | |
| **7.1** | User/Technical/Maintenance and operation manuals to be supplied in English. | | | |
| **7.2** | Certificate of calibration and inspection. | | | |
| **7.3** | List of Equipment available for providing calibration and routine Preventive Maintenance Support as per manufacturer documentation in service/technical manual. | | | |
| **7.4** | List of important spare parts and accessories with their part number and costing. | | | |
| **7.5** | Log book with instruction for daily , weekly, monthly and quarterly maintenance checklist | | | |
| **7.6** | The job description of the hospital technician and company service engineer should be clearly spelt out | | | |
| 8- **Environmental factors** | | | | |
| **8.1** | Complete installation should include:<br>Room Planning, designing and room reconstruction. Space requirements to be spelt out in advance. | | | |
| **8.2** | Air Conditioning and monitoring of Temperature & Relative Humidity and Air changes (To specify no. per hour) to be installed. | | | |
| **8.3** | The unit shall be capable of being stored continuously in ambient temperature of 0- 50deg C and relative humidity of 15-90% | | | |
| **8.4** | The unit shall be capable of operating in ambient temperature of 20-30 deg C and relative humidity of less than 70% | | | |
| **8.5** | Shall meet IEC-60601-1-2:2001(Or Equivalent BIS) General Requirements of Safety for Electromagnetic Compatibility. or should comply with 89/366/EEC; EMC-directive | | | |