

**RAJENDRA MEMORIAL RESEARCH INSTITUTE OF MEDICAL SCIENCES
(INDIAN COUNCIL OF MEDICAL RESEARCH)
MINISTRY OF HEALTH & FAMILY WELFARE, GOVT. OF INDIA
AGAM KUAN, PATNA – 800 007.**

No.: RMRI/ICMR/TDRC/Major-Equipment/ 331 /2016-17 Dated: 13-06-2016

TENDER DOCUMENT

**FOR EQUIPMENTS/INSTRUMENTS AT
SAMRAT ASHOKA TROPICAL DISEASES RESEARCH CENTRE, PATNA**

1.	Digital X-ray (D. R. System)
2.	2D/3D Color Doppler Ultrasound Machine
3.	CT Scanner

DATE OF ISSUE OF TENDER FORM WITH DOCUMENT : 14-06-2016 at 11:00 A.M.

**DATE & TIME FOR SUBMISSION OF TENDER DOCUMENT : From 14-06-2016 to
01-08-2016
up to 05:00 P.M.**

**DATE & TIME FOR OPENING OF TECHNICAL BID : 03-08-2016
at 03:00 P.M.**

(Naresh Kumar)
Administrative Officer

Annexure- I

**RAJENDRA MEMORIAL RESEARCH INSTITUTE OF MEDICAL SCIENCES
(INDIAN COUNCIL OF MEDICAL RESEARCH)
Dept. of Health Research, Ministry of Health & Family Welfare, Govt. of India
AGAMKUAN, PATNA – 800 007.**

No.: RMRI/ICMR/SATDRC/Major-Equip/05/2016-17

Dated: 13-06-2016

**Global Tender Notice for Major equipments at
Samrat Ashoka Tropical Diseases Research Centre**

The Institute is setting up a radiological investigation unit with facility of **CT-Scan, Ultrasound and Digital X-ray**. The interested parties having US FDA approved certificate to supply above mentioned equipments may quote single or package of all the three instruments.

The parties may submit their sealed tenders in two-bid system i.e. technical bid and financial bid for both systems to the undersigned latest by **01-08-2016 at 05:00 PM**. Financial bid of technically qualified parties will be opened on in presence or parties after the evaluation of technical bid so it will be informed to successful technical bidders on telephonically or through email.

Tender document for above items can be obtained from the office of undersigned by depositing **Rs.5000/-** (Rupees five thousand only) for each equipment in form Demand Draft in favour of "Director, RMRIMS, Patna" payable at Patna. Details information are available at our Institute's Webpage (www.rmrims.org.in)

List of Equipments/Instruments for Samrat Ashoka TDRC at RMRIMS, Patna.

Sl. No.	Item	Quantity	EMD
1.	Digital X-ray (D. R. System)	1	4.5 Lakhs
2.	2D/3D Color Doppler Ultrasound Machine	1	1.20 Lakhs
3.	CT Scanner	1	7.5 Lakhs

(Naresh Kumar)
Administrative Officer

RAJENDRA MEMORIAL RESEARCH INSTITUTE OF MEDICAL SCIENCES
(INDIAN COUNCIL OF MEDICAL RESEARCH)
AGAM KUAN, PATNA – 800 007.

TERMS & CONDITIONS

1. The Institute is planning to set up a radiological investigation unit with facility of **CT-Scan, Ultrasound and Digital X-ray**. The interested parties may quote single or package of all the three instruments.
2. EMD in the form of Demand Draft, in favour of Director, RMRIMS, Patna payable at SBI, Agamkuan, Patna (code-07878) from any scheduled bank, EMD in any other form will not be acceptable. **The EMD must be enclosed with Technical Bid as per advertisement** only. (EMD can be seen Annexure 1)
3. Tender evaluation will be done in two stages. i.e. (i) Technical bid (ii) Price bid. Each bid to be submitted in separate sealed envelopes super scribed as Technical bid & Price bid.
4. The Technical bids will be opened on 03-08-2016 **at 03:00** PM in the Institute premises. Tenderers/Bidders/or their representatives may present on the day of Tender opening date. Any changes in the schedule will be informed at our Institute website (www.rmrims.org.in)
5. **Technical bid should contain :-**
 - (a) Technical bid duly authorised by the Principal/ manufacturer will be accepted
 - (b) Name of items with specification, makes/ brands of the items and model No.
 - (c) Literature & Catalogues in support of the item quoted must be enclosed. (**Original Brochure**)
 - (d) Performance certificate of equipment and list of users shall be provided.
 - (e) Current authorisation letter i.e. a valid letter of authorisation from the principal / manufacturer.
 - (f) Attested photocopy of valid license for stockist and distributorship as applicable should be provided. **The EMD in form of Bank Draft must be enclosed with Technical Bid.**
6. **Price bid should contain:-**
 - (a) Should be submitted in a separate sealed envelope super scribing the word “Price bid” mentioning tender enquiry number and date.
 - (b) The rates quoted should be inclusive of Excise Duty (if required) and exclusive of VAT/ Sales Tax and Other incidental charges. The rates of VAT/ sales tax (State & Central) chargeable may however, be given separately. No VAT/ Sales tax or other charges will be payable if not mentioned in the tender or not applicable

under the relevant laws. For imported items the quoted rate should be on **FOB basis**.

- (c) Bidder should quote the FOB price and CIF charge mentioned separately. No condition like discount in price, free goods/ incentives will be accepted towards finalization of the tenders. Rates should be according to a unit.
- (d) Price should be quoted by the principal/ manufacturer will be accepted.
7. The tender documents should be typed. Any cutting/ overwriting must be signed by the tenderer otherwise the rates in r/o that particular item may not be considered.
 8. Each and every page of the tender must be numbered and signed by the tenderer along with seal of the firm. The signing should clearly mentioned name & designation.
 9. Security Deposit:- If bidder is awarded purchase order letter, The bidder should submit Bank Guarantee from a nationalized bank of 10% of the final cost of the Equipments indemnifying the RMRIMS against all losses incurred by the RMRIMS during the guarantee period i.e. 36 months from the date of installation & commissioning.
 10. The company should assure (With certificate that they will keep the original accessories, optional consumables/ non-consumables) minimum 10 years from the installation.
 11. If instruments should work 24 x7 in case there is any failure, company should/ shall rectify the defect within 72 hours. If not, a penalty Rs 500 per day will be charged from the date of installation of the instruments.
 12. **Gurantee/ Warranty: The bidder will provide a letter of warranty from the principal/ manufacturer for 36 months & institute will be provide CMC of another 36 months. The price should be enclosed with the bid.**
 13. The tenderer are bound to supply within the stipulated period as per purchase order .
 14. The firms may be asked to deliver the goods in fixed interval against the order.

15. EXCLUSIVE RIGHT OF DIRECTOR:-

Director, RMRIMS, Patna has the full and exclusive right to accept or reject any or all the tenders without assigning any reasons, whatsoever. No enquire, verbal or written shall be entertained in respect of acceptance/ rejection of the tender.

Administrative Officer

Item No. 1. Specifications for Direct digital flat panel Radiography unit with two flat panels Detectors and motorized table

1. Generator

- 1000 mA unit with microprocessor controlled high frequency X-ray generator with power output of 80 KW
- The exposure range should be 40-150KV
- Specify exposure time range
- The minimum exposure time should be 1ms or less.
- There should be provision for automatic exposure control (AEC).

2. X-Ray Tube

- Ceiling suspended
- Dual focus tube
- Small focal spot should be 0.7 or less and large focal spot should be 1.25 or less
- Tube loading should be at least 30 KW for small and at least 80 KW for large focus.
- Motorized movement of ceiling suspended tube.
- Mention range of tube movements in vertical, longitudinal and horizontal planes.
- Electromagnetic locks with collision protection sensor.
- Field size programming should be possible.
- Anode heat storage capacity should be 600 KHU or more
- X ray tube and collimator section should have automated image shuttering and cropping facility in collimator.

- All the movements of the overhead tube suspension (3D column stand) should be fully motorized. It should be possible to override it manually.
- There should be auto positioning of the overhead tube suspension against both the vertical detector and the table detector. This should be possible through selected protocol from both the console as well as from wall stand control.
- Overhead tube suspension (3D column stand) should also have a screen with display of important parameters and controls.
- Horizontal and vertical tube rotation should be $\pm 180^\circ$
- Should have motorised copper filter to avoid unwanted radiation

3. Horizontal Bucky Table

- Motor driven, adjustable height floating table top of carbon fibre.
- Compact Bucky table with digital flat panel detector.
- Mention range of vertical, horizontal and longitudinal movements of the table.
- Foot switches for adjusting height, longitudinal/side to side movements, locking.
- Detector movement should be synchronized with movement of the X-Ray tube.
- Removable grid for SID of 100cms for horizontal table applications
- Automatic exposure control should be available

4. Vertical Bucky (Wall stand)

- Motorised, counter balanced adjustable height vertical Bucky with digital flat panel detector.
- Vertical detector system should be tilt able (-15° to $+90^\circ$) and should travel from 1' to 6 ½' above floor level.

- Detector movement should be synchronized with movement of the X-Ray tube.
- Removable grid for SID of 180cms & 100 cm for vertical Bucky applications
- Automatic exposure control should be available

5. Detector System

- Detector material should be made of amorphous silicon with CSi scintillator
- Two Digital flat panel detector systems with detector integrated into the Bucky table as well as wall stand. The detector can be detachable or fixed. The firm should quote a model which has been manufactured on or after 2013.
- Minimum size of detector must be 40cms X 40 cms, 43cms X 35 cms or more.
- Image matrix size 2k x 2k pixels or more.
- Pixels size should be 200 μ m or less
- Image resolution should be 2.5 lps/mm or more
- DQE of detector system should be 65% or more at 0 lps
- Tube assembly movement to be automatically synchronized with both the horizontal and vertical detectors movement
- Should allow centered/de-centered collimation
- Specify refresh cycle (time for second exposure).

6. Operating (acquisition) Station

- Should have a high resolution TFT/LCD monitor of minimum 19" size or more (fully flat) with minimum 1024x1024 or more display matrix and antireflective front screen.
- Image acquisition matrix should be minimum of 2k x 2K

- System should have auto protocol select
- Operating console should have facility for patient identity entry, viewing and processing images, documentation.
- Preview image should be ready in 8 sec or less.
- System should have auto protocol select

7. Image Viewing, Post –Processing and Reporting Station and Documentation

- Should have independent monitor of high resolution TFT/LCD monitor of minimum 19" size or more.
- Image display matrix should be of high resolution, minimum of 1.5 K x 1.5 K
- High luminescence display for diagnostic image viewing.
- Post acquisition image processing, viewing, reprocessing, hard copy documentation and onward transmission should be possible.
- Image processing functions like rotate, mirroring, zoom, move, and windowing filter should be possible.
- There should be facility for measurements.
- Should be connected to a Dry chemistry Laser Camera of at least 500 DPI for documentation. The camera should accept all size films upto 14"x17" size (three film size trays should be active).
- Multiformat printing should be possible with user selectable options.
- It should be possible to create alphabetical, date wise and exam based, work list
- Work list should be auto refreshing
- System should have feature to see soft tissue, bony and standard image from pre-programmed exposure.
- System should have hard ware and software to stitch various images of body based on requirement like whole spine, entire lower limb (pelvis to toes)

without image distortion or artifact. Please specify the method used to achieve it. Stitching should be automatic or manual.

- 8. Image Storage and Transmission
- Hard disc storage capacity should be of 3000 or more images
- The systems should support storage of images on compact discs and DVD
- The system should be DICOM 3.0 (or higher version) ready (like send, receive, print, record on CD/DVD, acknowledge etc.) for connectivity to any network, computer/PC etc. in DICOM format.
- Easy integration and networking should be possible with any other existing/future networking including other modalities, HIS and RIS and PACS. Vendor will connect it to existing network without extra cost.

9. Accessories

- Voltage stabilizer for complete system
- UPS for the computer with 30 minute backup
- Vendor to install a mike system to call patients waiting outside.

10. Upgrading requirement:

- . Option Free upgrade softwares * 10 years

11. Furniture:

- Cupboard for storage – one
- Godrej swivel chairs with arm rest – Four
- Film viewing panel for X ray films – 3 films of 14X17 in one panel – Two
- Tables with storage space– No. 2
- Examination stool - 1
- Footstep for patient: one

- Lead aprons (light weight) : 02
- Gonadal shields for boys and girls of all age groups
- Stand for lead aprons and Gonadal shields
- Emergency light - one

12. Warranty/After Sale Service

- Five year comprehensive on site warranty of entire system (Spares and labour) including X-ray tube and all accessories and civil, electrical and air conditioning works. This will be followed by 5 years comprehensive AMC.
- 98% uptime guarantee should be given. In case down time exceeds 2%, penalty in the form of extended warranty, four times the number of days for which the equipment goes out of service, will be applied.

13. Installation and Turnkey

- All turnkey work proposed by the selected firm will require approval of Head of the department of Radio-diagnosis and competent authorities including engineering section, of the institute before implementation.
- A complete site preparation plan will be required to be submitted as a turnkey project. The vendor will be eligible to inspect the proposed site after obtaining permission from Head of the Institution. Renovation of equipment and console rooms will be required. Details of the civil work required to modify Room specified should be provided.
- The cost of alteration and preparation in a specified built in area on turn key basis which will include civil, electrical and air conditioning and maintenance of air conditioning is to be borne by the firm. Requirement of power and air conditioning must be clearly specified
- A state of art fire fighting system with alarm and smoke detectors to be installed and connected to main control of hospital.
- Internal finishes: Flooring and skirting of branded antiskid ceramic (vitrified) tiles of reputable firm; walls-POP with plastic emulsion paint;

GI powder coated ceiling system and brick wall partition between radiography room and console with lead glass.

- Lead lining of the walls and doors as required.
- Electrical distribution panel with copper electrical wiring and earthing to be provided.
- Changing room with powder coated aluminum section of required size.

14. Instructions to the vendor

- a) Supplier must ensure availability of expertise service and maintenance at site of installation. Uninterrupted availability of spare parts and repair for next ten years must be assured.
- b) Two bid system: vendor is required to make separate bids for technical and price components. These should be quoted in two separate sealed envelopes.
- c) In price bid, cost of locally supplied items must be quoted separately in Indian currency.
- d) Please respond to each specification in the same format and order as mentioned in the tender document and specify/ indicate the verification document from the product data sheet against each column.
- e) Original product data sheets, complete manuals and other necessary documents should be provided. Photocopies of these documents or printouts of the email/ web pages will not be accepted.
- f) When required, information other than those in the data sheets should be provided as a separate document from the principals only and should refer to the specific sections being addressed. When standard vendor data sheet disagrees with the bid response (offer/ compliance statement), clarification should accompany in the form of certificate from the principals only. In absence of this, the vendor data sheet will prevail for the purpose of evaluation and decision of the technical committee shall be final and binding on the supplier.

- g) Onsite training should be provided. The vendor has to station one application specialist at site for a period necessary to familiarize the medical and technical staff and enable them to achieve fast and efficient service.
- h) Mention the number (with addresses and phone numbers) of installations of the quoted unit in Patna (if any), India and Abroad.
- i) Optional: Please quote the price for providing a technician to run the machine during working hours of the Institute for at least two years from the installation of the machine.

Note: Assure turn key installation to the institute. The bidder provide comprehensive warranty of trouble free functioning of 36 months. After 36 months the firm provide maintenance services free of cost for another 24 months. After 5 years, the firm provide AMC for a minimum period of five years.

- 14. The Main DR System should be USFDA approved.

Item No.2. Specification for 2D / 3D Colour Doppler Ultrasound Machine

2D Color Doppler Ultrasound Equipment

The equipment must be capable of operating in B, M, Doppler, Color flow and Power Doppler modes. It must support transducers with linear, sector and convex formats. Further, it must include a full array of measurement and calculation packages. The specific minimum requirements for this equipment are as follow.

1 User Interface & Ergonomics

1.1 The system shall support backlight keys or provide an integrated light for ease of use in darkened work areas. The backlighting shall be tri-state to further simplify ease of use and indicate function selected.

1.2 The system shall include at least a 19" LCD/LED monitor to allow for both excellent images viewing as well as providing for workflow and productivity features.

1.3 The system shall have three active universal probe ports in a convenient, easy to access location to maximize the availability of needed probes.

2. Productivity

2.1 The system shall offer an extended field-of-view imaging that operates by sweeping a transducer over the anatomy of interest. This mode shall build the extended field-of-view in a real-time manner, showing the image as it builds.

2.2 System shall have image management features that store images by patient and include the ability to review images from different exam dates.

2.3 System shall support the ability to store digital raw data that allows to optimize imaging parameters such as B Gain, TGC, Color Gain, Dynamic Range, Speckle Reduction levels, Doppler Gain, Doppler Base Line on image recalled from the image archive.

2.4 System shall allow for live image and archive images side-by-side or quad display on a single monitor. This display shall allow any type of image – B-Mode, Color, or power Doppler on either side.

2.5 The system shall display thumbnails on a clipboard while scanning to facilitate exams.

3. Unit should have Auto IMT (Intima media thickness measurement) facility.

4. Unit should have Ultrasound Contrast imaging capability (Micro bubbles).

5. Raw Data Processing.

5.1 The system shall allow for post-storage image manipulation to provide maximum image flexibility, review and productivity. It shall include, at a minimum the ability to change the:

a) Overall B-Mode gain, dynamic range and gray scale maps.

b) Overall Doppler gain, base line shift, sweep speed and inverted spectral waveform.

c) 3D reconstruction from a stored 2D CINE-loop.

5.2 The system shall provide a display zoom function on frozen images.

6 Scanning Parameters

6.1 The system shall possess the ability to control speckle through the use of a speckle reduction (SRI) algorithm that enhances borders, reduces speckle artifact and improves detail and contrast resolution in gray scale with compatibility in Color mode, 3D and side-by-side display. This feature shall have operator selectable settings and be capable of displaying in side-by-side mode with non-speckle reduced image.

6.2 The system shall provide the ability to scan in the compound imaging mode with multiple lines on all linear and convex probes.

The system shall provide scan depths from a minimum of 2 cm to a maximum of at least 30 cm.

6.3 System should have minimum of 125,000 Digital Channels or more for better resolution.

6.4 System should have Dynamic Range of 200 or more db.

6.5 2D Frame rate 1000 frame/ s or more.

7 M-Mode Imaging

The system shall have a facility allowing the M-Mode cursor to be adjustable in any plane and allow for accurate measurements. The M-mode shall be available from a CINE loop or live image.

8 Spectral Doppler (PW)

8.1 Doppler mode shall be available on all probes.

8.2 The Doppler cursor shall be user-steerable with linear transducers.

8.3 The system shall provide the user with control to either have Doppler with real time B-Mode, Doppler with periodic B-Mode update or Doppler with frozen B-Mode scanning.

8.4 The system shall provide stereo audio of the Doppler spectral signal.

8.5 The system shall provide the user with control during timeline replay to review the spectrum only (i.e., frozen B-Mode) or with the spectrum and B-Mode together and synchronized.

8.6 The system shall provide the user with the ability to add a spectral peak and spectral mean trace onto the spectrum in both real time or after freezing the image.

9 Measurements and Calculations

9.1 The system shall provide digital calipers for at least the following measurements:

a) Depth & Distance

b) Circumference

c) Area

d) Volume

e) Velocity

9.2 All measurements should be possible on frozen images as well as on images recalled from the image archive.

9.3 The system shall provide a comprehensive set of obstetrical and gynecologic calculations and vascular calculations with summary reports.

10. Unit should have integrated 3D Imaging facility using Normal probes for MULTIPLANAR views and surface rendering as well as vascular 3D capabilities for Gray scale, Color Mode and also power Doppler. Also has facility to generate 3D from previously stored Cine Loops. System is capable of capturing 3 dimensional data from parallel and sweep movements.

11. Image Archive and Networking

11.1 The device should store images onto an integrated DVD-R Multiridrive and a USB port storage device.

11.2 The system shall include at least 100 GB bytes of dedicated hard drive for large local storage capacity.

12 DICOM Connectivity should be a standard feature.

13 Transducers

a) Transvaginal Probe , Operating Frequency 4- 9 MHz OBS/Cyne (option)

b) Convex Probe Operating Frequency: 1 - 5 MHz (2-6)

c) Linear Probe Operating Frequency: 5 – 10 MHz or higher

14 There should a provision of future upgradation to:

a)Real time 4D with Convex Volume Probe.

b)Cardiac Application with CWD.

15 The unit must be US FDA approved.

16 Suitable UPS for a 60 minute backup.

17: Optional item: Color Printer (Price to be mentioned separately).

18. Warranty/After Sale Service

- Five year comprehensive on site warranty of entire system (Spares including all probes and labour). This will be followed by 5 years comprehensive AMC/CMC.
- 95% uptime guarantee should be given. In case down time exceeds 5%, penalty in the form of extended warranty, double the number of days for which the equipment goes out of service, will be applied.

19. Instructions to the vendor

a) Supplier must ensure availability of expertise service and maintenance at site of installation. Uninterrupted availability of spare parts and repair for next ten years must be assured.

b) Two bid system: vendor is required to make separate bids for technical and price components. These should be quoted in two separate sealed envelopes.

c) In price bid, cost of locally supplied items must be quoted separately in Indian currency.

d) Please respond to each specification in the same format and order as mentioned in the tender document and specify/ indicate the verification document from the product data sheet against each column.

e) Original product data sheets, complete manuals and other necessary documents should be provided. Photocopies of these documents or printouts of the email/ web pages will not be accepted.

f) When required, information other than those in the data sheets should be provided as a separate document from the principals only and should refer to the specific sections being addressed. When standard vendor data sheet disagrees with the bid response (offer/ compliance statement), clarification should accompany in the form of certificate from the principals only. In absence of this, the vendor data sheet will prevail for the purpose of

evaluation and decision of the technical committee shall be final and binding on the supplier.

g) Onsite training should be provided. The vendor has to station one application specialist at site for a period necessary to familiarize the medical and technical staff and enable them to achieve fast and efficient service (at least).

h) Mention the number (with addresses and phone numbers) of installations of the quoted unit in Patna, India and Abroad.

Note: Assure turn key installation to the institute. The bidder provide comprehensive warranty of trouble free functioning of 36 months. After 36 months the firm provide maintenance services free of cost for another 24 months. After 5 years, the firm provide AMC for a minimum period of five years.

20. The ultrasound machine should be US FDA approved.

Item No.3. WHOLE BODY 16-SLICE CT SCANNER

SPECIFICATIONS

1. General requirements: The system should be of latest slip-ring technology allowing full and continuous rotation, multi-slice scanning (16 slices per rotation) with true isotropic volume acquisition and sub-millimetre resolution of at least 0.6 mm for whole body and vascular applications. Please specify the pitch used for each application to achieve this resolution. True future upgradeability to higher slices per rotation and future applications should be possible. The speed should be adequate for all body, neurological, and cardio-vascular imaging examinations. It should be US FDA . The offer model should have type approval from AERB & the successful bidder shall assist the Institute in getting the installation site approved & registered with AERB. The installation shall be on Turn-key basis.

2. X-ray Generator: high frequency, with power output of 48 kW or more to support continuous and sustained operation.

3. X-ray Tube:

- a) Tube Current: >300 mA or more mA rating at peak generator power must be mentioned.
- b) The system should have mechanism for real time mA modulation for both Z-axis and angular dose modulation. Specify mA modulation in relation to ECG available.
- c) Tube Voltage: 130 kV or more. Specify steps
- d) Anode Heat Storage Capacity. (>5 MHU) Specify (in MHU).
- e) Mention anode temperature monitoring system.
- f) Heat dissipation: Specify (in kHU/min)
- g) Filter and beam limiting devices: Their Al equivalent (at least 5 mm) and other specific features to reduce radiation dose to the patient must be specified.
- h) Specify focal spot size and number according to IEC recommendations. Automatic selection of focal spots should be possible.

4. Gantry

- a) Aperture: 70 cm or more.
- b) Tilt: +/- 30 degree.
- c) Entire range of rotation times for full 360 degree should be specified. Minimum rotation time should be 0.5 seconds or less for whole body applications.
- d) Remote controlled tilt from operator table should be possible.
- e) Maximum scan FOV should be at least 50 cm.
- f) Laser alignment lights should define accurately actual scan plane. It should operate over full range of gantry tilt.
- g) Specify if multi slice capability available in both tilted & non-tilted gantry positions.

5. Patient Table

- a) Maximum load: >160 kg or more with 1 mm positioning accuracy.
- b) Table speed: Horizontal – Up to 100 mm or more/sec.

- c) Vertical table travel: range and speed should be specified.
- d) Scan range, with and without headrest: should have at least 150 cm metal free scannable range.
- e) Facility of positioning aid for horizontal isocentric positioning of the patient.
- f) The table should be of carbon fibre.

6. Spiral CT

- a) Scan time: Minimum scan time for full 360-degree rotation should be 0.5 seconds or less. Specify minimum and maximum.
- b) Minimum slice thickness should be 0.625 mm or less and maximum 10 mm or more. Slice thickness and range should be freely selectable for prospective and retrospective reconstruction.
- c) Slice increment: specify range and selectable slice thickness.
- d) Pitch factor (volume pitch): Variable between 0.5 to 1.5 or more and should be user selectable. Specify all possible pitch selections.
- e) spiral length: 150 cm or more. Please specify the total length of Spiral achievable without interscan delay and the time taken and pitch used.
- f) Specify single continuous 'spiral-on time' - minimum 120 seconds or more.
- g) The system should optimise radiation dose and resolution for each selection.
- h) Bolus triggered spiral acquisition should be possible.
- i) True isotropic volume acquisition and sub-millimetre resolution of at least 0.625 mm for all body, angio/vascular applications. Please specify the pitch used for each application to achieve this resolution.
- j) Dose reduction at raw data level (mention specify technique used & reduction achieved)

7. Topogram:

- a) Length and width: specify range.
- b) Scan times: specify range. Specify real-time viewing option available.
- c) Views: should be feasible in frontal and lateral views
- d) Should be possible to interrupt acquisition manually if necessary.

8. Data acquisition system:

- a) Detector: Please specify the no. of detectors, detector design, type of detector.
- b) Number of rows with their thickness, number of elements (min 750) in each row.
- c) Channels per row and number of projections.
- d) Geometric and absorption efficiency of the detectors in %.
- e) Z-axis coverage with sub millimetre scan should be more than 10 mm.
- f) In built mechanism for adapting the tube current during each scan. This should enable radiation dose reduction where body part thickness is less. Specify mechanism used in the system.
- g) There should be in-built paediatric protocols adapted to weight and/or age.
- h) Specify available mechanisms to reduce the effective patient dose.

9. Image Reconstruction:

- a) Real time reconstruction speed: 10 images per sec or more at 512 x 512 matrix.
- b) Display matrix: 1024 x 1024 or more.
- c) Reconstructed slice thickness range should be less than one mm (< 1) to 10 mm, freely selectable. Inter slice reconstruction interval 0.1 mm
- d) Specify scan field and reconstruction field.

10. Monitors:

- a) Full flat screen LCD monitors of at least 19 inch or more.
- b) These should be of non-interlaced progressive display type.
- c) Image refresh rate should be fast and preferably instantaneous and flicker free.
- d) Monitor resolution of imaging quality (2k x 2k) or more.

11. Consoles:

a) The **main console** should simultaneously allow scan, reconstruct and archive with RAM at least 16 GB or more, HD to store at least (min) 250000 images of 512 matrix size and perform functions such as registration, scheduling, protocol selection, volume rendering, volume measurements, multi-planar reconstruction and standard evaluation applications and all available post-processing functions without the help of the satellite workstation as well as film exposure. Custom-designed keyboard should include controls for scan, display and archive including emergency stop and patient intercom.

Patient registration facility including online registration/pre-registration should be possible.

Scanning of the patient, exposing films and transfer of images to work station must be possible concurrently.

If the operator console is equipped with two monitors, the cursor should move within and between the two monitors in a smooth and continuous manner under the control of a mouse, with the cursor remaining visible during its movement.

b) An **independent satellite stand alone workstation** with hard disc of (to store 500000 images of 512 x 512 matrix), with all functions of the operator console including simultaneous viewing and all post processing functions and filming independently without the help of the main console. Data transfer between the operator console & the satellite workstation should be instantaneous. All special (optional) softwares including (Perfusion CT, , are to be installed in this workstation also (option).

d) Post processing software: VRT, MIP, MinIP SSD, Image fusion, vessel segmentation, and (virtual endoscopy software to be provided on the workstation navigation)

e) Cine display should be available, both interactive and automatic, and should have a minimum image refresh rate of 8-10/sec.

f) Window width and centre should be freely selectable.

12. Image evaluation tools

- a) Parallel evaluation of multiple ROI in circle, irregular and polygonal forms.
- b) Statistical evaluation for area/volume, SD, Mean, Min/Max and histogram.
- c) Profile cuts: horizontal, vertical and oblique views.
- d) Distance and angle measurement, freely selectable positioning of co-ordinate system, grid and image annotation.
- e) Facility to reduce streak artefacts in areas such as posterior fossa of head, clavicle, shoulder and body parts with metallic implants.

13. Post processing tools

- a) 2-D, including image zoom and pan, image manipulations, including averaging,

- reversal of grey-scale values, and mirroring; image filter functions, including advanced smoothing algorithm and advanced bone correction.
- b) Real-time multi-planar reconstruction (MPR) of secondary views, with viewing perspectives in all planes including curved and orthogonal MPR.
 - c) CT angiography with MIP, MinIP, SSD, VRT and other advanced 3D applications and colour coding for different tissues. Post-processing for CT angiography should be fully automated.
 - d) Virtual endoscopy of colon, bronchi and vessels with VR, MIP, MinIP and SSD display, automatic tracking, forward and reverse path selection. Manipulation of endoscope angle and diameter.
 - e) Spatial alignment and visualisation of two different data sets of one patient generated on different modalities or with different acquisition times.
 - f) Volume measurements.

Optional items:

- a) Bolus triggered Brain Perfusion CT study (at least 3-level) with automatic CBF, CBV, MTT, TTP maps, ROI placing, comparing ROI, saving maps.
- b) Neuro DSA with automatic bone removal software
- c) Fusion CT: fusion of morphological data obtained on CT, MR or DSA.
- d) Dental CT: high-resolution evaluation of teeth and jaws with automatic panoramic and paraxial reconstruction, evaluation of mandibular canal and life size filming.
- e) Radio-therapy planning software: Tumor localization, measurement, contouring and treatment planning
- f) Lung CT: low dose lung CT protocols for advanced lung nodule detection, assessment and follow-up. Lung segmentation software for nodule detection
- g) Bone CT: for bone mineral density assessment and quantification for metabolic bone diseases.

14. Patient communication system:

An integrated intercom & automated patient instruction system (API) to be provided.

15. Image quality:

- a) Low contrast resolution – specify low contrast resolution with 20 cm CATPHAN phantom. Specify surface dose, mAs, slice thickness and HU used.
- b) Specify High contrast resolution at 0% and 10% MTF with full FOV.
- c) Specify cross-field homogeneity.

16. Image documentation & archival:

- a) DICOM connectivity to be optimised for networking with other imaging systems.
- b) Filming parallel to other activities, including independent scanning, documentation and post-processing and configurable image text.
- c) Archiving: CD and DVD writer should be provided for archival, along with 1000 DVDs. Specify minimum number of uncompressed and compressed images that it can store per disc. Option of viewing these discs on any PC without DICOM viewer should be available. Warranty of the system should protect against obsolescence of this device.

17. Accessories to be provided

- a) Facility for non-invasive monitoring of oxygen saturation, blood pressure, respiratory rate and .(transparental ventilation)
- b) Dry Imager laser camera with resolution/ 500 dpi or more, minimum three ports, able to support multiple film sizes (including 17"x14"), throughput of 90 films or more per hour and DICOM 3.0 Compatible.
- c) Suitable double head barrel pressure injector with complete accessories & 1000syringes, tubing and connector. These should be provided over a period of 3 years.
- d) UPS (of appropriatekVA) for the complete unit. It should be possible to run the entire equipment including patient scanning for at least 30 minutes. (100KVa scanning)
- e) Two sets of standard patient positioning accessories and restraining devices.
- f) A complete set of operator manuals incorporating the newer applications.
- g) Appropriate lead glass for radiation protection for the operator in the gantry room.
- h) Good quality wrap-around ultra-lightweight zero lead aprons (2 No.) along with a stand for the aprons.
- i) 2 No.s of Tables & chairs, 1 no.of Instrument (medicine) trolley, collapsible wheel chair with rubberised swivel wheels & Patient trolley

18. Upgrading requirements: A free, comprehensive software upgrade (compatible with the existing platform) guarantee for entire life of the scanner must be provided.

19. Warranty/After Sale Service

- Five year comprehensive on-site warranty of entire system (Spares and labour) including X-ray tube and all accessories and civil, electrical and air conditioning works. This will be followed by 5 years comprehensive AMC.
- 95% uptime guarantee should be given. In case down time exceeds 5%, penalty in the form of extended warrantee, 4 times the number of days for which the equipment goes out of service, will be applied.

20. Installation and Turnkey

- All turnkey work proposed by the selected firm will require approval of Head of the department of Radio-diagnosis / Institution and competent authorities including engineering section, of the institute before implementation.
- A complete site preparation plan will be required to be submitted as a turnkey project. The vendor will be eligible to inspect the proposed site after obtaining permission from Head of the department of Radio-diagnosis/Institution. Renovation of equipment and console rooms will be required. Details of the civil work required to modify Room specified should be provided.
- The cost of alteration and preparation in a specified built in area on turn key basis which will include civil, electrical and air conditioning and maintenance of air conditioning is to be borne by the firm. Requirement of power and air conditioning must be clearly specified
- A state of art fire fighting system with alarm and smoke detectors to be installed and connected to main control of hospital.
- Internal finishes: Flooring and skirting of branded antiskid ceramic (vitrified) tiles of reputable firm; walls-POP with plastic emulsion paint; GI powder coated ceiling system and brick wall partition between radiography room and console with lead glass.

- Lead lining of the walls and doors as required.
- Electrical distribution panel with copper electrical wiring and earthing to be provided.
- Changing room with powder coated aluminum section of required size.

21. Instructions to the vendor

- a) Supplier must ensure availability of expertise service and maintenance at site of installation. Uninterrupted availability of spare parts and repair for next ten years must be assured.
- b) Two bid system: vendor is required to make separate bids for technical and price components. These should be quoted in two separate sealed envelopes.
- c) In price bid, cost of locally supplied items must be quoted separately in Indian currency.
- d) Please respond to each specification in the same format and order as mentioned in the tender document and specify/ indicate the verification document from the product data sheet against each column.
- e) Original product data sheets, complete manuals and other necessary documents should be provided. Photocopies of these documents or printouts of the email/ web pages will not be accepted.
- f) When required, information other than those in the data sheets should be provided as a separate document from the principals only and should refer to the specific sections being addressed. When standard vendor data sheet disagrees with the bid response (offer/ compliance statement), clarification should accompany in the form of certificate from the principals only. In absence of this, the vendor data sheet will prevail for the purpose of evaluation and decision of the technical committee shall be final and binding on the supplier.
- g) Onsite training should be provided. The vendor has to station one application specialist at site for a period necessary to familiarize the medical and technical staff and enable them to achieve fast and efficient service.
- h) Mention the number (with addresses and phone numbers) of installations of the quoted unit in Patna (if any), India and Abroad.
- i) Optional: Please quote the price for providing a technician to run the machine during working hours of the Institute for at least two years from the installation of the machine.

Note: Assure turn key installation to the institute. The bidder provide comprehensive warranty of trouble free functioning of 36 months. After 36 months the firm provide maintenance services free of cost for another 24 months. After 5 years, the firm provide AMC for a minimum period of five years.