NOTICE INVITING

EXPRESSION OF INTEREST (EOI)

FOR DESIGN, INSTALLATION, REFURBISHMENT, OPERATIONALIZATION AND MAINTENANCE OF IMAGING CENTRES IN 6 GOVERNMENT MEDICAL COLLEGE & HOSPITALS, 33 DISTRICT HOSPITALS AND LNJP ORTHO HOSPITAL RAJVANSHI NAGAR, PATNA IN BIHAR ON PPP MODE

Expression of Interest (EOI) is invited from reputed agencies for the design, installation, refurbishment, operationalization and maintenance of Imaging Centre (CT & MRI) in PPP mode in 6 Government Medical College & Hospitals, 33 District Hospitals and LNJP Ortho Hospital Rajvanshi Nagar, Patna. The installation of CT & MRI machines is proposed at PMCH Patna, NMCH Patna, SKMCH Muzaffarpur, DMCH Darbhanga, JLNMCH Bhagalpur, ANMMCH Gaya & LNJP Ortho Hospital, Rajvanshi Nagar, Patna. Apart from the above mentioned facilities CT Scan facility is proposed for District Hospitals in Araria, Arwal, Aurangabad, Banka, Begusarai, Bhojpur, Buxar, East Champaran, Gopalganj, Jamui, Jehanabad, Kaimur, Katihar, Khagaria, Kishanganj, Lakhisarai, Madhepura, Madhubani, Munger, Nalanda, Nawada, Purnia, Rohtas, Saharsa, Samastipur, Saran, Sheikhpura, Sheohar, Sitamarhi, Siwan, Supaul, Vaishali, & West Champaran.

The detailed terms and conditions may be downloaded from website (http://www.statehealthsocietybihar.org). A pre-bid meeting is scheduled at 3:00 pm on 15/12/2013 in the Conference Room of State Health Society Bihar building, Sheikhpura in Patna. Competent agencies are requested to submit the details of their proposal to the SHSB on or before 30/12/2013 at 5.00 P.M. Based on the documents submitted, firms shall be short listed. The short listed firms shall have to submit their financial bid in sealed cover immediately thereafter.

For any further clarifications, please contact Mr. Kumar Anuj, Senior Deputy Collector cum I/C Radiology on phone no: 9470003012 during working hours.

Sd/-
Secretary Health cum Executive Director
State Health Society, Bihar

EOI FOR DESIGN, INSTALLATION, REFURBISHMENT, OPERATIONALIZATION AND MAINTENANCE OF IMAGING CENTRE IN 6 GOVERNMENT MEDICAL COLLEGE & HOSPITALS, 33 DISTRICT HOSPITALS AND LNJP ORTHO HOSPITAL RAJVANSHI NAGAR, PATNA IN BIHAR ON PPP MODE

I. INTRODUCTION

Health sector in Bihar has witnessed notable developments in the last few years particularly in fields of health infrastructure, institutional delivery & improvement in different health parameters. The results of health initiatives in Bihar are positive and the state needs to sustain and strengthen the momentum during the coming years. Radiology Diagnostics being one of the most important components of health, second generation of reforms and positive initiatives is warranted for establishment of high technology Radio imaging centres in the state.

State Health Society Bihar (SHSB), thus, intends to establish Imaging Centre in 6 Government Medical College Hospitals (MCH), 33 District Hospitals and at LNJP Ortho Hospital, Rajvanshi Nagar, Patna through Public Private Partnership (PPP). The key objective is to provide access to high quality services at competitive rate under PPP mode to the people of Bihar. For the mentioned objectives, Expression of Interest is invited from competent agencies for designing, installing, refurbishing, operationalizing and maintaining MRI & CT scan Machines in the following centres in the Public- Private Partnership mode:

- **Proposed MRI Centres: (7 centres)**
    1. **PMCH Patna,**
    2. **NMCH Patna,**
    3. **SKMCH Muzaffarpur,**
    4. **DMCH Darbhanga,**
    5. **JLNMCH Bhagalpur,**
    6. **ANMMCH Gaya.**
    7. **LNJP Ortho Hospital, Rajvanshi Nagar.**

- **Proposed CT Scan Centres (40 centres)**

    1. **PMCH Patna,**
    2. **NMCH Patna,**
    3. **SKMCH Muzaffarpur,**
    4. **DMCH Darbhanga,**
    5. **JLNMCH Bhagalpur,**
    6. **ANMMCH Gaya.**
    7. **District Hospital Araria,**
    8. **District Hospital Arwal**
    9. **District Hospital Aurangabad**
    10. **District Hospital Banka,**
    11. **District Hospital Begusarai**
    12. **District Hospital Bhojpur**

13. **District Hospital Buxar**
14. **District Hospital East Champaran,**
15. **District Hospital Gopalganj**
16. **District Hospital Jamui**
17. **District Hospital Jehanabad**
18. **District Hospital Kaimur**
19. **District Hospital Katihar**
20. **District Hospital Khagaria**
21. **District Hospital Kishanganj**
22. **District Hospital Lakhisarai**
23. **District Hospital Madhepura**
24. **District Hospital Madhubani**
25. **District Hospital Munger**
26. **District Hospital Nalanda**
27. **District Hospital Nawada**
28. **District Hospital Purnia**
29. **District Hospital Rohtas**
30. **District Hospital Saharsa**
31. **District Hospital Samastipur**
32. **District Hospital Saran**
33. **District Hospital Sheikhpura**
34. **District Hospital Sheohar**
35. **District Hospital Sitamarhi**
36. **District Hospital Siwan**
37. **District Hospital Supaul**
38. **District Hospital Vaishali**
39. **District Hospital West Champaran**
40. **LNJP Ortho Hospital, Rajvanshi Nagar.**

II. SCOPE OF WORK

The selected agency will be allotted covered space in all the proposed government installations. The allotted space would be around 1500 SFT for CT Scan facility and 2500 SFT for CT & MRI scanning facility. The selected agency will have to carry out complete civil & electrical work, employ technical manpower as well as carry out all the necessary work for the establishment of the Imaging centres in the proposed installations. The selected agency/agencies will have to submit detailed design diagram of their proposed MRI/CT facility with the SHSB. The allotment of above mentioned facilities (for CT & MRI) would be done in clusters. **The details of the clusters are enclosed in Annexure I.** The financial bids would be allowed for the clusters and under no circumstances would the competing agencies be allowed to bid within the clusters.

III. MRI MACHINES FOR IMAGING CENTRES

The agency will design, install, refurbish, operationalize and maintain one **MRI machine each** at the above mentioned centres. The agency will provide complete technical support in terms of design and execution of the proposed MRI Centre. The agency will supply equipments & furniture as required including installation, operationalization and maintenance of MRI Centre, also including recruitment and necessary training to the staffs for operating and managing the machines as well as generating reports. **The Technical Details for the MRI Machines are in Annexure II. The selected Agency will have to install latest product introduced globally within last 3 years**. **Before installation of the machines the agency will provide necessary document evidence (including an affidavit) of the machines being new with the SHSB.**

IV. CT SCAN MACHINES FOR THE IMAGING CENTRES

The agency will design, install, refurbish, operationalize and maintain one **CT Scan machine each** at the above mentioned centres. The agency will provide complete technical support in terms of design, installation and maintenance of the CT Scan machines, supply equipments & furniture as required for operationalization of the facility. The agency would hire and train required manpower for operation, maintenance as well as generating reports for the CT Scan facility. **The Technical Details for the CT Scan Machines are in Annexure III. The selected Agency will have to install latest product introduced globally within last 3 years. Before installation of the machines the agency will provide necessary document evidence (including an affidavit) of the machines being new with the SHSB.**

V. GENERAL TERMS & CONDITIONS

1. **The selected agency/agencies will have to install, operate and maintain the Imaging Centre for initial five years.** The period of engagement may be extended beyond the stipulated 5 years (based on performance) by the SHSB.

2. Rogi Kalyan Samiti at each proposed facility will provide vacant covered space including water and electricity connection to the selected agency (charges payable by the agency).

3. Allotment to the competing agencies would done as per cluster/s indicated in Annexure I. Under no circumstances would competing agencies be allowed to bid within the clusters. No agency would be allotted more than three (3) clusters.

4. The competing agency will have to place competitive financial bid for each cluster separately which would be opened only after the agency qualifies in the technical bid. The floor rate for bidding for each cluster would be announced on the date of pre-bid meeting on 15.12.2013. Under no circumstances, bidding for facilities within the clusters will be allowed. After the qualification of any bidder, it will have to deposit the agreed amount with the SHSB in two installations (for the first 3 years & for the next two years). No agency would be allowed to bid for more than three clusters.

5. Selected agency will set up the equipments at the Hospitals identified under the project under consideration and bear all cost (cost of equipment, personnel, training facilities, repair & maintenance, security, etc.) for setting up and running of the unit.

6. The selected agency will have to provide the Imaging Centres free of cost for educational and training purposes to the Medical Colleges & Hospitals. To the extent mentioned above, the services of the Imaging Centres at the Medical Colleges & Hospital will be placed at the disposal of the Principals/ Head of the Radiology Department of the person/s authorized by them of the respective Medical Colleges & Hospitals.

7. **Selected agency will provide Imaging services to all patients at approved CGHS rates**. The receipt for user charges will be issued by the Operator. The Centre Operator will utilize the user charge for operation of imaging center including salary payments and other business expenses. The Centre Operator may retain any surplus. **Centre Operators are also to charge CGHS rates from patients referred to by private practitioners. Under no circumstances would any rate other than the approved CGHS rate, be allowed.**

8. The selected agency would be required to develop a dynamic website for managing and coordinating the services. Server maintenance and online security would be the sole legal responsibility of the Agency. Each and every patient availing the scanning facility would have to be registered at the website in real time. The website may be used by the agency (as per legal norms) for generating reports after the scan. The selected agency will have to necessarily provide administrative password and link to the official website of SHSB. Any unexplained difference between the real time patient registration report and physical inspection of scanning facility would be considered as a serious violation of the terms of contract which might draw financial fine from the SHSB after following due process.

9. The selected party would have to maintain and provide for competent radiologists for generating reports. The Agency can maintain its own channel of internet based telemedicine reporting system within legal norms.

10. **Sub-contracting for any part or any setup would not be allowed. The selected agency would have to report to the SHSB, the name, qualification, photograph and other details of every personnel working in different capacity in different installations under the proposed set up through the proposed dynamic website.**

11. Selected agency will operate and maintain these centers as required by any law or board, such as the **AERB norms** and shall display the requisite licenses for operationalizing the same. The Agency shall also display the 'do's and don'ts' for the imaging centre to prevent any hazard.

12. The Agency shall take all responsibility for maintaining monitoring of the Thermo luminescent Dosimeter (TLD) badges for the employees as per rule to ensure employee safety.

13. In case of any technology breakthrough, the agency would present its case before the SHSB which after thorough consultation, may allow technological up gradation of the imaging facility with terms and condition. The SHSB can also demand technological up gradation on the basis of available technology.

14. All services are to be provided as per standard guidelines prescribed by the Government. The SHSB reserves the right for third party inspection for assessment of physical and financial quality of services.

15. **Nature of Partnership:**
    i. The State Health Society will empanel the shortlisted vendors for the next five years.
    ii. The Agreement will then be done between District Health Society in each district or RKS (for MCH) and the selected agency. The RKS/DHS will sign the Usage right for the agency for the space and facilities provided in every allotted hospital.
    iii. The Selected agency shall function under the overall supervision of Rogi Kalyan Samiti of the respective hospital.
    iv. The SHSB would be overall in-charge of the timely operationalization, quality control, arbitration among others.

16. **Monitoring System:**
    i. The RKS under whose jurisdiction the hospital falls will monitor the facility.
    ii. Each facility will follow the advice of superintendent/ MOIC in whose jurisdiction the hospital falls for day-to-day activity. The agency will be free to have its own administrative system for management of its facility but it will have to take into consideration the advice and monitoring of operational activity from the competent authority of the RKS.
    iii. At the end of each month, within 5th day of the next month, the agency will be required to submit monthly report in a prescribed format on the activities and result areas for the month to the RKS, DHS and SHSB.
    iv. DHS will make one visit in three months to the facilities as part of monitoring activity. The monitoring can be comprehensive in terms of quality control, usage of manpower, cleanliness of the premises among others.
    v. In the event (supported by necessary evidence) of any agency following any malpractices including charging the patients higher than the prescribed rate, the matter would be reported immediately to the SHSB, which after following due process may impose financial fine on the agency and may also order the termination of the contract. The decision of the SHSB in this regard would be final.

vi. The agency in consultation with SHSB will develop the quality assurance systems for ensuring quality of services. The agency will have to abide by these guidelines.

vii. The SHSB, as mentioned earlier, would monitor overall functioning, quality control, timely operationalization among others of the Imaging centres. SHSB would act as an arbitrator in case of any dispute or lack of co ordination between the agency and the different RKS.

17. The Agency shall provide the following and shall he responsible for the same:

i. The centres should function 24 X7.

ii. The reports must be of highest quality standard.

iii. The agency shall be responsible for hiring qualified technical personal as per guidelines and Standard Operating Procedures (SOPs) and training them for running the centers. The **Radiologist** has to be also provided by the agency.

iv. The agency shall maintain the premises and it shall be the responsibility of the agency to carry out disposal of waste of the center as per the Biomedical Waste (Management and Handling) Rules, 1998.

v. The agency shall obtain all necessary provision and business such as laboratory licenses, Trade license and comply with all statutory requirements for running the Centre and produce relevant documents during inspection by statutory authorities. **The Agency shall be responsible for getting the Center registered/ authorized from Atomic Energy Regulation Board.**

vi. Agency shall be responsible for setting up of their own operations in respect of inventory management, customers servicing, financing accounting, record keeping and MIS.

vii. Agency shall coordinate with superintendent/MOIC concerning operational activities, patient servicing on day to day basis.

viii. Agency shall make provision for a suggestion box to give feedback based on which remedial action would be taken for patient/ customers satisfaction through a services mechanism.

18. Agency shall display the SHSB approved price list of essential tests at a prominent place for clients to see. The list would be in Hindi and English both. The Agency has to maintain transparency in all financial transaction.

19. Equipment/ system should be certified/accredited wherever applicable. It must be highlighted here that all the equipments installed in the facilities have to be new with annual maintenance contract, where ever applicable. The agency will have to submit documentary proof with the SHSB about procurement of every instruments and equipment installed in every facility. In case of any lacuna on this part, the SHSB may impose financial fine on the agency after following due process and may even terminate the contract.

20. In case the agency fails to make the facility functional within the stipulated time frame, the offer may be withdrawn after following the due process by the SHSB.

21. All internet usage charges have to be met by the agency. The hardware and software for internet usage has also to be provided by the agency. The agency will have to provide 24 hrs power back up.

22. The Bidder shall be responsible for all of the cost associated with the preparation of the EOI and its participation in the pre-bid meeting. The SHSB will not be responsible for any cost, regardless of the conduct for outcome of the bidding process.

23. **Delivery and installation:** The Imaging Centre shall be installed and commissioned within **6 (six) months** from the date of handing over of premises by the hospital to the agency.

24. **Payment Terms & Security deposit: The selected agency will have to deposit a bank guarantee as security money valid for 5 years with the SHSB. In the event of termination of contract before the stipulated time frame, the SHSB may forfeit the security deposit and blacklist the agency after following the due process. The amount of security deposit as bank guarantee (facility wise) would be finalized after pre-bid meeting.**

25. **Uptime guarantee**: During the contract period, the agency shall maintain the equipment with 95% uptime. The Agency shall give a written commitment for 95% uptime of the unit, calculated on annual basis, with penalty equivalent to double the amount of daily average revenue of the unit for each day's delay in proper functioning of the unit beyond 5% down time per annum.

26. **Penalty Clause:** The agency will be bound to establish the unit within the stipulated period as mentioned above, failing which the following penalty will be levied on the agency:
    i. For delayed setting up of Unit: A penalty of 0.5% of the security deposit will be imposed for each day delayed. Such matters are to be reported by the RKS to SHSB which would arbitrate on such matters after following due process.
    ii. For Non-setting up of Unit: Security Deposit of the firm shall be forfeited.
    iii. In case of downtime of more than 24 hours: A penalty of 0.5% of the security deposit will be imposed for each day delayed. Such matters are to be reported by the RKS to SHSB which would arbitrate on such matters after following due process.

27. **Correctness and Completeness of Imaging Centre**: The Imaging Centre should be correct and complete in every aspect with all the mounting fitting, fixtures, standard accessories which are normally supplied even though **not** specifically listed out in the technical specification. The Agency should calculate costs considering all these aspects.

28. **Annual Maintenance Contract (Next 5 years)**

The Agency shall further commit to provide unconditional AMC for the next 60 Months (five years) after completion of 5 (five) years of completion of Comprehensive warranty/ guarantee to ensure satisfactory/ flawless functioning of the Imaging Centres Unit to give the desired result. The Agency shall bear only the costs of spares at the prescribed prices, in case required as necessary/ essential, to keep the above equipment functional. The Agency shall submit a list of most commonly required components/ spare parts of the equipment along with their prevailing rates. **The Agency will also furnish the list of items not covered under warranty/ guarantee.**

29. The Agency will have to procure and install the equipment/ fixtures/ articles manufactured only by the reputed companies/ manufacturers. They will have to indicate the name of manufacturers in the bid document which will be duly approved by the Technical Committee of the SHSB before executing the work. **The refurbished gold seal units will not be accepted.**

VI. ELIGIBILITY CRITERIA:

Original Equipment Manufacturers (OEM) of Radiological Equipments as well as Service Providers can apply. The interested parties must have the following minimum credentials to qualify for the proposed task:

i. The minimum average annual turnover for OEMs in radiology equipments manufacture required for agencies taking part in this EOI shall be more than Rs. 150 crores in the last three years. Service Providers who are willing to participate in this EOI must have a minimum average turnover of Rs. 20 crores from radiology for the past three years. In the event of any competing agency being both the Service Provider as well as OEM, it will have to fulfill either of the two conditions.

ii. Minimum of 3 years of experience of working in setting up/ running of a MRI Unit/ CT Scan machines.

iii. The agency should at least have installed 5 MRI machines and/or 10 CT Scan in one or multiple centres/ locations.

iv. Must not be blacklisted by any government dept./institution

VII. SUBMISSION REQUIREMENTS

Interested Agencies wishing to undertake the above task on behalf of State Health Society Bihar, may submit their application in a sealed envelope marked **"Expression of Interest for Setting Up & Operating Imaging Centre in Government Hospitals in Bihar under PPP mode"**. Agency is required to clearly indicate the relevant page number against each of the submission requirements mentioned below in your cover letter/application accompanying the EOI.

The EOI should include the following:

i. Background profile of the firm/organization (along with contact details viz. Name, Address, Phone No., E-mail Address of the party). Competing agencies must submit memorandum of association, article of association/ partnership deed.

ii. Capability Statement (List of major work completed/on-going assignments similar to present assignment).
iii. Detailed Technical Proposal providing approach to the project along with offer of services and the process of rollout of the service.
iv. No-conviction certificate for the last three years submitting affidavit from Magistrate that they are not blacklisted by any Govt. Dept. /Govt. organization
v. List of Hospitals set up and managed and copy of Installation Orders and certificates.
vi. Audited Financial Statements for 2010-11, 2011-12 and 2012-13.

VIII. WHO CAN APPLY

The applicant(s) may be an Original Equipment Manufacturer (OEM) or a Services Provider in the field of Radiology. The detailed criterions' regarding eligibility is mentioned in the eligibility criteria (Section VI). **The SHSB at its pre- bid meeting may allow formation of Consortium with one or more members. Under no circumstances, however, sub- contracting of one or more components of the services would be allowed.**

IX. OTHER CONDITIONS

i) The SHSB may in its sole discretion place additional conditions on the ability of applicant(s) to affiliate or form consortia at the time of submission of proposals. The SHSB, reserves the right to seek any additional clarification and/or information from the applicant(s).

ii) SHSB reserves the right to reject any application(s) if:
(a) At any time, a material misrepresentation is made or uncovered, or
(b) The applicant(s) does not provide, within the time specified by SHSB, the supplemental information sought by SHSB for evaluation of the application(s). Such misrepresentation/ improper response shall lead to the disqualification of the applicant(s). If the applicant(s) is a **Consortium**, then the entire **Consortium** shall be disqualified / rejected.

X. SELECTION PROCESS

Steps involved in selection of PPP partner are as follows:-

i. Invitation of Expression of Interest
ii. Pre-bid meeting
iii. Submission of EOI
iv. Tender Floating
v. Short listing as per technical criteria
vi. Financial Bid Opening for technically qualified bidder
vii. Negotiation and award of contract

XI. SUBMISSION DEADLINE AND ADDRESS:

Completed Expression of Interest in English in a sealed envelope marked as **"Expression of Interest for Setting Up & Operating Imaging Centre in Government Hospitals in Bihar under PPP mode"** should reach the office of Executive Director, State Health Society Bihar, Sheikhpura, Patna - 800014 by 5:00 p.m. on 30/12/2013 through registered post/ courier/ speed post or dropped in the bid box at SHSB office located at the reception room at the following address.

A pre-bid meeting is scheduled at 3:00 p.m. on 15/12/2013 in the Conference Room of the State Health Society Bihar building, Sheikhpura in Patna.

The decision of SHSB to accept or reject any or all of the application(s) shall be final and binding and shall not be subject to any review or revision by any judicial or quasi-judicial authority. The State Health Society Bihar reserves all rights to reject any or all the EOI/ tender without assigning any reason.

For any further clarifications, please contact Mr. Kumar Anuj on Phone +91- 9470003012 during working hours.

-sd-
Secretary Health cum Executive Director
State Health Society, Bihar

ANNEXURE – 1

THE LIST OF CLUSTERS

- **CLUSTER 1**.
    a) MRI Centres
        1) PMCH Patna
        2) LNJP Ortho Hospital Rajvanshi Nagar
    b) CT Scan Centres
        1) PMCH Patna
        2) LNJP Ortho Hospital Rajvanshi Nagar
        3) District Hospital Nalanda
        4) District Hospital Bhojpur
        5) District Hospital Buxar
        6) District Hospital Rohtas
        7) District Hospital Kaimur

- **CLUSTER 2**
    a) MRI Centres
        1) ANMMCH Gaya
        2) NMCH Patna
    b) CT Scan Centres
        1) ANMMCH Gaya
        2) NMCH Patna
        3) District Hospital Jehanabad
        4) District Hospital Arwal
        5) District Hospital Nawada
        6) District Hospital Aurangabad

- **CLUSTER 3**
    a) MRI Centres
        1) SKMCH Muzaffarpur

b) CT Scan Centres

1) SKMCH Muzaffarpur
2) District Hospital Saran
3) District Hospital Siwan
4) District Hospital Gopalganj
5) District Hospital West Champaran
6) District Hospital East Champaran
7) District Hospital Sitamarhi
8) District Hospital Sheohar
9) District Hospital Vaishali

- **CLUSTER 4**

a) MRI Centres

1) DMCH Darbhanga

b) CT Scan Centres

1) DMCH Darbhanga
2) District Hospital Madhubani
3) District Hospital Samastipur
4) District Hospital Begusarai
5) District Hospital Munger
6) District Hospital Sheikhpura
7) District Hospital Lakhisarai
8) District Hospital Jamui
9) District Hospital Khagaria

- **CLUSTER 5**

a) MRI Centres

1) JLNMCH Bhagalpur

b) CT Scan Centres

1) JLNMCH Bhagalpur
2) District Hospital Banka
3) District Hospital Saharsa

4) District Hospital Supaul
5) District Hospital Madhepura
6) District Hospital Purnia
7) District Hospital Kishanganj
8) District Hospital Araria
9) District Hospital Katihar

ANNEXURE II

- **Applications of MRI Machines at Medical College & Hospital**

- MRI brain and spectroscopy
- MRI neuro vascular imaging with 12 channel or more coil and angio
- MRI dorsal/lumbar/cervical/sacrum
- MRI screening head neck spine imaging without Repositioning
- MRI upper abdomen 45cm fov in one scan in all axis
- MRI lower abdomen 45cm fov in one scan in all axis
- MRIKUB
- MRI joints with dedicated shoulder coil & knee foot coil
- MRI breast
- MR pelvic imaging
- MRI contrast and non contrast renal angio
- MRI MRCP
- MRI whole body 200cm diffusion without repositioning
- MRI dti and fibertrak imaging
- MR cartillage color mapping
- MR contrast kinematic imaging
- MR neuro perfusion
- MR blood oxygen level dependent (bold)imaging of brain
- MR sequence for triglyceride quantification in liver
- MR sequence and reconstruction package to get water only, fat only, in phase and out of phase in one scan.
- MR sequence scanning technique to acquire multiple echoes at different TE and generate greyscale and color images for assessment of iron.
- MR sequence and post processing for cardiac wall motion analysis, Cardiac perfusion delayed enhancement and non contrast imaging of Coronary vasculature
- MR sequence which uses water in arterial blood as contrast Medium for tissue perfusion and quantitative assessment of Cerebral blood flow .(asl)

Technical Specifications - Specifications of High End 1.5 Tesla MRI

TECHNICAL SPECIFICATIONS Medical Colleges & Hospital	
	1.5 TESLA MAGNETIC RESONANCE IMAGING SYSTEM,16 channel
S.N	**Description**
	Competitive bids are invited for installation of 1.5T MRI System 16 channel with state-of-the-art latest features commercially available at the time of supply. The system should be cost effective, with user friendly platform, reliable & capable of providing excellent performance for clinical imaging & research. The detailed specification that follows shall be understood to be minimum requirement

1	**Magnet**
a	Whole body 1.5 Tesla Magnetic Resonance Imaging System optimised for higher performance in whole body & vascular examinations with superconducting magnet, high performance gradients & digital radio frequency system
b	1.5T active shielded super conductive magnet should be short & non-claustrophobic
c	It should have at least 60 cm patient bore with flared opening
d	Magnet length should be less than 200 cm
e	Homogenecity of magnet should be less than 2 ppm over 45 cm DSV
f	The magnet should be well ventilated & illuminated with built-in 2 way intercom for communication with patient
g	It should have a built-in cryo-cooler such that helium consumption does not exceed 0.05 lit / hour
2	**Shim system**
a	High performance, highly stable shim system with global & localised automated shimmimg for high homogenicity magnetic field for imaging & spectroscopy
b	Auto shim should be available to shim the magnet with patient in position
3	**Gradient System**
a	Actively shielded gradient system
b	the gradient should be actively shielded with each axis having independently a slew rate(120). The gradient should be capable of providing spatial and temporal resolution imaging for radiology applications with a rise time less than 280 microseconds
c	The system should have efficient & adequate eddy current compensation
d	Effective cooling system for gradient coil & power supply
4	**RF System**
a	A fully digital RF system with Optical Receive system for higher SNR
b	It should also have independent DIGITAL RF receiver channels with each having bandwidth of 1 MHZ or more along with necessary hardware to support quadrature ICP array / matrix coils.
c	It should support parallel acquisition techniques with a factor of upto 4 in 2D
d	Should allow remote selection of coils and / or coil elements
5	**Patient Table**
a	The table should be fully motorised, computer controlled table movements in vertical &
b	there should be a handheld alarm for patients.
6	**Computer system / Image Processor / Operator Console**
a	The main host computer should have a 19 inches or more high resolution LCD TFT color monitor with 1024 x 1024 matrix display
b	The system should have image storage capacity of 100 GB for at least 2,00,000 images in 256 x 256 matrix
c	The reconstruction speed should be at least 1000 or more for full FOV 256 matrix

d	the main console should have facility for music system for patient in the magnet room. The system should have DVD / CD / flash drive archiving facility.
e	Two way intercom system for patient communication
f	MRI system should be DICOM ready in all parameters with no additional requirement of licenses for connectivity to any PACS / HIS / Radiotherapy treatment planning system stations
7	**Measurement System**
a	Largest field of view should be at least 48 cm in all 3 axis
b	the measurement matrix should be from 128 x 128 to 1024 x1024
c	Minimum 2D slice thickness should be equal to or less than 0.5mm
d	minimum 3D slice thickness mm should be equal to or less than 0.1mm
8	**Coil System**
a	the main body coil integrated to the magnet must be quadrature/CP. In addition to this following coils should be quoted .
b	Multichannel head coils with at least 8 elements for high resolution brain imaging.
c	Neurovascular coil with 16 or more elements or head / neck coil combined, capable of high resolution neuro-vascular imaging
d	Spine array / matrix coils with 12 elements or more for thoracic & lumbar spine imaging . System capabale to image Head neck and spine by combining coils without repositioning patient.
e	Single Body array / matrix coil with at least 48 cm z axis coverage for imaging of abdomen, angiograms & heart.
f	dedicated Shoulder coil (not General purpose Flex coil)
g	Suitable coil for peripheral angiography application. If inbuilt body coil is used for this please specify the FOV available and whether multistep software/whole body coverage is offered
h	Bilateral breast coil with at least 4 channel . It should be capable of bilateral breast imaging in axial and sagittal planes
i	Dedicated Knee/ foot coil
j	Dedicated orbit coil
k	general purpose flex coil
9	**Application Sequences**
a	The system should have basic sequence package with spin echo, inversion recovery, turbo spin echo with high turbo factor of 200 or more, gradient echo, FLAIR
b	Single slice, multiple single slice, multiple slice, multiple stacks, radial stacks & 3D
c	single & multishot EPI imaging techniques with ETL factor of 200 or more
d	Fat suppression for high quality images both STIR & SPIR
e	The system should acquire motion artifact free images in T2 studies of brain in restless patients (propeller, multivane, blade etc)
f	Dynamic study for pre & post contrast scans & time intensity studies
g	MR angio imaging : should have 20 / 30 TOF, 20 / 30 PC, MTS & TONE. ceMRA, facilities for accelerated time resolved vascular imaging with applications like treats / tracks / tricks sequences or equivalent

h	Fat & water excitation package. Diffusion weighted imaging with at least b value of 5000 or more
i	Bolus chasing with automatic & manual triggering
j	Non contrast enhanced peripheral angiography for arterial flow with native / trance /
k	Whole body screening imaging studies for metastasis
l	Whole body diffusion weighted imaging with background suppression
m	high resolution abdominal & liver imaging in breath hold & free breathing modes with respirator triggered volume acquisitions
n	the system should have basic & advanced MRCP packages including free breathing & 3D
o	The system should have the hydrogen, single voxel spectroscopy, multi voxel, The complete processing / post processing software including color metabolite maps should be available on main console.
p	Time resolved contrast kinetics like TRICKS/TRACKS/TWIST to be offered
q	Advanced breast imaging package (bilateral breast imaging protocols)
r	Perfusion imaging of brain with software for analysis
s	motion correction of imaging like Propeller/Blade/Multivane to be offered
t	Multi direction DWI & DTI with minimum of 32 directions (complete package including quantification & tractography software).
u	Functional BOLD imaging & evaluation & spectroscopic imaging
v	system should be capable of fat quantification in liver by specfying an region of intrest area
w	Sequence and application package for applying Multi B value diffusion in 3 directions simultaneously and also with varying Nex to Improve SNR
x	Sequence and reconstruction package to get water only, fat only, in phase and out of phase in one scan
y	Sequence and application package to utilize water in arterial blood as contrast medium for tissue perfusion and quantitative assessment of cerebral blood flow.
z	Scanning technique to acquire multiple echoes at different TE and generate greyscale and color images for assessment of IRON.
a1	System should have compatibility for addition of hardware , acquisistion and reconstruction to produce images giving relative stiffness of soft tissue.
b1	System should have soft wares for cardiac wall motion analysis, cardiac perfusion delayed enhancement and non contrast imaging of coronary vasculature
c1	Sequence and post processing for non invasive T2 mapping of cartilage to be offered
d1	Sequence and post processing for visualizing micro bleeds
e1	Tractography facility should be available
	Work Stations
a	A workstation with preferably the same user interface as of main console is required with the availability of all necessary software including basic post-processing software including MIP, MPR, surface reconstruction & volume rendering technique
b	It should have at least 21 inch(Medical Grade) LCD TFT color monitor, with hard disk of at least 500GB for at least 2,50,000 image storage in 256 matrix & 4 GB RAM capacity or more, with self playing DVD/CD archiving facility.

c	The workstation should display cardiac cine images in movie mode .
d	The workstation should enable printing in laser film camera & color printers
11	**safety Features**
	The system should have following safety features:
a	The magnet system should include an emergency ramp down unit (ERDU) for fast reduction of the magnetic field with ramp down time below 3 minutes
b	The magnet should have quench bands that contain the fringe fields to a specified value in the event of a magnet quench
c	real time SAR calculation should be performed by software to ensure that RF power levels comply with regulatory guidelines & are displayed on each image
d	The system shall have manual override of the motor drive for quick removal of the patients from the magnet bore
e	Temperature sensor (built in) for magnet refrigeration efficiency must be provided
12	**Documentation**
a	DICOM compatible dry chemistry laser camera with integrated processor for filming from main console & workstation
b	Printing on films of 14" x 17", 11" x 14" & 10" x 8" sizes in a resolution of 500 or more dpi. It should be possible to connect other imaging modalities including CT & ultrasound to the printer.
13	**UPS**
a	The system should be provided with on-line UPS system for the complete system with at least 1 hr backup.
14	**Suitable RF Enclosure**
a	RF cabin: The system should be supplied with RF room shielding, RF door screen &
15	**Accessories**
a	MR compatible pulse oximeter to be provided
b	Chiller for cold head gradients
c	MRI compatible anaesthesia unit & ventilator - all of international manufacturer (The vendor should quote model & make of the equipment)
d	1 non-ferromagnetic patient transfer trolley of international make should be provided(imported trolley)
e	Fire fighting system, detectors & 3 fire extinguishers and one MR compatible fire extinguisher
f	handheld metal detectors
g	phantoms for image quality audits

1	The model with 'the best and latest technical features' available with the vendor should be quoted in tender response with original printed vendor data sheets.
2	All product catalogues in original.
3	A soft copy in word format in addition to a hard copy to be provided in a CD.
4	When the vendor data sheet disagrees with the bid response, clarification should accompany in the form of letter/certificates from the principals in original.
5	The System should be DICOM – 3MPPS & should be ready to integrate with any existing PACS/HIS System.
6	Quoting vendor should have 2 or more working MRI systems in Bihar to confirm availabiity of service.
7	Up-time: 95% uptime as per standard government terms and conditions or downtime conversion to extended warranty
8	Silent D.G. set of required capacity
9	The model quoted must be US FDA approved. Copy of the certificate must be submitted
10	Installation site approval by AERB will be the responsibility of successful bidder .
11	All civil/ electrical work at site will be done by successful bidder.

ANNEXURE – III

SPECIFICATION FOR A WHOLE BODY MULTI-SLICE SPIRAL CT SCANNER 16 slice

Whole body spiral C.T. Scanner (Multi Slice Capabilities with 16 slice per rotations or more and system should be currently under production.

The System should have following essential features

1. X-RAY GENERATOR:

- High frequency generator on board gantry fitted.
- The KV range of at least 80-140 KVP with minimum 3 or more steps, 80 and 100 KV station is must for pediatric scanning

2. X-RAY TUBE:

- Mention X-Ray Tube with anode heat storage capacity -any scan techniques which can improve the effective heat capacity if available to be included and quoted
- Peak Anode heat dissipation rate of at least 500KHU/min. e. Mention focal spot size

3. GANTRY AND SCANNING TABLE:

- Gantry Aperture of at least 65 cms.
- Gantry tilt of at least -30/+30 degree or equivalent digital tilt with same capability
- Scan Field of View (FOV)of at least 40cm or above. At least two Scan Field of View should be possible, mention them
- Gantry should have a small foot print smaller the better.
- Scanning Table load of at least 200kg or more with position accuracy of 0.25mm f.
- Metal free Scanable range of at least100cm.
- Gantry should have visual instruction display for patient breadth hold Indication
- Dedicated Pediatrics Scan FOV should be available

4. OPERATOR CONSOLE:

- The operators should have architecture to allow simultaneous scan, reconstruct, and archive. With a RAM of at least 16GB or more and a hard disk capacity to store at least 250000 images in 512 matrix. The console should allow simultaneous scan, reconstruct, and archive. The total hard disk capacity should be more than 500 GB for image storage, raw data storage and application software. Custom designed Key

board that includes all of the controls necessary to control scan, display and archive including emergency stop and patient intercom.

- Laser Camera functions shall be initiated from operator's console.
- Multi format filming with flexible filming format should be possible

5. Detector

- 16 Rows of Solid State detectors of rare earth.
- It should be free from repeated Calibrations.
- The number of detectors elements / row should be more than 750 physical elements in a single row.
- Minimum Slice Thickness should be 0.625mm or lower.
- The Z axis detector width for sub mm slice should be equal or more than 10mm.

6. HIGH CONTRAST SPATIAL RESOLUTION:

- It should be at least 15lp / cm at 0% MTF using clinical algorithm

7. LOW CONTRAST DETECTABILITY:

- 5mm or less @0.3% using 20cm CATPHAN on 10mm slice thickness. Mention the dose to achieve this IQ.

8. SCAN TIME:

- Mention the minimum rotation time - should be less than or equal to 1s for 360 degrees.
- Mention all scan times possible with the sytem in Axial and Spiral mode.

9. SLICE THICKNESS:

The system Should provide multiple selections of slice thicknesses. Minimum slice thickness should be 0.625mm or lower.

10. SPIRAL MODE SPECIFICATIONS :

- Continuous data acquisition with overlapping slices.

- Maximum helical for single continuous spiral of at least 120 Seconds.
- Spiral mode must be extended spiral, back to back spiral and multi spiral as well as tilted and should be available on all the slice thickness offered.
- There should be algorithmic correction for cone beam artifact for highpitch spiral. Mention the maximum table speed/s with cone beam correction.
- Dedicated pediartic protocols with colour coded or BMI based protocol selection must be available.

11. IMAGE PROCESSING SYSTEM:

- Main CPU unit of at least Random Accessory Memory(RAM) at least 4GB with 2.33 GHz dual or quad processors
- Image reconstruction speed must be more than 5 images.

12. IMAGE PROCESSING SYSTEM:

- Image Reconstruction matrix at least 512 x 512.
- Display matrix at least 1024x1024.
- High resolution colour LCD Monitors 19"...2nos(Medical Grade).

13. IMAGE STORAGE:

- Image storage Capacity of at least 250000 images in 512 matrix.

14. IMAGE ARCHIVING:

- Image archiving on DVD / CD / MOD should be available. In case of MOD -10MODs rewritable may be supplied. In case of CD-1000CDs may be supplied along with.

15. FILMING:

- Laser Camera DICOM Compatible, with latest model camera should be able to take all standard make of films.

16. WORKSTATION:

- The workstation should be of at latest version with Dual LCD Monitors(Medical Grade) and with RAM of at least 12 GB & Hard disc capacity of minimum 200 GB .Also must have fastest reconstruction time available with the tenderer and should have DICOM-3.0 compatibility. It should have parallel processing capabilities. Direct filming facility from the main console and workstation must be provided.
- 3D rendering methods - Following 3D rendering methods should be possible - Surface, MiP, MinIP, RaySum, Integral, SSD, VED
- Multi object merging, Joint disarticulation should be possible

17. IMAGE TRANSFORMER/NETWORKING:

- The unit should have DICOM Interface for transmitting images and information in DICOM standard and also to permit communication between devices of various manufactures. The unit should have provision for connectivity of the Hospital Information System / Radiology Information System.

18. STANDARD SOFTWARES:

Routine software for image evaluation and display with minimum three region of interest (ROI), Angles and distance measurements. Histogram display profile, symmetry comparison, variable, multiple image display with independent window image, annotation and labelling, image addition and subtraction and volume artifact reduction capability, reversal of gray scale value and image filter functions reference scales topogram evaluation etc.

The CT console should have 3D and 2D processing capabilities such as 3D surface, Volume rendering, multiobject merge, CT angio. MPR, MPVR, Virtual Scopy etc

Direct Multiplannar reconstruction should be standard feature - should be able to create MPR imgaes in atleast in 3 orthogonal planes directly during scan.

Dynamic CT Scanning, oblique MPR, MIP capabilities to be provided as standard software. Real time reforming of secondary views with reconstruction facilities in saggital, coronal, paraxial, oblique and irregular (curvilinear). Outline should be determined in the topogram or in sagital images.

Zooming by reconstruction of the raw data. Image planning and zooming should be possible. Real time monitoring of contrast bolus injection. All these software's are to be available on the main console.

Should have Virtual endoscopy software for visualization of vessels and air filled structures and Colonography software for virtual endoscopic, colon study. Should have the facility of Perfusion CT for study of dynamic data of brain following contrast and study of cerebral perfusion.

19. ESSENTIAL ACCESSORIES TO BE INCLUDED WITH THE UNIT:

- **UPS** On-line UPS with MF batteries for the main computer system, digital imaging process and provision of light in console room and gantry room with backup time of 1hr.
- **Voltage Stabilizer:** Servo Voltage stabilizer for whole unit including accessories. The voltage vary at this Institute between 330-460V.

- **Color Printer :** Please offer color printer to take color images plain paper only of VR / CTA/CTP images on plain paper.
- **Lead Glass:** 60cm X 120 cm or more with lead equivalent as per the safety norms.
- e. **Pressure Injector:** CT pressure injector with single head - remote console of Medrad or equivalent make latest model with inter phase software along with 200 disposable syringes with connectors.
- Silent D.G. set of required capacity
- Latest model should be installed.

20. The model quoted must be US FDA approved. Copy of the certificate must be submitted with the offer.

21. Installation site approval by AERB will be the responsibility of successful bidder .

22. All civil/ electrical work at site will be done by successful bidder

Specification of 128 Slice Spiral CT Scanner (MCH)
Features :
The 128 Multi slice Spiral CT Scanner designed for the whole body and cardiac scanning

- The system consisting of Gantry, Couch, Operating console with 3D, reformat and volume rendering processing capabilities, Separate Multi-Modality post processing workstation. Filming with DICOM compatible Dry laser Imager, Color laser printer, Dual Head power injector.
- An Online UPS for the complete system for backup power in case of mains failure and
- fluctuation
- Image storage in system HD and image transfer through CD/DVD Writer
- The system must have DICOM (latest version) on online data /image transfer capability
- Rotating anode type X-ray tube and Ceramic / Solid state detector
- Automatic injector synchronized with the system
- Voice link: Vocal instruction the patient.

Specification :
Gantry & Scan Parameter :

- Scan Regions : Whole body including Head
- Gantry Aperture : 60 cm or more
- Scan field : 50 cm or more
- Scan time : 0.40sec or faster
- Recon Slice thickness : adjustable from 0.625mm to 5 mm
- Recon time : Min 16-20 images /sec

X-Ray Generator :

- X-Ray Generator : 70 kw or higher
- X-Ray Generator type : High frequency Inverter type
- X-ray Exposure : Continuous 100s or above

X-Ray Tube

- Computer controlled monitoring of anode temperature

- X-Ray Tube Voltage : Adjustable from 80 to 140 kV
- X-Ray Tube Current : 20 to 600mA or more
- Anode heat storage capacity : 6 MHU or higher
- Cooling rate : 800 KHU/min or more

X-Ray Detection

- Detector Material : Ceramic/ Solid state Detector
- Z-axis detector width : 40mm or more
- Number of slices /rotation : **capable of acquiring 128 slice/rotation**
- Number of detector rows : **at least 64 or more**
- Coverage per rotation in axial mode : 40 mm or more
- Numer of detector element s/row : 1200 or more

Image quality Specifications

- High Contrast detectability (using clinical high resolution algorithm) – helical mode X-Y plane should be more than 17lp/cm and Z –plane should be more than 19lp/cm
- Low Contrast detectability state at 3 mm at 0.32% contrast difference, specify the dose, using 8 inch catphan phantom. (lower dose system will be preferred)
- Latest Iterative Reconstruction method (such as Safire, ASiR, IMR, AIDR) is to be quoted as standard.

Patient Table

- Remote control of the couch from console
- The table move vertically and the table top moves longitudinally
- Motor driven couch top movement
- Load capacity : 200 kg or more
- Scanable range: 1700 mm or more.

Cardiac Acquisition Mode

- Prospective Gated Coronary acquisition
- The total time taken to cover 12cm of heart in Prospective gated acquisition mode
- Retrospective gating should be possible
- Minimal temporal resolution in multi sector mode must be less than or equal to 45mS
- Should be able to combine gated and non-gated acquisition in a single series

Pediatric Scan

- Pediatric Scan FOV should be available
- Dedicated BMI based/colour coded pediatric patient

Acquisition console

High performance computer for data acquisition, image reconstruction and routine post processing

- Processor : 2 x Xeon 2.6 or more GHz Dual Core
- Monitor : TFT/ LCD 21" (medical grade) or more with 1280 x 1024 or better resolution
- RAM : 18 GB or more
- HDD : Raw data 1TB & Image data 800GB or more
- Graphics Accelerator : For fast 3D processing
- DVD / CD writer : CD (700 MB or more), DVD (4.7 GB or more)
- DICOM VIEWER : Automatically included in every CD / DVD for viewing in viewer's PC USB port for connecting USB storage devices like pen drive, external hard disk etc.

Software:

- MPR (Multi Planer Reconstruction)
- 3D SSD (Shaded Surface Display)
- VRT (Volume Rendering Technique) for advanced 3D application
- Bolus CT
- Video Capture and Editing Tool
- Fly through
- Double – oblique image from standard scanning protocol
- Cardiac post processing

Multi Modality Post processing work station – 1number

High performance computer with advanced multi modality post processing facility
This should be from the same CT manufacturer to ensure full functionality

- Processor : 2 x Xeon 2.6 or more GHz Dual Core
- Monitor : TFT /LCD medical grad 21" or more, with 1280 x 1024 or better resolution
- RAM : 16 GB or more
- HDD : Preferably 1TB or more
- Graphics Accelerator : For fast 3D processing with additional 2 GB image memory
- DVD / CD writer : Minimum 16X
- DICOM Viewer : Automatically included in every CD / DVD for viewing in viewer's PC

Special Processing Soft wares for Multi- Modality cardiac workstation :

- Volume rendering with multi object merging
- Fly through (Virtual Endoscopy with Virtual bronchoscopy and CT Colonoscopy
- facilities)
- Bone Removal Software
- Automatic Quantification of stenosis and plaque analysis
- Automatic Vessels Measurement
- Automatic coronary vessel tree with auto labeling of vessels.
- Myocardial relative perfusion is must
- Perfusion for Neuro and body applications
- Calcium scoring software
- Cardiac function with LV function analysis

Additional fully functional independent work station of similar capacity as satellite work station should be installed in Radiology Department with registered Pulmonary and Cardiac Software.
CT Fluoroscopy facility for CT Guided FNAC and other interventional procedures (to be quoted separately)
Dual Head CT pressure injector with compatible syringe -100 pairs of syringes with pressure tubing and other required material to be supplied
Flow rate: 0.1- 10 ml/sec in 0.1 ml increments
Programmable pressure limit for 200 ml syringe : 2241 kPa
Syringe : 200 ml
Display control unit with stand

Dry Laser imager :

- Resolution : 500 pi or more
- Throughput : 70 films /h more
- Film size : 35 x 43 cm / 35 x 35 cm- one size online

Color laser printer:

- Resolution : 600 x 600 dpi
- Throughput : 30 pages / min
- Media types : A
- UPS : True on line UPS with backup of one hour for the whole system in case of mains failure &
- Generator: Silent DG set should be installed separately for running the machines.
- Lead Aprons: 6 sets with thyroid protector and radiation protector glass spectacles.
- Lead glass : 100 cm x 80 cm lead glass between machine room and control room for radiation protection.
- Quality Standard: Model to be quoted must be USFDA certified must be submitted with the offer.
- AERB type approval / NOC is to be attached.
- Latest model should be preferred.
- Installation site approved by AERB will be responsibility of the successful bidder.
- All civil and electrical work should be done by successful bidder.

Bidder are required to have silent D.G. set of required capacity at the center.