

No. IV-17017/13/06-Prov.I  
Government of India  
Ministry of Home Affairs

Jaisalmer House, Man Singh Road,  
New Delhi, 18.10.2006

To

The DGs: Assam Rifles/BSF/CISF/CRPF/ITBP/NSG/SSB/BPR&D

Subject:- Finalization of QRs/specifications for Medical Equipments

The QRs of the following Medical Equipments to be procured under Modernization Plan have been finalized and accepted by the MHA:-

- (i) 500 mA X-RAY MACHINE
- (ii) FIBRO OPTIC ENDOSCOPES
- (iii) COMPLETE ELECTRONIC CONTROLLED DENTAL UNIT WITH ACCESSORIES U/S SCALER
- (iv) MRI PLANT (WHOLE BODY)

2. Henceforth, all the CPMFs should procure the above items required by them strictly as per the laid down QRs/Specifications.

Yours faithfully,

  
(Alok Mukhopadhyay)  
Under Secretary (Prov-1)

Copy to:-

DD(Procurement),MHA

Copy for information to:-

1. PS to JS(PM),MHA
2. Dir(Prov), MHA

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SPECIFICATION FOR M.R.I.

MAGNET

1.5 T active shielded super conductive magnet.

The magnet length should be short

The homogeneity of the magnet should be mentioned in relation to 10,20,30,40 cm DSV.

GRADIENT SYSTEM

Actively shielded Gradient system with strength of at least 40 mT/m or more with the slew rate of 150 mT/m/sec or more. This slew rate of 150 at 40 mT should be available in each axis independently.

RF SYSTEM

RF Transmitter should be fully digital with transmit power of at least 15 Kw.

RF Receiver system should have at least minimum of 16 independent CP /Quadrature RF receiving channels with each having bandwidth of 1MHz or more.

PATIENT TABLE

The table should be fully motorized, computer controlled table movements in vertical and horizontal directions.

The CCTV system with colored LCD display to observe the patient.

The table should deliver the protocols for automatic bolus chasing in peripheral angio with the automatic table movement.

COMPUTER SYSTEM / IMAGE PROCESSOR / OPERATOR CONSOLE

Computer system should be latest in the industry, fast and efficient. It should have at least 2 GB RAM.

The system should have image storage capacity of 100 GB for at least 100,000 images in 256x256 matrix.

The main computer should have at least 18 inch LCD type Color monitor. The console should have facility for music system for the patient in the magnet room.

MEASUREMENT SYSTEM

Largest Field of View should be at least 50 cm in all three axis.

Minimum TE in Gradient Echo 2D / 3D should be at least 0.7 msec/0.7 msec or less at 256x256 matrix.

Minimum TR in Gradient Echo 2D / 3D should be at least 1.6 msec/1.6 msec or less at 256x256 matrix.

Minimum Slice Thickness in 2D should be at least 0.5 mm or less.

Minimum Slice Thickness in 3D should be at least 0.1 mm or less.

Maximum Echo Train Length in both Spin Echo and Gradient Echo should be at least 256 or more.

The measurement matrix should be from 128x128 to 1024x1024 in both 2D and 3D imaging as well.

COIL SYSTEM

The main body coil integrated to the magnet must be quadrature/CP. In addition to this coil following coils should be quoted.

1. 10 Channel Head Array Coil.
2. Neuro Vascular Coil with 16 Channels or alternatively a head / neck array Coil giving 16 Channel high resolution Neuro Vascular Imaging Capability.
3. Array Spine Coil for thoracic and Lumbar spine imaging.
4. Array Body coil, capable of doing abdomen, pelvic, MRCP and peripheral imaging. Please specify the time reduction factor with parallel acquisition techniques.
5. Flex Coil - Large for imaging of large regions such as shoulder, hip and knee etc.
6. Flex Coil - small for imaging of small regions such as shoulders, wrist, elbow and ankle.
7. small Loop Flex Coil
8. Large Loop Flex Coil
9. Quadrature Extremity Coil for Knee Imaging
10. Peripheral Angio Coil.
11. Coil for Pelvis. *cardiac coil*

APPLICATION SEQUENCES

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The system should have basic sequences package with Spin Echo, Inversion Recovery, Turbo Spin Echo with high turbo factor of 256 or more, Gradient Echo with echo train Length of 256 or more  
The application software for image smoothing and edge sharpness etc for improvement in image resolution should be quoted and it should apply for major imaging applications.  
Single and Multi shot EPI imaging techniques with ETL factor of 256 or more  
MR Angio Imaging : Should have 2D/3D TOF, 2D/3D PC, MTS and TONE, ceMRA to be quoted.

Fat and water excitation, please specify the application package. The system should have Diffusion Weighted Imaging, with at least b value of 8000 or more. The system should have facility for ON Line automated calculation of ADC maps.  
Please specify the motion correction algorithm/package for high resolution motion free Diffusion weighed imaging with multishot/segmented EPI techniques. It should be also possible to have PSIF diffusion.

Perfusion Imaging to enable large anatomy coverage of the brain and in line calculation of resulting hemodynamic data. The perfusion analysis should have capability to calculate color display of relMTT, rel CBV, rel CBF. If the perfusion analysis is not possible on main console, than hardware and software for the same should be quoted additionally on the workstation as detailed in item 8. 05.

BOLD imaging. BOLD technique with automated 3 dimensional motion correction, Z-score, correlation analysis with color overlay on anatomical images. It should be possible to have Real Time Processing of BOLD imaging data on the main console for the complete brain. If the same not possible on main console, than hardware and software to have the same should be quoted additionally on the workstation as detailed in item 8. 07

The perfusion and the BOLD imaging should be possible for the whole brain with motion correction techniques. Please specify the application package and the motion correction technique

Parallel Acquisition Techniques: Please specify the name of the package. It should have applications in abdomen, CTL imaging, neuro imaging including diffusion and perfusion etc, free breathing abdomen imaging and Cardiac imaging. The scan reduction time of at least 4 in 2D sequences should be possible.

Bolus chasing with automatic moving table should be offered and should be available with fluoro triggered MR angiography for manual and fast switchover in less than 1 sec for ceMRA results.

The system should facility for quantification of the CSF flow data. The same should be preferably on the main console. In case of this application not available on the main console, please provide it on the additional workstation as detailed in item 8. 08

The system should have the Hydrogen, Single Voxel spectroscopy, Multivoxel, multislice 2D, 3D Spectroscopy and also the Chemical shift imaging in 2d/3d. The complete processing/post processing software including color metabolite maps should be available on the main console. If the same not possible on main console, than hardware and software to have the same should be quoted additionally as detailed in item 8. 06.

Advanced Cardiac Applications: Morphology/wall motion, perfusion imaging; Myocardial viability imaging; Cardiac function including EF, ED/ES volume Cardiac output, wall thickening and wall thickness; Cardiac Tagging Techniques; Coronary artery techniques; real time interactive imaging; 2d/3d fast field echo/balanced/steady state techniques, combinable with Cardiac imaging. Please provide comprehensively all the details and quote for all the Cardiac application available.

The system should have prospective ECG triggering and retrospective gating with navigator pulses, interactive or automatic definition of the ventricular and myocardial contours, cine imaging, grid tagging etc. Besides this comprehensive set of all post processing Cardiac functions should be available on the workstations as listed under 8.04  
It should be possible to have the prostate spectroscopy in conjunction with the endorectal coils to be quotes as item 4. 13. Please include any other interface, or hardware and software required for this application.

*Image Compression software for Head to Sacrum imaging*  
*Software for motion correction - Respiratory/blade technology*

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The system should be available to perform Multi Direction Diffusion weighted imaging / Diffusion Tensor Imaging and the same should be possible on the main console.

**WORKSTATION**

The additional workstation with preferably the same user interface as of the main console with the availability of MPR MIP etc. It should have 18 inch LCD monitor, with hard disk of at least 50 GB for at least 95000 image storage in 256 matrix, and 2 GB RAM capacity or more. The workstation should have built in CD archiving facility.

Image documentation should be possible from the main as well as the workstation. The workstation should have availability of Cardiac post processing capabilities : 1. calculation of ventricular area/volume, stroke volume, ejection fraction, relative ejection fraction, calculation of myocardial thickness, Time volume diagram generation, filling rates and myocardial wall motion. 2. Graphical display of output, calculation of flow and velocity parameters with color display of velocity parameters. Cardiac Rest /stress studies analysis. Processing of 2D/3D CSI data with color metabolite mapping, if not offered/available on the main console as mentioned in point 7. 14 should be quoted here.

**DOCUMENTATION**

The system should have digital DICOM 3.0 dry Chemistry Laser camera. The system should have color laser printer for printing color images and protocols on plane paper.

**UPS**

The system should be provided with the 160 KVA UPS system for the complete system with at least 30 minute back up.

**SUITABLE RF ENCLOSURE**

RF Cabin: The system should be supplied with the imported RF cabin and interiors for the same should be carried out suitably.

**ACCESSORIES**

The system should have MR compatible pressure injector from well established supplier and the control for the same should be in console room.

The system should be offered with the suitable Chiller system.

MR compatible Pulse Oximeter to be supplied

**GUARANTEE**

The system should be guaranteed for 5 Years including Cold Head Helium & all accessories. Comprehensive contract including all accessories for 6<sup>th</sup> Year to 10<sup>th</sup> Year to be offered.

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Dr. B. D. ...  
Coordinator ...  
Department of ...  
VMC ...

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N.B. Appropriate financial response will be required for maintenance of this equipment

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