

STATEMENT OF WORK

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PROJECT TITLE: OPEN MRI SYSTEM

PROJECT LOCATION: THOMAS E. CREEK VA HEALTH CARE SYSTEM

6010 West Amarillo Boulevard
Amarillo, TX 79106-1990

PROJECT DESCRIPTION: Diagnostic Radiology Service, of the Amarillo VA Healthcare System, requests an open Magnetic Resonance Imaging (MRI) System.

GENERAL

I. BACKGROUND

The Thomas E. Creek VA Health Care System located in Amarillo, Texas is a campus style layout with numerous buildings. We service approximately 20,000 veterans in the Texas panhandle.

A. REQUIREMENTS:

Thomas E. Creek VA Health Care System, Diagnostic Radiology Service currently does not have a MRI system which results in a substantial fee dollars spent for MRI tests referred to the private sector. We are requesting open, 1.2-1.5 Tesla open MRI System with a fully “open” bore to best serve claustrophobic Veterans, with a full array of imaging coils to adequately evaluate the brain, spine, joints (small, medium, and large), as well as the abdomen, and pelvis. The system requirements shall have a minimum 660 pound table capacity to accommodate heavier patients. Vendor shall meet or exceed the following requirements:

1.2T vertical field strength for high SNR

Iron core for high field strength, uniformity and stability

Homogeneity: 0.3 ppm@35cm DSV (VRMS) for excellent general image quality and RF fat saturation

45 cm FOV in all axes

Shimming features including computer-modeled passive shims placement and “patient individualized” active shim capability

Active magnetic shielding to minimize the 5 Gauss footprint

Helium-only cryogen design (single cryogenic cooler) with refill once every two years with HMSA approved

Maintenance Plan for one year after installation that meets or exceeds OI&T Security Requirements.

Unobstructed view offered by open MRI

30 degree offset table so patients will always have a clear lateral view

Patient positioning to optimize iso-center imaging

660 lbs. patient weight limit

82 cm wide table

Three axis motorized movement

20 cm lateral (in bore)

222 cm longitudinal

40 cm vertical (capability to lower to 51 cm for improved wheelchair transfer)

Patient area lighting to further reduce anxiety

Advanced gradient technology to reduce acoustic noise without compromising clinical performance

Constant two-way communication system to reduce patient anxiety

Operator alert (patient initiated) to bring attention to the patient even without speaking

Ultra-fast, high-resolution system with a minimum of five channel brain imaging capability to enhance image quality, benefit workflow and complement patient comfort.

Minimum six channel design enabling applications from dynamic abdominal scans to cardiac imaging with parallel imaging. Anterior extenders included which can be used to accommodate very large patients.

Minimum Eight channel volumetric coil combined with parallel imaging to provide enhanced C-spine imaging capability.

Optimized SNR and signal uniformity for high quality images of the entire spine.

Minimum six channel coil with a through-arm loop and comfort pads to deliver an outstanding axillary penetration capability and coil stability.

Minimum six channel knee coil which supports high-resolution acquisitions and provides excellent patient comfort in a compact design. Detail Additional standard Quadrature, Multiple Array and Solenoid coils include:

Large body receiver coil with minimum 190 cm circumference to enable collection of diagnostic images from patients at the extreme of the demographic spectrum

General Purpose –

Spin Echo (SE) with up to 4 echoes

2D/3D Gradient Echo (GE) and Multi-Echo Gradient Echo

Inversion Recovery (IR)

FLAIR

STIR

2D/3D Fast Spin Echo (FSE)

Echo Factors (ETL): 2-256

User defined Inter Echo Spacing, TE

User defined Echo allocation including Centric, Anti-centric, ADA, and Sequential

Single Shot FSE-Ultra fast acquisition, Ultrahigh Echo Factor for MRCP, MR Urography, and MR Myelography

Driven Equilibrium- to increase SNR and without increasing TR

Echo Factors: 2-256

Inversion Time: 20-8000 ms enables fast STIR, fast FLAIR imaging
radial k-space acquisition

Double and Triple IR Black Blood acquisitions

RF-Spoiled SG to provide T1 weighting

Rephased SG -Flow compensation for reduced artifacts

Balanced SG – balanced SG to provide high SNR and bright fluids in a rapid acquisition

RF fat saturation

Phase-cycled fat suppression cardiac imaging

Motion compensated abdominal and cervical spine imaging

Time Reversed SG (TRSG)-T2 weighted Fluoro acquisition

Pulse Sequences Required

Diffusion Weighted Imaging (DWI)

Single Shot SE EPI

B-Factor: 0-2000

RF Fat Saturation

IR pulse

Fast gradient echo with optimized fat suppression for dynamic breast and abdomen imaging

2D/3D TOF

High contrast blood flow visualization

Combine with pre-saturation to image arteries or veins

Single slab or multi-slab (3D)

Non-contrast MRA

Bright fluid sequence with walking pre-sat

Phase Contrast MRA (PC-MRA)

Velocity Encode: 5-400 cm/sec, increment 1 cm/sec

No contrast agent imaging

Image Processing Tools Required

Multi-tasked tools and features to maximize image quality and workflow efficiency.

Maximum/Minimum/Average Intensity Projection (MIP)

Sliding and expanding MIP capabilities

MRA post processing tool

Freehand, elliptical, and rectangular cropping

Include/Exclude mode

Sliding, expanding mode

Multiplanar Reconstruction (MPR)
Parallel cut
Parallel slant cut
Radial cut
Curved
Vascular Volume Rendering
Radial, sliding, and expanding projection modes
Opacity setting
Filtering Tools
Adaptive imaging filter
Edge enhancement
Image mask
Enhanced-space signal processing
Image addition and subtraction
Calculated Images (Proton Density, T1 and T2)
Dynamic analysis
Multiple graph modes to include: Normalized Signal Intensity time graph, Multiplicative Signal Intensity-time graph, and Signal Intensity change rate-time graph
Multi-slice support
DICOM exportable
Diffusion Analysis
ADC map
Isotropic DWI map
Image Review Tools
Unlimited series review
Flexible window layout
Filming Tool with configurable layouts
Viewport Tools
Maximize/Resize
WW/WL
Magnify
Rotate/Reverse
Cine tool
Comment/Annotate
ROI (circular or rectangular)
Measuring functions
Statistics
Overlay
Protocol/Task management
Windows Explorer style
Protocol editing without loaded study
Categorized Anatomic Protocol Library

Chiller – A chilled water source shall ensure optimal Magnet operation with a compact design and outdoor installation to minimize installation requirements.

An enhanced operability suite shall be complete to ensure productivity by promoting seamless integration of a DICOM compliant HIS/RIS that promotes workflow capabilities to allow scheduled Workflow/Patient Information Reconciliation profile support, enabling study status flagging, and the query of a patient worklist from the HIS/RIS.

An enhanced worklist management tool shall enable the MRI system to access scheduled patient information from a DICOM 3.0 compliant hospital or radiology information system, potentially enhancing patient throughput and reducing data entry errors

MRI shall supply a 3D volume T2 isotropic fast spin echo with variable refocusing flip angle technique. Isotropic voxel to allow a user to acquire an image in one plane and create high quality images of other planes through Multi-Planar Reformatting (MPR).

MRI shall have the ability to allow user to program table increments for multi-stage imaging that allows for complete spine studies to be programmed and executed from the operator console.

An enhanced Neurologic application shall provide improved clinical capabilities with ultra-fast sequences to probe tissue intensity dynamics with a post processing analysis tools to yield mean transit time, relative cerebral blood flow, and relative cerebral blood volume maps.

Pulse Sequences

- ☐ Multislice 2D Susceptibility Acquisition
- ☐ Multislice 2D pulse sequence
- ☐ Multislice 2D pulse sequence for FLAIR contrast

Processing

- ☐ Mean Transit Time (MTT) Map
- ☐ Relative Cerebral Blood Flow (rCBF) Map
- ☐ Relative Cerebral Blood Volume (rCBV) Maps
- ☐ Color maps exportable via DICOM

Software requirements shall automatically determine and place optimal main scan slice locations based on the initial scanogram to save operator time and improving the consistency of routine brain scans.

The equipment shall use an alternative to fat saturation or STIR for robust fat suppression based on the Dixon method.

The equipment shall incorporate software to allow the “tagging of blood”, enabling excellent depictions of vasculature without a contrast agent thus providing another MRA alternative for patients with compromised renal function, with application to renal artery and portal vein imaging.

The MRI shall perform acquisition of image data during systole and again during diastole to include Subtraction capability of the two acquisitions to produce a high resolution depiction of the arterial flow, with no contrast agent, especially useful for peripheral vessels.

The MRI shall provide Neurovascular Coil that includes the flexibility needed to image cranio-cervical anatomy with multiple coil applications to include Head, Cervical, and Head/Neck minimizing patient repositioning and shall have a minimum eight channel coil which support advanced and conventional imaging modes.

MRI shall have a Bilateral Lower Extremity Coil to support advanced and conventional imaging modes for vascular applications with a minimum eight channel coil delivers excellent peripheral vessel imaging.

MRI shall have Body Large to deliver excellent abdomen, torso and spine imaging for larger patients, which is also useful for multi-station scanning such as peripheral vascular MRA.

MRI shall have a tabletop extension that allows for the extension of the length of patient table permanently by a minimum of 12 inches which allows additional flexibility for patient positioning.

MRI shall have a Coil Connector to allow for simultaneous connection of two body coils and the bilateral lower extremity coil, providing high SNR coverage from the renal to pedal vessels

MRI Music System shall have a patient music system will include at minimum the following features:

- ☐ Active volume compensation (Auto Gain) changes volume automatically to mask MR gradient sounds
- ☐ DSP technology provides the highest sound quality available for the patient
- ☐ Patient volume and music selection controls with voice feedback for maximum comfort, assurance, and distraction
- ☐ Multi Disc CD Changer, AM/FM tuner, iPod interface
- ☐ Backlit Technologist Control Unit allows operation of the entire system with a touch of the button
- ☐ Patented - Magnetically Inert RF Shielded Stereo Pneumatic Transducer
- ☐ Technologists Sound System
- ☐ Patented pneumatic headsets providing attenuation. Both “stethoscope” and “muff” style headphones included
- ☐ Interface to MR system console for proper mixing of music and two-way voice communication

Contrast Injector – The Contrast Injector shall be a dual head (contrast and saline) power contrast agent injector designed for use with MRI and consists of a scan room injection unit and a state-of-the-art fiber optic link to the control room control unit to include 6 user-programmable phases for tailoring injection protocols.

MRI vendor shall provide Biomed training to include travel and tuition for 2 facility biomed personnel.

Support Service/Training Required

At least two weeks of initial training on-site applications training to include at a minimum the following training topics:

- ☐ MR magnet safety
- ☐ MR System operation
- ☐ Patient positioning in the RF coils

Unlimited Follow-up Applications Training

Follow-up applications training visits required during the warranty period of one year after installation at no additional charge. The first follow-up applications visit is usually scheduled to occur within 6-12 weeks after initial training. The follow-up applications training visit will provide additional system training along with advanced applications such as MRA refinements, cardiac imaging and site specific special applications. Additional no-charge visits throughout the warranty period will be scheduled at our request. Purchase costs shall include all manuals and service materials in the training package to include all test phantoms in the purchase. Any training videos or training presentations formats shall be included as part of the training package in an electronic format for archive.

Helpline for applications service must be available Monday through Friday during normal operating hours.