

EQUIPMENT

The next-generation MAGNETOM Vida 3T MRI system will be provided by Siemens Healthineers. This advanced 3T MRI system will be built on the Vida platform and incorporate next-generation high-performance gradient technology with maximum gradient strength of 200 mT/m and slew rate of 200 T/m/s. The instrument thus represents a complete MR system solution catering to the diverse research and clinical translational needs of the broad user base at the Martinos Center and greater Boston area. The costs of scanner room renovation and electrical upgrades beyond those covered by the Shared Instrumentation Grant funds will be paid for by the MGH Executive Committee on Research (ECOR); see Dr. Orf's attached letter of support committing these extra funds. Additional costs not covered by the High-End Instrumentation Grant funds will be covered by the MGH Radiology Department (please see Dr. Rosen and Dr. Brink's attached joint letter of support). Siemens is also providing the installation and integration from its installation team with oversight from its on-site team of engineers.

The configuration and technical specifications of this new 3T scanner are listed below in Table 1. Siemens will commercialize the next-generation high-performance gradient option on the Vida 3T platform, in keeping with the precedent established at Siemens for embedding the latest gradient technology into state-of-the-art wide bore systems. For example, the original Connectome 3T scanner was delivered on the MAGNETOM Skyra wide bore 3T scanner, and the next-generation Connectome system (Connectome 2.0) will be a Vida-based 3T instrument equipped with an asymmetric head gradient coil. An itemized quote for the MAGNETOM Vida 3T MRI system with specific features and accessories that will be included in the delivered instrument is provided by Siemens with appropriate discounts and warranty terms (please see attached quote below). Note that the XT gradients described in the attached quote will be replaced by the advanced gradient package with $G_{\max} = 200$ mT/m and slew rate = 200 T/m/s, as specified in the budgetary letter provided by Drs. Rebecca Ramb and Arthur Kaindl of Siemens (please see attached budgetary letter). Because the MAGNETOM Vida 3T system including the next-generation high-performance gradient technology is classified as an investigational device by the FDA, the budget for the high-performance gradient upgrade is not itemized, which is the policy at Siemens for equipment upgrade components such as this. The budgetary letter provided by Siemens indicates their strong commitment to deliver the high-performance gradient package with the proposed Vida 3T MRI system and to provide an official offer containing all relevant terms and conditions at a suitable time, which is typical for devices of this kind and the "built-to-order" business model associated with it.

The research projects listed in this proposal are reflective of the NIH-sponsored research that has been performed for many years at the 3T Core Imaging Facility at the Martinos Center with an ever-growing number of users from MGH, Brigham and Women's Hospital and the greater Boston area now demanding the latest technology for high-resolution structural, functional, and anatomical MRI across the whole body at 3T. It is reasonable to assume that this volume of NIH-sponsored research will be maintained and continue to increase in the timeframe past the replacement of the current system, which will reach official end-of-support status by Siemens at the end of 2023.

Table 1: Cost of 3 Tesla MR System Replacement*

Base 3T Vida system

128 receive channels

TrueShape 2-channel parallel transmit

Full set of head, neck and body imaging coils including the BioMatrix sensorized 72-channel spine coil, 30-channel body coil, 32-channel head coil and 64-channel head-neck coil with integrated shims

BioMatrix Technology including physiological sensors for respiratory and cardiac monitoring

BioMatrix Tuners including CoilShim and SliceAdjust to reduce localized B_0 inhomogeneities

Standard and advanced software for Neuro applications, including advanced functional and diffusion MRI and arterial spin labeling

Standard and advanced software for Body and Cardiac applications

Established and cutting-edge acceleration software (Turbo Suite Essential, Excelebrate and Deep Resolve)

Advanced host and high-end image reconstruction computer

Installation of the magnet to include cool down, ramping and shimming of the magnet, standard local rigging and delivery (excluding out-of-scope rigging and delivery) and cryogens for initial ramp-up

High-performance gradient package

High-performance whole-body gradient with 200 mT/m maximum gradient strength and 200 T/m/s slew rate with a 60 cm patient bore size

Room renovations and electrical upgrades

Not included

Total

\$3,200,000

* Please see attached quote and budgetary letter for details

Siemens Medical Solutions USA, Inc.
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SIEMENS REPRESENTATIVE
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PRELIMINARY PROPOSAL

Customer Number: 0000158933

Date: 05/23/2022

MASSACHUSETTS GENERAL HOSPITAL
149 13TH STREET 2ND FL RM 2301
CHARLESTOWN, MA 02129

Estimated Delivery Date: 05/20/2023

Delivery dates and other contractual obligations of Seller may change due to the effects of the Covid-19 epidemic or other epidemic, including delays and disruptions in the supply chain, manufacturing, or execution as well orders by authorities and prioritization of (new and existing) orders of customers which are essential for the public healthcare. The magnitude of such changes cannot be predicted and might be substantial because it depends on the development of the Covid-19 epidemic or other epidemic.

Pricing in this proposal contingent on purchase of a 5yr service agreement.

Quote Nr. CPQ-599193 Rev. 0

MAGNETOM Vida (DE)

All items listed below are included for this system:

Qty	Part No.	Item Description
1	14456200	<p>MAGNETOM Vida - System MAGNETOM Vida – the first BioMatrix system – leverages the intelligent combination of Tim 4G and the Siemens unique BioMatrix technology to be ready to embrace the unique set of challenges that each and every patient brings to the MRI exam.</p> <p>System Design - Short and open appearance (186 cm total system length cover-to-cover and 70 cm Open Bore Design) to reduce patient anxiety and claustrophobia - Whole-body superconductive Zero Helium Boil-Off 3T magnet - Weight-optimized magnet technology based on high performance 7T magnet design - Actively Shielded water-cooled Siemens gradient system for maximum performance</p> <p>Evolving from Total imaging matrix, MAGNETOM Vida comprises a new technology that addresses the intrinsic biovariability in humans - BioMatrix Technology.</p> <p>Tim 4G (Total imaging matrix in the 4th generation) for excellent image quality and speed - Siemens unique DirectRX technology enabling all digital-in/digital-out design - Dual-Density Signal Transfer Technology</p> <p>Push-button exams with GO technologies Select&GO</p>

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DotGO/ myExam Companion
Recon&GO
MR View&GO

Tim Application Suite allowing excellent head-to-toe imaging for

- Neuro
- Angio
- Cardiac
- Body
- Onco
- Breast
- Ortho
- Pediatric
- Scientific

Further included

- High performance host computer and measurement and reconstruction system
- Patient communication including headphones
- syngo MR software including
- Turbo Suite Essential
- 1D/2D PACE
- BLADE
- Phoenix
- Inline Diffusion
- MDDW (Multiple Direction Diffusion Weighting)
- CISS
- DESS
- TGSE
- Offline Composing

1 14460161

MR General Engine #Vi

syngo.MR General Engine extends Numaris/X by adding dedicated workflows and tools for routine and advanced reading of MR examinations.

A generic MR Basic workflow is provided, as well as specific MR Neurology, MR Prostate Reading, MR Breast Reading, and MR Cardio-Vascular workflows.

1 14475308

myExam Brain Assist

myExam Brain Autopilot enables less experienced staff to scan brain MRI at high quality with just a few simple clicks. By using automation and AI, it takes away burdensome routine tasks for all technologists. Predefined automated protocols allow users to scan with no manual adjustments. A new and intuitive user interface simplifies scanning so that exams can be performed, or strategies can be changed easily. This new approach to operate MRI helps any user to generate consistent, comprehensive results. myExam Brain Autopilot is customizable to the site-specific standards of care.

1 14475309

myExam Spine Assist

myExam Spine Assist provides guided and flexible workflows for cervical, thoracic and lumbar spine. Optimized scan strategies are provided and can be selected based on the patient's condition, which allows for reproducible, high image quality and time efficient exams. The built-in flexibility allows users to change predefined strategies at any time during the spine workflow, and to personalize to the individual patient's condition and clinical need. myExam Spine Assist is customizable to the site-specific standards of care.

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- 1 14475310 **myExam Large Joints Assist**
 myExam Large Joints Assist provides guided and flexible workflows for knee, hip and shoulder. Optimized scan strategies are provided and can be selected based on the patient's condition, which allows for reproducible, high image quality and time efficient exams. The built-in flexibility allows users to change predefined strategies at any time during the scan workflow, and to personalize to the individual patient's condition and clinical need. myExam Large Joints Assist is customizable to the site-specific standards of care.
- 1 14441748 **Quiet Suite #T+D**
 Quiet Suite enables complete, quiet examinations for neurology and orthopedics with at least 70% reduction in sound pressure levels.
- 1 14460162 **Tim Whole Body Suite #Vi**
 Tim Whole Body Suite puts it all together. This suite enables table movement for imaging of up to 205 cm (6' 9") FoV without compromise. In combination with Tim's newly designed ultra-high density array higher spatial and temporal resolution can be achieved along with unmatched flexibility of any coverage up to Whole Body. For faster exams and greater diagnostic confidence.
- 1 14460227 **Tim Planning Suite #Vi**
 With the Tim Planning Suite, multiple regions in the entire body can be examined in a minimum of time through measurement planning on a single FoV of any desired size.
- 1 14456329 **syngo TimCT FastView #Vi**
 TimCT FastView is the "one go" localizer for the whole body or large body regions such as the whole spine or the whole abdomen. It acquires the complete extended Field of View in one volume with isotropic resolution. Transverse, coronal and sagittal reformats of the volume are calculated Inline and displayed for planning subsequent exams.
 - Inline reconstruction of the localizer images during the scan.
 - Localizing images in three planes over the maximum Field of View available for subsequent planning in all orientations.
 - TimCT FastView runs without laser light positioning to further streamline the workflow for several indications.
- 1 14460160 **Advanced Diffusion #Vi**
 QuietX DWI and RESOLVE together make up the Advanced Diffusion package.

 QuietX DWI enables quieter diffusion-weighted imaging of the brain with up to 70% reduction in sound pressure relative to conventional diffusion-weighted imaging. RESOLVE (Readout Segmentation Of Long Variable Echo-trains) is a multi-shot, readout segmented EPI sequence for high-resolution, low-distortion diffusion-weighted imaging (DWI). This technique is largely insensitive to susceptibility effects, providing anatomically accurate diffusion imaging for the brain, spine, breast and prostate. In combination with syngo.MR Tractography, RESOLVE enables excellent white-matter tract imaging even in regions of high susceptibility, such as the spine.

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- 1 14456327 **WARP & Advanced WARP #Vi**
 WARP and Advanced WARP (SEMAC) integrates different techniques tailored to reduce susceptibility artifacts caused by orthopedic MR-conditional metal implants.
- 1 14456237 **Advanced Cardiac incl. PSIR #Vi**
 This package contains special sequences and protocols for advanced cardiac imaging including 3D and 4D BEAT functionalities. It supports advanced techniques for ventricular function imaging, dynamic imaging, tissue characterization, coronary imaging, and more.
- 1 14456323 **Inline Composing syngo #Se**
 Automatic anatomical or angiographic composing of multiple adjacent coronal or sagittal images for presentation and further evaluation. Composed images can be automatically loaded into Graphical Slice Positioning for scan planning purposes.
- 1 14475447 **syngo Expert-i XA50**
 This software application enables remote access to the system (connected via local area network) for planning and processing.
- 1 14456328 **BioMatrix Technology #Vi**
 The new and unique BioMatrix technology addresses the different aspects of patient bio-variability. It is based on three technological clusters:
 - BioMatrix Sensors address patient physiology, in order to anticipate challenges
 - BioMatrix Tuners address patient anatomy, in order to adapt to all patients, especially critical ones.
 - BioMatrix Interfaces address user interaction with the patient, to accelerate the workflow in the face of patient variability.
- 1 14470783 **BioMatrix Respiratory Sensors#Vi,So**
 Highly integrated BioMatrix Respiratory sensors measure the patient's breathing cycle in head-first and feet-first orientation.
- 1 14470792 **BioMatrix Coil Shim #Vi,So**
 BioMatrix CoilShim helps to reduce patient induced strongly localized B0 inhomogeneities by dedicated local shim channels.
- 1 14470794 **BioMatrix SliceAdjust #BM**
 BioMatrix SliceAdjust helps to avoid station boundaries and apparent broken spine artifacts as well as to preserve the SNR for whole-body diffusion.
- 1 14456209 **BioMatrix Table #Vi**
 The new BioMatrix Table is designed for smooth patient preparation, high patient comfort and easy cleanability. The unique design of the BioMatrix table can support up to 250 kg (550 lbs) without restricting the vertical or horizontal movement.
- 1 14470795 **BioMatrix Select & GO #Vi,So**
 The BioMatrix Select&GO interface enables fast and easy single-touch patient positioning from both sides of the patient table. The interfaces are integrated left and right into the front covers. Correct positioning saves unnecessary wasted time for

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repositioning and additional adjustments, therefore shortening the total room time.

- 1 14456206 **Silver & White Design #Vi**
MAGNETOM Vida is available in different light and appealing design variants which perfectly integrate into different environments. The Silver &White Design Variant comprises a brilliant white front design ring with integrated unique Select&GO panels. The smoothly embracing deco area on the left side and the outer rings in the front and the back of the system is colored in brilliant silver.
The table cover is presented also in the same color and material selection.
- 1 14456270 **PC Keyboard US English #Vi**
Standard PC keyboard with 105 keys.
- 1 14460295 **Advanced Host Computer**
The Advanced Host Computer offers increased computing power and increased memory for supporting an external syngo MR Workplace (optional) and/or to give a performance boost to applications that generate and process large data sets (e.g. BOLD imaging, fMRI post-processing).
- 1 14456238 **Peripheral Pulse Unit #Vi**
Peripheral Pulse Unit for Pulse Triggering
- 1 14475335 **SW syngo MR XA50A**
syngo MR XA50A is the new software platform, bringing the latest features and functionality for daily clinical excellence. syngo MR XA50A guides and enables the user throughout the entire workflow: from patient registration; patient set up with guided workflows on the Select&GO; protocol management and selection; image acquisition and viewing; data handling; and post processing and reporting. This software together with the hardware enables diagnostic excellence for your daily clinical needs.

The syngo MR XA50A platform offers myExam Companion which introduces a new MRI operation philosophy by providing built-in expertise and automation for users and clinical questions. myExam Companion provides different workflow modes for tailored assistance: myExam Assist and myExam Cockpit. No matter the user or patient, myExam Companion helps generate consistent, comprehensive results.
- 1 14461619 **Turbo Suite Essential #BM**
Turbo Suite Essential comprises established acceleration techniques to maximize productivity for all contrasts, orientations and all routine imaging applications from head-to-toe.
- 1 14475508 **Turbo Suite Excelerate**
Turbo Suite Excelerate comprises access to cutting edge acceleration techniques such as Simultaneous Multi-Slice, Compressed Sensing and Wave-CAIPI for static 2D and static 3D imaging applications in Neuro, MSK and Body MRI.
- 1 14475525 **Deep Resolve Pro Package**
The Deep Resolve Pro Package combines the three applications Deep Resolve Gain, Deep Resolve Sharp and Deep Resolve Boost which use intelligent reconstruction algorithms and Deep Learning networks to reconstruct accelerated

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images with higher signal to noise ratio and better image sharpness.

- 1 14475529 **Deep Resolve Swift Brain as Add-on**
 Deep Resolve Swift Brain offers a set of highly accelerated clinical protocols for T1, T2, T2*, FLAIR and DWI contrasts for routine brain examinations. The acquisition uses, among others, a novel multi-shot EPI sequence including an image reconstruction in which Deep Learning-based algorithms are applied. The total acquisition time of all contrasts allows a drastically reduced table time for routine brain examinations including AutoAlign and the typical contrasts.
- 1 14402527 **SWI #Tim**
 Susceptibility Weighted Imaging is a high-resolution 3D imaging technique for the brain with ultra-high sensitivity for microscopic magnetic field inhomogeneities caused by deoxygenated blood, products of blood decomposition and microscopic iron deposits. Among other things, the method allows for the highly sensitive proof of cerebral hemorrhages and the high-resolution display of venous cerebral blood vessels.
- 1 14475530 **BLADE Diffusion**
 Diffusion-weighted imaging with the new BLADE Diffusion sequence improves imaging in challenging regions with high B0 field inhomogeneities, e.g., in the middle ear region. As a non-EPI-based acquisition technique it is well-suited for this purpose. It is possible to combine this imaging technique with GRAPPA and SMS.
- 1 14441849 **Diffusion Tensor Imaging #T+D**
 Diffusion Tensor Imaging provides a Single Shot EPI sequence for measuring diffusion-weighted data sets with up to 256 directions of diffusion weighting. Based on these data sets, the diffusion tensor itself and parametric maps derived from it (e.g. fractional anisotropy) are calculated automatically and in real-time. The package supports both clinical applications regarding diseases of the white matter (e.g. multiple sclerosis, brain maturation disorders, or displacement of nerve fiber tracts through masses) and advanced research applications. Diffusion spectrum imaging (DSI), an extension of diffusion tensor imaging, is included in this package. DSI expands on the DTI acquisition capabilities by providing the ability to resolve white matter fiber crossings.
- 1 07820090 **Inline BOLD Imaging #Tim**
 The BOLD imaging package is based on blood oxygen level dependent (BOLD) contrast-sensitive single-shot EPI sequences. Inline technology enables the automatic real-time calculation and display of statistical (t-value) images during the measurement of BOLD paradigms (including 3D motion correction and spatial filtration). Visualization as a mosaic image is supported. Clinical protocols are prepared. With Inline BOLD Imaging, functional brain mapping can be optimally integrated into clinical routine, e.g. prior to neurosurgical interventions.
- 1 14405330 **3D PACE syngo #Tim**
 3D PACE (Prospective Acquisition CorrEction) enhances Inline BOLD imaging with motion correction during the acquisition of a BOLD exam. In contrast to a retrospective motion correction that corrects previously acquired data, the unique 3D PACE tracks the head of the patient, correcting for motion in real time during the acquisition.

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- 1 14405316 **fMRI Trigger Converter**
 An optical trigger signal is available to trigger external stimulation devices in fMRI experiments.
 With the "fMRI Trigger Converter" this signal can be converted to an electrical signal (TTL/BNC and RS 232 interface for PC; modes: toggle or impulse).
- 1 14461562 **PCASL #BM**
 Blood labeling technique Pseudo Continuous Arterial Spin Labeling (PCASL).
- 1 14482844 **Arterial Spin Labeling 3D**
 ASL is a non-contrast-enhanced brain perfusion technique. A 3D volume is acquired with high SNR by using a turbo gradient spin echo technique and an ASL preparation module to achieve clinically feasible scan times.
 3D ASL provides generation of relative CBF maps. For multi-TI experiments bolus arrival time maps can be generated.
- 1 14405341 **Mapit syngo #Tim**
 Based on the T1, T2 or T2* properties of the cartilage syngo ParametricMap allows the early detection of osteoarthritic break down of cartilage structures even before morphological changes occur. The method supports therapeutic decisions in individual patients and can be used to control treatments non-invasively, replacing surgeries or biopsies.
 The assessment of T1, T2 and T2* properties of tissues in other body regions is also possible.
 syngo ParametricMap provides very fast 2D and 3D high-resolution imaging sequences and the Inline calculation of parametric maps for the T1, T2 and T2* properties of the imaged tissue.
- 1 08464740 **Flow Quantification #Tim**
 Special sequences for quantitative assessment of flow i
- 1 14456235 **Spectroscopy Package #Vi**
 This package combines the following functionalities:
 - Single-Voxel Spectroscopy,
 - 2D Chemical Shift Imaging,
 - 3D Chemical Shift Imaging,
 - syngo.MR Spectro Engine
- 1 14470964 **SVS Spectral Editing**
 Spectral Editing extends single voxel spectroscopy (SVS) by spectral editing support. With this feature, J-coupled metabolites (e.g. gamma aminobutyric acid, GABA) can be detected with 1H MR spectroscopy. For this aim, the provided SVS_Edit sequence enables spectral editing by using spectral editing RF pulses.
- 1 14456220 **Head/Neck 64 w/ CoilShim #Vi**
 The BioMatrix Head/Neck 64 with CoilShim combines the known benefits of Tim 4G coil technology with those of the new Siemens unique BioMatrix technology, resulting in unmatched image quality, high patient comfort and easy handling.
 Integrated BioMatrix Tuners: The integrated CoilShim elements minimize patient

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induced local anatomy-specific B0 field inhomogeneity, thus ensuring excellent image quality.

The very open design ensures that patients will feel comfortable, while the anatomic design ensures highest signal-to noise ratio.

The BioMatrix Head/Neck 64 features:

- 64-element design with 64 integrated preamplifiers, 55 elements in the head region, 9 elements in the neck region.
- Integrated SlideConnect and DirectConnect technology
- Combined head/neck coil for an optimized workflow of the head/neck region
- Upper coil part removable
- Lower coil part usable without upper part for highly claustrophobic patients
- Smoothly integrated into the patient table with BioMatrix Spine
- Cushioned head stabilizers (removable)
- No coil tuning
- iPAT-compatible in all directions
- Optimized for sequences using iPAT²
- Dual-Density Signal Transfer enables ultrahigh density coil designs by integrating key RF components into the local coil
- Rear opening for up to 128 EEG electrode leads
- Detachable look-out mirror

Applications:

- Head examination
- Neck examination
- Cervical spine examination
- MR Head Angiography, also time-resolved
- MR Neck Angiography
- Combined head / neck examination
- TMJ (temporo mandibular joints)

1 14456241

Separator 60kW/75kW #Vi

The SEP (Separation cabinet) has to be used if a central hospital chilled water supply is available or if a chiller of any brand/type is already available.

The SEP is the interface between the on-site water chiller (of any brand or type) or the interface to the central hospital cooling water supply.

For the above-mentioned cases the SEP is mandatory!

In these cases, the primary water specifications must fulfill the requirements:

XJ: 45kW; water temperature: 6 - 14°C

XQ: 60kW; water temperature: 6 - 14°C

XT: 75kW; water temperature: 6 - 12°C

For all gradient systems:

Flow: 100+-10l/min; pH value 6-8; max working pressure 6 bar.

Dimensions: 1950mm x 650mm x 650mm (height x width x depth)

Weight: approx. 350kg

1 14460249

UPS system #Vi

UPS system Liebert GXT5 3000IRT2UXLE for MAGNETOM Vida for safeguarding computers. Including Power Cable of 9 m for connecting the UPS.

Power output: 3.0 kVA / 3 kW

Bridge time: 3 min full load / 12 min half load

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Input voltage: 230 VAC

- 1 14456316 **UPS Battery module (Libert GXT4 BATT)**
 UPS battery module Liebert GXT5 72VBATTE for MAGNETOM Aera, Skyra, Prisma, ESSENZA, Amira, Spectra, C! for safeguarding computers.
 Extension for: Liebert GXT5 3000IRT2UXLE (14456315)
 Battery type: Closed, maintenance-free
 Extension of the bridge time to: 21 minutes full load / 48 min half load with one module
 Dimensions (H x D x W): Battery module: 430 x 540 x 85 mm

 Weight: approx. 30 kg

- 1 14456228 **System Start Timer #Vi**
 Timer clock that can be installed together with the MAGNETOM MR system to start the system automatically at user-definable times, eliminating waiting times during system boot up.

- 1 14456203 **Tim [228x128] XT + TrueShape #Vi**
 Tim [228x128] XT-gradients performance level

 Tim 4G's RF system and innovative coil architecture enables high-resolution imaging and increased throughput. The system provides a maximum number of 228 channels (coil elements) that can be connected simultaneously. Flexible parallel imaging is achieved by 128 independent receiver channels that can be used simultaneously in one single scan and in one single FOV, each generating an independent partial image.

 XT - gradients
 The XT 60/200 gradients are the most powerful commercially available gradients at 70 cm currently on the market. The XT gradients combine 60 mT/m peak amplitude with a slew rate of 200 T/m/s, capable of driving higher SNR throughout all regions of the body.
 The force compensated gradient system minimizes vibration levels and acoustic noise while the high-performance cooling for each individual axis allows full duty cycle over long-term measurements with outstanding stability.

 TimTX TrueShape
 TimTX TrueShape is Siemens' architecture for parallel transmit (pTX) technology.

 High-performance measurement and reconstruction system.

- 1 14456215 **Standard Coil Package, 128-ch #Vi**
 This package includes (if not exchanged with different variants via respective quote items):
 - BioMatrix Head/Neck 20 tiltable with CoilShim
 - BioMatrix Spine 72 with Respiratory Sensor
 - Body 18
 - Flex Large 4
 - Flex Small 4
 - Flex Coil Interface

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- 1 14456230 **High-End Computing [228x128] #Vi**
 Tim 4G power computing upgrade for MAGNETOM Vida with 128 receive channels. This upgrade brings a high-end image reconstruction computer to the Tim [228x128] configuration.
- 1 14475450 **myExam Assist XL Package USA**
 The myExam Assist XL Package includes:
 - myExam Angio Assist
 - myExam Abdomen Assist
 - myExam Cardiac Assist
 - myExam Breast Assist

The myExam Assist XL package offers a comprehensive set myExam Companions for the maximum coverage of MR examination requests. Robust image quality can be achieved efficiently and consistently in the clinical areas of Neuro, MSK, Vascular, Cardiac and Oncology.

The myExam Angio Assist provides semi-automatic detection of arterial and venous timing windows using a test bolus technique. This information is feedback for next planning steps automatically adapting scan parameters to the individual patient and patient's condition.

The myExam Abdomen Assist offers intuitive guidance and a high level of automation. It allows automatic sequence scaling according to physiological characteristic.

The myExam Cardiac Assist uses anatomical landmarks, standard views of the heart, such as dedicated long axis and short-axis views - easily generated and reproduced.

The myExam Breast Assist provides lesion detection, implant evaluation and breast biopsy. The myExam Companions support various breast coils, head-first or optional feet-first positioning and examination approaches (fatsat, nonfatsat).
- 1 14416946 **Neuro Perfusion Package #T+D**
 The Neuro Perfusions Package helps to streamline the clinical workflow by inline post-processing in dynamic susceptibility contrast (DSC) based perfusion imaging. This makes it possible to see perfusion maps immediately.

Perfusion parameter maps are based on a Local Arterial Input function. A corrected relCBV map calculation and motion correction is provided.
- 1 14475452 **myExam LiverLab Assist**
 myExam LiverLab Assist is a system guided workflow to examine the hepatic fat and iron status.
- 1 14470766 **MR Elastography incl. HW**
 MR Elastography offers a new diagnostic tool for all Tim+Dot systems that allows identifying variations in liver tissue stiffness.
 This option includes the HW starter set for Elastography (3rd party HW) and the Elastography SW.

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- 1 14405316 **fMRI Trigger Converter**
 An optical trigger signal is available to trigger external stimulation devices in fMRI experiments.
 With the "fMRI Trigger Converter" this signal can be converted to an electrical signal (TTL/BNC and RS 232 interface for PC; modes: toggle or impulse).
- 1 14446385 **MyoMaps # 3T**
 This package contains special sequences and protocols for inline T1 and T2 calculation at the heart. The generation of T1 and T2 parametric maps is enhanced by the use of motion correction. T1 and T2 parametric maps could be used to support assessment of cardiovascular disease.
- 1 14456236 **Multinuclear Support #Vi**
 The hardware and software package required to prepare the MR system for spectroscopy and nuclear imaging with the nuclei 3He, 7Li, 13C, 17O, 19F, 23Na, 31P, and 129Xe. A Tim Coil Interface MNO for connecting multi-nucleus coil is included.
 Coils with preamplifiers and transmitter duplexers as well as optimized pulse sequences for the individual nuclei are not included.
- 1 14430399 **Multinuclear Spectroscopy #Sk**
 Software package for CSI spectroscopy with 7Li, 13C, 17O, 19F, and 31P nuclei.
- 1 14430448 **Tim Coil Interface MNO**
 Coil adapter plug for up to 8 receive and 1 transmit channels, in order to connect dedicated multinuclear coils with MAGNETOM Skyra Systems.
- 1 14430492 **Body 18 long #Sk**
 The new Tim 4G coil technology with Dual Density Signal Transfer and SlideConnect Technology combines key imaging benefits: excellent image quality, high patient comfort, and unmatched flexibility:
 - 18 channels (inherent) or more, if the coil is combined with other coils
 - Dual Density Signal Transfer
 - Ultra light-weight
 - SlideConnect Technology
 The 18-channel coil with its 18 integrated pre-amplifiers ensures excellent signal-to-noise ratio. The 18 coil elements provide extensive coverage in all directions. The single SlideConnect plug allows for fast and easy patient preparation. The coil's extended cable allows for more flexibility in connector selection which is especially helpful if multiple flexible coils need to be combined and challenging imaging set-ups need to be supported like in therapy imaging (e.g. for combined head-neck exams). The light-weight coil ensures highest patient comfort.

 The Body 18 3T long features:
 - 18-element design with 18 integrated preamplifiers (3 clusters of 6 elements each)
 - Operates in an integrated fashion with the Spine 32 as an 30 channel body coil (not in combination with the Combi Dockable Table)
 - Can be combined with further coils for larger coverage
 - Can be positioned in different orientations (0°, 90°, 180°, 270°) for patient specific adaptations
 - No coil tuning
 - iPAT compatible in all directions

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The highly flexible design supports a wide variety of applications including:

- Thorax (incl. heart)
- Abdomen
- Pelvis
- Hip

1 14441810

Body 30 #3T

The Tim 4G coil technology with Dual Density Signal Transfer and SlideConnect Technology combines key imaging benefits: excellent image quality, high patient comfort, and unmatched flexibility:

- 30 channels or up to 46 (in combination with the Spine 32)
- Dual Density Signal Transfer
- Ultra light-weight
- Highly flexible viscoelastic material
- SlideConnect Technology

The Body 30 features:

- 30-element design with 30 integrated preamplifiers (5 clusters of 6 elements each)
- Can be combined with further coils for larger coverage
- Can be positioned in different orientations (0°, 90°, 180°, 270°) for patient specific adaptations
- No coil tuning
- iPAT compatible in all directions

The highly flexible design allows the usage for:

- Thorax (incl. heart)
- Abdomen
- Pelvis (incl. prostate)
- Hip
- Angiography

Dedicated protocols are provided for abdominal imaging.

Typically combined with:

- Spine 32
- Body 18
- Body 18 long (optional)
- Peripheral Angio 36 (optional)
- Body 30 (optional)

1 14418519

Tim Coil Interface 3T

Coil adapter plug for up to 8 receive and 1 transmit channels. This adapter will be required if the following Tim coils will be used on a compatible 3T MAGNETOM system with Tim 4G technology.

1 14416904

32-channel Head Coil #Sk

The 32-channel Head Array Coil is an iPAT-compatible "no-tune" receiver coil for MAGNETOM Skyra, Vida, Lumina and Prisma/ Prisma fit.

1 14469230

Flex -> UltraFlex Upgrade #3T

This option exchanges the Flex Small & Large 4 coils incl. the Flex Coil Interface from the standard coil configuration for the superior UltraFlex Small & Large 18.

PRELIMINARY PROPOSAL

These are two lightweight, iPAT compatible, 18-element no-tune receive coils made of highly flexible and soft material.

UltraFlex Large 18

Ideal for examinations of larger extremities (e.g. medium to large shoulder, hip, knee, ankle and hand) and for abdominal examinations. Dedicated positioning aids for larger extremities are delivered with the coil.

UltraFlex Small 18

Ideal for examinations of smaller extremities (e.g. small to medium shoulder, smaller ankle, elbow and hand) and for abdominal examinations. Dedicated positioning aids for smaller extremities are delivered with the coil.

- 1 14456282 **Positioning Aids Shoulder&Ankle #Vi**
This package contains additional positioning aids that can be used for the UltraFlex Large 18 and UltraFlex Small 18.
- 1 14407259 **MR Workplace Table, height adjust.**
The table is suitable for the syngo Acquisition Workplace and the syngo MR Workplace based on syngo hardware.
This 110V version has motorized table height adjustment.
- 1 14407261 **MR Workplace Container, 50cm**
50 cm wide extra case for the syngo host computer with sliding front door to allow change of storage media (CD/DVD/USB).
- 1 MR_STD_RIG_I
NST **MR Standard Rigging and Installation**
MR Standard Rigging and Installation

This quotation includes standard rigging and installation of your new MAGNETOM system

Standard rigging into a room on ground floor level of the building during standard working hours (Mon. – Fri./ 8 a.m. to 5 p.m.)
It remains the responsibility of the Customer to prepare the room in accordance with the SIEMENS planning documents
Any rigging requiring a crane over 80 tons and/or special site requirements (e.g. removal of existing systems, etc.) is an incremental cost and the responsibility of the Customer.
All other "out of scope" charges (not covered by the standard rigging and installation) will be identified during the site assessment and remain the responsibility of the Customer.
- 1 MR_BTL_INSTA
LL **MR Standard Rigging & Install**
- 1 MR_PREINST_F
IXED **T+D Preinstall kit for fixed table**
- 1 MR_CRYO **Standard Cryogens**

PRELIMINARY PROPOSAL

- 1 MR_PM **MR Project Management**
 A Siemens Project Manager (PM) will be the single point of contact for the implementation of your Siemen’s equipment. The assigned PM will work with the customer’s facilities management, architect or building contractor to assist you in ensuring that your site is ready for installation. Your PM will provide initial and final drawings and will coordinate the scheduling of the equipment, installation, and rigging, as well as the initiation of on-site clinical education.
- 1 MRIMAB_100 **MRI Armboard w/ Pad**
- 1 MR_BUDG_AD
DL_RIG **Budgetary Add'l/Out of Scope Rigging; \$45,000**
- 1 BMRXP200 **MRXperion injector**
 The MRXperion injector has the following features:
 Streamlined Injection Workflow
 Enhanced Point of Care - On-board eGFR and Weight Based Dosing Calculators, an Injection Pressure Graph, and independent Test Inject and KVO functions.
 Informatics-ready - Connect with the Radimetrics Enterprise Platform for automated documentation, advanced analytics and viewable patient histories to facilitate standardized injection protocols and enhanced operational consistency.
 Maximized Uptime Support - Connect to VirtualCare Remote Support for advanced injector system diagnostics, seamless software updates, and fast repairs.

 Price includes installation, training and one year warranty through Bayer Healthcare.
- 1 MR_BD_LV1 **Essential Education Level 1 (MR)**
 This Essential Education Bundle provides system training in a blended learning environment using training modules (typically 1 hour):
 This (12) month multi-modality e.learning subscription will provide access for (10) imaging professionals at the customer site to utilize up to (50) CEUs.
 Essential Training Part 1- Up to (28) hours of on-site clinical education training, scheduled consecutively (Monday – Friday) during standard business hours for a maximum of (4) imaging professionals.
 Tuition for (1) imaging professional to attend a virtual classroom course for up to 24 hours.
 Essential Training Part 2- Up to (24) hours of on-site clinical education training, scheduled consecutively (Monday – Friday) during standard business hours for a maximum of (4) imaging professionals.
 Essential Training Part 2- Up to (28) hours of on-site clinical education training, scheduled consecutively (Monday – Friday) during standard business hours for a maximum of (4) imaging professionals.
 This educational offering must be completed (12) months from install end date. If training is not completed within the applicable time period, Siemens obligation to provide the training will expire without refund.

System Total \$ 3,200,000.00



Siemens Medical Solutions USA, Inc.
40 Liberty Boulevard, Malvern, PA 19355

SIEMENS REPRESENTATIVE
Geralynn Lagno
geralynn.lagno@siemens-healthineers.com

PRELIMINARY PROPOSAL

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PRELIMINARY PROPOSAL

FINANCING: The equipment listed above may be financed through one of our financing partners. Ask us about our full range of financial products that can be tailored to meet your business and cash flow requirements. For further information, please contact your local Sales Representative.

Siemens Healthineers is pleased to submit this Preliminary Pricing Proposal. A Preliminary Pricing Proposal is provided for planning purposes only; it is not contractually binding. To receive a contractually binding proposal for the Products listed above, inclusive of Terms, Conditions, and Warranty coverage, please contact your Siemens Healthineers Sales Representative.

Siemens Healthineers
Geralynn Lagno

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Date	May 17, 2022
Reference	PR22-00941

Athinoula A. Martinos Center for Biomedical Imaging
Department of Radiology
Massachusetts General Hospital
Building 149, Room 2.301
Charlestown, MA 02129

RE: NIH Shared Instrumentation Grant for Advanced 3T MRI Research Scanner

Dear Dr. Huang:

Siemens Healthineers expresses its interest in supporting your NIH Shared Instrumentation Grant proposal for an Advanced 3T MRI Research Scanner which includes next-generation high-performance gradient technology with maximum gradient strength 200 mT/m and slew rate 200 T/m/s hosted in a 3T MAGNETOM Vida whole body MRI system. The bore size for this system is 60 cm, which will enable scanning of the whole body at unprecedented diffusion- and spatial-resolution at 3T.

The Siemens Healthineers MR R&D division in Erlangen, Germany, has been developing this next-generation high performance gradient system for some time now, and we will deliver this system during calendar year 2023, with an announcement planned during RSNA 2022 in Chicago. In addition to the high-performance whole-body gradient, this 3T system will include our latest MR innovations including MR applications like Deep Resolve reconstruction (deep learning-based reconstruction), state-of-the-art Biomatrix technology including high-channel count receive coils, and an advanced image reconstruction framework. This entire package including the high-end whole-body gradient system hosted in a 3T MAGNETOM VIDA whole-body MRI scanner is offered to you at a budgetary cost of US \$3,200,000. We will provide you with a binding offer containing all relevant terms and conditions at a suitable time.

Siemens Healthcare GmbH
Management : Bernhard Montag, President and Chief Executive Officer ;
Darleen Caron, Jochen Schmitz, Elisabeth Staudinger

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Registered office : Munich, Germany ; Commercial Registry : Munich, HRB 213821
WEEE-Reg.-No. DE 64872105


Siemens MR has a long history of innovations in high-end gradient systems, as evidenced by our highly successful collaboration with you in engineering the first-ever human 3T MRI scanner with unprecedented 300 mT/m maximum gradient strength for the MGH-USC Human Connectome Project. This research project has now been duplicated at several sites worldwide for advanced neuroscience research and initiated the development of our top-of-the-line research scanner, the 3T MAGNETOM Prisma scanner, which is now in use worldwide and has successfully advanced the quality of 3T brain imaging across the board.

Siemens continues to innovate in the field of high-performance gradients with a novel "Impulse" head gradient coil (900 T/m/s slew rate and 200 mT/m maximum gradient strength, where we exceeded the design target slew rate of 700 T/m/s), which was recently installed in a 7T scanner at University of California Berkeley with key technical contributions from MGH, and the ongoing development of a Connectom 2.0 head gradient coil (design targets of 600 T/m/s slew rate and 500 mT/m maximum gradient strength) in collaboration with you. Both innovations will allow researchers to probe tissue microstructure and function in the brain in unique and unprecedented ways. The Advanced 3T MRI Research Scanner with high-performance whole-body gradients in this grant is unique because it will allow wider dissemination of these methods in the brain as well as other body regions outside the brain.

Siemens and MGH have a more than 20-year history of extremely successful collaborations, starting with the development of our first 7T scanner, of the first MR/PET system, and the Connectom scanner. We are delighted to continue this long-standing collaboration with you and your team at the Martinos Center for Biomedical Imaging. We very much look forward to the opportunity to collaborate with you and your colleagues on this exciting project.

Please note for clarification that this letter is not legally binding and is not intended to result in any legal or commercial obligation.

Sincerely,
Siemens Healthcare GmbH



Electronically signed by:
Rebecca Ramb
Reason: Document
Execution
Date: May 25, 2022 18:04
GMT+2

Rebecca Ramb, Ph.D.
Vice President Research & Clinical Translation
Magnetic Resonance
Siemens Healthineers, Erlangen, Germany



Electronically signed by:
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Date: May 25, 2022 16:59
GMT+2

Arthur Kaindl, Ph.D.
Executive Vice President
Magnetic Resonance
Siemens Healthineers, Erlangen, Germany